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INFORMATION AND COMMUNICATION TECHNOLOGIES IN EARLY CHILDHOOD EDUCATION TEACHER TRAINING COLLEGES: A CASE OF IGEMBE DISTRICTS, MERU COUNTY - KENYA

BY

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DECLARATION

This research project is my original work and has not been presented for a degree in any other university.

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ABSTRACT

The government has undertaken an ambitious programme to introduce laptops for all children joining class one in all public government schools in the country beginning the year 2014. This policy has been reinforced by a government budget allocation for the programme. This programme, however noble, can only succeed if the teachers within the schools have adequate skills and knowledge on how to use Information and Communication Technologies in their instruction to ensure the children reap maximum benefits. Children should be prepared on how to use the computers from pre-school so that they can fruitfully make use of the government computers once they join mainstream schooling. Lack of teachers with the correct skills in ICT usage in instruction will greatly affect the success of introduction of computer programme in primary schools. This research aims to establish the availability and use of Information and Communication Technologies in Early Childhood Teacher training colleges within Igembe Districts. The researcher aimed to establish the availability and use of ICTs in the Districts, factors influencing their use, challenges and possibly solutions to challenges in the use of ICTs in ECDE colleges. The study was based on Bandura's Social Learning Theory and the Self-efficacy Theory. The researcher adopted a descriptive survey design to carry out the research. The population for this research were the ECDE teacher training colleges within Igembe District encompassing the teacher trainers (tutors) and student teachers. Random sampling was used to select the sample to avoid bias. A questionnaire and an observation schedule were the main data collection tools used for this study to test the availability and use of ICTs in the ECDE colleges. The data collection instruments were piloted before they were used in the field to attest their validity and reliability. Data was collected from 30% of the population with a 98% return rate of the questionnaires. The data was collected, analysed, tabulated, classified and presented using frequency distribution tables, bar graphs, charts and summary paragraphs. Statistical Package for Social Sciences (SPSS) was used to prepare data for analysis. T-test and Chi-square test were used to test the data collected to ensure their credibility. From the research findings, there are very few ICTs available in the ECD TTCs and the few available are inadequate. Tutors and students too have limited ways in which they use ICTs. Availability of ICTs and limited knowledge of the ICTs are among the many factors hindering use of ICT in the colleges. The researcher has made conclusions from data collected that negative attitudes by teachers and lack of government intervention are among factors affecting the use of ICTs in the colleges. The researcher has proposed a raft of measures to ensure the use of ICTs in colleges such as attitude changes by all stakeholders, government interventions such as coming up with an appropriate curriculum to help train teachers in ICT, tax incentives to make the ICTs affordable, collaboration with development partners and supervision among others. All these will be geared to having ICT savvy teachers and the same knowledge, skills and attitudes will eventually be transferred to the children in the ECD centres before they transition to mainstream schooling.

DEDICATION

This research project is dedicated to my parents, Mr & Mrs Gatuyu, my son Brandon Muthomi, siblings and all Early Childhood teachers who have the passion to set good foundations for our future generations.

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My special gratitude also goes to my parents, siblings and friends for their moral support during my master's studies period at Kenyatta University. To all, God bless them in abundance.

ACRONYMS AND ABBREVIATIONS

CAI	:	Computer Assisted Instruction
DSD-US	:	Directorate of Staff Development – United States (of America)
DVD	:	Digital Video Decoder
ECD	:	Early Childhood Development
ECDE	:	Early Childhood Development and Education
ECE	:	Early Childhood Education
GPAs	:	Grade Point Averages
HTML	:	Hyper Text Mark-up Language
ICT	:	Information and Communication Technology
KICD	:	Kenya Institute of Curriculum Development
KNEC	:	Kenya National Examinations Council
MOEST	:	Ministry of Education, Science and Technology
PCs	:	Personal Computers
SPSS	:	Statistical Package for Social Sciences
UNESCO	:	United Nations Education Scientific and Cultural Organisation
UNICEF	:	United Nations Children's Fund
USA	:	United States of America
VCR	:	Video Cassette Recorder
DOS	:	Disk Operating System
GUI	:	Graphical User Interface

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CHAPTER ONE

INTRODUCTION AND CONTEXT OF THE STUDY

1.1 Background to the Study

The benefits of technology in education have been lauded for many years, from Thomas Edison's 1910 proclamation that film would transform education making books obsolete, to the most recent phenomenon of using the Internet for instructional purposes. Large sums of money have been spent over the years on the researching and investment of new technologies for education, such as the 170 million dollars spent in the 1950's on testing the use of television for educational purposes by the Ford Foundation in the US, to the more recent investments in computer and networking infrastructure in schools which saw 40 billion dollars spent in the decade leading up to 2003 alone. With so much promised and invested, the question begs as to what the benefits of using technology in education are. (Farrell, 2007)

Information and Communication Technologies (ICT) have great potential to contribute positively towards knowledge dissemination, effective learning and the development of more efficient education services (Collins and Jung, 2003). Today's classroom teachers must be prepared to provide technology supported learning opportunities to their students or pupils. They should be prepared to use technology, and to know how that technology can support student learning. This must be made integral to every teacher's repertoire (UNICEF, Intel® and Directorate of Staff Development [DSD-US], 2009).

Today's technologies are essential tools for teaching and learning. To use these tools effectively and efficiently, teachers need visions of the technologies' potential, opportunities to apply them, training, technical support, and time to experiment. Only then can teachers be informed and be confident in their use of new technologies (Bowes, 2003).

Teaching in the 21st century is becoming one of the most challenging professions in our society where knowledge is expanding rapidly and much of it is available to students as well as teachers at the same time (Robinson & Latchem, 2003). As new concepts of learning have evolved, teachers are expected to facilitate learning and make it meaningful to individual learners rather than just to provide knowledge and skills. Modern developments of innovative technologies have provided new possibilities to teaching professions, but at the same time have placed more demands on teachers to learn how to use these new technologies in their teaching. These challenges require teachers to continuously retrain themselves and acquire new knowledge and skills while maintaining their jobs (Robinson & Latchem, 2003).

Today, a variety of ICT tools can facilitate not only delivery of instruction, but also the learning process itself. Moreover, ICT can promote international collaboration and networking in education and professional development. There's a range of ICT options – from video-conferencing through multimedia delivery to web sites - which can be used to meet the challenges teachers face today. In fact, there is increasing evidence that ICT may be able to provide more flexible and effective ways for lifelong professional development for today's teachers (Dawes, 2001).

Traditional initial teacher training as well as in-service continued training institutions worldwide are undergoing a rapid change in the structure and content of their training and delivery methods of their courses because of rapid development in ICT, especially the Internet. Research indicates that ICT can change the way teachers teach and that it is especially useful in supporting more student-centred approaches to instruction and in developing the higher order skills and promoting collaborative activities (Khirwadkar, 2011). Recognizing the importance of ICT in teaching and learning, a majority of the countries in the world have provided ICT teacher training in a variety of forms and degrees. There seem to be several efforts around the world in which countries are effectively using technology to train teachers, and/or are training teachers to use technology as tools for enhancing teaching and learning.

Kenya like many developing countries has not been left behind in the use of technology. The Ministry of Education has put in place policy strategies aimed at addressing the issue of ICT in the education sector. The objectives and strategies pertaining to ICT and education being; the use of ICT in schools, colleges, universities and other educational institutions in the country in order to improve the quality of teaching and learning. The strategy puts emphasis on ICT as a tool for improving curriculum delivery and learning. This culminated in the drafting of the ICT in Education Options Paper of 2005 (MOEST, 2005). However, efforts have been put in introducing ICTs in secondary schools and Primary Teacher Training Colleges with no mention of the early childhood sector at all. To quote from the paper, "The government is committed to the improvement of Primary Teacher Education and has continuously reviewed the program to make it more relevant to the needs of the country and in tandem with the latest international trends in teacher education"

(MOEST, 2005: 22). However, this is faced by a myriad of challenges such as lack of equipment and personnel shortages. This study will try to establish the availability of ICTs in the ECDE teacher training colleges as they prepare teacher trainees on the use of ICTs in their instruction.

Premier teacher training Institutions, for example Kenyatta University, have seen the impact of ICT and have developed ways and means of imparting ICT knowledge to the teacher trainees. An e-learning mode of study has been established where teachers can develop professionally by taking courses through the use of the internet and other supporting technologies. Maseno University on the other hand has all its teacher courses laced with an IT component with the aim of giving the teachers key knowledge in the use of progressive technologies to make their work easier and ease the learning process.

Early Childhood Education requires creativity and provision of varied stimuli to maintain the attention of the kids as well as ensure meaningful learning takes place. ICT is a key tool in the provision of child-centred instruction and the variation of stimuli to make learning both enjoyable and fruitful. The Early Childhood teachers are the key movers in the sector and their training should incorporate ICT to equip the teachers with the requisite knowledge, skills and attitudes to use ICT tools in their instruction and in their general professional life as teachers.

Teachers in Early Childhood and Lower Primary have been found to have minimal use of ICT tools in their instruction. According to Begi (2007), in his study he found that teachers rarely use computer technology to teach subject areas. He also established there was low computer knowledge by pre-school teachers and low

computer self-efficacy by the pre-school teachers. This study is supported by another by Mwololo (2011) who also found in his study that teachers have low usage of visual media in the classrooms. The cause of this low computer knowledge, the low computer efficacy and lack of computer technology use in instruction can be attributed to unavailability and lack of use of ICTs by the student teachers and teacher trainers in the ECD colleges during teacher training. This study will therefore seek to establish the availability and use of ICTs by both the tutors and the students in the ECDE teacher training colleges and the factors that influence the use of ICTs by the tutors and students within Igembe Districts in Meru County, Kenya.

1.2 Statement of the Problem

The emergence of Information and Communication Technologies like computers, internet, mobile phones, televisions, radios, cameras and a wide array of related technologies has changed the way information is transmitted significantly. Teachers are supposed to be responsible for ordering learning experiences for them to be fruitful to the learners as such they need to be ahead of the learners every time in the use of ICTs.

The importance of ICT in our lives and in education in particular is very evident. All the sectors in our day to day businesses are permeated with the use of technology. In Kenya, the government, through the Ministry of Education has launched an ambitious project to provide a laptop for every child joining class one. This is a noble idea as the children will get a chance to interact and familiarise themselves with technology at a very young age. This will increase creativity and use of technology to further the national cause. The children who will be privileged to be given the laptops will need

guidance on how to use them. Teachers should thus be competent enough to handle the incoming challenges of guiding the children to productively use the new technology. Teacher training is supposed to inculcate in the teacher the requisite skills, knowledge, attitudes and correct and creative pedagogical approaches to deliver constructive instruction in the classroom by the use of ICT. This study therefore seeks to investigate whether ICT tools are available in ECDE teacher training colleges and how they are being used to ensure the student teachers are well prepared to use the technologies in instruction.

1.3 Purpose of the Study

The purpose of this study was to establish the availability and use of Information and Communication Technologies (ICTs) in the training of Early Childhood teachers in Igembe District. The study also investigated the key factors influencing the use of ICTs in ECDE teacher training colleges. The challenges hindering use of ICTs in the colleges were also investigated.

