DETERMINANTS OF INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN INSTRUCTION IN EARLY CHILDHOOD EDUCATION PROGRAMMES IN SELECTED UNIVERSITIES IN KENYA

MWOLOLO JOSEPHAT NZIKA
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DECLARATION

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

Signature: _____ **Date:** 15/11/2019

Mwololo, Josephat Nzika

E83/24901/2012

We confirm that the work reported in this thesis was carried out by the candidate under our supervision as University supervisors:

Signature: _____ **Date:** 15/11/19

Dr. Nyakwara Begi

Department of Early Childhood and Special Needs Education

Kenyatta University

Signature: _____ **Date:** 15/11/19

Dr. Maureen Mweru

Department of Early Childhood and Special Needs Education

Kenyatta University

DEDICATION

This work is dedicated to my family.

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ABBREVIATIONS AND ACRONYMS

CUE	- Commission for University Education
ECE	- Early Childhood Education
ECEP	-Early Childhood Education Programmes
ECSNE	-Early Childhood and Special Needs Education
ECTE	-Early Childhood Teacher Education
ESC	-Euro Secondary College
EU	- European Union
DIO	-Diffusion of Information
GOL	- Gueteng Online
ICT	- Information and Communication Technology
IQ	- Intelligent Quotient
IT	- Information Technology
LMS	- Learning Management Software
NAS	- New American School
NACOSTI	-National Council for Science, Technology and Innovation
NCES	- National Centre for Educational Statistics
PEOU	- Perceived Ease Of Use
PU	- Perceived Usefulness
TAM	- Technology Acceptance Model
VLE	-Virtual Learning Environment

ABSTRACT

The purpose of the study was to establish the extent to which lecturers integrate Information and Communication Technologies (ICTs) in instruction and to determine how specific factors influence such integration in selected universities in Kenya. The study objectives were; firstly to establish the extent to which lecturers integrate ICT in instruction in ECE programmes. Secondly, to find out relationship between lecturers' perceived ICT abilities and ICT integration in instruction in ECE programmes. Thirdly, to explore relationship between lecturers' perceived ICT usefulness and ICT integration in instruction in ECE programmes and finally to find out relationship between availability of ICT leadership support and ICT integration in instruction in ECE programmes. Significant of the study was that university management may use the study findings to determine the scope to which lecturers integrate ICT in instruction and factors influencing it. Results of the study could assist ECE administration to identify and establish ways of encouraging and motivating lecturers to integrate ICT in instruction. In addition, the study findings may help lecturers appreciate the benefits of ICT integration in instruction and seek ways to improve the integration. Diffusion of Innovations (DOI) theory and Technology Acceptance Model (TAM) were used to guide the study. Correlational research design was used. The independent variables were: lecturers' perceived ICT abilities, lecturers' perceived ICT usefulness, and availability of ICT leadership support, while the dependent variable was ICT integration in instruction. The target population was all lecturers teaching ECE programmes in public and private universities. Purposive and stratified sampling techniques were used in selecting a sample of 88 lecturers. Pilot study was done using 20 lecturers from two universities; one public and the other private. Questionnaire, observation checklist, and document analysis were the data collection methods used. Content validity of the research instruments was established by the researcher and confirmed by two experts from the department of Educational Communication and Technology of Kenyatta University. Cronbach's Alpha reliability coefficient of test retest for all the research instruments was calculated and ranged between 0.88 and 0.92. Data was analysed using descriptive and inferential statistics. Frequencies, means, standard deviations and percentages were calculated and presented on tables and figures while t-test for independent samples and Pearson's Correlation Coefficient were calculated to test the null hypotheses at alpha value 0.05. The relationship between lecturers' perceived ICT abilities and ICT integration in instruction and between availability of ICT leadership support and ICT integration in instruction were found statistically significant. The best predictor variable for ICT integration in instruction in ECE programmes was lecturers' perceived ICT abilities. It was concluded that most lecturers who perceived their ICT abilities to be adequate integrated ICT in instruction. Lecturers who perceived ICT to be useful did not translate that to ICT integration in instruction and availability of ICT leadership support positively influenced ICT integration in instruction. Based on the results, it was recommended that lecturers need to constantly train in ICT integration in instruction to enhance their confidence in ICT use and learn to integrate advanced ICT tools in instruction.

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Introduction

This chapter focuses on background to the study, statement of the problem, purpose of the study, objectives of the study, research hypotheses, assumptions of the study, delimitation and limitation of the study and significance of the study. Theoretical, conceptual framework and operational definitions of terms have also been discussed.

1.2 Background to the Study

Globally, institutions of higher learning and particularly universities are expected to produce graduates who are among other specialties, competent in Information and Communication Technology (ICT) (Haydn & Barton, 2008). This is because ICT integration in instruction is anticipated to be continuously applied in universities to enhance achievement of learning outcomes. When ICT is integrated in instruction, it promotes collaboration, sharing of resources, motivates learners, as well as making them think critically (Onwuagboke, Singh & Fook, 2015; Khan, Hasan & Clement, 2012; Zaman, Shamim & Clement, 2011; Volman & Van Eck, 2001). In addition ICT integration in instruction helps learners to link theory and practice (Zaman, Shamim & Clement, 2011). Scholars report that use of ICT in instruction helps teachers become more effective in content delivery (Makhoha & Mutisya, 2014). Studies show that when teacher educators integrate ICT in instruction, teacher trainees'

performances and competencies improve significantly (Yusuf, Kajuru & Musa, 2014; Qasem & Viswanathappa, 2016). Interestingly, BECTA (2010) reports that in Africa, integration of ICT in instruction is greatly under-emphasised and requires a better holistic approach if educational institutions, especially the universities are to tap the immense benefits of ICT use in the classroom. This view is supported by Kisoi, Chang'ach and Sang, (2012) who note that many institutions of learning in Kenya rarely integrate ICT in instruction.

Different authorities describe ICT in reference to its various digital technology accomplishments. However ICT has generally been referred to as a range of technological tools and resources used to transmit, store, generate, and share information (UNESCO, 2012). These tools include computers, internet, software programmes, and video-conferencing among others. Goldstrein, Waldman, Tesler, Shonfeld, Forkosh-Baruch, Zelkovich, Mor, Heilweil, Zidan & Kozminsky, (2011) classified ICT tools necessary for use in instruction into basic and advanced tools. In each of these ICT tools' categories, use of computer is common (Sharma & Garg, 2016; Lancaster, David, Albert & Shin-Yuan, 2007).

Many organisations report fast delivery of services when ICT is used. Internationally, ICT integration in instruction has revolutionised the teaching-learning process (Voogt, Fisser, Pareja, Tondeur, & van Braak, 2013). In Japan, USA, German, Spain, Canada, among other developed countries, teachers enhance students' academic performance through integration of ICT in

instruction (Sangani, 2013). Poore (2015) adds that teachers in developed countries have embraced ICT in their workplace and daily lives to improve work performance (Tuckman & Monetti, 2011) a situation reported lacking in developing countries.

In African countries, reports indicate that there has been notable increase in supply and access to digital technology equipment and facilities in most of the sectors. A number of educational institutions including universities have embraced digital learning commonly referred to as e-learning. Particular universities have specific terms in reference to e-learning. For example, in Kenyatta Universities in Kenya, the term Virtual and Open Learning is used while in the University of Nairobi use of Open and Distance Learning is preferred. Other institutions of learning use different terms to refer to digital learning. However, research findings show that the available ICT equipment in most developing countries, Kenya included are underutilised and teacher educators do not integrate ICT in instruction as required (Salem, & Mohammadzadeh, 2018; El-Seoud, Seddiek, Taj-Eddin, Ghenghesh, & El-Khouly, 2013). Essay (2013) affirms lack of consistency among teachers in African countries in the concept of ICT integration in instruction. Studies done to establish the situation of ICT use in instruction in universities in Africa indicate a dismal performance (Makhoha &Mutisya, 2016). Hollow and ICWE (2009) support that ICT integration in instruction in universities in Africa is in its infancy stage. Toure, Tchombe and Karsenti (2008) report that most teachers in Ghana had inadequate training in ICT instruction. Boakye and Banini (2008)

report that majority of teachers in Benin, Cameroon, Ghana and Mali had negative attitude towards ICT and that discouraged them from using ICT in instruction. Similarly, Kamba (2009) informs that despite the high degree of ICT awareness shown by lecturers in universities in Nigeria, ICT integration in instruction was below expectation.

Scholars report minimal use of ICT in most developing countries. In Sub-Saharan Africa, studies indicate that countries lag behind in ICT literacy, ICT content, affordability and access when compared to other countries (Hibert, 2012; Mutula, 2004). In addition, studies have shown that institutions of higher learning in sub Saharan Africa have ICT equipment and resources that are not used as required (Ford, 2007; Kass, 2012). Mpofu, Samukange, Kusure, Zinyandu, Denhere, Huggins, Sithole, (2012) maintain that in many universities in Africa, lecturers assigned to deliver on distant and e-learning lacked adequate experiences on ICT use. For example, Chitiyo and Harmon (2009) reported that university lecturers in Zimbabwe had negative attitude towards integrating ICT in instruction.

Research on ICT use in instruction has been done in a number of countries in Eastern Africa. Kasse and Balungwa (2013) reported that lecturers of universities in Uganda mostly used ICT to deliver learning materials and least to enhance instruction. Additionally, most of the lecturers lacked ICT competence. In Tanzania, Sanga, Sife and Lwoga (2007) investigated the implementation of ICT in instruction in ten universities. Results revealed that despite Tanzanian

government support of technology implementation in universities, ICT integration in instruction was low. Similar findings were reported by Nkembo, Koloseni, & Shimba, (2011) who found university lecturers in Tanzania had negative attitudes towards ICT integration in instruction. Based on these revelations, it was therefore important to evaluate the situation in Kenya by finding out how ECE lecturers perceived ICT usefulness in instruction and whether the perception could be influencing lecturers' adoption and integration of ICT in the teaching-learning process.

Many countries have realised the many benefits derived when ICT is used in different areas. This has tended to make most countries to develop ICT policy. In Kenya, the Government approved ICT policy and strategy to guide ICT usage in education (Republic of Kenya, 2006). This policy emphasises on ICT integration in curriculum at all levels of education. As a result, and over the past few years, in Kenya, there has been a remarkable increase in ICT resources in many institutions of learning including universities. However, reports indicate that these ICT equipment and facilities have not been adequately used. Research has shown that integration of technology in instruction is more than availing technologies in institutions. It calls for bringing in genuine learning contexts that employ innovative technologies in blended and meaningful ways to promote learning (Yelland, 2006; Kinuthia, 2009; Makhoha & Mutisya, 2016). Studies conducted in Minnesota State, USA revealed that use of ICT in instruction in institutions of higher learning was influenced by educators' attitudes on their ICT abilities, perceived ICT usefulness as well as university management ICT

support (Chowdhury, 2010). This study was done in a developed country. A similar study could be duplicated in a developing country such as Kenya and find how these factors influence lecturers' ICT integration in instruction in ECE programmes.

Reports indicate that in Kenya, a number of studies have been conducted on computer use in instruction in schools and colleges. However, studies conducted in universities have shown that more investigations need to be carried out on ICT integration in instruction (Omwenga, 2003; Keiyoro, 2011; Gikonyo, 2012). This is because most of the studies focused on availability and access of computers and not generally ICT integration in instruction. In addition, these studies were based on other educational programmes and not ECE. It was therefore important for a study to be done to establish ICT integration in instruction in ECE programmes in universities in Kenya.

There seems to have been a concern about the adoption and utilization of ICT integration in instruction in universities in Kenya. Nyerere, Gravenir and Mse, (2012) report non-optimal utilization of ICT resources in instruction in universities in Kenya. They further inform that majority of the faculty members demonstrating negative attitude towards ICT use in instruction. The subject of limited ICT integration in instruction has also been reported in early years' education in Kenya. Kaindio and Wagithunu, (2014) found that many pre-primary school teachers were not ICT competent and demonstrated minimal knowledge on ICT. Similar findings were reported by Begi (2007) who

compared usage of computer technology in instruction between pre-primary school and lower primary school teachers in schools in Nairobi.

The Digital Learning Programme, a Government of Kenya initiative, focused on making learners in early years effectively develop appropriate digital skills for use in learning and communication may not be achieved if pre-primary school teachers are not adequately trained in ICT integration in instruction. The inadequate ICT integration in instruction by teachers in educational levels lower than universities could be traced to their initial training in universities. It is from the above background information that this study was designed to establish the extent ECE lecturers integrated ICT in instruction and determine the role of specific factors believed to influence lecturers' ICT integration in instruction in ECE programmes.

1.3 Statement of the Problem

Studies have shown that integration of ICT in instruction in most educational levels in Africa and Kenya, in particular is limited. These studies appear to have focused on access to computers and factors influencing it. Studies done particularly in universities were found to have centred on general programmes and focused on integration of basic ICT tools. It was also noted that ICT integration in instruction in schools was limited and in infancy stage. Teachers in schools are trained in institutions of higher learning universities included. The inadequate ICT integration in instruction in schools could therefore be linked to teacher training programmes. It was therefore important to determine the extent

of ICT integration in instruction in ECE programmes in universities and the role played by lecturers' ICT perception on ICT integration in instruction. If this is not adequately and urgently addressed, benefits that would have otherwise been realised in ICT use by both lecturers and learners will be foregone.

1.4 Purpose of the Study

The purpose of the study was to establish the extent to which lecturers integrated ICT in instruction in ECE programmes in selected universities in Kenya. The study also explored the influence of lecturers' perceived ICT abilities, perceived ICT usefulness and availability of ICT leadership support on ICT integration in instruction in ECE programmes.

1.5 Objectives of the Study

The study sought to achieve the following objectives:

(i) To establish the extent to which lecturers integrate ICT in instruction in ECE programmes.

(ii) To find out the relationship between lecturers' perceived ICT abilities and ICT integration in instruction in ECE programmes.

(iii) To explore the relationship between lecturers' perceived ICT usefulness and ICT integration in instruction in ECE programmes.

(iv) To investigate the relationship between availability of ICT leadership support and ICT integration in instruction in ECE programmes.

1.6 Research Hypotheses

The following were the research hypotheses:

Ha_1: There is a difference in ICT integration in instruction in ECE programmes between public and private university lecturers.

Ha_2: There is a relationship between lecturers' perceived ICT abilities and ICT integration in instruction in ECE programmes in universities.

Ha_3: There is a relationship between lecturers' perceived ICT usefulness and ICT integration in instruction in ECE programmes in universities.

Ha_4: There is a relationship between availability of ICT leadership support and ICT integration in instruction in ECE programmes in universities.

1.7 Assumptions of the Study

The researcher made two assumptions. The first assumption was that the study respondents were honest and freely provided the researcher with the ratings regarding their ICT integration in instruction. To maintain the assumption, the researcher prepared and provided a consent form to the respondents before administering data collection tools. The consent form assured each research respondent of confidentiality and anonymity during and after the research exercise. The respondents could choose to withdraw from the study exercise at any stage. Further, the respondents were informed that the researcher was a student hence respondents were invited to freely participate in the student's scholarly work for examination.

The second assumption of the study was that the research respondents objectively rated their responses on ICT integration in instruction. This was assumed so since in the consent form, the respondents were informed of their freedom to choose to answer or not to answer any question they felt uncomfortable.

1.8 Delimitations and Limitations of the Study

The scope to which the research was done and challenges are described under the following subsections:

1.8.1 Delimitation of the Study

Many factors influence use of ICT in instruction like ICT training and attitudes towards ICT. This study focused on lecturers' perceived ICT abilities, perceived ICT usefulness, and availability of ICT leadership support and their influence on ICT integration in instruction. The study was further delimited to ECE programmes in both public and private universities in Kenya.

1.8.2 Limitations of the study

The study had some impediments. Firstly, lecturers were required to report on how they were using ICT in instruction and how they perceived their ICT abilities and ICT usefulness in instruction. Some lecturers could hesitate in participating in the research exercise due to anxiety of disclosure of their ICT skills' status. The limitation was overcome by the researcher developing a research questionnaire that was soliciting general information on ICT integration

in instruction in ECE programmes. Further, observation and document analysis methods of data collection were used to supplement the reported information by the respondents.

Secondly, during data collection exercise, it was found that some universities which offered ECE programmes had stopped offering them due to lack of student quorum. The challenge was overcome by replacing the universities which were no longer offering ECE programmes with an equivalent number from the set previously left out at the sampling stage.

1.9 Significance of the Study

The results on the extent lecturers integrate ICT in instruction in ECE programmes may be of great importance to university management in helping them to conclusively understand the scope to which lecturers integrate ICT in ECE programmes and the factors influencing it. University management may use the findings of the study to provide appropriate and adequate ICT leadership support to enhance ICT integration in instruction in ECE programmes. Evidence gathered in this study may assist ECE administration to identify and establish varied means of encouraging and motivating lecturers to integrate ICT in instruction in ECE programmes.

The findings of the study may help lecturers to appreciate their status in ICT integration in instruction and find ways of improving it. Results on the relationship between the availability of ICT leadership support and ICT

integration in instruction may inform the university management on ways to minimize and possibly eliminate possible challenges on provision of such support.

1.10 Theoretical Framework

The study was guided by a theory and a model and each has been described.

1.10.1 Diffusion of Innovation (DOI) Theory by Rogers

According to Rogers (2003), DOI are the steps followed in adopting an innovation. The theory explains why, how and the rate of spread of new ideas, product, or practice, their adoption and integration in doing activities considered useful by members of a given community. Four factors determine the adoption of an innovation. They include; the innovation itself, methods used to communicate the information about the innovation, time and lastly, the recipient community.

Rogers reveals that five attributes of innovation are considered for a community to adopt an innovation. He explains that the potential adopters evaluate an innovation on its relative advantage over the existing one or status quo. Secondly, compatibility of the innovation with existing social systems and values, experiences, and needs of the potential users. Thirdly, complexity to learn. In this case, the innovation must be simple and easy to understand. Fourthly, trialability. The innovation has the potential of being easily tried for a limited time to present an opportunity for potential users to learn and practise.

Finally, observed effects. The innovation must give observable positive evidence of output. When the innovation is tested and proved useful, fast rate of adoption is realized.

According to Rogers, 49 – 87 per cent of difference in the rate of adoption of an innovation is accounted for by the five factors explained. However other variables that may influence this rate include the nature of social systems and the willingness and support of change agents in doing so. Rogers cites communication and interpersonal contacts as potential aspects that influence the adoption of an innovation. He points out that the adoption of innovation does not occur at the same time to members of a particular community. It is a practice that undertakes several stages before full assimilation. Rogers ranked the stages of adoption of an innovation hierarchically – Innovator, Early Adopters, Early Maturity, Late Maturity and Laggards and apportioned each category of innovation adoption in percentages as explained:

(i) Innovators

These are the first group of people to adopt an innovation. They are considered as the risk-takers. They account for 2.5% of any given population of a society lecturers included. This group of adopters represents the least members of a community to adopt an innovation. Members of this category are characterised by the courage to take up an innovation even when limited in technical knowledge on its application. They are ambitious to explore the benefits

attached to a particular technology of choice. Mostly they exhibit high social networks and contacts of scientific references.