1.4 Objectives of the Study

This study was guided by the following objectives:

i. To establish the ICTs available in ECDE teacher training colleges in Igembe Districts.

ii. To find out how the ICT technologies are used for instruction in ECDE colleges.

iii. To determine the key factors influencing the use of ICT technologies in instruction in ECDE teacher training colleges.

iv. Investigate the challenges hindering the use of ICTs in ECDE teacher training Colleges.

1.5 Research Questions

i. Which ICT technologies are available in ECDE teacher training colleges?

ii. How ICT technologies are used for instruction in the ECDE colleges?

iii. What are the key factors influencing the use of ICT technologies in instruction in ECDE teacher training colleges?

iv. What are the challenges hindering the use of ICTs in ECDE teacher training?

1.6 Significance of the Study

Information and Communication Technologies (ICTs) has potential to bring transformations to the education sector. This study therefore will bridge the gap in knowledge on the available Information and Communication Technologies in ECD teacher training colleges, how they are used in the colleges and the factors that affect use of ICTs by the teachers as well as provide solutions to how the factors affecting use of ICTs can be countered.

The study provides knowledge on the Information and Communication Technologies that can be used in ECD teacher education. The ECD teacher trainers will acquire knowledge on the various ICT tools that can be used in ECD teacher training. This will enable them give better output in terms of quality trained teachers for the teacher trainers.

This research may be of great value to the Government of Kenya through the Ministry of Education and in particular the Curriculum developing organ, the Kenya Institute of Curriculum Development (KICD). With this research there will be a foundation of knowledge on the ICT tools available and used in ECDE teacher training colleges, and this may influence ICT inclusion in the ECD teacher training curriculum. The development of a curriculum for training ECD teachers it's hoped will have ICTs as a core component of the curriculum.

This study may provide a sound reference point in the development of appropriate policies touching on the integration of ICT in the training of ECDE teachers as there will be information on the available ICTs and how they are used.

The study will be an addition to the existing body of knowledge on the importance of using ICT in the teaching and learning process at all levels and the various ways in which ICT can be used in education.

1.7 Delimitation and Limitations of the Study

1.7.1 Delimitation of the Study

This research was delimited to the availability and use of Information and Communication Technologies (ICTs) in the training of ECDE teachers, the factors influencing their use and the challenges faced. Availability and use of ICTs in other sectors/levels of education was not taken into consideration during the data collection.

1.7.2 Limitations of the Study

The research is limited to Igembe Districts only and the situation on ICTs availability and use in ECDE teacher training colleges may vary in other regions. As such the study was not conclusive and more study is necessary in other regions in the country.

The findings of this study can be generalised to only ECDE colleges in Igembe District and ECDE centres in other districts with similar characteristics.

1.8 Assumptions of the Study

In carrying out this research, the researcher made the following assumptions:

i. The respondents have a basic understanding of ICT and ICT education tools.

ii. The respondents may have either a positive or a negative attitude towards the use of ICTs in ECDE teacher training.

1.9 Theoretical Framework

This research was guided by Albert Bandura's two theories of learning; The Social Learning Theory (Bandura 1977) and the Self-efficacy Theory (Bandura 1977).

1.9.1 Social Learning Theory

This theory was proposed by Albert Bandura (1977). According to Bandura (1977) learning would be exceedingly laborious, if not hazardous, if people had to rely solely on the effects of their own actions to inform them what to do. However, most human behaviour is learned observationally through modelling. From observing others, one forms an idea of how new behaviours are performed, and on later occasions this coded information serves as a guide for action. Bandura (1977) believed that direct reinforcement could not account for all types of learning and that people can learn new information and behaviours by watching other people, known as observational learning (or modelling). In his famous "Bobo doll experiment", Bandura demonstrated that children learn and imitate behaviours they have observed in other people. The children in Bandura's studies observed an adult acting violently toward a

Bobo doll. When the children were later allowed to play in a room with the Bobo doll, they began to imitate the aggressive actions they had previously observed. Bandura identified three basic models of observational learning as a live model, which involves an actual individual demonstrating or acting out behaviour, a verbal instructional model, which involves descriptions and explanations of behaviour and lastly a symbolic model, which involves real or fictional characters displaying behaviours in books, films, television programs, or online media.

From Bandura's theory on social learning, ECD teachers learn and often teach the children like their tutors taught them. If teacher trainees observe their trainers using ICTs in their instruction, the teacher trainees too will aspire and at times unconsciously teach like their trainers, not like the teachers teach them to teach. The teacher trainers should be empowered and encouraged to make use of Information and Communication Technologies in their instruction in order to act as role models to their students and the student teachers will copy them.

1.9.2 Self-efficacy Theory

The concept of self-efficacy lies at the centre of psychologist Albert Bandura's social cognitive theory. According to Albert Bandura, self-efficacy is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations." Self-efficacy is a person's belief in his or her ability to succeed in a particular situation. Bandura described these beliefs as determinants of how people think, behave, and feel. According to Bandura, a person's attitudes, abilities, and cognitive skills comprise what is known as the self-system. This system plays a major role in how we perceive situations and how we behave in response to different situations. Self-efficacy plays an essential part of this self-system. Virtually

all people can identify goals they want to accomplish, things they would like to change, and things they would like to achieve. However, most people also realize that putting these plans into action is not quite so simple. Bandura and others have found that an individual's self-efficacy plays a major role in how goals, tasks, and challenges are approached.

People with a strong sense of self-efficacy view challenging problems as tasks to be mastered, develop deeper interest in the activities in which they participate, form a stronger sense of commitment to their interests and activities and recover quickly from setbacks and disappointments whereas people with a weak sense of self-efficacy avoid challenging tasks, believe that difficult tasks and situations are beyond their capabilities, focus on personal failings and negative outcomes and quickly lose confidence in personal abilities. According to Bandura, self-efficacy begins to form in early childhood as children deal with a wide variety of experiences, tasks, and situations. However, the growth of self-efficacy does not end during youth, but continues to evolve throughout life as people acquire new skills, experiences, and understanding. Bandura postulates that people can develop self-efficacy through mastery of experiences, social modelling, social persuasion and psychological responses to situations.

From this theory therefore, student teachers being trained to be ECD teachers should be inculcated positive attitudes towards the use of ICTs in instruction, have their trainers make use of ICTs in training them and make them feel that using ICTs in instruction is a good thing. They should be taught not to fear trying out new technologies in their instruction, take on new challenges to learn how to use new ICTs and have the confidence to use ICTs in instruction. The school administrators will

also make ICTs available if they do not see them as a threat and understand their importance in instruction.

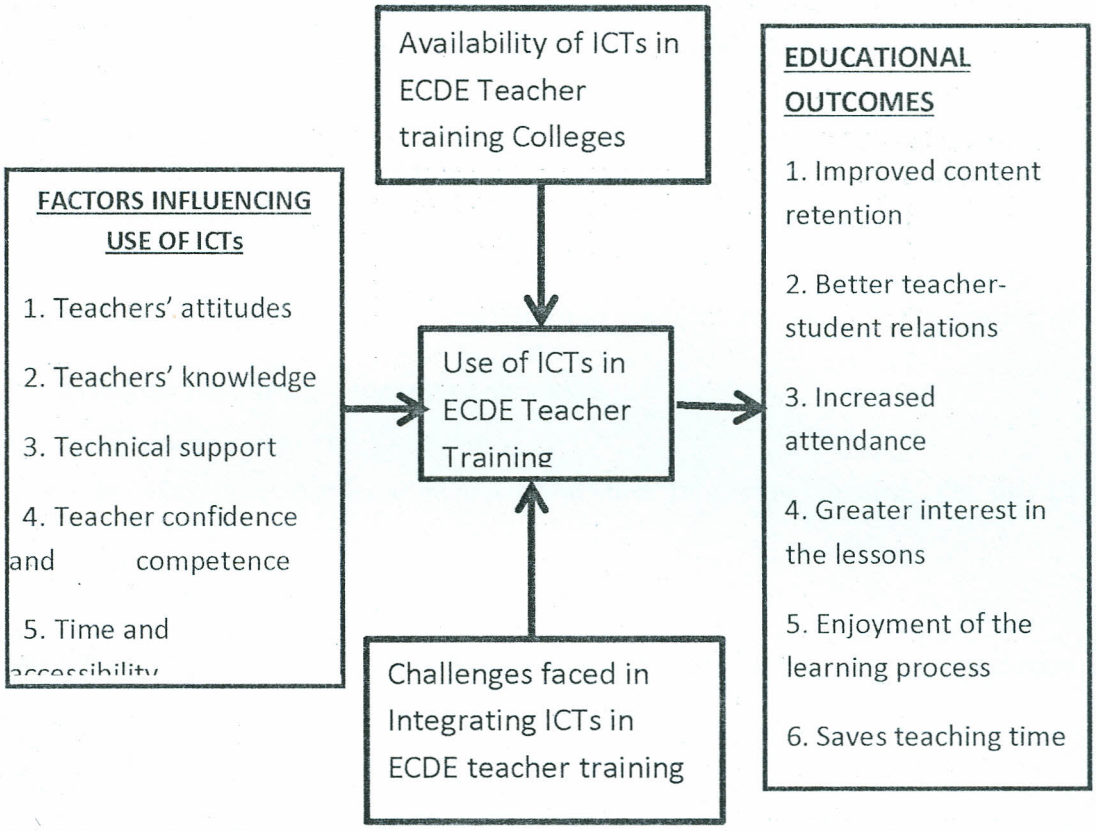
1.10 Conceptual Framework

In our society, there has been a deeply entrenched fear of technologies and often technologies have been seen as a preserve for the elite (UNESCO, 2003). To overcome this 'technophobia', it is envisaged that the education system should play a major role in the process. This must start with the teachers being made conversant with the various aspects of ICTs and then they can be in a position to transmit this knowledge on to the learners. The integration of ICT in teacher education can occur in three ways. It can be taught as an object where the learners are trained skills on how to use computers, its peripherals and other related computer software. It can also be used as an aspect where student teachers are trained via ICT for their own personal and professional progress. Lastly it can also be used as a medium where teacher trainees use ICT tools to deliver instruction and pass communication to their learners. (UNESCO, 2003)

However the use of ICTs in the colleges is dictated by their availability among other factors that influence its use. Among some of the identified factors that may influence ICT use are time, technical support, teachers' knowledge and teachers' attitudes among others. The researcher therefore visualizes that if the ICTs are made available in the colleges, and effort is made to sensitize and empower teachers to use them, as well counter other factors that influence teachers' use of ICTs in their instruction, then teacher teachers will use ICTs in their instruction, the teacher trainees will emulate

their trainers and the final consumers of the education process (the pupils) will realise the full benefits of ICTs. This is visualized by the figure below:

Figure1.1 Conceptual Framework Diagram



The figure shows that the use of ICTs in ECDE teacher training colleges is influenced by several factors. The use of ICT also impacts on educational outcomes. The use of ICTs in ECDE teacher training colleges may be facing several challenges.

1.11 Operational Definitions of Terms

Computer: Is an electro-mechanical device that is used to process data and give output. In this case it is seen as one of the educational technologies that can be used to support learning.

Integration: the act or process of using one or more ICTs in the teaching and learning process.

ICT tools: These refer to any technologies that the teacher can use to generate and pass information to the students such as TVs, computers among others.

Use of ICTs: This refers to the inclusion of various ICTs in the instruction process in ECDE teacher training colleges by both the tutors and student teachers.

Self-efficacy: the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations.