(ii) Early Adopters

These are the second group of people to adopt an innovation. They account for 13.5% of a given community. They demonstrate the highest degree of opinion leadership compared to any other group in the innovation adoption categories. They constantly seek information concerning an innovation so that they update themselves with the current trends.

(iii) Early Maturity

This is the third group to adopt an innovation. They account for 34% of the society. They have been found to take a relatively long period to adopt an innovation when compared to innovators and early adopters.

(iv) Late Maturity

This is the fourth group of people to adopt an innovation. They account for 34% of the society. The group demonstrates little interest in adopting an innovation. They tend to try an innovation after the average participant. They attach very little value to innovation and its associated benefits.

(v) The Laggards

They are the last group to adopt an innovation. In any community, including universities, they form 16% of the members. According to Rogers, this is the last

group of people to have interest in adopting an innovation. They are characterised by high levels of resistance to change. They prefer their long-held beliefs and practices to any new innovation.

ICT is positively growing almost daily. Researchers tend to agree that when these ICT changes are integrated into instruction both teachers and students benefit. Interestingly, a minimal number of lecturers are reported to integrate ICT in instruction. University ECE lecturers and by extension all university lecturers need to be well versed with new and emerging technologies. They require updating themselves on ICT development to keep the pace of its development. ICT leadership support seems necessary. This means university leadership needs to implement different result-oriented approaches for lecturers to actively participate and consistently integrate ICT in instruction. This may be achieved through formal ICT education, attending ICT seminars, workshops and other varied aspects of ICT content gain. When this happens, lecturers are likely to develop positive attitudes towards the innovation, consequently affecting their perceptions on ICT abilities and ICT usefulness among other attributes.

In this study, the determinants that influence individual adoption and spread of innovation as cited by Rogers, (2003) were considered. The theory gives an understanding of the difference in ICT application by lecturers in their classroom instruction. The theory also explains and accounts for the specific variables that influence ICT integration in instruction in ECE programmes in universities. DOI theory helps leaders to recognise the effect of their ICT support to lecturers. This

support may be in different areas including timely provision of adequate ICT resources, ICT training, recruiting and employing ICT technicians and providing relevant motivation to the lecturers. The communication channels used to spread innovation and the nature of the community addressed verifies with the rate of adoption of an innovation. In universities, this can be achieved through sensitising lecturers on ICT integration in instruction.

This theory serves various innovation adopters who include administrators and lecturers as change agents. In addition, it provides different communities to evaluate ICT use and its relative advantage, compatibility among others that will positively influence potential users. However, this theory does not lay a basis for predicting outcomes and providing guidance on the way to accelerate the rate of adoption (Minishi-Majanja & Kiplangat, 2005). Due to the rapid changes in ICT development, this theory gives an understanding of the ways lecturers may apply to introduce new ICT ideas on ICT integration in instruction and sustain them. The theory was found relevant and used.

1.10.2 Technology Acceptance Model (TAM) by Davis 1989

This model explains factors that lead to the adoption of an innovation by individuals and communities. Davis (1989) identified Perceived Usefulness (PU) and Perceived Ease Of Use (PEOU) as the specific factors that may influence an individual or community to make use of a discovery. According to Davis (1989), PU is demonstrated when individuals relate improvement of their job performance to use of an innovation. Similarly, PEOU is advocated when

individuals use an innovation because of the minimal level of effort required when applying the innovation compared to existing practice. Davis demonstrated TAM as seen in figure 1.1.

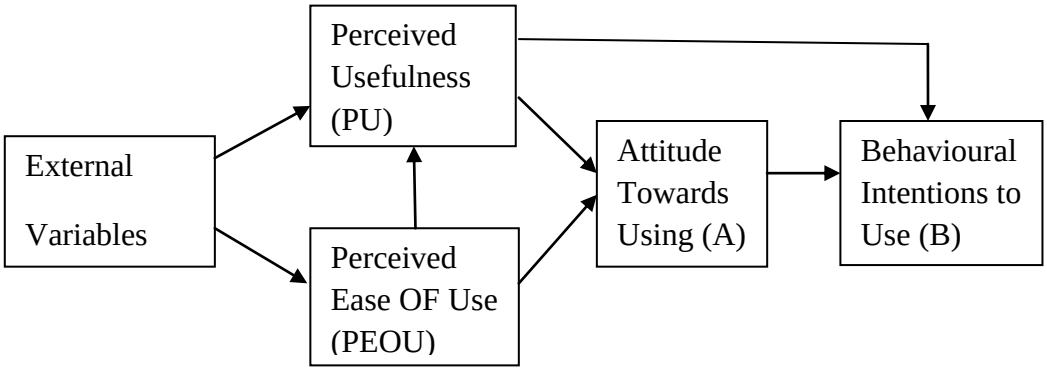

Figure 1.1 Technology Acceptance Model, Davis 1989

Davis was of the view that different individuals will be influenced by external factors in determining whether an innovation will enhance their job performance. However, PU is enhanced by the way such an individual considers the amount of effort to exert as demanded by the innovation (PEOU). When an individual is convinced of the value addition an innovation has in their job performance, the individual is likely to use the specific innovation. The motivation to use the innovation may also be as a result of change in attitude towards the innovation and extrinsic factors. Relating TAM to this study, it informs that lecturers who believe ICT integration in instruction brings improvement in instruction in ECE programmes, adopt and integrate ICT in their teaching-learning process, while lecturers who regard ICT integration in instruction not useful may not integrate it in instruction.

The theory of DOI and TAM were found relevant to guide the study since DOI assisted to determine lecturers' perception of ICT in instruction, and ICT leadership support levels and their extent of use in ECE programmes in universities while TAM verified the claims.

1.11 Conceptual Framework

Related literature was reviewed to shed light on the factors which were key in understanding ICT integration in instruction. The factors were lecturers' perceived ICT abilities, lecturers' perceived ICT usefulness and availability of ICT leadership support in instruction. These variables contribute to quality instruction and achievement of learning outcomes as shown in figure 1.2.

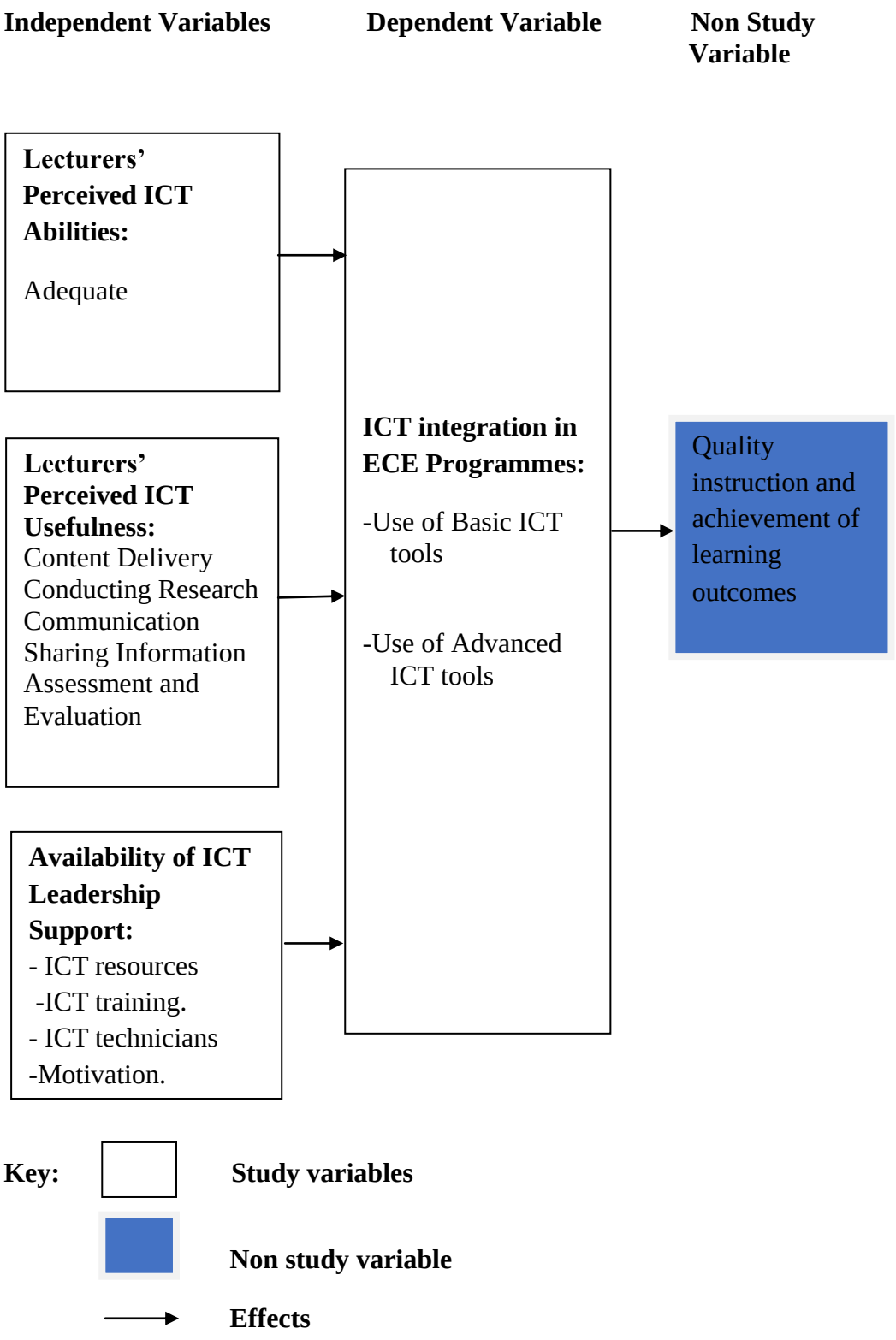

Figure 1.2 Factors Influencing ICT Integration in Instruction

Figure 1.2, demonstrates that lecturers' perceived ICT abilities, lecturers' perceived ICT usefulness and availability of ICT leadership support influence the level of ICT integration in ECE programmes. Lecturers' ICT integration in instruction includes use of Basic tools and or Advanced ICT tools. The lecturers' perceived ICT abilities in integrating ICT in instruction may be adequate or inadequate. In line with DOI and TAM, lecturers who perceive ICT to be useful may integrate ICT in instruction. However, this is possible if universities provide ICT leadership support. Lectures who have a positive perception of their ICT abilities, perceive ICT integration to be useful in instruction and experience availability of ICT leadership support within their universities are likely to integrate ICT in instruction, which consequently may result to quality instruction and achievement of learning outcomes.

1.12 Operational Definition of Terms

Determinants – Perceived ICT abilities, perceived ICT usefulness and availability of ICT leadership support being factors which influence lecturers to integrate ICT in instruction.

Early Childhood Education Programmes – These are learning experiences particularly for early years.

ICT integration - Extent to which lecturers' use ICT in instruction.

ICT Leadership support – Refers to the technical support available in provision of resources, motivation and expertise in ICT.

Information and Communication Technologies - Basic and advanced innovative tools used in instruction.

Lecturers' perceived ICT abilities – Lecturers' beliefs and views regarding their competencies to use ICT in teaching - learning.

Lecturers' perceived ICT usefulness - Beliefs, opinions, and values regarding benefits that accrue from ICT integration in teaching-learning.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

In this chapter, the integration of ICT in instruction in ECE programmes is discussed. Studies on: Integration of ICT in instruction, perceived ICT abilities and ICT integration in instruction, perceived ICT usefulness and ICT integration in instruction, and ICT leadership support and ICT integration in instruction were reviewed. Both theoretical and empirical literature is reviewed. Summary of the literature review was also covered.

2.2 Integration of ICT in Instruction

The ICT innovation and its subsequent use has tended to rapidly spread across the world. Application of ICT is reported to have widely spread mostly in all social fields with education taking the lead (Makhoha & Mutisya, 2016). Several scholars tend to agree that ICT integration in instruction is an online data reporting system that allows both teachers and students to actively interact and get timely feedback on progress (Qasem & Viswanathappa, 2016). According to Makewa, Kuboja, Yango, & Ngussa, (2014) when ICT is integrated in instruction, it makes achievement of educational objectives easy in all learning domains. In order for ICT integration in instruction to realise effective learning experiences, (Hart, 2013) suggests that teachers need to use ICT in content delivery and continue to turn their teaching methods to ICT deliverables. For this to happen, the teaching staff need to be trained in designing online

instructional materials and in ICT pedagogical skills (Mpofu et al. 2012; Nyerere, Gravenir & Mse, 2012).

Different methods of ICT use in education are reported. Nyambane and Nzuki, (2014) inform that in most universities all over the world ICT is provided through web-based Learning Management Systems (LMS), also referred to as e-learning. These LMS have instruction enabling features that allow lecturers to share learning materials and give room for interaction with their students anywhere, any time. Available literature indicates that in developing countries particularly in Africa, the most popular LMS used are Moodle, Sakai, and WebCT, which are popularly referred to as instructional softwares (Garcia, 2012). In Kenya, most institutions of higher learning that have embraced LMS report increased student enrolment, timely completion of areas of coverage and increased student understanding. Reports indicate that most ECE students unable to attend face to face instruction choose e-learning as an alternative method of learning (Kaindio & Wagithunu, 2014).

Instruction in universities has tended to improve when ICT is used. Research findings reveal that university students whose ECE programmes are ICT enabled do better than those taught using traditional methods (El-Seoud et al; 2013). Upon this realization, the United Nations, (2015), Sustainable Development Goals (SDG) item 4 was enacted to support inclusivity and equity in the education delivery using a method capable of exposing learners to a wide range of learning opportunities and ICT is given preference. SDGs focus equal access

to quality ECE education to boys and girls and achievement of a smooth transition from early year grades to primary education by 2030. In addition, every student is hoped to acquire necessary knowledge and expertise required to enhance sustainable development (United Nations, 2015). In this regard, ECE teachers are acknowledged as important change agents whose participation in the achievement of SDGs is important. In order to achieve these endeavours, ECE teachers are advised to integrate ICT in instruction (El-Seoud et al. 2013). It was therefore important to investigate the practice of lecturers' ICT integration in instruction in ECE programmes in selected universities in Kenya in line with wishes outlined by the SDGs.

Different researchers have suggested various ways in which ICT can be used in instruction. Sanga, Sife and Lwoga (2007) suggest that ICT can be taught as an independent subject focusing on creating labour force with ICT skills. ICT can also be integrated into pedagogy to improve the curriculum in what is commonly called blended learning. In addition, ICT can be used to enable learning everywhere at all times geared towards developing knowledge based people in which every person has ICT skills. These scholars further point out that each of the identified approaches demand different ICT infrastructure, personnel and management requirements. According to Mwawasi (2014), blended learning, which is key to this study, focuses on adding value to the quality of instruction. In addition, it has been found that blended learning enables students to have a wide range of access to education (Mtebe, 2015).

There seems to have been a steady growth of ICT application in education over the years. In the 1980s, technology was used mostly for archiving (Pelgrum & Law, 2003). In the same period, it is reported that the application of technology in arithmetic remarkably slowed. The term IT (Information Technology) was introduced and included basic tools, and advanced tools (Lancaster, et al., 2007) where in each category, computer continued to be dominantly used (Sharma & Garg, 2016).

A wealth of evidence indicates that ICT provides a wide range of opportunities for educational institutions to tap and integrate it in their instructional processes (Reilly, 2014). Goldstein et al. (2011) support the view that university teacher educators take the lead in determining the success of ICT integration in instruction since they are models for future teachers. Regrettably, studies have found that university teacher educators have inadequate level of ICT integration in instruction and often choose to teach technological knowledge (Barell, Darling-Hammond, Dede, DuFour, Fisher, Fogarty, Frey, Gardner, Hargreaves, Johnson, Lemke, McTighe, November, Pearlman, Pete, Reeves, Richardson, & Seif, 2010; Goktas, Yildrim & Yildrim, 2009; Brzycki & Dudt, 2005). According to Arnseth and Hatlevic (2012), ICT application in instruction predicts students' academic performance. Researchers have found that ICT use in instruction encourages teachers to manage their instruction strategies in meaningful ways (Eaton-Kawecki, 2003). Moreover, ICT assists teachers to present opportunities for students to shape their education in many useful ways (Chai, Koh, & Tsai, 2010; Hong & Sogan, 2011). Chang, (2012) adds that ICT

use in teaching and learning processes supports new teaching styles and solves many challenges associated with instruction. Upon this realization, most of the developed countries have reorganised their educational systems to respond to the growing demands of ICT integration in instruction (Goldstein et al. 2011). The educational restructuring is aimed at enhancing important student skills that include effective use of ICT in learning (Becta, 2010; Barell et al. 2010).

Quality of professional performance seems to be pegged on competence. Teachers' proficiency in ICTs ranks high when determining ICT integration in instruction (Makewa, Kuboja, Yango, & Ngussa, 2014). Balash, Yong, and bin Abu, (2011) add that teachers who are confident in ICT competencies are likely to effectively integrate ICT resources in instruction contrary to those lacking such expertize. Studies indicate that teachers' competence in ICT usage is demonstrated by how well and effective they integrate such ICT tools in instruction. Teachers who are competent in ICT integration in instruction will manage information, develop problem tasks, and effectively use open-ended software tools that are subject specific and involving student participation. ICT competent teachers will expose their students to collaborative projects using web-based resources. In such cases, students can collaborate, access information and seek assistance from external experts to get solutions to their challenges (Makewa, et al. 2014).

A wealth of literature reveal that many countries across the world have invested heavily in ICT infrastructure, equipment and professional development

(Makhoha & Mutisya, 2016). Gulbar (2007) argues that these investments had little impact and lacked evidence on ICT integration in instruction in ECE programmes, especially in developing countries. It was therefore important to investigate the issues behind such arguments especially in universities offering ECE programmes in Kenya.

Use of ICTs in instruction seems to motivate students to continuously learn. Studies reveal that when ICT resources are used in instruction teachers and students realise positive results (Montrieux, Vanderlinde, Schellens, & De Marez, 2015; Hill & Hannafin, 2001). It is reported that continued use of ICT tools in instruction removes distance and shapes teacher-student relationships (Reilly, 2014; Makhoha & Mutisya, 2016). One important ICT tool is the internet which when integrated in instruction transforms the learning environment (Reilly, 2014). According to Montrieux et, al (2015), the traditional classroom has in the recent past been classified as non-adaptive and obsolete education system which requires a blend with ICT tools for improved learner involvement. Web-based virtual learning has been singled out among other ICT tools as the medium that offers self-directed learning to students (Sharma & Garg, 2016). It is therefore critical for educators to be well versed with web-based virtual learning processes.

There has been a growing concern on blended learning in the context of teacher education (Mtebe, 2015; Ho, Nokamoria, Ho & Ho, 2013). This has been revealed by the reviewed studies on blended learning and appreciation of its

value (Qasem & Viswanathappa, 2016). Although evidence of arguments regarding the adoption of blended learning and its use has been comparatively significant, limited empirical studies exist particularly on ICT integration in instruction in ECE programmes (Abidoye, 2015; Keengwe & Kang, 2013). Masoumi (2015) urges that teachers are driven to integrate ICT resources in instruction majorly by their adequate perceived ICT abilities developed over time through training and practice. Keengwe and Kang (2013) indicate that most teachers who use ICT resources in instruction were sufficiently trained and regularly observed their trainers use such technologies. Consequently, it can be arguably said that success of ECE teacher trainees in ICT integration in instruction majorly depends on their trainers' ICT perception, preparedness and professional application of varied ICT resources in instruction (Chamwei & Koech, 2014). As a result, the situation in universities in Kenya needed to be determined.