Attitude: This is a teacher's mental disposition or feeling towards the use of technologies in instruction.

Modelling: This is a teacher using ICTs in instruction for the learners to see and copy him/her later.

ECDE Teacher Training: This refers to the training of teachers to work in ECDE centres catering for children below six year of age.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In this chapter the researcher explores existing literature on the definition of ICT in an educational context, explores various technologies that can be used for teacher training, how the technologies can be used in teacher training colleges, the various factors influencing the use of ICT in education, benefits of ICT in education and the summary of the literature reviewed.

2.1 Definition of ICT

According to the National Association for the Education of Young Children (NAEYC; 2012) in their paper "Technology and Interactive Media as Tools in Early Childhood Programs" defines Information and Communication Technology (ICT) tools as encompassing a broad range of digital devices such as computers, tablets, multi-touch screens, interactive whiteboards, mobile devices, cameras, DVD and music players, audio recorders, electronic toys, games, e-book readers, and older analogue devices still being used such as tape recorders, Video Cassette Recorders, tapes, record and cassette players, light tables, projectors, and microscopes. Begi (2012) also defines Information and Communication Technology (ICT) as anything which allows us to get information, to communicate with each other, or to have an effect on the environment using electronic or digital equipment.

Technology and interactive media thus are tools that can promote effective learning and development when they are used intentionally by early childhood educators,

within the framework of developmentally appropriate practice, to support learning goals established for individual children (NAEYC 2012). Young children live in a world of interactive media. They are growing up at ease with digital devices that are rapidly becoming the tools of the culture at home, at school, at work, and in the community. Technology tools for communication, collaboration, social networking, and user-generated content have transformed mainstream culture. In particular, these tools have transformed how parents and families manage their daily lives and seek out entertainment, how teachers use materials in the classroom with young children and communicate with parents and families, and how we deliver teacher education and professional development (Lefebvre, Deaudelin & Loiselle, 2006).

2.2 ICT Technologies Available in Teacher Training Colleges

In the 21st Century technological advances have exploded (UNESCO, 2008). Schools have not been left out in these advancements. Classroom technology has become increasingly more popular and will soon become must-haves for every teacher in the classroom. Today's students are digital natives and as such the use of technology in education has proven to be an issue that cannot be wished away. Teachers must therefore be well conversant with these technologies to be able to programme meaningful and relevant learning for the children (Geeta, 2011; Kathleen, 2012; Meador, 2012). Mungai (2011) in his study on "In-service preparation of science and Mathematics Teacher educators for ICT integration in teaching and learning" identifies computers, TVs, DVDs, video cameras and graphing calculators as some of the technologies available at Kenya Technical Teachers College. Begi (2007) in his study on "Pre-school and lower primary school teachers' computer usage" also identified computers as one of the ICTs that can be used for educational purposes.

Other studies by Maithya and Ndebu (2011) and Chepwogen (2010) concur on the use of computers and other peripherals as part of the ICTs that can be used to deliver instruction in class. However there is scanty literature available, on the actual Information and Communication Technologies available in ECDE teacher training colleges and this research will aim to establish the actual technologies available in the colleges.

There have been identified possible technologies that teachers can make use of in their classrooms to better instruction from various researchers. Personal Computers (PCs) is one of these technologies. Classroom PCs are a valuable information and communication technology tool in the classroom. According to Kathleen (2012), when every student has access to his/her own computer (laptop or desktop), learning takes on a whole different dynamic. For example, a teacher can allow students to follow along during a writing lesson on Word programs. In addition, students can research and explore on their own. PCs can store a student's work more efficiently than folders. Bulky encyclopaedias and dictionaries are unnecessary if every student can access the Internet on his or her own time using a personal computer. A paperless world in the classroom can be organized as well as environmentally friendly. Finally, students become empowered in their education by having their own personal tool to better their academic outcomes.

A projector is another technology that can be used in the classroom. Projectors are a basic way to introduce technology to students in the classroom (Kathleen, 2012). The projector is hooked up to the teacher's laptop or desktop and projects the screen from the laptop to the white board in the front of the room. This enables students to see a larger version of what is on the laptop screen. A teacher can project a word document

and show students' note-taking strategies. The teacher can also show PowerPoint presentations to students using the projector. Students can follow the teacher as he or she goes onto educational websites as well. A projector in the classroom is a remarkable tool in engaging the student with technology.

SMART Technologies are leading the way in classroom interaction between students and teachers using computers. A SMARTboard, according to Meador (2012), is a fantastic way for students to stay engaged in lessons. A SMARTboard is an interactive white board that allows the teacher to project an image from a laptop to the front of the room. The amazing part is that the teacher can then digitally draw on that image. Graphs and tables are available templates in a SMARTboard. A SMARTboard can store lessons and digitally enhance plain templates into customized learning tools. Hundreds of applications are possible with this technology, and teachers can benefit immensely from it.

Class websites and blogs is another technology that can be used in education. It is very easy to create a website or blog using WordPress or any other content management software. Teachers can create class blogs were they can post assignments and other instructional content for the students to access (Geeta, 2011).

A digital microphone is another technology to use in the classroom. Big classrooms are characterized by endless noise, so teachers can resort to these wireless digital microphones according to Meador (2012). The microphone will transmit the voice to the loud speakers and every student will hear their teacher clearly. This helps the teachers not to strain their voice while trying to explain points to their students. These digital microphones are not too expensive so even a small income generating school

can manage to buy a wireless microphone for every classroom. Also students can use the same microphone when asking questions to their teachers in class, or when they are explaining a subject to their fellow students during a classroom debate.

Mobile devices are other technologies to use in classrooms. Teachers and students can use smart-phones for academic purposes in the classroom according to Meador (2012) and Geeta (2011). Mobile learning is similar to e-learning or long distance education though it's based on mobile phones. M-Learning is convenient because it is accessible from anywhere. Mobile phones are very light yet they can also have the same application a simple PC can have, a student can access academic information like assignments via an educational mobile application. Teachers can tell their students to use mobile applications like "PIAZZA" to access course materials and also to post questions about specific subjects, all this can be done in the classroom or outside the classroom.

Teachers and students can both use online streaming Medias to learn in the classroom. With the aid of a projector, computer, internet and a white board, a teacher displays a real-time example using sites like Youtube.com as articulated by Kathleen (2012). This website has videos which can be used for academic reference. For example a geography teacher can explain volcanic activities and its impacts on the environment using live stream YouTube videos about the subject. This type of illustration will attract the student's attention and they will learn easily.

A digital camera is another great technology for education. Today's digital cameras have video capabilities that bring a new dimension to your classroom. According to Meador (2012), a digital camera can be used in a variety of ways to engage students

in the learning process. A science teacher may have students take pictures of different trees that can be found within their community. They can then identify those trees from the pictures and build a Power Point presentation giving more information about each specific type of tree. A reading class teacher can assign his/her students to role play scenes and then record those scenes to play back and discuss different aspects of each particular scene. Teachers who use this technology find that students will work hard to learn because they enjoy the interaction with the camera and the fact that it is a different style of teaching and learning.

In summary, with all the technology available for use in the classroom, it must be accompanied by a rigorous technology education for teachers. Students have surpassed many teachers in technology use. Because of this, to effectively utilize technology in the classroom, teachers should be properly trained and encouraged to use technology. In addition, it is more academically supported if all teachers use the technology together. It is insufficient for a student to receive an interactive education in only a few classes while in others he or she is receiving out-dated instructional strategies as espoused by Meador (2012). Explicit, interactive instruction is the most useful and engaging way to reach a student and enhance his or her learning potential.

2.3 Use of ICT in Teacher Training Colleges

The use of ICT within teacher training programs around the world is being approached in a number of different ways with varying degrees of success according to Khirwadkar (2011) and Ayse (2006). The use of ICT in teacher training colleges can take the approach of an ICT skills development approach where importance is given to providing training in use of ICT in general. Student teachers are expected to

be skilled users of ICT for their daily activities. Knowledge on various software and hardware and their use in educational process is provided.

The use of ICT in education can also take the approach of ICT pedagogy approach, according to Khirwadkar (2011) and Ayse (2006). In this approach, emphasis is on integrating ICT skills in a respective subject. Drawing on the principles of constructivism, teachers design lessons and activities that centre on the use of ICT tools that will foster the attainment of learning outcomes. This approach is useful to the extent that the skills enhance ICT literacy skills and the underlying pedagogy allows students to further develop and maintain these skills in the context of designing classroom-based resources.

Use of ICT in teacher training colleges can also take a subject-specific approach (Khirwadkar, 2011 and Ayse, 2006). In this approach, ICT is embedded into one's own subject area. By this method, teachers and subject experts are not only exposing students to new and innovative ways of learning but are providing them with a practical understanding of what learning and teaching with ICT looks and feels like. In this way, ICT is not an 'add on' but an integral tool that is accessed by teachers and students across a wide range of the curricula.

ICT use on teacher training colleges can also take a practice driven approach. With this approach, emphasis is on providing exposure to the use of ICT in practical aspects of teacher training. Focus is on developing lessons and student assessments. Using ICT and implementing it in their work experience at various levels provides students an opportunity to assess the facilities available at their school and effectively use their own skills.

Thus, ICT in teacher training can take many forms. Teachers can be trained to learn how to use ICT tools. ICT can be used as a core component or a complementary means to the teacher training process (Collis & Jung, 2003). From the above suggested approaches, regarding ICT as integrated content at the pre-service level, integration of all approaches would help in developing proper attributes among prospective teachers. There should be joint efforts of educators and prospective teachers in implementing and sharpening ICT skills. Whatever approach is followed in educational institutions to develop knowledge about ICT, it has inherent limitations. Coupled with other reasons, it cannot make student teachers fully confident in using ICT in their daily classroom activities. As reported by Larose et al (1999) in their study, the level of computer literacy of the teaching staff is satisfactory but there is little transfer of these competencies to teaching practices. Efforts are required on the part of teachers to make use of the available facilities for the best use in teaching/learning.

Begi (2007) in his comparative study of pre-school and lower primary school teachers' computer technology usage in teaching found that teachers rarely make use of technologies in their teaching. Similar findings were established by Mwololo (2010), Mungai (2011) and Maithya and Ndebu (2011). The lack of usage of ICTs in teaching could be attributed to their unavailability. This leads the researcher to strive to establish whether the ICTs are available for the teachers to use in ECDE teacher training to be models for the teacher trainees to use the same technologies in their instruction.

2.4 Factors influencing the use of ICT in Teacher Training Colleges

The use ICT in teaching and learning is a complex process and is influenced by many factors. According to Bingimlas (2009) in his study "Barriers to the successful Integration of ICT in Teaching and Learning Environments" he pointed out various factors that influence the use of ICT in education. These factors can arise from the teacher such as lack of time, lack of confidence and resistance to change or can arise from the school such as lack of effective training in solving technical problems, lack of access to resources, lack of competent human resource among others.

According to Bingimlas (2009), lack of confidence is a major factor that prevents teachers from using ICT in their teaching. Balanskat et al (2006) in their study, "A review of studies of ICT impact on schools in Europe" established that teachers' "fear of failure" caused a lack of confidence. He found that limitations in teachers' ICT knowledge makes them feel anxious about using ICT in the classroom and thus not confident to use it in their teaching. Becta (2004), in his study on "Primary Schools-ICT and Standards" also established 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 perhaps know more than they do. Many teachers are particularly afraid of entering the classroom with limited knowledge in the area of ICT with their students knowing that this was the case. Lack of confidence and adequate experience with technology influences teachers' motivation to use ICT in the classroom (Balanskat et al (2006). On the other hand, teachers who confidently use technologies in their classrooms understand the usefulness of ICT. Teachers who have confidence in using ICT identify that technologies are helpful in their teaching and personal work and they need to extend their use further in the future (Bingimlas, 2009).

Another barrier which is directly related to teacher confidence is teachers' competence in integrating ICT into pedagogical practice. Becta, (2004) and Newhouse (2002) found that many teachers lacked knowledge and skills to use computers and were not enthusiastic about the changes and integration of supplementary learning associated with bringing computers into their teaching practices. Current research has shown that the level of this barrier differs from country to country. In the developing countries, teachers' lack of technological competence is a main barrier to their acceptance of ICT (Pelgrum, 2001; Al-Oteawi, 2002). According to Farrel (2007), in his study on ICT in Education in Kenya, many teachers still choose not to use ICT and media in teaching situations because of their lack of ICT skills rather than for pedagogical reasons.

Teachers' attitudes and an inherent resistance to change is another significant factor to the integration of ICT into education. Balanskat et al, (2006) and Watson (1999) argued that integrating new technologies into educational settings requires change and different teachers will handle this change differently. According to Watson (1999), considering teachers' attitudes towards the new technologies and to change is important because teachers' beliefs influence what they do in classrooms. According to Becta (2004), one key area of teachers' attitudes towards the use of technologies is their understanding of how these technologies will benefit their teaching and their students' learning. Cox et al (1999) found that teachers are unlikely to use new technologies in their teaching if they see no need to change their professional practice. They found that teachers who resist change are not rejecting the need for change but lack the necessary education in accepting the changes and are given insufficient long-term opportunities to make sense of the new technologies for themselves.

According to Bingimlas (2009) most of the factors that influence ICT use in schools also arise from the school. Lack of time in the schools and an overloaded school curriculum is a major factor that influences teachers' use of ICT in schools. The problem of lack of time exists for teachers in many aspects of their work as it affects their ability to complete tasks, lack of time to plan for technology lessons, explore the different internet sites or look at various aspects of educational software. According to Becta, (2004) in his study "Primary schools-ICT and standards" teachers are also pressed for time to locate internet advice, prepare lessons, explore and practise using the technology, deal with technical problems and receive adequate training. In Kenya most teachers usually have a packed 8 hour work day and the average number of class sessions is over twenty hours per week. Both teachers and students have limited hours during the day to work on integrating ICT in their education. Teachers also take much more time to design projects that include ICT than to prepare traditional lessons.

In most of the schools there are not enough training opportunities for teachers in the use of ICTs in a classroom environment. According to Becta (2004) the issue of training is certainly complex because it is important to consider several components to ensure the effectiveness of the training. These were time for training, pedagogical training, skills training and an ICT use in initial teacher training. Providing pedagogical training for teachers, rather than simply training them to use ICT tools, is of importance according to Becta, (2004). If teachers are to be convinced of the value of using ICT in their teaching, their training should focus on the pedagogical issues. Many teachers courses focus on teachers acquiring basic ICT skills and did not often teach teachers how to develop the pedagogical aspects of ICT.

Lack of accessibility to ICT by the teachers in schools is another major factor that influences the use of ICT by teachers in colleges. Pelgrum (2001) in his study, "Obstacles to the integration in ICT in education" identifies from his research the main obstacles to the accessibility of ICTs in schools. These were insufficient numbers of computers, insufficient peripherals such as printers, insufficient numbers of copies of software and insufficient simultaneous internet access. However, Balanskat et al (2006) argues that the accessibility of ICT resources does not guarantee its successful implementation in teaching, and this is not merely because of the lack of ICT infrastructure but also because of other barriers such as lack of high quality hardware, suitable educational software and access to ICT resources. Poor choices of hardware and software and a lack of consideration of what is suitable for classroom teaching are problems facing many teachers.

Lack of technical support when using ICTs in the classroom is a major factor influencing use of ICT in classrooms (Bingimlas, 2009). Without both good technical supports in the classroom and whole-school resources, teachers cannot be expected to overcome barriers preventing them from using ICTs according to Pelgrum (2001). These technical barriers may include waiting for websites to open, failing to connect to the internet, computers and printers malfunctioning and teachers having to work on old computers. Technical barriers impede the smooth delivery of the lesson or the natural flow of the classroom activity. Technical faults discourage teachers from using ICT in their teaching because of fear of equipment breaking down during a lesson (Bingimlas, 2009).

Other factors identified by a Farrell (2007), Shafika (2007) and a wide range of other researchers as influencing the use of ICTs in classes include lack of computers, lack

of quality software, lack of time, technical problems, teachers' attitudes towards computers, poor funding, lack of teacher confidence, resistance to change, poor administrative support, lack of computer skills, poor fit with the curriculum, lack of incentives, scheduling difficulties, poor training opportunities and lack of skills on how to integrate ICT in education.

The study, based on literature identified for factors that influence the use of ICTs in teacher training will try to establish the factors that hinder or influence the use of ICTs within Igembe District. This area has not been covered before and the researcher will thus strive to establish if the same factors that influence teachers' use of ICT in other parts of the world are the same as within Igembe Districts.

2.5 Summary of the Literature Review

From the reviewed literature, we have defined Information and Communication Technology (ICT) as anything which allows us to get information, to communicate with each other, or to have an effect on the environment using electronic or digital equipment. According to NAEYC (2012) technology and interactive media are tools that can promote effective learning and development when they are used intentionally by early childhood educators, within the framework of developmentally appropriate practice, to support learning goals established for individual children. The ICT technologies used in Early Childhood Education (ECE) have been seen to include Computers, cameras, internet, mobile phones, printers, photocopiers, computer software programmes, scanners, video conferencing technologies, television sets, radios and others. From studies however, teachers have been seen to make minimal use of these available ICTs in the market in their instruction. The use of ICTs in

education is influenced by a variety of factors which includes teacher-level factors such as the teachers' knowledge of the ICTs, their attitudes towards their use, their confidence among others. Also school-level factors such as an overloaded school curriculum, lack of training opportunities for teachers, accessibility of the ICTs by the teachers, lack of technical support among many other factors. Thus with all the identified benefits of technology, the identified factors influencing the use of technology and benefits that accrue from technology use in the classrooms, the researcher aims to establish whether with all the rich literature in the area, ICTs are available and whether teachers and teacher trainers are using the ICTs in their classrooms and general professional practice in ECD teacher training colleges within Igembe Districts.

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CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

In this chapter the researcher will discuss the research design, location of the research, target population, sampling techniques, sample size, research instruments, data collection procedure and logistical and ethical considerations in research.

3.1 Research Design

In doing this research, the researcher used descriptive research design using the survey method. Descriptive research design is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals (Kombo & Tromp, 2003). The survey method is found suitable for the present study since it does not require manipulation of variables. The researcher used the collected information to describe the variables under study. There is no researcher influence in the findings and the researcher reports the findings as they are in the field. For this research, the researcher has analysed the integration of ICTs in training of ECDE teachers within Igembe District and has made a report of the findings as they are.

3.2 Variables under Study

(i) The independent variable was the use of ICT technologies in Early Childhood Development and Education Teacher Training colleges. The ICTs that can be used in ECDE teacher training colleges include computers, projectors, digital cameras, digital microphones, mobile devices, SMARTboards and the internet. They can be used in the search for new information, to network with other teachers in the globe, be

updated on latest trends in education and deliver instruction in creative ways in the classroom.

(ii) The dependent variables are the factors that influence the use of the ICTs. The factors include attitudes towards ICTs, knowledge of ICTs, technical support, confidence, time support, and accessibility.

3.3 Location of the Study

This research was done within Igembe Districts in Meru County. Purposive sampling was used to select Igembe Districts as the research location as little study has been put into the educational outcomes of this area unlike the neighbouring parts of Meru such as the Imenti region which boasts more development. The teacher training colleges in the area are also relatively new with the oldest barely ten years old and majority of them being in-service teacher training centres. Education levels in the District have remained low despite government efforts to introduce Free Primary Education and subsidised secondary education. In the last ten years, there has been the emergence of teacher training colleges training teachers in ECDE and Primary education. These colleges produce teachers to add to the country's pool of teachers. At times the teachers do not perform well in exams with none of the colleges ever having registered a 100% pass in teacher national examinations by Kenya National Examinations Council. Given the area is populous and colleges are mushrooming, and the importance ICT is being given in education sector world over, the researcher thus aimed to establish the availability and how ICTs are used in the colleges by both the tutors and students within ECDE colleges in Igembe Districts. Igembe is also the home district of the researcher and the researcher feels obliged to be part of the

solutions to educational problems bedevilling the region, starting with the production of quality teachers who are ICT literate to offer globally competitive training to children in ECDE centres.

3.4 Target Population

Igembe District currently has eight teacher training colleges with most of them being in-service colleges training teachers in diploma and certificate in ECDE. Two of these also train teachers in Primary 1(P1) teacher certificate. These colleges include: Nyambene ECD College, Igembe ECDE College, Fr. Soldati Teachers Training College, Maua ECD College, Kiengu ECD College, St. Francis ECDE, Kenya Methodist University (KEMU)-Maua Satellite Campus, Chuka University College Kiengu Satellite Campus. The researcher targeted the teacher trainees and the teacher trainers in the colleges as the primary respondents. Teachers are the primary drivers of the education sector and the success and failure of the sector depends on the teachers.

The population of the colleges in the area under study is as shown in the table below:

Table 3.1: Population of the students and tutors in ECD colleges in Igembe Districts

COLLEGE	STUDENTS	TEACHER TRAINERS
Nyambene ECD College	284	15
Igembe ECDE College	195	14
Fr. Soldati Teachers Training College	250	17
Maua ECD College	89	8
St. Francis ECDE	81	8
Kiengu ECD College	109	8
Kenya Methodist University (KEMU)-Maua Satellite Campus	220	12
Chuka University College Kiengu Satellite Campus	144	14
TOTALS	**1372**	**96**

3.5 Sampling Techniques and Sample Size

3.5.1 Sampling Technique

Simple random and voluntary sampling was used for this research. In simple random sampling, all the members of a population have an equal chance of selection to be part of the study. The researcher used stratified random sampling to select the student teachers to be part of the study from all the colleges. The researcher ensured student teachers at various stages of their training are selected to participate in the study to ensure the responses received are generalizable to the whole college fraternity. The

respondents however voluntarily chose to be part of the study. All the ECD teacher training colleges in the study location were considered for purposes of this study.

3.5.2 Sample Size

The sample for this study was primarily drawn from the ECD teacher trainees and their tutors from within Igembe Districts. All the members of this population had an equal chance to participate in the research to avoid bias. The sample that was selected has been highlighted in the table below.