Several studies conducted on ICT application in instruction seem to support the importance of ICT integration in instruction. Ryan, Magro and Sharp (2011) investigated the use of internet and its applicability in instruction among doctoral students in America. Findings were that facebook, whatsApp, messenger and other social networking sites facilitated social interaction and knowledge acquisition. Similarly, Moran, Seaman and Tinti-Kane, (2011) investigated intra and inter use of internet in higher institutions of education in America. The study involved 1920 teachers. Questionnaire was the main method of data collection. Most of the teachers reported the internet to be a valuable tool for team teaching

and learning. In addition, Oproiu (2015) did a study on the use of e-learning platforms in university teaching process in Romania. The findings were that most of the students (88%) expressed their willingness to use the e-learning platform more often than previously practised. The researcher suggested that university teaching staff was critical in training students on the practical applications of the e-learning platform. The study further suggested that lecturers need to take a leading role in creating activities that make students use e-learning platform in their learning process. However, for lecturers to do so, they need to be knowledgeable in the practical use of the virtual learning environment. It is important to note that these studies were conducted in developed countries and the culture of the west is different from that of developing countries, such as Kenya. Therefore the study results may not be generalised in Kenya and therefore the need for this study.

Colleges and universities across the world are reported to employ modern technologies in instruction. Evidence on the importance of ICT integration in ECE programmes across all educational levels in the developed countries has made researchers shift focus on the impact of ICT in ECE instruction and concentrate on investigating possible motivators of ICT integration in ECE instruction (Hicks, 2011). Conflicting results have been advanced towards this argument. A study by Kardong-Edgren and Emerson (2010) found that majority of students in Washington, USA reported better learning experiences when teachers competent in ICT integrated ICT in instruction. Interestingly, studies done in Africa reported mixed information. In Nigeria, studies have shown that

there has been poor use of ICT in most of the institutions in the education sector (Kamba, 2009). Factors identified to have continued to promote the low use of ICT in instruction in Nigeria include inadequate ICT competencies, and poor accessibility and insufficient supply of ICT tools (Augustine, Daud & Kamaruddin, 2018). In Kenya, little if any information on ICT and instruction in university ECE programmes is largely lacking.

The internet has provided avenues for enhanced instruction (Montrieux et al., 2015). Yan (2008), comments that ICT applications such as instructional software continue to assist in the classroom teacher-learner interaction. When teachers use instructional softwares, students develop critical thinking, various technical skills and get encouraged to team work (Hilbert, 2012). It is therefore important for teacher trainers to sustain use of ICT in instruction. This is because continuous ICT adoption in instruction influences student-teachers during and after training (Qasem &Viswanathappa, 2016).

There has been an unprecedented increase in research on use of ICT in instruction in teacher education (Ho, et al, 2013). This is because integration of ICT resources in instruction has been associated with the teacher and the trainee (Qasem & Viswanathappa, 2016). Use of ICTs in instruction has been reported to be widespread in education programmes in developed countries (Khlaisang & Likhifdamrongkiat, 2015). However, scanty evidence is advanced on use of technology in instruction in ECE programmes in developing countries. It was

therefore important to find out the situation of ICT integration in instruction in ECE programmes in universities in Kenya.

ICT in Kenya continues to be recognised as a catalyst to economic and social development. Upon this realisation, the National ICT policy was promulgated in 2006. Among other areas of concern addressed was the support of human resource development. This is hoped to be fully achieved through emphasis on the integration of ICT in instruction at all educational levels. In addition, Kenya government has established ICT educational networks from pre-primary schools to universities which intend to promote e-learning by way of adequately funding ICT programmes.

The e-Government strategy on ICT in line with the Ministry of Education (2006) adopted in 2004 was geared towards integrating ICT in instruction in pre-primary to university. This was aimed at equipping learners with the required ICT knowledge and skills. Accordingly, use of ICT tools in education to achieve vision 2030 is a priority. When the National ICT policy and the e-Government strategies are evaluated, the main focus is on education, particularly in schools and universities. Lecturers are considered important change agents in society in line with the implementation of the ICT policies in education. The review of the Kenya government policies on ICT provides an avenue to determine the role of lecturers' perceived ICT abilities, ICT usefulness and availability of ICT leadership support in integrating ICT in instruction.

ICT integration in instruction has revolutionised instructional processes in public and private educational institutions (Abubakar, 2016). Reviewed studies suggest that lecturers in universities need to integrate ICT in instruction because when technology is integrated in instruction learners are motivated (Sharma, Gandher & Sharma, 2011) and ICT have the potential for effective instruction (Yusuf, Kajuru & Musa, 2014).

Teacher educators embrace the benefits experienced in education when ICT is integrated in instruction (Hicks, 2011). Moreover, university students of the 21st century, unlike past generations have a wider interaction with technology and need to be guided on how to maximise on its use in learning (Murray & Olcese, 2011). This brings a need for universities to continuously update their educational and research policies to be in line with the growing technological advancement aimed at providing quality instruction (Garcia, 2012) since teachers have been identified to be a strong driving force for successful ICT integration in instruction (2011). Reed-Swale (2009) reports that teachers of today need to periodically update their technical knowledge and skills to match the rapidly changing innovation. These findings are supported by Koehler, Mishra, Kereluik, Shin, and Graham, (2014) who found that educators need to constantly acquire relevant professional developments to match the current trends in technological advancements especially when such technologies are to be integrated in instruction. Joy and Ishikaku (2014) report that university educators must be ICT competent for them to realise effective ICT integration in instruction during this era of digital technology. However, other factors come

into play in determining ICT integration in instruction. This study was therefore set out to determine in particular the role of perceived ICT abilities, perceived ICT usefulness and availability of ICT leadership support in ICT integration in instruction in ECE programmes in selected universities in Kenya.

In recent years, the demand for university education has steadily grown (Makhoha & Mutisya, 2016). Several universities have opted to combine electronic learning platforms with the traditional teaching approaches to meet the growing university education demands (Oproiu, 2015). According to Opriou and Chicioreanu (2012), moodle, which is a Virtual Learning Environment (VLE) and a LMS is commonly used by universities for the management of distance education. This learning platform enables chats and videoconferencing between teachers and students in a synchronised manner. In addition moodle provides enabling environment for forum messaging and blogs between teachers and students (Weller, 2007). When moodle learning environment is used, both lecturers and students meet, collaborative activities are accomplished and information is created (Oproiu, 2015). The benefits accruing from ICT integration in instruction in universities in Kenya to both students and lecturers may be lost if determinants of ICT integration in instruction are not timely and adequately investigated and addressed accordingly.

Studies on ICT use by students have been done. In Europe, several researchers focussed their studies on ICT use at the undergraduate level (Kyei-Blaunon, Keengwe & Blankson, 2009). Nearly all these studies were on ICT use in the

classroom and perceptions of students towards ICT. In addition, these studies were done in the developed countries and were not particular to ECE lecturers.

2.3 Lecturers' Perceived ICT Abilities and ICT Integration in Instruction

ICT integration in instruction has been widely publicised all over the World. Different scholars seem to agree that teaching and learning in universities requires a focus towards ICT use to match the education changes that continue to be experienced throughout the World (Makewa, et al. 2014). Leaders in educational institutions have the mandate and responsibility to provide the necessary ICT knowledge and skills to their teachers (Wilen-Daugenti & McKee, 2008).

Decisions to integrate ICT in instruction are highly influenced by teachers' perceptions (Makhoha & Mutisya, 2016). These perceptions are as a result of specific fundamental personal teacher beliefs on the results of such an adoption (Sugar, Craawley & Fine, 2004). Wachholz, (2005) suggests that teacher trainers need to adopt ICT relevant training programmes to impart ICT competencies to their trainees for infusion in instructional delivery after training. This is because insufficient ICT teacher training has been found to be the most serious challenge to ICT integration in instruction (Bauer & Kenton, 2005; Yan, 2008).

Globally, there has been a growing concern on ICT capacity of teachers. Researchers report that majority of the teaching staff assigned to conduct e-learning in most universities in the world lack capacity in online instruction

(Commonwealth of learning, 2004) and demonstrate inadequate skills necessary to develop desired e-content (Tarus, Gichoya & Muumba, 2015). In Kenya, reports point out that most (68%) of lecturers responsible in facilitating e-learning lack the necessary e-instructional skills and knowledge and often encounter challenges in designing online learning materials (Nyerere, Gravenir & Mse, 2012). In practice, lecturers were found to use materials for instruction set aside for the residential model of study which may be inappropriate to e-learning thus denying students the benefits attached to e-learning (Mwaniki, Njihia, Chege, & Ireri, 2016). Interestingly, most of these reports are not particular to ECE programmes. Based on the literature reviewed and in order to improve teachers' ICT capacity to integration ICT in ECE instruction, it was important to understand the lecturers' ICT abilities exhibited in ICT integration in instruction in ECE programmes in universities in Kenya.

Studies reveal a close relationship between teachers' ICT abilities and ICT integration in instruction. Burkhardt and Brass, (1990) report that there seems to be a direct correlation between ICT abilities and ICT integration in instruction. Teachers reported to possess adequate ICT abilities tend to integrate ICT in instruction while those who doubt their ICT abilities seem to lack confidence in their ICT integration in instruction and do not use it (Harrison & Rainer, 1997). This correlation was determined in other contexts and not in universities particularly in developing countries. To find out the status of such a relationship in Kenya, this study was formulated.

Some ICT related variables predict ICT use in teaching and learning while others do not. Littrell, Zagumny, and Zagumny, (2005) investigated the influence of contextual and psychological factors as key determinants of classroom technology use in America. The study sample was 168 k-12 teachers who were selected using a stratified random sampling technique. Questionnaire was the tool for data collection. Teachers' perceived ICT abilities were found to be a significant predictor of ICT integration in instruction. Another study by AL Bataineh (2014) in Jordan upper primary and secondary school teachers informed that teachers' ICT competency determined ICT integration in instruction during social studies lessons. Similarly, Onyia and Onyia (2011) did a study to investigate whether there was a relationship between perception and ICT integration in instruction among lecturers in selected universities in Nigeria. A positive correlation was found to exist between teachers' perceived ICT abilities and ICT integration in instruction. Interestingly, most of these studies were done on teachers of educational levels lower than universities and those done in universities were not particular on ECE lecturers. The results may not, therefore, be generalised. This brought the need to duplicate a similar study to determine the extent to which university lecturers' perceived ICT abilities influence ICT integration in instruction particularly in ECE programmes in Kenya.

Modelling has been associated with behaviour change. Steketee, (2006) points out that teacher trainees of the 21st century are likely to employ ICT in instruction when their teacher educators are serious and role models in ICT

integration in instruction. Teacher graduates who were not adequately trained in ICT integration in instruction are likely to experience challenges in ICT application (Elkhouly, 2010). It is therefore important for ECE teacher educators in the universities to be well versed with ICT and apply it in instruction. By such a practice, they become models on ICT use to their students. However, available evidence reveals that successful ICT integration in instruction is dependent on educators' perceptions of ICT (Kaindio & Wagithunu, 2014). It was therefore important to determine ECE lecturers' perception of ICT integration in instruction in universities with a view to improving instruction within the ECE programmes.

ICT innovation is fast growing across the world. Teachers are advised to keep pace with the frequent ICT changes (Reilly, 2014). To sustain the global spread of ICT, education policymakers are recommended to continue to put all-inclusive ICT policies for renewed education and reform (Chowdhury, 2010). This was one reason why the Millennium Development Goal (MDG) Target 8 invited the private sector to work with governments to make available the benefits of innovations especially ICT to both teachers and learners (United Nations, 2012).

Teacher training in ICT has been suggested to promote ICT integration in instruction. Goldstein et al. (2011) did a study on ICT integration in instruction by teacher educators in Isreali colleges of Education. The study involved 22 academic managers. Questionnaire and semi-structured interviews were the tools

used for data collection. It was found that 90% of the respondents had scanty knowledge and skills to integrate basic ICT tools – email, internet search and word in instruction. The study concluded that generally most faculty members employed traditional ways of content delivery and did not use LMS in instruction despite its availability. In addition, Jegede, (2006) investigated computer use in secondary schools in Nigeria. It was found that most teachers did not integrate ICT in instruction since they reported to have no training in ICT integration in instruction and lacked ICT abilities. Teachers were found not to have the prerequisite abilities to integrate ICT in instruction. The situation in Kenya particularly on ECE programmes in universities seems unknown.

In Kenya, several studies on teacher training and ICT integration in instruction in levels below universities have been conducted. Sulungai, Toili and Amadolo (2012) did a study on teacher demographic factors and their influence on ICT integration in teaching of mathematics in secondary schools in Kakamega South District (now Sub County), Kenya. The respondents were 147 mathematics teachers (43 females and 104 males). Methods of data collection were questionnaire, checklist and interview schedule. Majority (96.6%) of mathematics teachers were found to have very low perceived ICT abilities. These teachers lacked basic technology training and felt incompetent to use computers in teaching and learning of mathematics. Similarly, Kiarie (2014) investigated the ease of access and usage of computers in teaching and learning of Business Studies in several secondary schools in Westlands, Nairobi County, Kenya. Both students and teachers participated in the study. The methods of data

collection were questionnaire and interview schedule. It was found that 62.5% of the Business Education teachers did not use computers in instruction and 75% of the teachers never used internet to communicate on teaching and learning materials to their learners and colleagues. According to Goldstrein, et, al. (2011) internet search and communication are classified among the basic ICT tools since they perform elementary functions. These teachers were products of different universities in Kenya and found to have inadequate ICT capacities. Could these ICT inadequacies be traced in the universities? This study tried to answer this question with respect to ECE programmes.

2.4 Lecturers' Perceived ICT Usefulness and ICT Integration in Instruction

Teachers will determine the level of success of a programme in a school set up. Technology infusion in instruction is no exception. Teachers who discover ICT use in instruction results to a marked improvement of classroom performance are likely to use technology in instruction. Huang and Liaw (2005) report that the way teachers perceive an innovation such as ICT will determine its use. Teachers who have evidence of observed positive effects in the instructional processes when ICT is integrated in instruction are expected to use ICT in instruction. An innovation such as ICT to be perceived useful and accepted by teachers must have been tried and tested (Rogers, 1995). On the contrary, when teachers perceive ICTs to be unfulfilling to their instructional needs and intentions they will avoid using them (Keengwe & Onchwari, 2008; Hew & Brush, 2007). There have been conflicting reports on ICT integration in

instruction in different educational levels, especially in developing countries. To get clarity on the situation in Kenya, particularly ICT integration in instruction in ECE programmes in universities, this research was found necessary.

Numerous attributes have been associated with any innovation capable of influencing users to adopt it. Perceived usefulness has been singled out as a significant predictor of integrating innovation to relevant use (Rogers, 2003). When teachers believe that their work outcome will be enhanced as a result of using ICT in instruction, they are likely to integrate ICT in instruction. Understanding ways of promoting educators' perceived ICT usefulness may positively influence their frequency of integrating ICT in instruction (Abubakar, 2016).

Several studies done to determine the relationship between teachers' perceived ICT usefulness and ICT integration in instruction in different educational levels had inconsistent results. For example, Drent and Meelissen (2008) investigated factors which influence innovative integration of ICT in instruction by teachers in the Netherlands. A sample of 210 teachers participated in the study. A survey questionnaire collected data from study participants. The results indicated that teachers' perceived ICT usefulness positively influenced ICT integration in instruction. The results support those of Eugene (2006) who studied aspects of elementary secondary school teachers' perception and their relationship to ICT integration in instruction in Texas, USA. The study used observation as the only method of data collection. Teachers' perceived ICT usefulness was found to be

significantly related to teachers' ICT integration in instruction. These results contradicted those of a study done by EU Schoolnet (2010) on teachers' internet technology use in several countries in Europe. Mixed results emerged. Half of the respondents believed that ICT supported learning beyond the classroom walls while an equal number indicated lack of benefits when ICT is used in instruction and did not use it. These studies were done in countries with cultures different from that of Kenya. Moreover, in all the studies, one method of data collection, was used. There was a likelihood of subjectivity in reporting the results for each study. It was therefore found necessary for a similar study to be carried out in Kenya using more than one method of data collection to give light to the contradictions.

Technology that yields better results compared to past practices is adopted and used (Korte & Husing, 2007). End-users of innovation will adopt innovation when they perceive it to bring better results compared to precedents (Rogers, 2003). When teachers consider ICT to have value addition in instruction, they will integrate it in instruction (Finley, 2003). Several studies conducted support these views. For example, Cope and Ward (2002) did a study to determine experienced high school teachers' perceptions of learning technologies at Euro Secondary College (ESC), Victoria in Australia. The study had 15 participants. Data was collected using semi-structured, open-ended interviews. It was found that learning technologies were perceived to be useful and enhanced learning. In another related study, Askar, Usluel and Mumcu (2006) conducted a survey on logistic regression modelling for predictive task-related ICT use in teaching

among secondary schools in Ankara, Turkey. The study comprised 416 secondary school teachers. A questionnaire was used for data collection. Logistic Stepwise Regression Analysis was computed to determine the perceived ICT usefulness in integrating ICT in instruction. It was found that secondary school teachers' perceived ICT usefulness in instruction was a predictor for ICT integration in instruction.

The way society perceives an innovation strongly determines adoption and use of such an innovation. Studies seem to report that teachers' perceived ICT usefulness influences their integration in instruction (Magen-Nagar & Peled, 2013). According to Teo (2006), the success of students in adopting and implementing ICT use in learning largely depends on perceptions teachers have towards ICT usefulness and their willingness to embrace technology in the classroom. When early childhood teacher educators perceive ICT to be useful and integrate it in instruction, their trainees are likely to emulate and practise the same during and after training. Begi (2014) reports that both preschool teachers and Lower primary school teachers in Kenya had below average training in computer and rarely used computers in instruction. Farrel (2007) in a study on ICT education in Kenya reported a significant number of teachers who did not integrate ICT in instruction since they lacked ICT skills and had negative perception of ICT. Could this negative perception of ICT use have been passed over by the teacher trainers in the universities? To conclusively answer this question, a study to investigate perceived ICT usefulness and extent of ICT

integration in instruction in ECE programmes in universities in Kenya needed to be done.

2.5 Availability of ICT Leadership Support and Lecturers' ICT Integration in Instruction

ICT leadership support seems critical in any social set up. Different scholars tend to agree that members of an organization need leadership support in yielding positive results. In education, through availability of ICT leadership support, teachers may update themselves with the current ICT educational developments (Buabeng-Andoh, 2012). According to Mwawasi (2014), the rapid growth of technology demands management of learning institutions to support teachers to constantly renew their ICT knowledge and skills. Ineffective use of ICT in instruction has been related to inadequate professional support, inadequate available ICT resources and limited ICT training (Macharia, 2013). Afshari (2012) advises that education leadership of today is required to clearly communicate the desired changes in curriculum to the teachers under them since leadership plays a pivotal role in giving directional drive.