Table 3.2: Sample student teachers and tutors in ECD colleges in Igembe Districts

College	Students' Population	Selected sample	Percentage	Tutors' Population	Selected Sample
Nyambene ECD College	284	45	15.8%	15	15
Igembe ECDE College	195	30	15.4%	14	14
Fr. Soldati TTC	250	40	16%	17	17
Maua ECD College	89	15	16.9%	8	8
St. Francis ECDE	81	15	18.5%	8	8
Kiengu ECD College	109	21	19.2%	8	8
Kenya Methodist University (KEMU)-Maua Satellite Campus	220	35	16%	12	_
Chuka University College Kiengu Satellite Campus	144	15	10.4%	14	_
Total	**1372**	**216**	**15.7%**	**96**	**70**

From the approximate target population of 1372 ECDE teacher trainees, the researcher randomly selected 216 teacher trainees to take part in the study. This is a percentage of 15.7% of all the total population. The researcher selected 15.7% of student teachers from all the sampled colleges with representation of the various levels of education. This is representative of the whole population under study. The researcher also selected 70 teacher trainers to take part in the study. The tutors from the two satellite campuses of Chuka University and Kenya Methodist University are mainly part-time lecturers and it was hard to have them participate in the study for logistical reasons. All respondents who were selected to take part in the study did so voluntarily without any form of coercion whatsoever.

3.6 Research Instruments

3.6.1 Questionnaire

The researcher used a questionnaire to collect data from the tutors and the student teachers from the sampled colleges. The questionnaires had both structured (closed-ended) questions and unstructured (open-ended) questions for the respondents to fill. Structured questions were used more to save time and maximise responses. They are direct and easier to analyse and clearly bring out the comparisons between variables. The questionnaires tried to assess the teachers' knowledge of various technologies that can be used in education, their attitudes towards using the technologies and the extent to which they used the technologies in their daily educational activities. The questionnaires are divided into four sections. Section A seeks to gather information about the respondents' background while maintaining anonymity. Section B seeks to establish the ICTs available in the ECD colleges. Section C is intended to gather information on the use of ICTs and challenges faced in their use by both the students

and the teachers. Lastly section D was to get the tutors' and students' attitudes towards the use of ICTs in the teaching and learning process. The researcher personally delivered the questionnaires to the select colleges and collected them after a day when the respondents had filled them. The questionnaires were self-formulated by the researcher.

3.6.2 Observation Checklists

The researcher used an observation checklist to gather data for the research. The observation checklist was prepared to take stock of the technologies available in the colleges and how the teachers make use of the available technologies. An observation checklist was preferred to supplement the questionnaire and to verify the information obtained from the respondents. The researcher made a list of various ICTs that can be used in teacher training to ascertain their availability in the colleges and how they are used.

3.7 Piloting

Piloting was done to determine the validity and reliability of the data collection instruments. The piloting was done at Fr. Soldati TTC and Igembe ECDE College. The colleges are within the metropolis of Maua town, easily accessible and they have many students at all levels. The researcher randomly selected students from the college at all levels and gave them the questionnaires to fill. The tutors in the colleges were also be given the tutor's questionnaire to fill. This enabled the researcher review the instruments so that they were respondent friendly to have a high return rate and meet the research objectives.

3.7.1 Validity

Validity is the extent to which a test measures what it is supposed to measure (Kodhari, 2009). Piloting was done to establish the validity of the research instruments. Content validity was used to ensure the content being presented to the respondents is what is expected while face validity was used to make the tests appear to measure what they are intended to measure. The questionnaire and the observation checklist were piloted in two ECDE colleges to establish if they measure the objectives of the study and the content being measured tallies with the research objectives. The responses from the student teachers and their tutors during the piloting exercise enabled the researcher establish if the research instruments measured the objectives of the study (content validity).

3.7.2 Reliability

Piloting was also done to establish the reliability of the research instruments. Test-retest reliability was used to ensure the items in the questionnaire are consistent over time. The piloting exercise was done among various ECDE instructors separately to establish whether the items in the questionnaire are clear and all respondents deduced the same meaning from the items. This was to ensure the correct response was received from all the respondents as the researcher intended and also to get rid of any ambiguity in the research instruments. From the piloting exercise, 98% of the respondents gave intended results thus the instruments were assumed to be reliable.

3.8 Data Collection Procedure

The researcher arranged for transport to the ECDE teacher training colleges to collect data. He personally talked to some of the respondents and convinced them of the

importance of the study to ensure maximum response rate. The printing of adequate questionnaires and observation checklists to ensure smooth collection of data was arranged in advance. After preparation and testing of the data collection instruments, the researcher personally administered the research instruments in the schools. He took the questionnaires to the schools for the respondents to fill and collected them after they had completed answering them. An online questionnaire using Google Docs for student teachers and for tutors was prepared for those with internet connections to fill online. The observation checklist was administered by the researcher where he was checking the available ICTs in the colleges to describe their condition and ascertain if they are adequate or inadequate.

3.9 Data Analysis Procedures

After collecting data from the field, the researcher followed the laid down data processing procedures. He edited the data collected from the field, coded the data according to the various research objectives the data was to achieve, classified the data as per the objectives and lastly tabulated in frequency distribution tables for analysis. The qualitative data was analysed as per the objectives of the research and by the use of appropriate explanatory paragraphs the data was presented to the reader. Statistical Package for Social Sciences (SPSS) and other statistical software like Microsoft Excel were used for purposes of analysing the quantitative data collected. Statistical tests such as T-test and Chi-square test was used to ensure credibility of the data results.

3.10 Logistical and Ethical Considerations in Research

The researcher took into consideration various logistics and research ethics in carrying out the study. The logistical and ethical considerations are important to ensure the research carried out is smooth and meets the legal guidelines and is humane.

The researcher obtained a permit from the county education office as well as from Kenyatta University to be able to undertake this study in the selected area without hindrance. With the introduction letters from the two offices, the researcher did not face major challenges in getting permission to carry out his study in the ECDE colleges in Igembe Districts.

The researcher informed the participants the purpose of the study so that they took part in the study based on adequate information on its purpose. Their consent was sought before collecting data from them. The researcher used a letter of introduction from Kenyatta University to introduce himself to the respondents to ascertain genuineness of the study and used to seek consent from the respondents. Verbal explanations and persuasions were also used.

The respondents who chose to take part in this study did so on their own volition as the researcher did not use any influence or coercion to make the respondents participate in the study.

The respondents were not required to write any personal details on the questionnaire and as such their identities are not known. This ensured confidentiality and privacy as a questionnaire cannot be traced to a specific respondent.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.0 Introduction

In this chapter the researcher will carry out data analysis, present the results and discussions of data collected from the field.

Descriptive and inferential statistics were used to analyse the collected data. Raw data was first prepared for analysis using Statistical Program for Social Scientists (SPSS). Descriptive statistics calculated include: Frequencies; means and percentages. Summary paragraphs have been used to present inferred data. Frequency distributions tables, graphs and charts have been use to present the data and bring out clear comparisons of the various data variables under study and ease the readers' conception of the issue under investigation. The researcher has presented the data collected as per the objectives of the study.

The objectives to be achieved were:

- To establish the ICTs available in ECDE teacher training colleges in Igembe Districts.
- To find out how the ICT technologies are used for instruction in ECDE colleges.
- To determine the key factors influencing the use of ICT technologies in instruction in ECDE teacher training colleges.

- Investigate the challenges hindering the use of ICTs in ECDE teacher training Colleges

4.1 Demographic Characteristics of the Sample

4.1.1 Demographic Characteristics of the student teachers

This section presents the respondent's distribution by gender and professional qualifications. The distribution is as shown in the pie chart below:

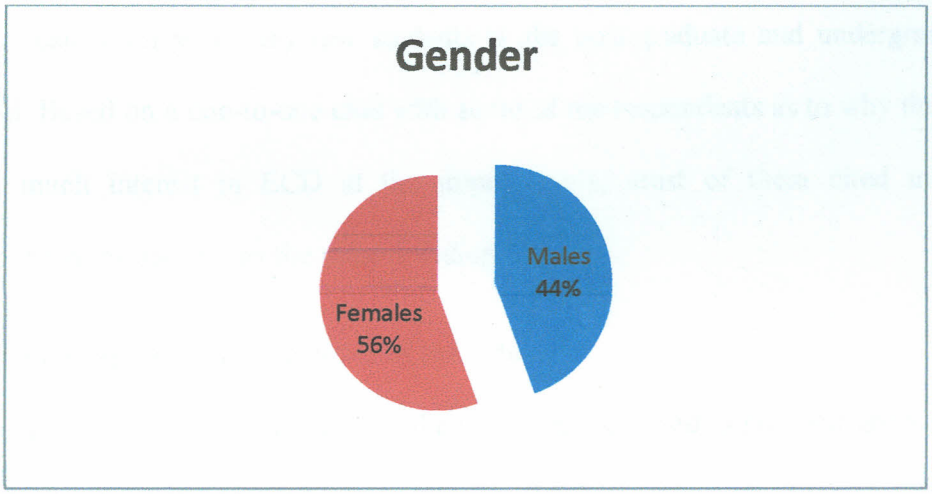

Figure 4.1.1: Gender distribution of student teachers taking ECD within Igembe Districts.

Among the students pursuing ECD as a course of study, it was evident there are more females (120 sampled) than males (96 sampled) pursuing the course. This was especially so at the certificate levels where majority were women as compared to the higher levels where men were gaining in numbers.

Table 4.1: Distribution of student teachers according to their level of study

Level of Study	Frequency	Percentage
Post-Graduate	4	2%
Undergraduate	32	15%
Diploma	36	17%
Certificate	144	67%
Other	0	0%

Majority of student teachers pursuing ECD as a career are doing it at the certificate level with very few students at the post-graduate and undergraduate level. Based on a one-to-one chat with some of the respondents as to why there is not much interest in ECD at the upper levels, most of them cited market opportunities and pay as the most deciding factors.

4.1.2 Demographic Characteristics of the tutors

The demographic characteristics of the tutors characterised as per their gender was as shown in the chart below:

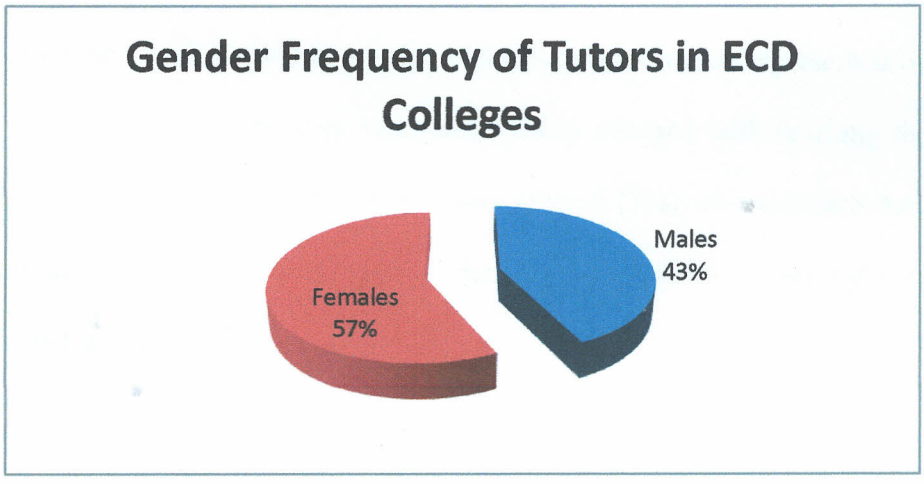

Figure 4.1.2: Gender distribution of the tutors within the ECD colleges in Igembe Districts

As shown in the figure above, 57% (40 tutors) of the tutors within the ECD colleges were female as compared to 43% (30 tutors) who were male. This might be another indicator of non-participation of men in the ECD sector. However more men are now slowly joining the ECD sector than before where it was a recluse for women.