In nearly all organizational set ups, leadership plays a key role in determining the direction in which its members take. In education, leadership gives a critical pedagogical drive and determines whether teachers will integrate ICT in instruction or not (McGarr & Kearney, 2009). Teachers' knowledge on the benefits of integrating ICT in instruction may not translate to implementation unless their leaders support them both morally and financially (Wang, 2010).

The practice of teachers to integrate ICT in instruction is situational (Makhoha & Mutisya, 2016). To achieve an effective ICT integration in instruction, it is reported that teachers need in-depth knowledge of their institutional ICT vision, their students' characteristics, and the environment teachers interact with on a daily basis. Further, teachers need to be aware of the available ICT tools, ICT infrastructure and their personal ICT development (Voogt & Tondeur, 2015). It is the responsibility of leaders in every organizational set up to make it known to their juniors of what they are expected to do. Lecturers are no exception. They need to be adequately supported on provision of ICT equipment and resources to be able to utilize them as required. It was therefore important to determine availability of ICT leadership support and its effects in ICT integration in instruction in ECE programmes in selected universities in Kenya in order to give out relevant recommendations.

Much has been reported on ICT integration in instruction. Different scholars tend to agree that teaching and learning in universities need to be geared towards ICT use to match the educational changes that continue being experienced throughout the World (Makewa, et al. 2014). Leaders in educational institutions have the mandate and responsibility to provide the necessary ICT knowledge and skills to their teachers (Wilen-Daugenti & McKee, 2009). The situation in Kenya is unclear hence found necessary to be determined.

Different organizations exhibit various ways in which they support their staff to achieve quality results. In education, availability of ICT leadership support is

displayed in the way an institution utilizes strategies in an effort to offer assistance to teachers' knowledge, skills and attitudes in adopting and using ICT in instruction (Zhao & Frank 2003; Royer, 2002). Baubeng-Andoh (2012), reports several factors that influence educators' practice of ICT integration in instruction. Among the key factors, the availability of ICT tools, teacher preparedness towards ICT use, and motivational techniques to sustain ICT integration in instruction lead. These factors were evaluated in the context of ICT integration in instruction in ECE programmes in selected universities in Kenya.

Reports indicate that the fast growth of technology in educational institutions has found some institutional leaders unprepared for the changes. Afshari, (2012) reveals that some educational leaders are not aware of the trend in use of ICT to enhance instruction. Schiller concludes that such leaders may not guide teachers on how to use ICT in instruction. In Kenya, the common outstanding ICT challenge identified in schools continues to be leadership failure to support fellow teachers in their quest to integrate ICT in instruction (Gichumu, 2016). However, the situation in universities offering ECE programmes is yet to be determined.

The fast development of technology tends to give educational leaders the world over a new responsibility as technological leaders (Gakuu & Kidombo, 2010). It follows that these leaders need to acquaint themselves with new competencies in order to effectively deliver. According to UNESCO-Bangkok (2012) for

teachers to have an impact on ICT integration in instruction they need to conclusively understand the subject matter, the appropriate pedagogy for the subject content and how the two aspects interact within the context of their institutions. School leaders therefore play a central role in influencing teachers on capacity building, pedagogical and technological knowledge and subsequent utilization of ICT in instruction (Mwawasi, 2014). It was therefore necessary to determine the prevailing practices in regard to universities that offer ECE in Kenya.

Departments within institutions of learning, universities included are recommended to have a vision policy in place to guide the department on the direction to follow in order to achieve their objectives (Mutwiri, Kafwa & Mwaka-Kyalo, 2017). University departments that promote ECE programmes in Kenya need to have ICT policy to provide direction on implementation of ICT use. Without such a vision policy, members may not have a clear focus on ICT implementation in curriculum. It is therefore emphasized that leaders in charge of ECE need to provide instructional ICT leadership support on the place of ICT in instruction. Stating a clear ICT vision is one way of giving support. When leaders have a clear vision of their department, external factors may not interfere with the plans put in place since members of the department will concentrate on the clear roadmap through a well-executed plan of action (Charalambous & Papaioannou, 2011). The vision policy on ICT integration in instruction in university ECE departments likely influences ICT use in instruction. It was therefore important to determine whether such support is in existence in Kenyan

universities particularly those offering ECE programmes and how it affects ICT integration in instruction.

Training in a particular field enhances an individual's potential to excel. Bauer and Kenton, (2005) report that teachers' ICT competencies are enhanced when teachers attend ICT training. Training promotes teachers' attitudes towards use of ICT in instruction (Keengwe & Onchwari, 2008). Most teachers in Kenya are trained university graduates. These teachers are expected to embrace technology in their teaching and management of schools. This is dependent on whether such teachers were trained on ways to integrate technology in instruction. For lecturers in universities to adopt technology in instruction, availability of ICT leadership support has been identified as a significant predictor variable (Mwawasi, 2014). However, in Kenya, the relationship between ICT leadership support and ICT integration in ECE programmes seems not clarified.

Educational leaders have been credited for the important role they play in establishing and maintaining instructional environments driven by technology. Moreover, there seems to be a consensus that institutional ICT leadership that provides clear objectives, and teacher professional development strategies in integrating ICT in instruction results in remarkable positive instructional changes (Schiller, 2003). According to Afshari (2012), successful ICT integration in instruction is dependent on effective ICT leadership support. Failure of educational institutions to adopt ICT integration in instruction has been attributed to lack of ICT administrative support (Moyle, 2006). Several

studies support this claim. Salleh and Laxman (2014) did a study to find out the relationship between strategies carried out by primary school leaders to enhance use of ICT in learning and how such strategies relate to teachers' use of ICT in instruction in Australia. It was found that school leaders visualized strategic plan and ICT goals as critical policy issues that may trigger ICT integration in instruction. In the study, school leaders confirmed that in Australia, it was a requirement for ICT to be used in instruction. The fact that many teachers believed using ICT in instruction was a school need, tended to make majority of the teachers integrate ICT in instruction. The situation in Kenya on availability of leadership support on ICT integration particularly in ECE programmes has remained unclear.

Fair distribution of ICT equipment and resources within a learning institution is essential. Mutwiri, Kafwa and Mwaka-Kyalo, (2017) argue that ICT tools in a learning institution require reasonable distribution to enable uniform interaction with both the teaching staff and students. Mwawasi (2014) asserts that fair allocation of ICT resources throughout an institution provides an opportunity to teachers and students to use them in a teaching-learning environment. Access to ICT gives a chance for teachers to integrate ICT in instruction (Abubakar, 2016; Akinjde, Sunday & Adebayo, 2015). While efforts have been put to avail computers, which are a critical component in ICT use in learning institutions, reports indicate that there still exists great inequalities of access to ICT in educational institutions (Blankenship, 1998). This is supported by Gilakjani, (2013) who did a study on barriers teachers face in an attempt to integrate ICT in

instruction. A total of 1163 teachers formed the study sample. The results were that there was a positive relationship between accessibility of ICT tools and equipment and teachers' use of ICT in instruction. Thus it seems necessary for university leadership to make ICT tools, materials and equipment readily available and accessible to the lecturers to enable their use in instruction and this forms part of the objectives of this study.

ICT equipment requires regular technical inspection to caution their breakdown. Skillful ICT technologists become helpful to teachers when ICT equipment breaks down. According to Jones, (2004) teachers feel discouraged and may discontinue using ICT in instruction when they fail to get assistance to redeem a broken down ICT facility. Teachers' potential to integrate ICT in instruction is threatened by unavailable ICT technicians in the educational institutions. Leadership in an educational set up has the responsibility of providing ICT technical support through employing relevant personnel. In order to verify this claim, Tondeur, van Keer, van Braak and Valcke, (2008) conducted a study on ICT integration in classroom. The study had a representative sample of 53 schools. A Principal from the selected schools was included in the study together with 574 teachers. The results were that ICT plan, ICT support and ICT training significantly influenced ICT use in class. In addition, the researchers were of the view that educational institutions need to develop a shared and institution-wide vision in reference to ICT integration in instruction that includes the entire leadership and teachers. ICT leadership support was therefore indicated as critical in influencing ICT integration in instruction. With this understanding, it

was important to evaluate availability of ICT leadership support and establish the relationship it may have with lecturers' ICT integration in instruction in university ECE programmes in Kenya.

2.6 Summary of Review of Related Literature

The literature reviewed has shown fast change of ICT as innovation, widespread use of ICT, and extensive range of benefits received when ICT is integrated in instruction. Studies have indicated a notable difference in ICT use in instruction by teachers in various educational levels in developed and developing countries.

Most studies reviewed focused on the integration of mostly computers in instruction and not ICT tools in general. In addition, most of these studies were done in educational institutions lower than universities. Scanty information found relating to ICT integration in instruction was not particular to ECE programmes. Besides, current evidence was required to inform about the prevailing practice of ECE lecturers' ICT integration in instruction in universities. The study focused on providing evidence and detailed report on how lecturers' perceived their ICT abilities, their ICT usefulness, availability of ICT leadership support and the influence each of these variables had on their ICT integration in instruction in ECE programmes in universities in Kenya that offer such programmes.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter describes the research methodology used in the study. The specific research design utilised within the methodology is explained. A clear description of the variables of the study is articulated. This chapter presents the location of the study, target population, sampling techniques and sample size. It also covers the different research instruments used for data collection, procedures for data validation to avoid research biases. Data analysis techniques are also discussed. The chapter ends with statements of the null hypotheses of the study and breakdown of logistical and ethical issues.

3.1 Research Design

The study was set to find out determinants of integrating ICT in instruction in ECE programmes in selected universities in Kenya. In this quantitative research, a correlational research design was found suitable and used. This research design was relevant because the researcher was interested in establishing non-causal relationships amongst variables. Further, the researcher was concerned in establishing whether a relationship existed between each of the three independent variables: lecturers' perceived ICT abilities, lecturers' perceived ICT usefulness, and availability of ICT leadership support and the dependent variable – ICT integration in instruction in ECE programmes. The study respondents were purposely selected from universities offering ECE

programmes and were pioneer to offer such programmes. Data collected was subsequently analysed without manipulating any with a view to understanding the variables' underlying relationships. The sought statistical relationship between each of the independent variables and the dependent variable enabled the researcher to describe the strength of association and direction of the relationship using scores assigned to each of the variables.

3.2 Variables of the Study

The study consisted of independent variables and dependent variables.

3.2.1 Independent Variables

(i) Lecturers' perceived ICT abilities. The researcher presented to the respondents nine distinct ICT areas. The respondents were required to indicate whether they perceived themselves to have the necessary ICT abilities to integrate ICT resources in instruction. The ICT areas included word processor, spreadsheet, presentation, database, blogs, search engine communication, teleconferencing, and learning management systems. The responses ranged from Strongly Disagree = SD, scored 1, Disagree = D, scored 2, Undecided = U, scored 3, Agree = A, scored 4, and Strongly Agree = SA, scored 5. Response Mean scores were calculated. Means ranging from 1 – 3.49 indicated inadequate perception, while means ranging from 3.5 – 5 indicated adequate perception.

(ii) Lecturers' perceived ICT usefulness. The respondents were presented with ten statements soliciting responses on perceived ICT usefulness in integrating

ICT in instruction. The responses were categorized to range from SD scored 1, D scored 2, U scored 3, A scored 4 and SA scored 5. Response weights were calculated. Weights that ranged 1 - 3.49 were considered to indicate negative perception and that ranged 3.5 – 5 were considered to indicate positive perception.

(iii) ICT Leadership support. The respondents were presented with eleven questionnaire items soliciting responses on specific availability of ICT leadership support. Each questionnaire item was scored ranging from SD scored 1, D scored 2, U scored 3, A scored 4, and SA scored 5. The Mean weights of each questionnaire item were calculated. Mean weights that ranged from 1 – 2.99 indicated inadequate availability of ICT leadership support, Mean weights ranging from 3 - 3.49 indicated moderate availability of ICT leadership support while Mean weights ranging from 3.5 – 5 indicated adequate availability of ICT leadership support.

3.2.2 Dependent Variable

The dependent variable was ICT integration in instruction. Respondents were presented with Basic and Advanced categories of ICT tools. The basic tools category had eight areas of computer programmes. Respondents were required to indicate on each respective computer programme how they integrated it in instruction and to what extent. Scores on the extent of use of each presented basic tool ranged from Never = N, scored 1; Rarely = R, scored 2; Sometimes = S, scored 3; Often = O, scored 4; and Always = A, scored 5. Mean scores were

calculated. Mean scores that ranged 1 – 2.99 indicated below average ICT integration in instruction while Means that ranged 3 – 3.49 indicated average ICT integration in instruction. Means that ranged 3.5 – 5 indicated above average in ICT integration in instruction.

The Advanced ICT tools category had four LMS items against which the respondents were required to indicate how they used each in instruction and to what extent. Scores on the extent of use were applied. Mean scores were calculated the same way those of Basic ICT tools were done.

3.3 Location of the Study

The study was done in specific universities that were considered ECE pioneers and continued to offer ECE programmes. Public and private universities that offer ECE programmes were included in the study. These universities are spread across eleven counties in Kenya. Nairobi City County produced majority of the universities for the study.

3.4 Target population

The target population was 261 ECE lecturers in public and private universities that offered ECE programmes. A total of 40 universities offered ECE programmes. They comprised of 23 public universities with 142 lecturers and 17 private universities with 119 lecturers (CUE, 2018). The researcher visited universities whose websites did not provide information on personnel and

established the number of lecturers teaching ECE programmes from the relevant department.

3.5 Sampling Techniques and Sample Size

Two sampling techniques were used in determining the sample size of the study. The sampling techniques have been described under the following subsections:

3.5.1 Sampling Techniques

Purposive and stratified sampling techniques were used to select the sample for the study. Purposive sampling was used to select universities that offered ECE programmes and were considered pioneers in ECE programmes. Secondly, stratified sampling was used to categorize the universities. Public universities were separated from private universities. Ten universities were purposely selected from the set of public universities while six private universities were purposely selected from the set of private universities. All the university lecturers who taught ECE programmes in the sampled universities formed study respondents.

3.5.2 Sample Size

The study sample size has been presented in Table 3.1.

Table 3.1 Sampling Frame

Type of University	Universities offering ECE programmes and ECE Lecturers			
	No of Universities	No of Lecturers	No of Sampled universities	No of Sampled Lecturers
Public	23	142	10 (25%)	50 (19%
Private	17	119	6 (15%)	38 (15%)
Total	**40**	**261**	**16 (40%)**	**88 (34%)**

Table 3.1 shows that 40 universities in Kenya offered ECE programmes and had 261 ECE lecturers. Out of the total number of public universities, 10 were selected for the study. They accounted for 43% of the public universities and 25% of the total universities offering ECE programmes in Kenya. The selected 10 public universities had a total of 55 lecturers teaching ECE programmes representing 35% of the ECE lecturers in public universities and 19% of all ECE lecturers in both public and private universities in Kenya. All the 55 selected ECE public university lecturers formed part of the study sample.

There were 6 private universities selected for the study. They accounted for 35% of the total private universities that offered ECE programmes and 15% of the total universities that offered ECE programmes in Kenya. The 6 private universities had a total of 38 ECE lecturers accounting for 32% of all private university ECE lecturers and 15% of all ECE lecturers in universities in Kenya that offered ECE programmes. All the 38 ECE private university lecturers selected for the study together with those selected from the public universities formed the study sample.

The total number of lecturers selected for the study sample was 88. Gay, Mills and Airasian, (2009) suggest that an adequate sample is arrived at say, population, N = 300 (give or take 100) 0.5 of the result. Therefore, 88 respondents were considered a suitable sample for the study since it was within the acceptable sample range.

3.6 Research Instruments

Several research instruments were used. They included questionnaire for lecturers, observation checklist and document analysis.

3.6.1 Questionnaire for Lecturers

The design of the questionnaire was guided by the study objectives. It was meant to collect self-reported information from the respondents. The questionnaire was employed because it is a unique research tool favourable when collecting data from respondents located far apart (Polit & Hungler, 1995). The study respondents were spread across Kenya. The questionnaire was found relevant and used.

The researcher sought permission and modified part of the questionnaire items used by researchers Nicolle (2005), Chowdhury (2010), and Reilly (2014) when conducting research on 'Technology adoption into teaching and learning by mainstream university faculty', The relationship between ICT integration and improvement in teaching as perceived by college instructors' and 'Information

and Communication Technology use in the College Classroom' respectively. The adopted research items were used in studies that investigated perception, a major variable of this study. In all the cases, the research tool was found valid.

The questionnaire consisted of five sections. They were;

Section A: Demographic Information

This section included type of university, gender of respondents and professional qualification.

Section B: ICT Integration in Instruction

This section had two levels; the first level (A) contained two lists; one list of basic ICT tools and another list of advanced ICT tools. Respondents were required to state how each of the listed ICT tools were integrated in instruction and their extent of use. The extent of use was rated and scored: N = 1, R = 2, S = 3, O = 4 and A = 5.

Section C: Perceived ICT Abilities and ICT Integration in Instruction

This section had nine statements soliciting responses on lecturer's perceived ICT abilities on ICT integration in instruction using basic and advanced tools. Responses were rated and scored: SD = 1, D = 2, U = 3, A = 4 and SA = 5.

Section D: Perceived ICT Usefulness and ICT Integration in Instruction.

This section had ten items soliciting responses on perceived ICT usefulness and ICT integration in instruction. Responses were rated and scored: SD = 1, D = 2, U = 3, A = 4 and SA = 5.

Section E: Availability of ICT Leadership Support

This section had eleven items soliciting responses on availability of ICT leadership support and ICT integration in instruction. Responses were rated and scored: SD = 1, D = 2, U = 3, A = 4 and SA = 5.

3.6.2 Observation Checklist

The purpose of this data collection method was to enable the researcher to observe and record ICT resources available for integration in instruction. When a researcher undertakes an observation, an opportunity is availed to compare the results with other information collected using alternative methods. Studies tend to agree that observation method of data collection allows scholars to gather evidence of the way things are organised, and prioritized (Nkembo, Koloseni, & Shimba, 2011).

In the observation checklist, the researcher did indicate a number of ICT concerns. First, the researcher indicated specific ICT resources found in each of the sampled universities. This was followed by listing down the number of each specific ICT resource found in each university. In addition, the researcher indicated the working condition of the ICT resource. In this case, the researcher classified the ICT resource condition as either good or poor depending on the ICT functional state. Further, the researcher indicated whether ECE department considered the specific ICT resource to be adequate or inadequate. Lastly, the researcher did indicate where each ICT resource was located within the

university. Details in the observation checklist were then compared with information gathered using the questionnaire for clarity and authenticity purposes.

3.6.3 Document Analysis

While visiting the sampled universities, the researcher with the help of relevant authorities did document ICT resource records available and the extent of use. The specific ICT records documented were; ICT inventory, university ICT policy, Rewarding System for ICT integration in instruction, ICT register on ICT training, University shared strategic plan on ICT, evaluation records on ICT integration in instruction and any other ICT document presented by the university. Document analysis is essential in field research since scholars are of the opinion that it is used to validate similar and relevant data derived using other different data collection methods (Yin, 2003; Polit & Hungler, 1995). Data triangulation was therefore necessary to enhance the accuracy and validity of the study findings.

3.7 Pilot Study

Lecturers from two universities (one public with 12 lecturers and the other private with 8 lecturers) which offered ECE programmes were used for the pilot study. These universities and their respective ECE lecturers were purposely picked to provide an opportunity for the researcher to verify the validity and reliability of the research instruments. It was necessary to verify validity and reliability of the research instruments because most of the questionnaire items

were adopted from researchers (Reilley, 2014; Chowdhury, 2010; Nicolle, 2005) who did similar studies in developed countries. A few of the adopted questionnaires were modified to suit the current study.

A pilot study was also necessary to ensure clarity of the questionnaire, observation and document analysis items to the respondents. Further, the pilot study provided an opportunity for the research assistants to familiarise themselves with the process of implementing the actual data collection.

During the pilot study, the research instruments were administered to the study respondents in each of the universities within an interval of two weeks. After the pilot study, results informed the researcher to do some minor corrections to some items of the research instruments, while other items were removed.

3.7.1 Validity of Research Instruments

Content validity was established to ensure the research instruments measured the construct intended. Content validity establishes the correctness a test tool solicits answers of particular themes of interest to the researcher. The researcher critically analysed each item of the research tool until a personal conviction that the research tools sought answers to the construct of interest as required by the respective research objectives. To ascertain content validity of the research instruments, expert opinion was sought from two Kenyatta University Educational and Communication Technology subject authorities. These subject experts subjected each of the research instruments to systematic technical

scrutiny and gave their criticisms and relevant suggestions for improvement. All the expert suggestions were incorporated in each of the research instruments before administering the tools to the respondents.

3.7.2 Reliability of Research Instruments

Reliability of the adopted and modified questionnaire tool was reported by Nicolle, (2005), Chowdhury, (2010), and Reilley, (2014). The internal consistency for the four constructs of interest in the research tool used by each of the three researchers was above 0.87. Babbie, (2007) advises that a researcher may adopt items with proven reliability borrowed from previous similar research. The researcher calculated measures of internal consistency of the questionnaire responses using test re-test method. The questionnaire was administered to the pilot group of lecturers within an interval of two weeks. Cronbach's Alpha coefficient for ICT integration, perceived ICT abilities, perceived ICT usefulness and availability of ICT leadership support were calculated. The results are presented in Table 3.2.

Table 3.2: Reliability Results

Construct	**Test One**		**Test Two**	
	No of Items	**Cronbach's Alpha**	**No of Items**	**Cronbach's Alpha**
ICT integration	10	0.84	9	0.89
Perceived ICT Abilities	10	0.89	9	0.88
Perceived ICT Usefulness	10	0.88	10	0.89
ICT Leadership Support	12	0.91	11	0.92

Table 3.2 shows reliability coefficient for each of the four constructs; ICT integration, lecturers' perceived ICT abilities, lecturers' perceived ICT usefulness and availability of ICT leadership support in the questionnaire was above 0.8 meaning the instrument was above 80% reliable. Mbithi (2014) affirms that Cronbach's Alpha reliability coefficient higher than 0.70 indicates a strong test and the instruments may be used. The test items were found reliable and used.

3.8 Data Collection Procedures

Data was collected in five stages as follows:

Stage One: Induction of Research Assistants

Two postgraduate students were recruited to assist in data collection. The principal researcher organised a two days' induction seminar for the research assistants. During the induction period, the two research assistants were sequentially taken through each item in the respective data collection instrument and encouraged to ask questions for clarification. A complete and similar understanding of the operation of the research tools was sought in order for each research assistant to practise uniformity in data collection process and reporting during pilot stage and at the actual data collection stage. Ethical requirements of the study were extensively discussed and explained. Logistics that were to be considered during the pilot and actual data collection stages were also discussed.

Stage Two: Administration of Questionnaire to Lecturers

The researcher sought consent of the respondents to participate in the study. This was done by requesting the would-be respondents to sign prepared consent form during the researcher visit. Subsequently, questionnaires were administered to the respondents in their respective universities. The researchers collected the questionnaires immediately they were completed. Some lecturers were not available at the time the researchers visited their universities for questionnaire administration. The researchers used the office of the Chairperson of ECE department in coordinating collection of the left behind consent forms and questionnaire for the missing lecturers. The left behind consent forms and questionnaire were to be picked within one week. The process of data collection took about two months to complete.

Stage Three: Conducting Observation

Observations were conducted to confirm the available ICT tools for lecturers' use in instruction.

Stage Four: Document Analysis

Records about ICT utilization were analysed and noted. The records included ICT inventory, ICT training programmes, ICT reward system and ICT policy among other ICT documents.

3.9 Data Analysis

Descriptive statistics was used to analyze the quantitative data collected. The descriptive statistics generated were frequencies, percentages, means, and

standard deviations; while the inferential statistics computed were t-test, Pearson Correlation Coefficient and Regression Analysis all at alpha value 0.05. H_{01} was tested using t-test because the null hypothesis sought the difference between two means of independent samples drawn from same target population. $H_{02,}$ $H_{03,}$ and H_{04} were tested using Pearson's Correlation Coefficient since this test is applied when researchers are determining direction and measure of strength of a linear association between two variables of study. In H_{02}, the two variables of study were lecturers' perceived ICT abilities and ICT integration in instruction while in $H_{03,}$ the two variables were lecturers' perceived ICT usefulness and ICT integration in instruction. In H_{04}, the two variables were availability of ICT leadership support and ICT integration in instruction. Statistical Package for Social Sciences (SPSS) was used to prepare and analyse data. Results were presented using tables, figures and text.

3.9.1 Null Hypotheses

The following four null hypotheses were stated:

$H_{01:}$ There is no significant difference in ICT integration in instruction in ECE programmes between lecturers in public universities and those in private universities at alpha value 0.05. For this hypothesis, independent samples t-test was used to establish level of significance.

$H_{02:}$ There is no significant relationship between lecturers' perceived ICT abilities and ICT integration in instruction in ECE programmes in universities at alpha value 0.05. For this hypothesis, Pearson's correlation

coefficient was used to determine linear association and strength of the association. Direction of the relationship was also established.

$H_{03:}$ There is no significant relationship between lecturers' perceived ICT usefulness and ICT integration in instruction in ECE programmes in universities at alpha value 0.05. For this hypothesis, Pearson's Correlation coefficient was used to determine linear association and strength of the association. Direction of the relationship was also established.

$H_{04:}$ There is no significant relationship between availability of ICT leadership support and ICT integration in instruction in ECE programmes in universities at alpha value 0.05. For this hypothesis, Pearson's Correlation coefficient was used to determine linear association and strength of the association. Direction of the relationship was also established.

3.9.2 Logistical and Ethical Considerations

To conduct this study, it was necessary for the researcher to seek authority from the concerned entities. The following process was undertaken.

3.9.3 Logistical Consideration

After obtaining research authorization from the Graduate School of Kenyatta University, a research permit to carry out this study was obtained from the National Council for Science, Technology and Innovation (NACOSTI). Thereafter, researchers informed Vice-Chancellors of selected universities,

County Commissioners and County Directors of Education of counties which host the sampled universities of the study.

3.9.4 Ethical Consideration

Respondents were informed that their participation in the study was voluntary and may choose not to participate. The respondents were free to withdraw from the research process at any stage without providing any reason. In addition, respondents were free to choose to answer questions or not to answer should they feel uncomfortable to do so. Further, respondents were free to choose to maintain anonymity by way of concealing their identity on the questionnaire. The researcher assured respondents that the information they provided would be kept confidential and used for research purposes only.

CHAPTER FOUR

FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

In this chapter results from data analysis are presented, interpreted and discussed. The demographic information of the respondents are first presented followed by descriptive and inferential results according to the objectives of the study which were:

(i) To establish the extent to which lecturers integrate ICT in instruction in ECE programmes.

(ii) To find out the relationship between lecturers' perceived ICT abilities and ICT integration in instruction in ECE programmes in universities.

(iii) To explore the relationship between lecturers' perceived ICT usefulness and ICT integration in instruction in ECE programmes in universities.

(iv) To find out the relationship between availability of ICT leadership support and ICT integration in instruction in ECE programmes in universities.

4.2 General and Demographic Information

In this section, the general information and demographic characteristics of the study respondents have been presented.

4.2.1 General Information

Out of the 97 lecturers involved in the study, 95 completed and returned the questionnaires. Seven questionnaires were discarded since they had incomplete data. A sample of 88 lecturers completed the questionnaire in full, yielding to a 91% return rate. Pagano and Gauvreau (2000) advise that a questionnaire response return rate of 60% and above is sufficient for inference. This is supported by Buseinei (2012) and Monari (2013) whose questionnaire response rate was 69% and 80% respectively and considered sufficient.

4.2.2 Demographic Information of the Respondents

The demographic information sought included type of university (public or private), gender, and professional qualification. Information on lecturers' employment status was also obtained. The demographic results have been presented and described under the following headings.

4.2.2.1 Gender

The lecturers' gender was sought and the results have been presented in Table 4.1.

Table 4.1: Distribution of Lecturers by Gender

Gender	No. of Lecturers	Percentage
Male	44	50
Female	44	50
Total	**88**	**100**

Table 4.1 shows that there was equal representation of lecturers by gender. Male lecturers were 44 in number accounting for 50% of the total sample size. Female lecturers were of equal number as that of the males. A total of eighty eight lecturers were involved in the study.

4.2.2.2 Professional Qualification

Distribution of lecturers by their professional qualification was established and is presented in Table 4.2.

Table 4.2: Distribution of Lecturers by Professional Qualification

Qualification	No. of Lecturers	Percentage
Master	58	65.9
Ph D	30	34.1
Total	**88**	**100**

Table 4.2 shows that qualification of the respondents ranged from Masters of Education to Doctor of Philosophy. Majority of the lecturers (58) had Master of Education in ECE qualification and they accounted for 65.9%. Lecturers who were Ph D holders were 30 and accounted for 34.1% of the total study sample.

4.3 Employment Status

The distribution of lecturers by their employment status was established and presented in Table 4.3.

Table 4.3: Distribution of Lecturers by Employment Status

Employment Status	No. of Lecturers	Percentage
Full Time	40	45.5
Part Time	48	54.5
Total	**88**	**100**

Table 4.3 shows that majority of the lecturers (48) accounting for 54.5% were on part time employment and the balance (40) representing 45.5% were in full time employment. Majority of university ECE lecturers were engaged on part-time basis. Work force employed in part time basis is likely to look for alternative sources of earning contrary to those engaged in full time basis a situation that may limit them to engage in continuous learning of new innovations such as ICT.

4.4 ICT Integration in Instruction

The first objective of the study was: To establish the extent to which lecturers integrate ICT in instruction in ECE programmes in selected universities. To achieve the objective the different ways lecturers used ICT in instruction, ICT used and corresponding category (basic or advanced) was established using a questionnaire with nine items. In the questionnaire, lecturers were required to indicate specific ICT used in instruction against preferred instructional activity and results are presented on Table 4.4.

Table 4.4: ICT Tool Used in Instruction by Lecturers

Instructional Activity	ICT used	Advanced tool (A) / Basic tool (B)
Giving lectures	PowerPoint	B
Preparing notes	Word	B
Sharing information	Social media	B
Finding resources	Internet	B
Teaching online	Moodle	A
Discussions	Moodle	A
Chats	Moodle	A
Assignment	Word	B
Conducting tutorials	Power point	B

Table 4.4 shows that most lecturers integrated basic ICT tools in instruction in most instructional activities. Teaching online, Chats and Discussion were the reported activities in which lecturers used advanced ICT tools particularly LMS - Moodle interface in instruction. These results were interpreted to mean that university lecturers preferred integrating basic ICT tools in instruction to advanced ICT tools. This may be as a result of lecturers' low level of competency in using advanced ICT tools in instruction.

When ICT tools used in instruction and the preferred activities for ICT use were established, frequency and the extent of use of ICT in instruction was determined. A Likert scale was used ranging from Never = **N**, scored 1; Rarely

= R, scored 2; Sometimes = S, scored 3; Often = O, scored 4; and Always = A, scored 5. The results are presented in Table 4.5.

Table 4.5: Lecturers' ICT Use in Instruction

ICT Used in:	N		R		S		O		A	
	F	%	F	%	F	%	F	%	F	%
Giving lectures	4	4.5	17	19.3	31	35.2	22	25.0	14	15.9
Preparing notes	8	9.1	10	11.4	21	23.9	36	40.9	13	14.7
Sharing information	16	18.2	22	25.0	19	21.6	23	26.1	8	9.1
Finding resources	0	0.0	4	4.5	9	10.2	32	36.4	43	48.9
Teaching online	7	8.0	14	15.9	26	29.5	24	27.3	17	19.3
Discussions	9	10.2	23	26.1	23	26.1	24	27.3	9	10.2
Chats	4	4.5	12	13.6	23	26.1	33	37.5	16	18.2
Assignment	6	6.8	11	12.5	28	31.8	26	29.5	17	19.3
Conducting tutorials	7	7.9	20	22.7	18	20.5	27	30.6	16	18.2

F = Count, % = Per cent

Table 4.5 shows that the main ways lecturers integrated ICT in instruction (Often and Always) included: Finding resources 85.3%, preparing notes 55.6%, and chatting 55.7%. The other ways included giving assignments 48.8%, conducting tutorials 48.8%, teaching online 46.6%, giving lectures 41.9%, conducting discussions 37.5% and sharing information 35.2%. The results reveal that majority of lecturers used basic ICT tools in instruction majorly to do research and teach. These findings concur with those of Kisirkoi (2015) who conducted a case study to investigate the motivation of teachers to integrate ICT in instruction in a boys' secondary school in Ngong town, Kajiado County, Kenya. The respondents were 18 teachers randomly drawn from a population of 30 teachers. Questionnaire was the only method of data collection. It was found that majority (77.7%) of teachers used ICT particularly computer which is a

basic tool, in instruction to do research, teach, plan and keep record all combined.

Results from observation guide showed several basic and advanced ICT tools were available for use by lecturers in different universities. The questionnaire reported inadequate use of advanced ICT tools. The advanced ICT tools observed in the universities included Video conferencing, and instructional softwares composed of Moodle, WebCT and Sakai.

When these findings are compared to the channels of diffusion of innovations as advocated by Rogers (1995), it showed that university lecturers were in the early stage of technology adoption. In this stage, majority of individuals in an organisation doubt the benefits of innovation and avoid changing from their long-held traditional ways of doing things.

It was established that majority of lecturers were not using advanced ICT tools as expected. The common reason analysed from the responses was lack of adequate ICT leadership support on formal training in ICT integration in instruction. These findings support those of Nyerere, Gravenir & Mse, (2012) who found that majority of faculty members (68%) did not incorporate Open and Distant education Learning (ODeL) in their instruction and reported lack of any formal training on content delivery using this method of teaching. The results are similar to those of Makhoha and Mutisya (2016) who reported that majority of lecturers in Kenya lacked adequate capacity in advanced ICT tools

and as a result could not competently handle online courses since they were not conversant with their university's LMS.

Further analysis was done by calculating and categorising individual Mean scores for the different uses of ICT integration in instruction. Questionnaire item Means that ranged 1 – 2.99 indicated below average ICT integration in instruction while questionnaire item Means that ranged 3 - 3.49 indicated average ICT integration. Questionnaire item Means that ranged 3.5 – 5 indicated above average ICT integration. The results have been presented in Figure 4.1.

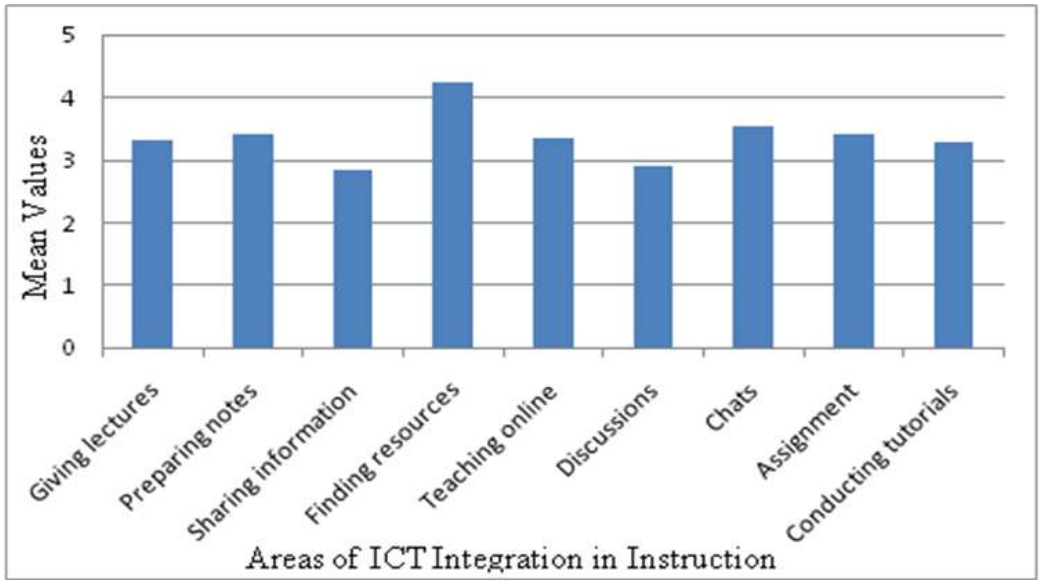

Figure 4.1: Lecturers' Mean Scores of ICT Integration in Instruction

Figure 4.1 shows that lecturers in public and in private universities often integrated ICT in instruction notably in finding resources (Mean = 4.14) and in chats (Mean = 4.30). On further scrutiny, it is revealed that on average, lecturers

integrated ICT in instruction in giving lectures, preparing notes, assignments, teaching online, and conducting tutorials. Generally, the results indicate that most lecturers integrated ICT in instruction when finding resources and chatting while the least number of lecturers integrated ICT in instruction when sharing information.

These findings support those of Buabeng-Andoh (2012) who found that majority of teachers in Ghana were fairly good in using basic ICT tools (Mean = 3.02, SD = 0.99). In support of the study results, Jegede, (2006) in Nigeria and Lau and Sim (2008) in Malaysia found that teachers integrate basic ICT tools in instruction.

To understand the extent to which lecturers integrated ICT in instruction, overall Mean scores in ICT integration were calculated and the results presented in Table 4.6.

Table 4.6: Overall Lectures' Mean Score in ICT Integration by University Type

	Type of university	N	Mean	Std. Deviation
Average ICT integration	Public	50	3.4542	.65326
	Private	38	3.3824	.76889

Table 4.6 shows the overall Mean score in ICT integration for lecturers in public universities was 3.45, while that of lecturers in private universities was 3.38. Since Means ranging from 3 - 3.49 indicated average ICT integration, the results imply that lecturers in both public and private universities had moderate level of

ICT integration in instruction and the difference in ICT integration between them was minimal. On average, lecturers in both public and private universities integrated ICT in instruction.

The findings are consistent with those of Dawam, Rafidah, Ahmad, Kamaruzaman, Taniza, Jamel, and Suhardi, (2009) who did a study on the use of ICT instruction in public and private institutions of higher learning in Malaysia. The study found that there was no difference in lecturers' ICT integration in instruction.

Further analysis was done to find out whether there was a difference in ICT integration in instruction in ECE programmes between lecturers in public and in private university. The following null hypothesis was stated and tested at alpha value 0.05.