Table 4.1.2: Qualifications of tutors within the ECD colleges in Igembe Districts

Qualification	Frequency	Percentage
Post-Graduate Degree	20	29%
Undergraduate Degree	40	57%
Diploma	5	7%
Certificate	0	0%
Other	5	7%

From the data above, most of the tutors in the ECD colleges are first degree holders in Early Childhood Studies or other education related discipline represented by 57% (40 tutors) of all the tutors contacted. These were followed by tutors who have enrolled for Masters or with a Masters' degree represented by 29% (20 tutors). Diploma holders, who were mainly charged with teaching the certificate class were 5 (7%) while there were other 5 (7%) who although they were providing teaching services, had no education background neither had they qualified as teachers.

Table 4.1.3: Tutors' Teaching Experience

Duration	Frequency	Percentage
Above 20 years	0	0%
15-20 years	5	7%
10-15 years	5	7%
5-10 years	20	29%
Below 5 years	40	57%

Most of the tutors training students in ECD within Igembe Districts have a teaching experience of below 5 years as shown in the table above represented by 57% of the tutors sampled. This was followed by tutors who had between 5-10 years of experience represented by 29% (20 tutors). Very few teachers had over 10 years of teaching experience represented by a total of 14% (10 tutors) of all the teachers sampled. It is worth noting that these experienced teachers were mainly in the administrative roles and some were the directors of the ECD colleges.

4.2 Availability of ICTs in ECDE teacher training colleges in Igembe Districts

The researcher administered an observation checklist on all the sampled ECD colleges within Igembe Districts to establish the ICTs available in the colleges. The computer laboratories that did not meet the standards prescribed of a computer laboratory were marked as ill-equiped. When the ratio of computers was more than one computer to a student for every session, they were marked as inadequate. When there was no ICT observed at all, that was marked as "not available." The observed ICTs are presented in the table below:

Table 4.2.1: Various ICTs observed in the ECDE Colleges within Igembe Districts

ICTs Observed	Colleges with the ICT	Condition
Computer Laboratory	5	Ill equipped
Computers	7	Inadequate
Instructional Software	0	Not available
Printers	7	Inadequate
Projectors	2	Inadequate
Televisions	8	Inadequate
Radios	8	Inadequate
Public Address System	3	Inadequate
Interactive White Board	0	Not available
Internet Connectivity	0	Not Available

From the observations done during the visits to the colleges and administration of the observation checklist, 5 of the eight colleges had computer laboratories. Three of these colleges shared the computer laboratory with the host secondary schools. The computers in these laboratories were far from being adequate with up to six students sharing one computer. This makes the students loose the enthusiasm of using the computers. The other colleges had one computer which was mainly used for administrative purposes. Each of the colleges had a printer that was again attached to the administrative office and not available to the students and teachers. There was no instructional software in any of the colleges and the teachers did not have an idea of

any instructional software that exists. Interactive whiteboards were too non-existent in the region.

It is a worthy note that over 90% of the tutors observed in the teacher training colleges had internet enabled mobile phones while at least 50% of the tutors had personal laptops that they used for personal business and mainly entertainment.

Despite the observed apparent lack of availability of ICTs in the colleges, when the student teachers and their tutors were asked whether they could make use of ICTs, 100% of all the respondents were positive they could make use of ICTs to enhance the teaching and learning process.

4.3 Teachers' and Student Teachers' Self-efficacy towards mastery of ICT Skills

The researcher also sought to establish the self-efficacy of both the tutors and student teachers towards mastery of ICT skills. The findings are presented in the table below:

Table 4.3.1 showing Teachers' and Student teachers' self-efficacy towards mastery of ICT Skills

Skill Mastery Level	Tutors	Percentage	Student Teachers	Percentage
Very Good	20	29%	60	28%
Good	25	36%	48	22%
Fair	25	36%	60	28%
Poor	0	0%	48	22%
Very Poor	0	0%	0	0%
TOTAL	**70**	**100%**	**216**	**100%**

Below is a graphical presentation of Teachers' and Student teachers' self-efficacy towards mastery of ICT Skills.

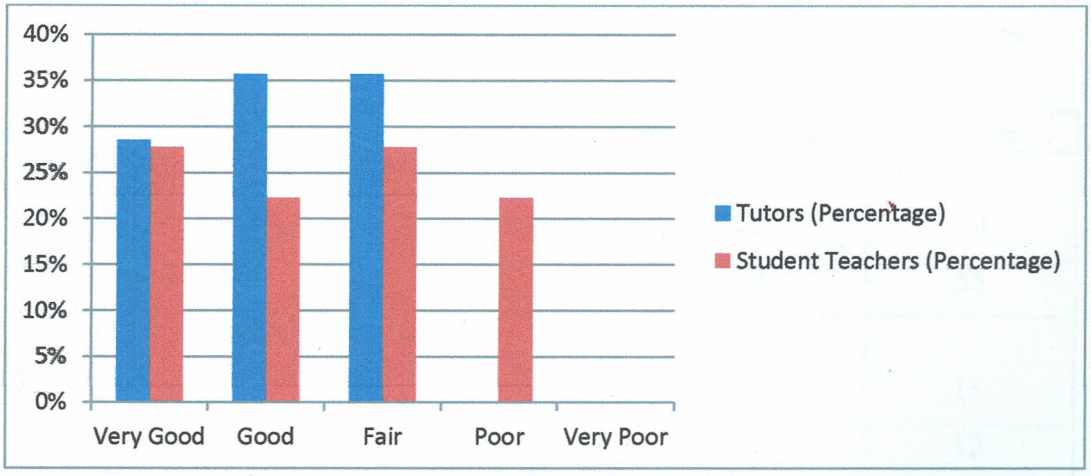

Figure 4.3.1: A graph showing Teachers' and Student teachers' self-efficacy towards mastery of ICT Skills

The student teachers and the tutors have a high self-efficacy on their ICT skills with most of them rating themselves as fair upwards. 65% of the tutors rated themselves as either good or very good in ICT skills as compared to 50% of the student teachers. Some student teachers rated themselves as poor (22%) as the only interaction they have had with ICTs was only through a word of mouth. It is worth noting that none of the tutors rated themselves as poor in ICT skills.

Given the high confidence levels of the tutors and student teachers in their ICT skills, this is potential that can be utilised to offer quality teaching by the use of ICTs.

4.4 Use of ICT Technologies for Instruction in ECDE Colleges

The researcher sought to establish how tutors and student teachers visualize they can use ICTs to enrich the teaching and learning process. The findings are presented in the table below:

Table 4.4.1: Ways tutors and student teachers visualize they can use ICTs to enhance teaching and learning

	Student teachers	Tutors
Searching for new information from the internet	203	60
Typing class notes	210	55
Making presentations of subject content to learners	0	15
Assessments of students	0	12
Online interactions with students	0	9
Developing computer skills	72	49
Storing content online for learners to access	0	32
Online teaching	0	0

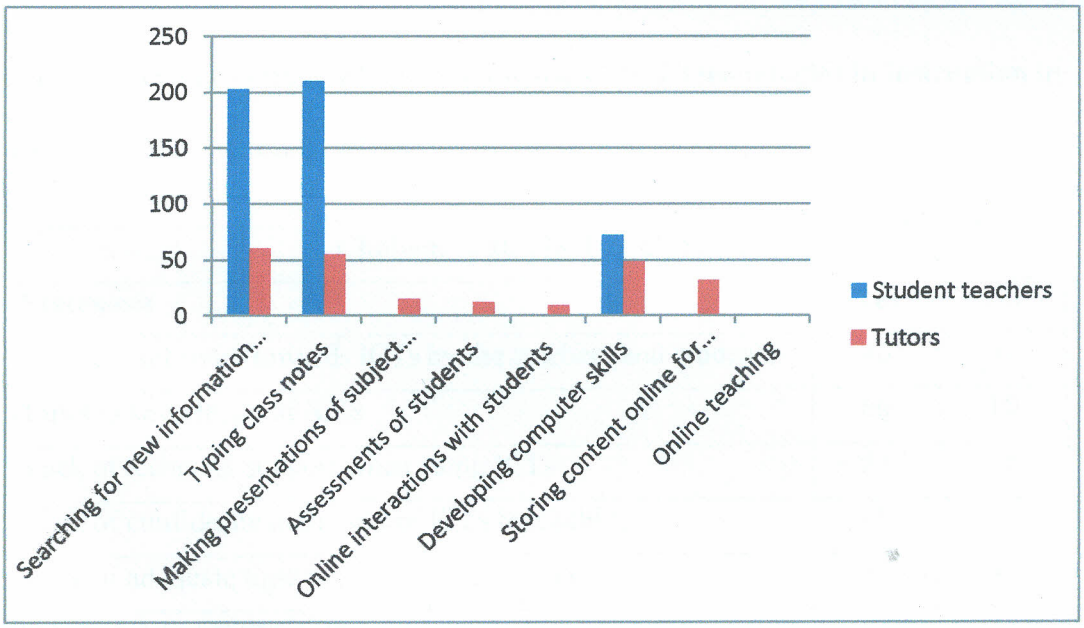

Figure 4.4.1: A graph showing ways tutors and student teachers visualize they can use ICTs to enhance teaching and learning

From the data presented above, most of the tutors were opined that they could make use of ICTs to search for new information on the internet, type teaching and class

notes and develop basic computer skills. Some tutors felt that they could also make use of ICTs to make presentations to learners, use them to assess students, have online interactions with their students like in chat rooms and storing online content for the students to access. However neither the students nor the tutors visualized they could carry out online teaching.

4.5 Key factors influencing the use of ICT Technologies in Instruction in ECDE Teacher Training Colleges

The researcher established the key factors that influence the use or lack of use of ICTs in the teaching and learning process. The common factors identified are shown in table 4.5.1 below:

Table 4.5.1: Key factors influencing the use of ICT technologies in instruction in ECDE teacher training colleges

Challenges In The Use Of ICTs		
Statement	**Yes**	**No**
Negative attitudes towards ICTs by the teachers and students	40	30
Limited knowledge of ICTs	60	10
Lack of technical support when using ICTs	55	15
Lack of confidence in the use of ICTs in teaching	40	30
Lack of adequate time to prepare to use ICTs	35	35
Inaccessibility of the ICTs	55	15
None of the above	5	65

From the information gathered from the teacher trainers (tutors), there are many factors influencing the use of ICT technologies in instruction in ECDE centres. However there was no complete consensus on the various factors and how they

influence ICT use. Most of the teachers however were in agreement that negative attitudes towards ICTs, limited knowledge of ICTs, lack of technical support to use ICTs, lack of confidence and inaccessibility of the ICTs are major factors that influence ICTs use. However there was no consensus on whether time to prepare for ICTs was an influencing factor in the use of ICTs in the instruction process.