> $H_{01:}$ *There is no significant difference in ICT integration in instruction in ECE programmes between lecturers in public and private universities at alpha value 0.05.*

Independent sample t-test was used to test the hypothesis and the results have been presented in Table 4.7.

Table 4.7: Independent Samples Test for Equality of Means

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Average ICT integration	Equal variances assumed	.39	86	.69	.07	.18	-.29	.43
	Equal variances not assumed	.36	21.86	.72	.07	.20	-.35	.49

Results in Table 4.7 show that the Mean difference in lecturers' ICT integration in instruction in ECE programmes in public and private universities was .07 with a p-value of 0.69. The results imply that the difference between the two Means was not significant and thus the null hypothesis was accepted. It was therefore evident that lecturers' ICT integration in instruction in ECE programmes in public and private universities was similar.

The findings of this study were in line with those of Kasse & Balunywa, (2013) who found that no major differences existed in ICT integration in instruction in universities. These studies found ICT integration in instruction in both public and private universities to be average and the same. Similarly, the current results indicate that ICT integration in instruction in ECE programmes in universities is not dependent on the university status - public or private. Lecturers in public and

in private universities were found to integrate ICT in instruction in ECE programmes in similar ways.

These findings concur with those of Ajegbalen (2016) who did a study on the use of ICT to enhance university education in Nigeria. It was found that most university lecturers, on average integrated ICT in instruction. Similarly, Makewa, et al. (2014) investigated ICT integration in Higher Education at University of Arusha. It was found that lecturers regularly integrated basic ICT tools in instruction.

Results of the current study support DOI theory by Rogers (1962). Rogers established that adoption of innovation in a society occurs at different levels within the social system.

4.5 Perceived ICT Abilities and ICT Integration in Instruction

The second objective of the study was**:** To find out the relationship between lecturers' perceived ICT abilities and ICT integration in instruction in ECE programmes in selected universities.

To realise the objective, the different ways lecturers perceived their ICT abilities in ICT integration in instruction were established using a questionnaire of nine items. A Likert scale ranging from; Strongly Disagree = SD, scored 1; Disagree = D, scored 2; Undecided = U, scored 3; Agree = A, scored 4; and Strongly

Agree = SA, scored 5 was used to measure the extent of lecturers' perceived ICT abilities in ICT integration in instruction. The results are presented in Table 4.8.

Table 4.8: Perceived ICT Abilities to Integrate ICT in Instruction

Perceived ICT abilities in integrating:	**SD**		**D**		**U**		**A**		**SA**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Word processor (eg Microsoft word)	0	0	8	9.1	14	15.9	38	43.2	28	31.8
Spreadsheet (eg Microsoft excel)	5	5.7	20	22.7	22	25	25	28.4	16	18.2
Presentation (eg Microsoft powerpoint)	4	4.5	11	12.5	29	33.0	29	33.0	15	17.0
Database (Microsoft Access)	11	12.5	14	15.9	22	25	31	35.2	10	11.4
Blogs	39	44.3	38	43.2	4	4.5	4	4.5	3	3.4
Search engines (eg Internet/ WWW)	3	3.4	4	4.5	5	5.7	37	42.0	39	44.3
Communication (eg Email)	2	2.3	11	12.5	9	10.2	39	44.3	27	30.7
Teleconferencing	31	35.2	39	44.3	13	14.8	3	3.4	2	2.3
Learning Management Systems(eg moodle)	12	13.6	11	12.5	12	13.6	28	31.8	25	28.4

F = Frequency, % = per cent

Table 4.8 shows that generally, lecturers perceived themselves to have sufficient abilities to integrate ICT in instruction using different ICT tools. Majority of the lecturers (Agree and Strongly Agree) 86.3% distinguished themselves to have prerequisite ICT abilities to integrate search engines in instruction and 75% in word processor while the minority of the lecturers reported having perceived ICT abilities to integrate ICT in instruction in teleconferencing 5.7% and in blogs 7.9%. These findings are consistent with those of Onyia and Onyia (2011) who investigated faculty perception for technology integration in Nigeria

university system: Implication for faculty quality curriculum design. A mixed method research design was used. Data was collected using a questionnaire from 60 respondents. It was found that majority (66%) of the lecturers had positive ICT abilities with basic ICT tools application in instruction.

It has been reported that success of ICT integration in instruction largely depends on teacher educators' perceived ICT abilities. When teacher educators have an inner confession to effectively handle a wide range of ICT resources in instruction, they are likely to demonstrate ICT competencies (Tondeur, Velcke & VanBraark, 2008).

To understand the level of lecturers' perceived ICT abilities, Mean score for each area of lecturers' perceived ICT abilities was determined. Mean scores that ranged 1 - 3.49 indicated inadequate perceived ICT abilities and Mean scores that ranged 3.5 – 5 indicated adequate perceived ICT abilities. The results have been presented in Figure 4.2.

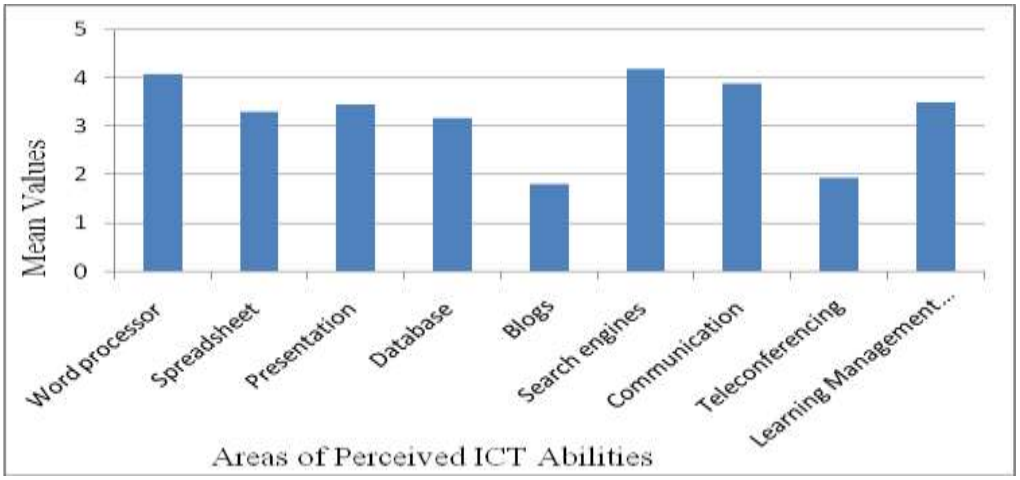

Figure 4.2: Lecturers' Mean Scores of Perceived ICT Abilities to Integrate ICT in Instruction

Figure 4.2 shows Mean of lecturers' perceived ICT abilities ranged from 1.93 - 4.19. Areas in which lecturers' Mean perceived ICT abilities was above 3.5 were word processor Mean = 4.10, Search Engines, Mean = 4.19, and Communication, Mean = 3.90. Out of the nine areas on lecturers' perceived ICT abilities, six areas had Means below 3.5, falling in the category (1 – 3.49) which was considered to indicate inadequate perceived ICT abilities. These results presented the view that most lecturers felt uncomfortable to use ICT in instruction. The results may be interpreted to mean that most lecturers in ECE programmes lacked the necessary knowledge and skills to confidently integrate ICT in instruction hence developed a negative feeling towards ICT use in the classroom.

The findings of this study support those reported by Gacer and Dag (2012), El-Deghaidy and Nouby (2008), and Al Bataineh (2014). These researchers found

that teacher educators had inadequate ICT abilities necessary to integrate ICT in instruction. These findings are also in agreement with those of Makaura, (2014) who investigated students' perceptions on the use of ICT in a higher education teaching-learning context. Among other findings, students reported that on average, lecturers integrated ICT in instruction though they lacked the enthusiasm to do so. This may be attributed to the lecturers' low perceived ICT abilities thus sometimes feeling uncomfortable to integrate ICT in instruction. Other findings in support of the current study are those of Dawam, et al (2009). The study was based on lecturers' perception on the integration of ICT in the teaching learning process. It was reported that lecturers' perceived ICT abilities to integrate ICT in instruction were inadequate and that contributed to part of the barriers to technology implementation in higher institutions of learning in Malaysia.

In contrast to the current study are findings by Bee, Lau, and Hua, (2008) in who explored the extent of ICT adoption among lecturers in institutions of higher learning in Malaysia. It was found that lecturers had high levels of perception of their ICT competencies (Mean = 3.68, SD = 0.55) in ICT integration in instruction and did integrate ICT in instruction. Moreover, Harris (2002) found those teachers who perceived their ICT abilities to integrate ICT in instruction as adequate were confident and willing to explore new pedagogical methods by use of ICT. Gulbahar and Guven (2008) reported that the way teachers are taught during training determines whether they will experiment with emerging ICT related teaching approaches. It therefore implies that teacher educators who

integrate ICT in instruction are likely to positively influence their trainees in using ICT in instruction.

In order to determine whether the relationship between lecturers' perceived ICT abilities and ICT integration in instruction was significant, the following hypothesis was stated and tested at alpha value 0.05:

> $H_{02:}$ *There is no significant relationship between lecturers' perceived ICT abilities and ICT integration in instruction in ECE programmes in universities at alpha value 0.05.*

Pearson Correlation was used to compute the correlation coefficient and level of significance. The results are presented in Table 4.9.

Table 4.9: Correlation Between Lecturers' Perceived ICT Abilities and ICT Integration in Instruction

	Test	**Lecturers' Perceived ICT Abilities**
ICT Integration In Instruction	Pearson Correlation (r)	.486**
	Sig. (2-tailed)	.000
	N	88

P<0.05

Table 4.9 shows that correlation coefficient between overall lecturers' perceived ICT abilities and ICT integration in instruction in universities was significant (r = 0.486, p = 0.000). These results imply that a significant relationship existed between lecturers' perceived ICT abilities and ICT integration in instruction in ECE programmes in universities. Therefore the null hypothesis stated "there is

no significant relationship between lecturers' perceived ICT abilities and ICT integration in instruction in ECE programmes in universities" was rejected. The statistically significant relationship between lecturers' perceived ICT abilities and ICT integration in instruction indicates positive influence of lecturers' perceived ICT abilities in integrating ICT in instruction. This may mean that strategies need to be put in place to constantly boost lecturers' perceived ICT abilities, which is likely to positively influence their ICT integration in instruction.

These study findings confirm those of Buabeng-Andoh (2012) who found a substantial positive relationship between teachers' perceived ICT competencies and ICT integration in instruction ($r = 0.68$, $p < 0.01$). The study results are consistent with those of Sorgo, Verckonik and Kocijanic (2010) whose data analysis revealed a positive correlation between teachers' perceived ICT competencies and ICT integration in instruction ($r = .49$, $p < 0.01$).

The result of the current study supports that of Olojede (2016) whose study was about lecturers' perception and attitudes in integrating ICT in instruction in Nigeria. A randomly selected sample of 120 lecturers was used. A questionnaire was employed to collect data. The study results had a correlation coefficient of 0.037 which was significant at alpha value 0.05. Similarly, Makewa, et al. (2014) study results in Tanzania found that there was a positive and significant relationship between lecturers' perceived ICT abilities and ICT integration in instruction.

4.6 Perceived ICT Usefulness and ICT Integration in Instruction

The third objective of the study was: To explore the relationship between lecturers' perceived ICT usefulness and ICT integration in instruction in ECE programmes in universities.

To achieve this objective, a questionnaire consisting of ten items soliciting information concerning lecturers' perceived ICT usefulness and ICT integration in instruction was formulated and administered. A Likert scale ranging from; Strongly Disagree = SD, scored 1; Disagree = D, scored 2; Undecided = U, scored 3; Agree = A, scored 4; and Strongly Agree = SA, scored 5 was used to measure the extent of lecturers' perceived ICT usefulness and ICT integration in instruction. The results have been presented in Table 4.10.

Table 4.10: Perceived ICT Usefulness in Instruction

Statement	SD		D		U		A		SA	
	F	%	F	%	F	%	F	%	F	%
Improves the quality of instruction	1	1.1	1	1.1	7	8.0	35	39.8	44	50.0
Improves curriculum	0	0.0	3	3.4	8	9.1	32	36.4	45	51.1
Enjoyable and stimulating	0	0.0	1	1.1	8	9.1	33	37.5	46	52.3
It's very involving	6	6.8	8	9.1	6	6.8	24	27.3	44	50.0
Reduces work	3	3.4	12	13.6	15	17.0	32	36.4	26	29.5
Makes work easy	1	1.1	4	4.5	7	8.0	34	38.6	42	47.7
Improves innovativeness	0	0.0	4	4.5	4	4.5	41	46.6	39	44.3
Lowers remedial instruction	1	1.1	7	8.0	19	21.6	28	31.8	33	37.5
Expands learning past school walls	1	1.1	1	1.1	2	2.3	26	29.5	58	65.9
Promotes research in ECE	1	1.1	4	4.5	2	2.3	25	28.4	56	63.6

Table 4.10 shows that all the lecturers considered ICT useful when integrated in instruction. The number ranged between (Agree and Strongly Agree) 64.1% and 95.4%. This indicates that lecturers perceived ICT usefulness to be considered highly useful especially in expanding learning beyond the classroom 95.4%, promoting research in ECE 92.0% and improving innovativeness 91%. The least number of lecturers considered ICT to be useful in reducing their work 65.9%. Interestingly, 77% of the lecturers reported ICT to be very involving.

To have more light on how the lecturers perceived ICT usefulness, individual Mean scores of each area of lecturers' perceived ICT usefulness in instruction was calculated. Mean scores that ranged 1 – 3.49 indicated negative perception and Mean scores that ranged 3.5 – 5 indicated positive perception. The results have been presented in Figure 4.3.

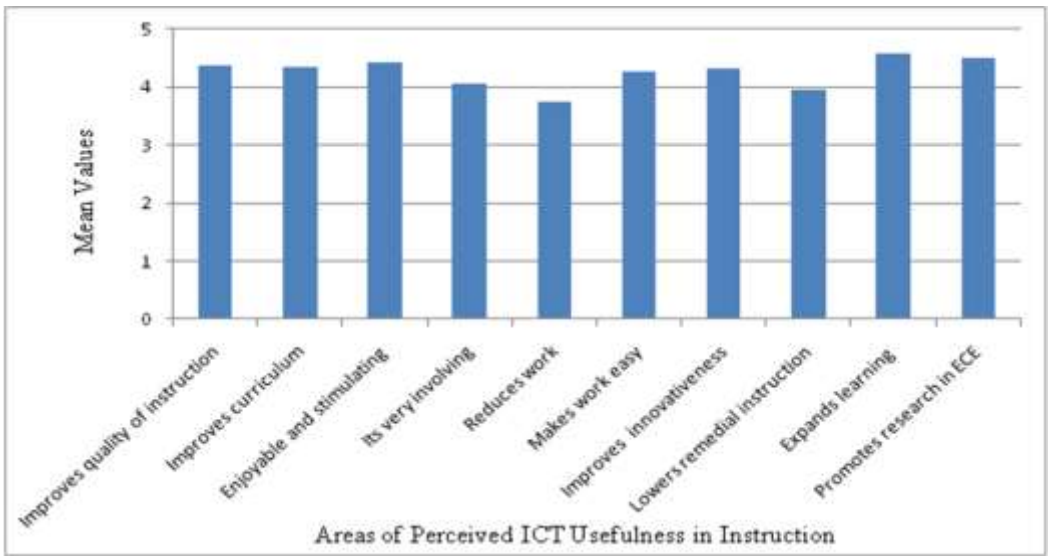

Figure 4.3: Lecturers' Mean Scores of Perceived ICT Usefulness in Instruction

The results in Figure 4.3 show all the Mean scores of the questionnaire items were above 3.5 and specifically ranged (M = 3.75 and 4.58). This meant that lecturers had positive perception on ICT usefulness when integrated in instruction. Lecturers perceived ICT to be most useful when integrated in instruction in expanding learning (Mean = 4.58) and less useful in reducing their

work (Mean = 3.75). This implied that all lecturers had positive perception of ICT usefulness in instruction.

To find out whether there was a significant relationship between lecturers' perceived ICT usefulness and ICT integration in instruction, the following hypothesis was stated and tested at alpha value 0.05:

> *$H_{03:}$ There is no significant relationship between lecturers' perceived ICT usefulness and ICT integration in instruction in ECE programmes in universities at alpha value 0.05.*

Pearson Correlation Coefficient was calculated to determine the relationship between lecturers' perceived ICT usefulness and ICT integration in instruction. The results are shown in Table 4.11.

Table 4.11: Relationship between Perceived ICT Usefulness and ICT Integration in Instruction

		Overall Lecturers' ICT Perceived Usefulness
ICT Integration In Instruction	Pearson Correlation	.176
	Sig. (2-tailed)	.102
	N	88

P>0.05

Table 4.11 shows that the relationship between lecturers' perceived ICT usefulness and ICT integration in instruction was not significant (r = 0.176, p = 0.102). Therefore, the null hypothesis which stated that "there is no significant relationship between lecturers' perceived ICT usefulness and ICT integration in

instruction in ECE programmes in universities" was accepted. This meant that ECE university lecturers considered ICT to be useful when integrated in instruction although that was not reflected in their reporting.

This study findings support that of Chien, Wu, and Hsu, (2014) in Taiwan which explored teachers' beliefs on the use of ICT and their perceived ICT usefulness in instruction. It was reported that although most teachers considered ICT useful in instruction, a significant number of them did not integrate ICT in instruction. Similarly, Wanjala, Aurah,and Koros, (2015) found teachers in secondary schools in Kenya valued ICT as an important component of mathematics instruction. However, most of the teachers did not use ICT in instruction. In addition, Miima, Ondigi, and Mavisi, (2013) found teachers to have high levels of perceived ICT usefulness in instruction with majority integrating ICT in instruction using basic ICT tools (50%) and none using advanced tools.

The results of the current study contradict those of Augustine, Daud and Kamaruddin (2018) who investigate teachers' use of ICT in teaching and learning in Secondary Schools in Nigeria. A sample of 234 teachers was selected from 20 secondary schools. Data was collected using a questionnaire. It was found that teachers' perceived ICT usefulness determined ICT use in instruction and that most teachers perceived ICT to be useful and integrated it in instruction.

4.7 ICT Leadership Support and ICT Integration in Instruction

The fourth objective of the study was: To find out the relationship between availability of ICT leadership support and ICT integration in instruction in ECE programmes in universities.

To achieve the objective statements on frequency and extent on availability of ICT leadership support and ICT integration in instruction were determined using a questionnaire consisting of eleven items. A Likert scale was used ranging from Never **= N**, scored 1; Rarely = R, scored 2; Sometimes = S, scored 3; Often = O, scored 4; and Always = A scored 5. The results have been presented in Table 4.12.

Table 4.12: ICT Leadership Support Indicators

Statement	SD		D		U		A		SA	
	F	%	F	%	F	%	F	%	F	%
My University has a variety of ICT facilities	8	9.1	23	26.1	17	19.3	33	37.5	7	8.0
My University provides ICT technicians	4	4.5	20	22.7	23	26.1	34	38.6	7	8.0
ICT training is personal responsibility in my University	5	5.7	19	21.6	31	35.2	22	25.0	11	12.5
My University has clear ICT policy	1	1.1	11	12.5	26	29.5	31	35.2	19	21.6
My expertise in ICT is self-driven	4	4.5	6	6.8	8	9.1	43	48.9	27	30.7
My department has junk ICT equipment	9	10.2	20	22.7	27	30.7	21	23.9	11	12.5
The lecture halls have few ICT facilities	12	13.6	14	15.9	20	22.7	25	28.4	17	19.3
My department has limited ICT access	10	11.4	19	21.6	18	20.5	31	35.2	10	11.4
My University promotes my ICT knowledge	14	15.9	23	26.1	20	22.7	19	21.6	12	13.6
My department has adequately ICT facilities	10	11.4	24	27.3	25	28.4	21	23.9	8	9.1
My university has clear ICT objectives	2	2.3	10	11.4	20	22.7	31	35.2	25	28.4

F = Frequency, % = Per cent

Table 4.12 shows both public and private universities had ICT policies, accounting for (Agree and Strongly Agree) 56.8 % and ICT objectives 63.6%. Interestingly, majority (79.6%) of the lecturers reported having attained ICT expertise through self-training. This implies that most lecturers support

themselves in training in ICT usage. Consequently, it was found that lecturers get minimal support in ICT development from their university leadership. These findings concur with those of Tibebu, Bandyopadhyay, and Negash, (2009) who found majority of teachers (97%) in Ethiopia trained themselves in ICT integration in instruction.

To provide more light on how the lecturers perceived ICT leadership support available in their universities, individual questionnaire item Mean score was calculated for each of the areas of ICT leadership support. Mean scores that ranged 1 - 2.99 indicated inadequate availability of ICT leadership support while Mean scores that ranged 3 - 3.49 indicated moderate availability of ICT leadership support. Mean scores that ranged 3.5 – 5 indicated adequate availability of ICT leadership support. Results have been presented in Figure 4.4.

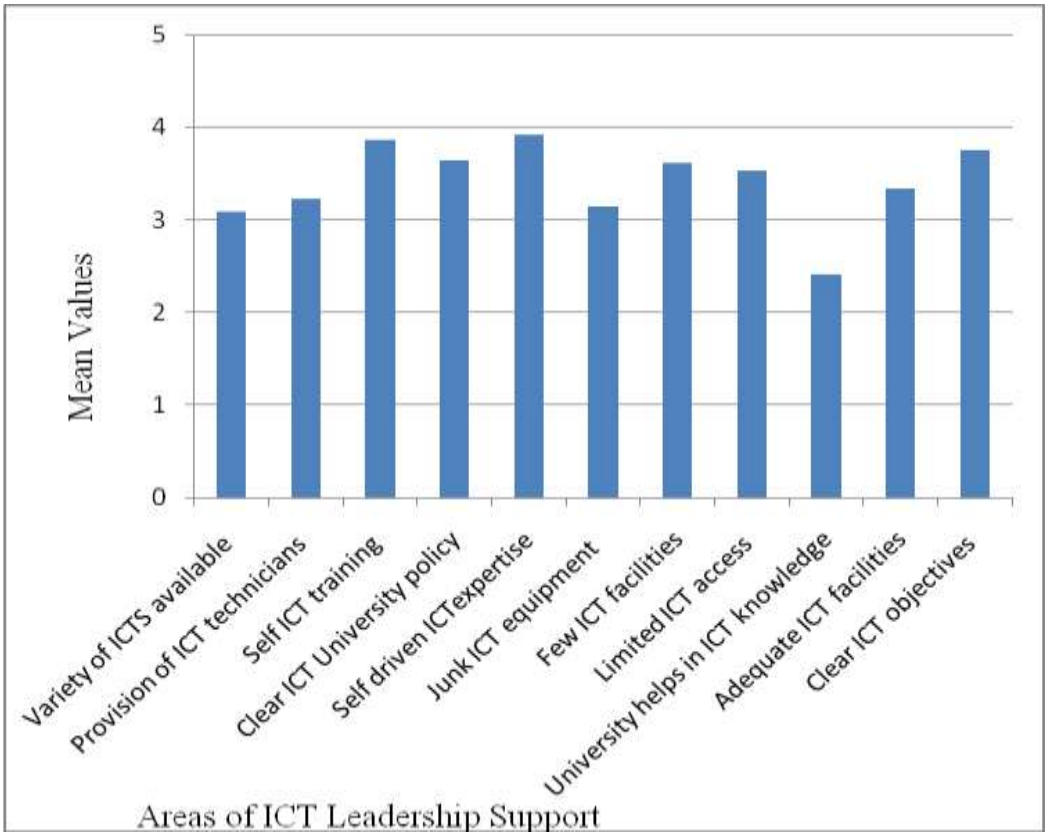

Figure 4.4: Mean Scores of ICT Leadership Support and ICT Integration in Instruction

Figure 4.4 shows majority of lecturers were responsible of their ICT expertise and ICT training (mean = 3.92, and mean = 3.87 respectively). A minimal number of lecturers (Mean = 2.41) were of the opinion that they got support from their university leadership in advancing their ICT knowledge and skills. These findings concur with those of Onwuagboke and Ukegbu, (2010) who found a general lack of ICT leadership support (mean = 3.7) and shortage of ICT technical personnel in Nigerian colleges of Education.

To further find out whether the relationship between leadership support and ICT integration in instruction was significant, the following null hypothesis was stated and tested at alpha value 0.05.

> *$H_{04:}$ There is no significant relationship between availability of ICT leadership support and ICT integration in instruction in ECE programmes in universities at alpha value 0.05.*

To test this hypothesis, data was subjected to correlation analysis. Pearson Correlation Coefficient test was computed and the results have been presented in Table 4.13.

Table 4.13: Relationship between ICT Leadership Support and ICT Integration in Instruction

		Availability of Leadership ICT Support
ICT Integration In Instruction	Pearson Correlation	.308**
	Sig. (2-tailed)	.004
	N	88

P < 0.05

Table 4.13 shows Pearson's Correlation Coefficient between availability of ICT leadership support and integration of ICT in instruction at alpha value 0.05 was significant (r = 0.308, p = 0.004). Therefore the null hypothesis which stated "there is no significant relationship between availability of ICT leadership support and ICT integration in instruction" was rejected. The positive and significant relationship between availability of ICT leadership support and ICT integration in instruction implies that increased availability of ICT leadership

support in universities is likely to translate to a similar increase in lecturers' ICT integration in instruction. Similarly, inadequate availability of ICT leadership support in universities may negatively influence ICT integration in instruction.

The study findings match those of Mwawasi (2014) who did a study on ICT leadership support and ICT use in instruction. It was found that ICT leadership support plays a critical role in determining ICT integration in instruction. The study further revealed that ICT leadership support translates to teacher motivation in ICT integration in instruction.

The current study findings also agree with those reported by Ali, Haolader and Muhammad (2013) on the role of ICT in making teaching-learning effective in higher institutions of learning in Uganda. A sample of 90 teachers and 75 administrators was selected. A questionnaire was used for data collection. Chi-square test and weighted average were the statistical tests used to analyse and interpret the data collected. It was revealed that ICT leadership support was among other factors that influence use of ICT in instruction.

Similarly, Emmanuel, Chiaka and Edna (2014) conducted a study on ICT Integration in the Curriculum of Federal Unity Schools in Nigeria. It was found that ICT leadership support had a significant influence on ICT utilization. This implies that ICT leadership support plays an important role in all educational institutions in influencing teachers' and students' ICT integration in instruction. However, Ang'ondi (2013) points out that despite the positive and significant

relationship between ICT leadership support and ICT integration in instruction, challenges such as inadequate functional ICT equipment and related facilities, and teachers' lack of relevant knowledge and skills on how to integrate ICT in instruction seem to challenge such a relationship.

According to Mwawasi (2014), ICT leadership support includes timely communication of the institution's vision on ICT, ICT objectives put in place, lecturers' in-service refresher training on ICT, motivation of lecturers to use ICT in instruction, among other support services. When lecturers are supported with equipped functional ICT lecture rooms and current ICT facilities, allowed to attend ICT refresher courses and seminars, lecturers are likely to integrate ICT in instruction. This is because it was found that there exists a positive and significant relationship between ICT leadership support and ICT integration in instruction.

Lecturers who are constantly exposed to ICT practices are likely to develop interest in ICT integration in instruction. Kpolovie, Iderima and Ololube, (2014) suggest that fear of failure in integrating ICT in instruction discourages lecturers from using ICT applications in instruction. This fear may be harboured by lecturers when they fail to frequently interact with ICT infrastructure. Availability of high-level ICT leadership support committed in areas of ICT training, provision of modern ICT infrastructure and generally personnel support are critical components of successful ICT integration in instruction at all educational levels (MacCallum, Jeffrey & Kinshuk, 2014).

4.8 Exploratory Analysis

An exploratory analysis was needed to determine contribution of each of the independent variables in ICT integration in instruction.

4.8.1 Prediction of ICT Integration in Instruction from Perceived ICT Abilities, Perceived ICT Usefulness and Availability of ICT Leadership Support

The data on lecturers' ICT integration in instruction and that of each of the three independent variables were subjected to Regression Analysis. This was to determine the best predictor variable on lecturers' ICT integration in instruction among the three independent variables. The results have been presented on Table 4.14.

Table 4.14: Contributions of Independent Variables to ICT Integration in instruction

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.853	.667	.439	1.279	.204
Average perceived ICT abilities	.570	.139	.433	4.102	.000
Average perceived ICT usefulness	-.008	.149	-.005	-.052	.958
Average availability of ICT leadership support	.173	.128	.141	1.352	.180

a. Dependent Variable: Average ICT integration

Table 4.14 shows regression coefficients of the independent variables in lecturers' ICT integration in instruction. The regression coefficients represent the contribution of each independent variable to ICT integration in instruction. The results show that lecturers perceived ICT abilities significantly influenced

lecturers' ICT integration in instruction ($t = 4.10$, $p = .000$). The regression coefficient of lecturers' perceived ICT usefulness and ICT integration in instruction was negative and not significant ($t = -.052$, $p = .958$). The regression coefficient of availability of ICT leadership support and ICT integration in instruction was not significant ($t = 1.35$, $p = .180$). It was therefore found that lecturers' perceived ICT abilities were the best predictor variable of ICT integration in instruction followed by availability of ICT leadership support. Qasen and Viswanathappa (2016) report that teachers' ICT integration in instruction largely depends on their general perception of ICT abilities. The findings of the study support that of Usman (2015) who did a study on e-learning acceptance among secondary school teachers in Nigeria. Among other independent variables, teachers' perceived ICT abilities was found to significantly determine teachers' ICT integration in instruction with a $p < 0.05$.

Results of the current study contradict those by Teeroovengadum, Heeraman and Jugurnath (2017) who examined the antecedents of ICT adoption in education using an extended technology acceptance model. Prediction of influence of several independent variables was done using multivariate regression analysis. It was established that among other independent variables, perceived ICT usefulness significantly influenced secondary school teachers' ICT integration in instruction in Mauritius ($t = 5.78$, $p < 0.05$). Similar findings were revealed by Wanjala, Aurah and Symon (2015) who studied pedagogical factors affecting the integration of computers in mathematics instruction in secondary schools in

Kenya. It was found that perceived ICT usefulness in mathematics positively and significantly influenced ICT integration in instruction ($t = 1.81$, $p < 0.02$).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings of the study, conclusions based on the findings of the study and outlines recommendations and suggestions for further research.

5.2 Summary of the Findings

The study established that a variety of ICT resources were available to the lecturers for integration in ECE instruction in both public and private universities. These ICT resources included computers, computer programmes, online programmes, and internet. Most lecturers of public and private universities were found to be on average integrating ICT in instruction. On a Likert scale of range 1 - 5, it was found that the overall Mean score in ICT integration in instruction for lecturers in public universities was 3.45, while that of lecturers in private universities was 3.38. When these figures were rounded off to the nearest one, a figure of 3 was arrived at in both cases. It therefore followed, lecturers teaching ECE in universities integrated ICT on almost the same level. Further analysis revealed that statistically, there was no significance difference in ICT integration in instruction between lecturers in public and those in private universities since the Mean difference in ICT integration in instruction was .07 with a p-value of .69.

It was found that majority of lecturers from both public and private universities were using basic ICT tools in instruction. The common areas of basic ICT integration in instruction were administering lectures, preparing lesson notes, sharing information, and finding resources. The other ways included conducting discussions and chatting with students, giving assignments for students to do and conducting tutorials. Lecturers from both public and private universities were minimally integrating Advanced ICT tools in instruction.

Results of the study showed that the relationship between lecturers' perceived ICT abilities and ICT integration in instruction was statistically significant at alpha value 0.05. The relationship had a Pearson's Correlation coefficient of 0.486 and a p-value of 0.000. Majority of the lecturers reported to have trained themselves in ICT integration in instruction in ECE programmes.

It was further established that majority of lecturers' perceived ICT usefulness and ICT integration in instruction in ECE programmes was positive. Using a scale of 1-5 to determine the perception, Mean scores in lecturers' ICT integration in instruction ranged from 3.75 - 4.58. This range was considered positive perception. However, the relationship between lecturers' perceived usefulness and ICT integration in instruction was not statistically significant at alpha value 0.05 since when Pearson Correlation coefficient was determined, it was found to be 0.176, with p-value, 0.102.

Majority of lecturers in both public and private universities reported inadequate availability of ICT leadership support. The relationship between availability of ICT leadership support and ICT integration in ECE instruction was statistically significant at alpha value 0.05. The relationship had a Pearson's Correlation coefficient of 0.308 and a p-value, 0.004.

5.3 Conclusions

The first objective was to establish the extent to which lecturers integrated ICT in instruction in ECE programmes. Results revealed that lecturers mostly integrated basic ICT tools in instruction and the integration was low in both public and private universities. It was therefore apparent that most lecturers' ICT integration in instruction was minimal and at the initial stage.

In the second objective the researcher was to find out the relationship between lecturers' perceived ICT abilities and ICT integration in instruction in ECE programmes in universities. The result showed that majority of lecturers' perceived ICT abilities was negative. The relationship between lecturers' perceived ICT abilities and ICT integration in instruction was found to be statistically significant. Consequently, it was concluded that lecturers' perceived ICT abilities positively influenced ICT integration in instruction.

In the third objective, the researcher was to explore the relationship between lecturers' perceived ICT usefulness and ICT integration in instruction in ECE programmes in universities. Results showed that majority of lecturers'

perception of ICT usefulness was positive. This meant that lectures valued ICT integration in instruction. However, the relationship between lecturers' perceived ICT usefulness and ICT integration in instruction was not significant at alpha value 0.05. Thus lecturers' perceived ICT usefulness did not translate to their integration of ICT in instruction.

Lastly, the study was to find out the relationship between availability of ICT leadership support and ICT integration in instruction in ECE programmes in universities. Results showed that majority of ECE lecturers in both public and private universities had inadequate ICT leadership support. The relationship between availability of ICT leadership support and ICT integration in instruction was statistically significant at alpha value 0.05. This meant that availability of ICT leadership support in universities positively influenced lecturers' integration of ICT in instruction in ECE programmes.

5.4 Recommendations

To improve integration of ICT in instruction, the following are the recommendation for the key stakeholders. The key stakeholders include: Lecturers of ECE programmes, management of universities, and Ministry of Education, Science and Technology.

5.4.1 Lecturers of ECE Programmes

(i) Attend in-service training like seminars and workshops on how to integrate advanced ICT tools in instruction. This is because most lecturers were found to be using basic ICT tools in instruction.

(ii) Integrate more ICT in instruction. This is because lecturers' ICT integration in instruction was minimal and at the initial stage.

(iii) Frequently attend ICT training to continuously and constantly learn how to integrate ICT in instruction. When this is implemented in universities, it is hoped that lecturers may improve their competences on ICT integration in instruction. This is because majority of lecturers' perceived ICT abilities to integrate ICT in instruction was negative. The relationship between lecturers' perceived ICT usefulness and ICT integration in instruction was not significant and therefore had a negative impact on ICT integration in instruction in ECE programmes.

5.4.2 Management of Universities

(i) Organize frequent in-service training for lecturers to learn how to integrate advanced ICT tools in instruction. This is because most lecturers were using basic ICT tools in instruction. Lecturers' ICT integration in instruction was also minimal and their perceived ICT abilities was inadequate.

(ii) Appreciate and carter for the factors that influence ICT integration in instruction. University management need to clearly understand the role played by lecturers' perceived ICT abilities and ICT leadership support in

ICT integration in instruction so as to seek strategies to strengthen lecturers for better use of ICT in instruction.

(iii) Motivate lecturers to integrate ICT integration in instruction. Lecturers' ICT integration in instruction in both public and private universities was minimal. The relationship between lecturers' perceived ICT usefulness and ICT integration in instruction was not significant at alpha value 0.05.

(iv) Provide lecturers with easy access to ICT resources for both lesson preparation and instructional use.

(v) Provide lecturers with more time for teaching so as for them to plan on how to integrate ICT in instruction.

(vi) Provide technical support for ICT integration in instruction. Majority of the lecturers in both public and private universities reported inadequate availability of ICT leadership support.

5.4.3 Ministry of Education Science and Technology

Provide adequate funds to universities to enable them to organize adequate in-service training for lecturers to learn how to integrate advanced ICT tools in instruction. The funds would also be used to provide more ICT resources for ICT integration in instruction as outlined in the National ICT policy framework.

5.4.4 Recommendations for Further Research

The following recommendations were suggested for future research:

(i) The present study focused on lecturers' ICT perceptions, availability of ICT leadership support and ICT integration in instruction. There might be other

factors that determine lecturers' ICT integration in instruction like gender, age, work load, experience, and terms of engagement. Therefore, there is need to do a study on these other factors and establish their impact on lecturers' ICT integration in instruction in ECE programmes in universities.

(ii) Similar studies need to be done aimed at investigating challenges encountered by ECE lecturers and students in ICT integration in instruction in universities.

(iii) A similar study may be duplicated with a bigger sample.

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APPENDICES

APPENDIX I

QUESTIONNAIRE FOR LECTURERS

You are requested to read each statement in this questionnaire and make your informed response. In some sections, text answers are required and in others you tick (√) the most appropriate relevant answer. The statements solicit your views on perceived ICT abilities, perceived ICT usefulness, and ICT leadership support and integration of ICT in instruction. Your responses are most valued. Without them, this research will not be complete.

SECTION A: Demographic information

1. Type of university

   Public ☐

   Private ☐

2. Your Gender

   Male ☐ Female ☐

3. Professional Qualification:

   Diploma ☐

   Degree ☐

   Masters ☐

   Ph D ☐

SECTION B: ICT INTEGRATION IN INSTRUCTION

Indicate content area you integrate ICT in instruction against the respective ICT tool. Thereafter, select your most appropriate answer by indicating the respective scale value against each statement on extent of use of ICT tools on the content area stated. The scale ranges from 1 – 5:

1 = **Never,** 2 = **Rarely,** 3 = **Sometimes**, 4 = **Often,** 5= **Always**.