4.6 Tutors' and student teachers' attitudes towards the use of ICTs

By the use of a five level Likert attitude scale, the researcher established the attitudes of student teachers and their tutors towards the use of ICTs in their instruction. The findings are as presented in table 4.6.1 below:

Table 4.6.1: Student Teachers' Attitudes Towards the use of ICTs

Statement	Level of agreement				
	1	2	3	4	5
Student teachers are well conversant with ICT Education Tools	24	144	0	36	12
Lessons integrated with ICTs are enjoyable	144	72	0	0	0
All subject areas can be taught by use of ICT	48	96	36	24	12
Tutors make use of ICTs in their lessons	12	132	48	24	0
Using ICTs to teach is easy	120	60	24	12	0
Preparing lessons to use ICTs can be hard	36	36	72	60	12
All teachers will use ICTs in their lessons if its available	36	60	84	12	24
Use of ICTs in lessons enhances content mastery	132	72	12	0	0

The student teachers showed strong agreements with the statements above where there were strong agreements that lessons integrated with ICTs are enjoyable, using ICTs to teach is easy and use of ICTs in lessons enhances content mastery. There was

also disagreement that preparing lessons to use ICTs can be hard. Many still had no opinion on whether all teachers will use ICTs in their lessons if it's available. Interesting is the opinion that student teachers are well conversant with ICT education tools where most of the students showed some form of agreement whereas others disagreed with the statement.

Table 4.6.2: Responses by tutors on their attitudes towards use of ICTs

Statement	Level of agreement				
	1	2	3	4	5
Teachers should be given refresher courses on how to use ICT in their teaching	60	10	0	0	0
Student teachers should be trained in the use of ICT in classes	60	10	0	0	0
The use of ICTs in teaching increases learning outcomes	35	30	5	0	0
Students enjoy more ICT integrated lessons	50	20	0	0	0
ICT integrated lessons are easy to administer	15	40	15	0	0
Teacher becomes better in the use of ICT in the classroom with practice	50	20	0	0	0
ICT can be used to teach all subjects in the teacher training curricula	35	20	10	5	0
Teachers can make use of ICT in their teaching with appropriate support	35	35	0	0	0
ICTs assist teachers to become better teachers professionally	40	25	5	0	0

From the responses above, most of the tutors in the ECD colleges had some level of agreement with all the statements on the use of ICTs in the teaching and learning process. There was strong consent that there should be refresher courses for tutors

teaching ECD colleges. All students taking ECD courses should be trained in the use of ICTs and that students enjoy more ICT integrated classes. Also with strong agreements was the fact that ICT can be used to facilitate the teaching of all subjects in the teacher training curricula, ICT laced lessons are easy to administer and that teachers can make heavy use of ICTs in their instruction with appropriate support and encouragement.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

In this chapter, the researcher will give a summary of the data collected from the field and analysed, draw conclusions from the analysed data, offer recommendations and recommendations for further research.

5.1 Summary of the Research Findings

From the data collected, majority of the student teachers as well as their tutors in the ECD centres are female represented by 56% for the students and 57% for the tutors. This gender disparity was more prominent in the lower levels of training like certificate course in ECD, who are most likely to have one-on-one interaction with children in ECD centres. The men were mainly TSC employees keen to get a promotion after the diploma or degree. It is worth noting that majority of the students training in ECD were at the certificate level and special emphasis should be laid on this sector. Majority of the tutors in the ECD sector are first degree holders (57% of all sampled) with a considerable number pursuing post graduate (29%). Many of these have less than 5 years of experience (57%) and another 29% with 5-10 years of experience. This means many of these tutors are relatively young and conversant with emerging technologies. If conditions were favourable, this group of tutors will champion the use of ICTs in the ECD sector.

The availability of ICTs in the teacher training colleges within Igembe Districts is very minimal with only 5 of the colleges with computer labs that are shared with the

host secondary schools and rarely used in the ECD instruction process. 7 of the colleges had computers and printers but these were mainly used for administrative purposes other than for the instruction process. Televisions and radios were mainly used to watch and listen to news bulletins in the evening by the students and tutors and other forms of entertainment that they offer. It is worth noting that none of the colleges had invested in any form of instructional software or internet connectivity and none were aware of the operations of an interactive whiteboard.

From the student teachers' and their tutors' responses, 100% of the students and 78% of the tutors rated their computer skills above fair. This positive self-efficacy among the students and tutors in ECD colleges can be harnessed to introduce ICTs in the sector en masse.

The students and tutors in ECD colleges mainly use ICTs to search for new information from the internet, type class notes and in developing computer skills. Only 32 of the tutors used ICTs to store content online for their students to access, 12 used ICTs to assess their students while another 15 used ICTs to make presentations of subject content to learners.

Students and their tutors agreed there were key factors that influenced the use of ICT technologies. Majority felt limited knowledge on the use of ICTs was the biggest factor influencing ICT usage followed by lack of technical support when using ICTs and inaccessibility of the ICTs. Other key factors influencing the use of ICTs includes lack of adequate time to prepare to use ICTs and lack of confidence in the use of the ICTs.

The student teachers in ECD teacher training colleges did show agreement that lessons integrated with ICT are enjoyable as well as ICTs make content mastery easy. It is also easy to teach using ICTs according to the students sampled. However, there was disagreement that preparing lessons to use ICTs is hard and a divided opinion that teachers will use ICTs in their lessons if it's available.

The tutors on the other hand were in agreement that teachers should receive refresher courses on how to use ICTs and student teachers be trained in the use of ICT as part of their core course. There was agreement that ICTs can be used to teach all subjects in the curricula and that teachers get better in the use of ICTs with practice. Most of the tutors agreed ICT integrated lessons are enjoyable, easy to administer, increase learning outcomes and assists teachers become better teachers professionally.

To summarise the data presented in Chapter four above, there is a lot of positive thinking from the student teachers and tutors towards the use of technology in the teaching and learning process. All the tutors and student teachers sampled declared they would use ICTs in the teaching and learning process if the existing barriers to the use of ICTs were removed. For example the ICTs existing in the colleges are very limited in number and variety thus inadequate to foster meaningful teaching and learning. Some ICTs available in the teacher colleges are outdated technologies that cannot be of value in the present generation. For example having a computer that operates on DOS (Disk Operating System) which uses command prompts when the rest of the world has shifted to GUI (Graphical User Interface) operating systems does not add value to the students based on the changing trends. The data collected however shows positive attitudes by the respondents towards the use of ICTs in the colleges and this could translate to the ECD classrooms.

5.2 Conclusions

From the data presented in chapter four, the following conclusions can be made from the research findings:

There are very few ICTs available in the teacher training colleges training teachers in ECD in Igembe Districts with none of the sampled colleges practising complete integration of ICTs in the teaching and learning process. This may count for lack of ICT use in the colleges. The administrators of the colleges do not also find it as a priority to equip their colleges with various instructional ICTs as it does not directly count on the passing of exams by their students. Teachers who have personal computers and other related ICTs make very limited use of them in the instruction process and majority use them for entertainment purposes. This may be attributed to the lack of awareness on how to use the ICTs in the learning process.

The use of ICTs in the teaching learning process is influenced by a variety of factors such as availability of the ICTs, technical support to use the ICTs, tutors and students' knowledge on how to use the ICTs, negative attitudes towards the ICTs among many other factors identified as influencing use of ICTs in ECD colleges.

There is also little effort being made to integrate ICTs in the ECD teacher training process by the college administration and also by the government. This is evident by lack of provision to train the student teachers in the use of ICTs in the ECD colleges or give the tutors in these colleges refresher courses on the use of the new emerging technologies. Tutors and student teachers however feel they can use ICTs to search for new content online, network with other teachers, make presentations to learners,

and carry out assessments among other creative ways to enrich the teaching learning process.

The level of computer knowledge among the students and tutors is very elementary given the various ways in which they use ICTs in the teaching and learning process. Many use ICTs for entertainment purposes and not heavily inclined to using them for instructional purposes as shown by an observation of the teachers in the field.

The government too has done very little to ensure that ICTs are being taught in the ECD colleges and teachers are adequately prepared to use ICTs in the teaching of children in the ECD centres. There is lack of a formal curriculum to be followed to offer instruction to student teachers' on the use of ICTs and there are no refresher courses ever organised for the tutors to keep the up to date with developments in the ICT sector and how they impact on education.

The high cost of various ICTs also is a hindrance towards integrating them in the teaching and learning process. Most of the technologies are very expensive and it would take a heavy investment to have them in the colleges. This may be a big hindrance towards their availability as the colleges cannot charge fees high enough to equip the colleges and remain profitable. The government should provide incentives for the institutions to buy these ICTs at an affordable cost and use them in the teaching and learning process.

There are few men who want to venture into the early childhood sector unlike the females. This is especially so at the lower levels of ECD training (Certificate level) where the participation of men is very low. Given the nature of men and women, men

are more experimental with technologies than women and lack of male participation in the ECD sector may contribute to the lack of use of ICTs in the sector.

5.3 Recommendations

5.3.1 Recommendations to the Teachers and College Directors

Teachers being the key drivers of the education sector should seek refresher courses or get trained in the use of ICTs in the teaching and learning process to be able to keep with the times and transfer the same skills to their pupils.

Teachers should also champion the use of ICTs in the ECD centres to ensure children are adequately prepared to use the ICTs once they join mainstream schooling where the children may have more access to ICTs if the government plans come to fruition.

Tutors in the ECD teacher training colleges should strive to act as role models to their students as most students teach like their teachers. The power of role modelling and setting good examples in the integration of ICTs in the teaching and learning process is undeniable. If the tutors made use of the ICTs in their training of teachers, then the trained teachers will most likely do the same as they teach young children in ECD centres.

Attitude changes towards the use of ICTs by the student teachers and their tutors will be important to ensuring that ICTs are used in the teaching and learning process in these colleges despite the challenges faced herein. All systems have challenges and it takes courage to oversee the challenges and forge ahead. Starting with simple steps like having the students listen to educative radio programs or TV programmes which are free to air is a major step towards the integration of ICT in the learning process.

Teachers need not wait for the expensive technologies before they can start using the available ICTs.

The directors of the ECD teacher training colleges should as a way to boost performance in National Examinations and improve marketability of their colleges invest in ICTs. The students will have access to a wider array of information than the tutors can give in classroom notes. Offering training in ICTs also gives a college edge over competitors and thus taking a bigger share of the market.

The government through the curriculum development agency, Kenya Institute of Curriculum Development (KICD) should develop an appropriate curriculum to be used to train ECD teachers in the use of ICTs. Presently, there is no provision in the ECD syllabus for the teaching of ICT and this makes the colleges training the teachers not put emphasis as it is not examinable.

The government too should ensure that the colleges being licenced to offer ECD training to the teachers have the capacity to offer training in ICTs. They should have the requisite equipment and personnel. This should be a requirement for all the colleges unlike the present scenario where there is minimal supervision of the colleges and students' passing of exams is all that the directors of the colleges are after.

To make the ICTs available in the ECD teacher training colleges, the government can provide incentives to the colleges that want to buy them for instructional purposes like having tax waivers to be able to acquire them at a lower cost.

The government can set the standard on the use of ICTs in teacher training by equipping the government owned colleges well to serve as demonstration centres for

the private colleges to follow suit. Presently, some of the government colleges are in a worse state than the private colleges.

5.4 Recommendations for Further Research

There should be more conclusive research on the effects of the use of emerging technologies such as touch screen technologies and other screens on the developmental abilities of young children such that as teachers introduce these technologies to the children, it is based on sound scientific research evidence on their impacts to the children.

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APPENDICES

APPENDIX 1: QUESTIONNAIRE FOR THE TEACHER TRAINERS (TUTORS)

Introduction:

I am Cosmus Gatuyu, a Master of Education (ECS) student at Kenyatta University. This questionnaire is to seek information on the availability and use of ICTs in ECDE teacher training colleges within Igembe Districts. The study is purely for academic purposes. Confidentiality will be highly maintained. You do not need to write any personal details on the questionnaire.

Please answer the questions in the spaces provided as honestly and genuinely as possible.

Thanks in advance.

SECTION A

1. What is your gender?

Male ☐ Female ☐

2. What is your qualification as a teacher?

Post-graduate ☐ Graduate (Degree) ☐

Diploma ☐ Certificate ☐

Others (Specify) _____

3. How many years have you been in the teaching profession training teachers in ECDE?

Above 20 years ☐ 15-20 years ☐

☐

10-15 years 5-10 years

Below 5 years ☐

4. How do you rate your ICT skills?

Excellent ☐

Very good ☐

Good ☐

Fair ☐

Poor ☐

Very poor ☐

SECTION B: AVAILABILITY AND USE OF ICTs

5 (a) Which of the following technologies do you use in your teaching?

Technologies available in ECDE TTCs		
Radios		
Televisions		
Mobile Phones		
DVD/VCD players		
Public address systems		
Computers		
Projectors		
Interactive white boards		
Others (specify)		

5 (b) How often do you make use of the ICTs identified in 5 (a) above?

Always ☐ Frequently ☐

No opinion ☐ Rarely ☐

Never ☐

Other (specify) _____

6) Which of the following are ways do you make use of ICTs in teaching?

Task	YES	NO
Searching for information from the internet		
Typing class notes		
Making presentations of subject content to students		
Giving students assignments via computers		
Online interactions with students like in chat rooms		
Developing computer skills		
None of the above		

7) Does the ECDE teacher training curriculum make provisions for training the student teachers in the use of ICTs in their teaching?

YES ☐ NO ☐

SECTION C: CHALLENGES FACED IN USE OF ICTS

8) What are the challenges you encounter as you try to integrate ICT in your teaching?

CHALLENGE	YES	NO
Negative attitudes towards ICTs by the teachers		
Limited knowledge of ICTs		
Lack of technical support when using ICTs		
Lack of confidence in the use of ICTs		
Lack of adequate time to prepare to use ICTs		
Inaccessibility of the ICTs		
None of the above		

OTHERS (Please Specify)

_____

_____

_____

_____

_____

SECTION D: TEACHERS' ATTITUDE TOWARDS ICTs

For the statements below, indicate how you agree with the statements below:

Key: 1 = strongly agree 2 = Agree 3 = Undecided 4 = disagree

5 = strongly disagree

	1	2	3	4	5
Teacher trainers should be given refresher courses on how to use ICT in their teaching					
Student teachers should be trained in the use of ICT in classes					
The use of ICTs in teaching increases learning outcomes					
Students would enjoy more ICT integrated lessons					
ICT integrated lessons are easy to administer					
Teacher become better in the use of ICT in classrooms with practice					
ICT can be used to teach all subjects in the teacher training curricula					
Teachers can make use of ICT in their teaching with appropriate support					
ICTs assist teachers to become better teachers professionally					

APPENDIX 2: QUESTIONNAIRE FOR THE TEACHER TRAINEES

Introduction:

I am Cosmus Gatuyu, a Master of Education (ECS) student at Kenyatta University. This questionnaire is to seek information on the integration of ICT in ECDE teacher training colleges within Igembe District. The study is purely for academic purposes. Confidentiality will be highly maintained. You do not need to write any personal details on the questionnaire.

Please answer the questions in the spaces provided as honestly and genuinely as possible.

Thanks in advance.

SECTION A:

1. What is your gender? Male ☐ Female ☐

2. In which college do you train as a teacher: _____

3. What level are you training to be a teacher:

Postgraduate ☐

Graduate ☐

Certificate ☐

Other (specify) _____

4. i) Do you learn the use of computers and other technologies in your training as teachers?

Yes ☐ No ☐

ii) If yes in (i) above, what is your opinion on the relevance of what you are learning about computers to your role as a future teacher?

_____

_____

5. How do you rate your computer skills?

Very good ☐ Good ☐

Fair ☐ Poor ☐

Very poor ☐

SECTION B: AVAILABILITY OF ICTs

6. What technologies do you visualise you can use to aid your teaching?

Technology		
Computers		
Radios		
Televisions		

Mobile Phones		
DVD/VCD players		
Public address systems		
Projectors		
Interactive white boards		
Others (specify)		

SECTION C: USE OF ICTs IN ECDE TTCs

7. i) Would you make use ICTs in your teaching?

Yes ☐ No ☐

ii) If yes in (i) above, how would you use ICTs in your teaching?

Task	
Searching for information from the internet	
Typing class notes	
Making presentations of subject content to students	
Giving students assignments via computers	
Online interactions with students like in chat rooms	
Developing computer skills	

Storing content on Computers for students to access	
Doing online teaching	
None of the above	

8. Do you think you would be more effective in your teaching if you used computers and other supporting technologies?

Yes ☐ No ☐

Other (specify) _____

9. Would you be comfortable if the use of ICTs in the classroom was made compulsory for all teachers?

Yes ☐ No ☐

Other (specify) _____

10. What recommendations can you make on ICT use in schools?

_____

_____

_____

_____

_____

SECTION D: STUDENTS' ATTITUDES TOWARDS USE OF ICTs

For the statements below, indicate how you agree with the statements below:

Key: 1 = Strongly agree 2 = Agree 3 = No opinion 4 = disagree

5 = Strongly disagree

STATEMENT	1	2	3	4	5
Student teachers are well conversant with education tools					
Lessons integrated with ICTs are enjoyable					
All subject areas can be taught by the use of ICT					
Our teacher trainers make use of ICT in their lessons					
Using ICT to teach is easy					
Preparing lessons to use ICT can be hard					
All teachers will use ICT in their lessons if it's available					
Use of ICT in lessons enhances content mastery					

APPENDIX 3: OBSERVATION CHECKLIST FOR THE AVAILABILITY OF ICTS IN THE COLLEGES

College: _____

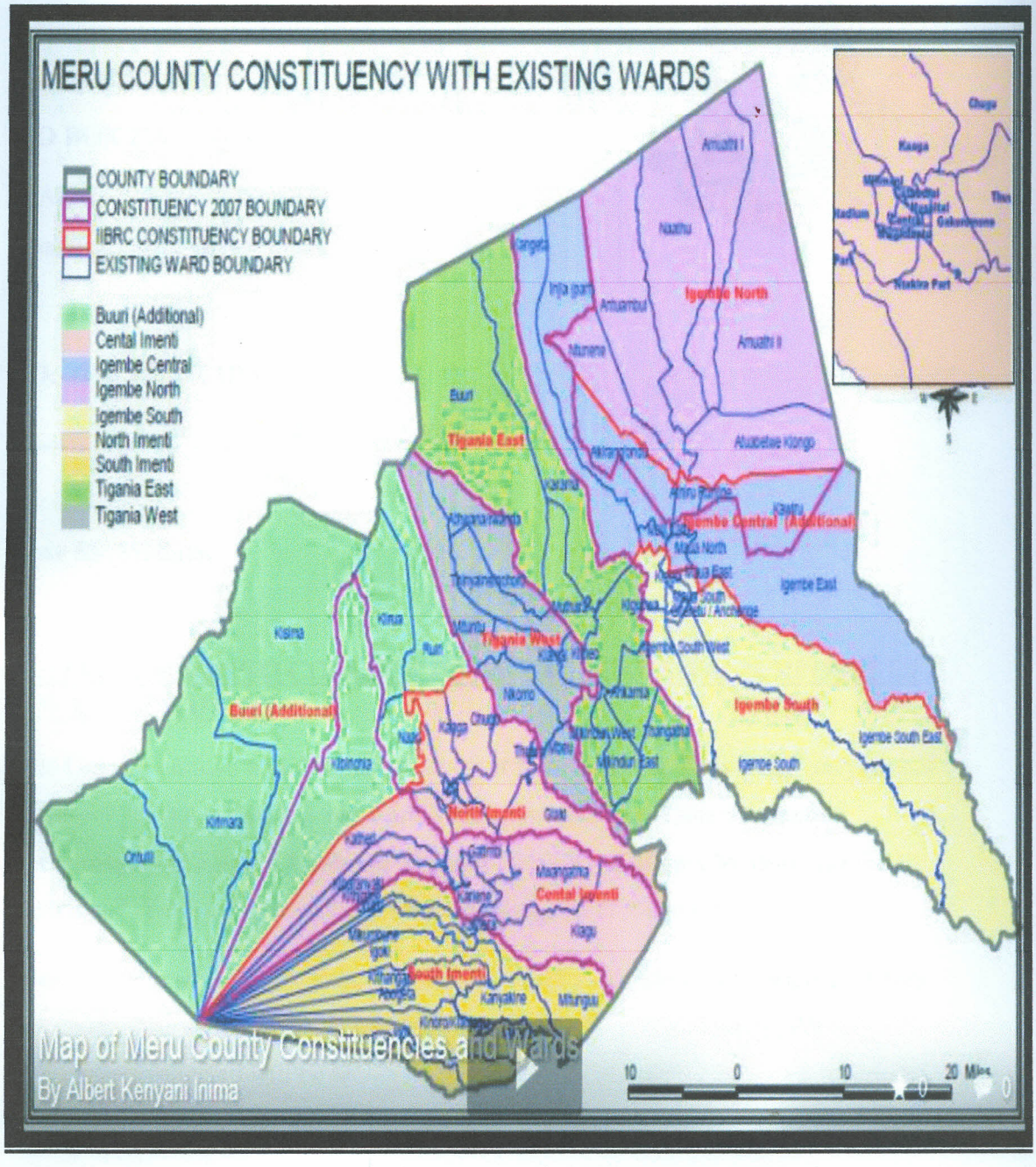
ITEM	Available		Unavailable	Describe Condition
	Adequate	Inadequate		
Computer Laboratory				
Computers				
Instructional software				
Printers				
Projectors				
Televisions				
Radios				
Public address system				
Interactive while boards				
Internet connectivity				

KEY:

Projectors, televisions, radios, public address system, networked printer, interactive white boards are adequate if there is one for each classroom.

Computers (with instructional software installed) are adequate if there is a computer for each student for a training session, otherwise sharing computers is inadequate.

APPENDIX 4: MAP OF MERU COUNTY SHOWING IGEMBE DISTRICS



Source: http://www.flickr.com

APPENDIX 5: INTRODUCTION LETTER DURING DATA COLLECTION

Cosmus M. Gatuyu,

P.O BOX 226 – 60600

MAUA

15th November 2013

TO: THE PRINCIPAL

_____ ECD COLLEGE

Dear Sir/Madam,

RE: PERMISSION TO COLLECT DATA FOR ACADEMIC PURPOSES IN YOUR INSTITUTION

I am Cosmus Gatuyu an ECS Masters student from Kenyatta University carrying out a research for his master's project titled "**Information and Communication Technologies in Early Childhood Teacher Training Colleges Within Igembe Districts.**" Your college has been selected to be part of the study.

I would like to seek your permission to collect data from the student teachers, tutors and do an observation of the general college for purposes of this study. All information collected will be treated with utmost confidentiality and used for academic purposes only.

Your consent to my request will be highly appreciated.

Yours Sincerely,

Cosmus Gatuyu,

ECS Masters Student, Kenyatta University

Contact: 0722102328 email: cosgat@gmail.com