A	**ICT Tools**	**Content area ICT is used in instruction**	**Extent of Use**				
	Basic		**1**	**2**	**3**	**4**	**5**
	Word						
	excel						
	access						
	PowerPoint						
	SPSS						
	Internet						
	email						
	Social media						
B	**Advanced**						
	Software programmes (LMS)	**Content area ICT is used in instruction**	**Extent of Use**				
			1	**2**	**3**	**4**	**5**
	Moodle						
	Sakai						
	Video conferencing						
	WebCT						

SECTION C: Lecturers' Perceived ICT abilities and ICT integration in instruction

Select your most appropriate answer by indicating the respective scale value against each statement on perceived usefulness of ICT integration in instruction. The scale ranges from Likert scale 1 – 5:

1= Strongly Disagree, 2= Disagree, 3 = Undecided, 4= Agree, 5= Strongly Agree.

	Statement about Perceived ICT Abilities **I have the necessary abilities to integrate ICT in instruction using;**	**1**	**2**	**3**	**4**	**5**
1	Word processor (eg Microsoft word)					
2	Spreadsheet (eg Microsoft excel)					
3	Presentation (eg Microsoft powerpoint)					
4	Database (Microsoft Access)					
5	Blogs					
6	Search engines (eg Internet / WWW)					
7	Communication (eg Email / Social media)					
8	Teleconferencing					
9	Learning Management Systems(eg moodle)					

SECTION D: Lecturers' Perceived ICT Usefulness and ICT Integration in Instruction

Select your most appropriate answer by indicating the respective scale value against each statement on perceived usefulness of ICT integration in instruction. The Likert scale ranges from 1 – 5:

1= Strongly Disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Strongly Agree.

	Statement on perceived ICT usefulness in integrating ICT resources in instruction: **ICT;**	**1**	**2**	**3**	**4**	**5**
1	Improves the quality of instruction					
2	Improves curriculum					
3	Enjoyable and stimulating					
4	Is very involving					
5	Reduces work					
6	Makes work easy					
7	Improves innovativeness					
8	Lowers remedial instruction					
9	Expands learning past school walls					
10	Promotes research in ECE					

SECTION E: **Leadership support and integration of ICT in instruction**

Select your most appropriate answer by indicating the respective scale value against each statement on leadership support and ICT integration in instruction. The Likert scale ranges from 1 – 5:

1=Strongly Disagree, 2= Disagree, 3 = Undecided, 4= Agree, 5= Strongly Agree

	Statement on leadership ICT support	**1**	**2**	**3**	**4**	**5**
1	My University has a variety of ICT facilities					
2	My University provides ICT technicians					
3	ICT training is personal responsibility in my University					
4	My University has clear ICT policy					
5	My expertise in ICT is self-driven					
6	My department has junk ICT equipment					
7	The lecture halls have few ICT facilities					
8	My department has limited ICT access					
9	My University promotes my ICT knowledge					
10	My department has adequately ICT facilities					
11	My university has clear ICT objectives					

APPENDIX II:

OBSERVATION CHECKLIST

ICT Resource	No. of ICT Resources	Functionality Good/Poor	Adequate/ Inadequate	Where Located

APPENDIX III

DOCUMENT ANALYSIS GUIDE

The researcher with the help of relevant authorities analysed ICT records to establish availability of ICT records and extent of use

ICT Records	**Available / Not available**	**Extent of Use**
Inventory		
Policy		
Rewards		
Training Plan		
Strategic Plan		
Evaluation		
Any other ICT record(s)		

APPENDIX IV

CONSENT FORM

Study Title: Determinants of Information and Communication Technologies' Integration in Instruction in Early childhood Education Programmes in Selected Universities in Kenya.

BACKGROUND AND PURPOSE: I am a student of Kenyatta University pursuing Ph D in Early Childhood Education. You are requested to participate in this scholarly work in support of my thesis' examination. The purpose of the study is to establish the extent to which ECE lecturers integrate ICT in instruction and determine the factors that influence ICT integration in instruction.

PROCDURE: A questionnaire with five parts will be used. The parts are; Demographic information, ICT integration in instruction, Perceived ICT abilities, Perceived ICT usefulness and ICT leadership support. Some items require use of text while others need to be checked (√).

CONFIDENTIALITY AND RISK: Some information sought may touch on your personality and cause fear. Items that solicit information that may make you feel uncomfortable need NOT to be answered. You may choose to withdraw from this exercise at any stage without giving reasons.

COST AND BENEFITS TO YOU: I acknowledge that you are to spend your time in responding to the questionnaire items. This may in turn affect your pay for the lost time. The exercise has no direct benefits to you. However, your participation will go a long way in informing lecturers in general their current ICT integration in instruction status and university management on need to promote ICT integration in instruction and that may be part of your contribution to the community.

REQUEST FOR MORE INFORMATION: Use these contacts: Telephone 0721272725, and email address: makaumwololo@gmail.com when need arises.

SIGNATURE: I confirm that all relevant information of this research has been explained to the participant and that participation is purely on voluntary basis. The participant has freely offered to participate. A mature witness of over 18 years is needed to authenticate this acceptance.

Researchers signature:_____ Date:_____

Participant signature:_____ Date:_____

Witness signature:_____ Date:_____

APPENDIX V

COVER LETTER

COVER LETTER TO ECE LECTURERS (PARTICIPANTS)
(Information about the study)

14th August 2017

Dear Lecturer

RESEARCH PARTICIPATION

I am a student pursuing Doctor of Philosophy in the Department of Early Childhood and Special Needs Education in Kenyatta University, Kenya. The study title is 'Determinants of integration of Information and Communication Technologies in instruction in Early Childhood programmes in selected universities in Kenya'. The purpose of the study is to establish lecturers' ICT integration in instruction so that the findings may offer response to the government, university administration and other stakeholders for better utilization of technology in instruction.

You are requested to fill in the attached questionnaire as guided. The responses are purely your own opinion. There is no right or wrong response. All details in the questionnaire will be treated confidential. The researcher will not share solicited information with any other person or institution. You are further requested to complete the questionnaire within three weeks, put it in the attached envelope, seal the envelope and return the sealed envelope to the department Chair.

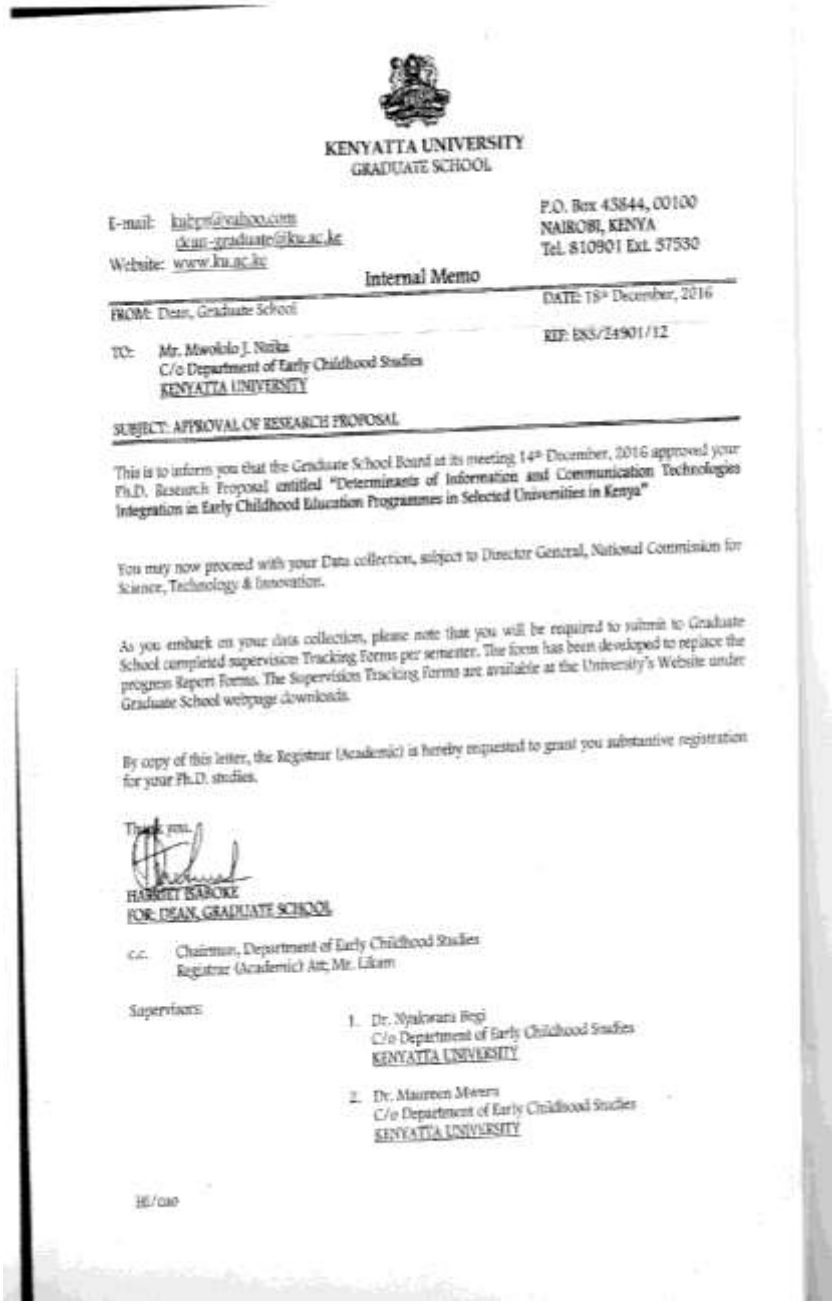
Thank you.

Yours sincerely,

Josephat Mwololo,
Ph D candidate,
Kenyatta University.

APPENDIX VI

APPROVAL OF RESEARCH PROPOSAL



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: kuhpr@yahoo.com
dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 57530

Internal Memo

FROM: Dean, Graduate School

DATE: 18th December, 2016

REF: ES5/24901/12

TO: Mr. Mwololo J. Nzika
C/o Department of Early Childhood Studies
KENYATTA UNIVERSITY

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that the Graduate School Board at its meeting 14th December, 2016 approved your Ph.D. Research Proposal entitled **"Determinants of Information and Communication Technologies Integration in Early Childhood Education Programmes in Selected Universities in Kenya"**

You may now proceed with your Data collection, subject to Director General, National Commision for Science, Technology & Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed supervision Tracking Forms per semester. The form has been developed to replace the progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

By copy of this letter, the Registrar (Academic) is hereby requested to grant you substantive registration for your Ph.D. studies.

Thank you.

HARRIET ISABOKE
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Department of Early Childhood Studies
Registrar (Academic) Att: Mr. Likam

Supervisors:

1. Dr. Nyakwara Begi
C/o Department of Early Childhood Studies
KENYATTA UNIVERSITY

2. Dr. Maureen Mwera
C/o Department of Early Childhood Studies
KENYATTA UNIVERSITY

HI/ono

APPENDIX VII

KENYATTA UNIVERSITY AUTHORIZATION

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: kubps@yahoo.com
dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: E83/24901/12

Date: 18th December, 2016

The Director General,
National Commission for Science, Technology & Innovation
P.O. BOX 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MR. MWOLOLO J. NZIKA REG. NO. E83/24901/12

I write to introduce Mr. Nzika who is a Postgraduate Student of this University. He is registered for a Ph.D. degree programme in the **Department Early Childhood Studies in the School of Education.**

Mr. Nzika intends to conduct research for Ph.D. thesis entitled, **"Determinants of Information and Communication Technologies Integration in Early Childhood Education Programmes in Selected Universities in Kenya"**

Any assistance given will be highly appreciated.

Yours faithfully,

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

HI/cao

APPENDIX VIII

RESEARCH AUTHORIZATION - NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349,3310571,2219420
Fax: +254-20-318245,318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/17/56921/15593**

Date: **3rd February, 2017**

Josephat Nzika Mwololo
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Determinants of information and communication technologies integration in early childhood education programmes in selected universities in Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **selected Counties** for the period ending **3rd February, 2018.**

You are advised to report to **the Vice Chancellors, selected Universities, the County Commissioners and the County Directors of Education, selected Counties** before embarking on the research project.

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

DR. STEPHEN K. KIBIRU, PhD.
FOR: DIRECTOR-GENERAL/CEO

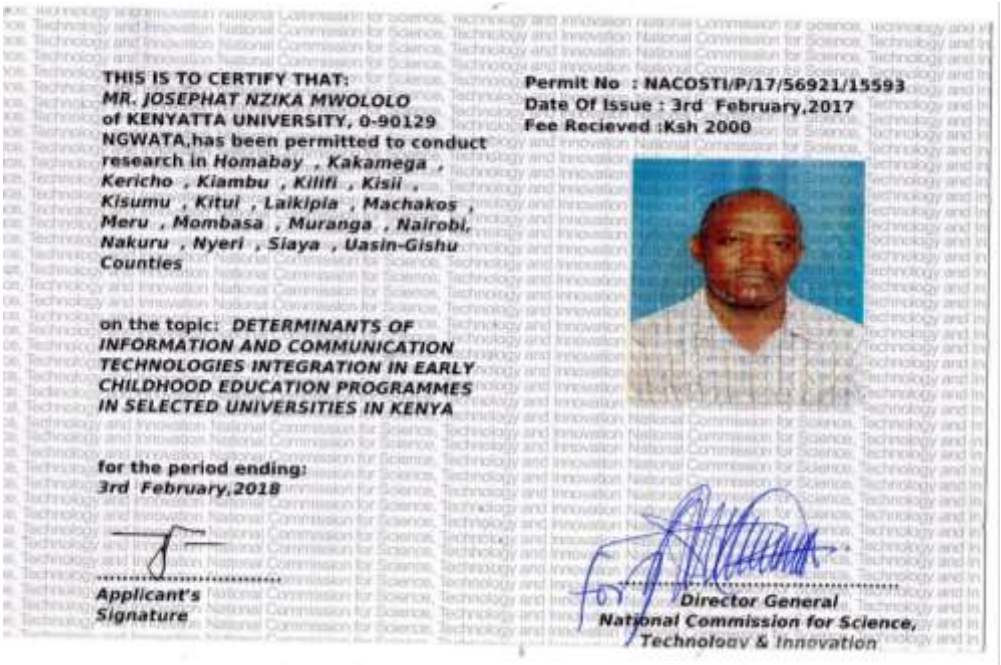
Copy to:

The Vice Chancellors
Selected Universities.

The County Commissioners
Selected Counties.

APPENDIX IX:

RESEARCH PERMIT - NACOSTI



THIS IS TO CERTIFY THAT:
MR. JOSEPHAT NZIKA MWOLOLO
of KENYATTA UNIVERSITY, 0-90129
NGWATA,has been permitted to conduct
research in *Homabay , Kakamega , Kericho , Kiambu , Kilifi , Kisii , Kisumu , Kitui , Laikipia , Machakos , Meru , Mombasa , Muranga , Nairobi, Nakuru , Nyeri , Siaya , Uasin-Gishu* Counties

on the topic: *DETERMINANTS OF INFORMATION AND COMMUNICATION TECHNOLOGIES INTEGRATION IN EARLY CHILDHOOD EDUCATION PROGRAMMES IN SELECTED UNIVERSITIES IN KENYA*

for the period ending:
3rd February,2018

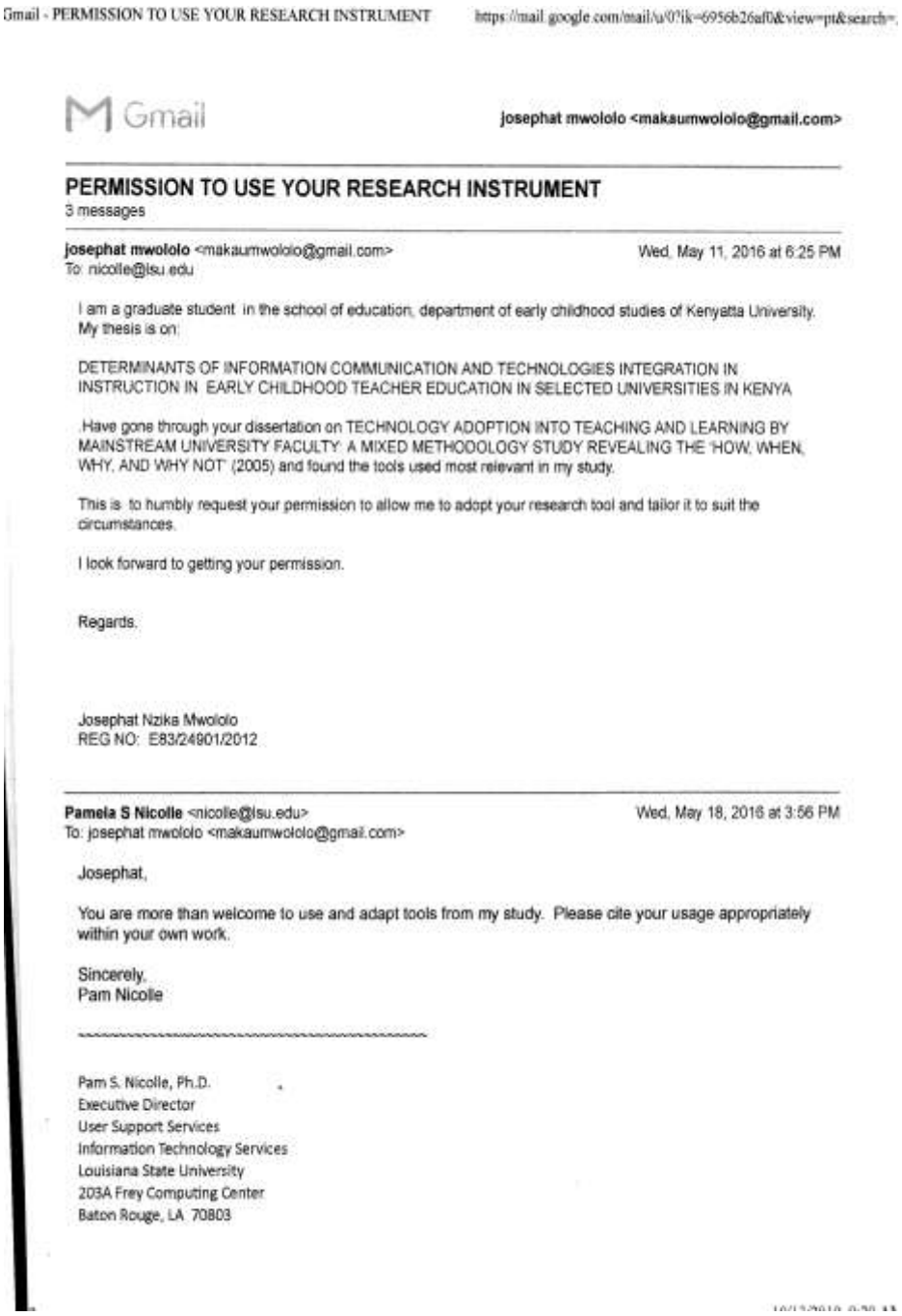
.....
Applicant's Signature

Permit No : NACOSTI/P/17/56921/15593
Date Of Issue : 3rd February,2017
Fee Recieved :Ksh 2000

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

APPENDIX X

PERMISSION TO USE RESEARCH TOOLS



Gmail - PERMISSION TO USE YOUR RESEARCH INSTRUMENT https://mail.google.com/mail/u/0?ik=6956b26af0&view=pt&search=...

Gmail josephat mwololo <makaumwololo@gmail.com>

PERMISSION TO USE YOUR RESEARCH INSTRUMENT
3 messages

josephat mwololo <makaumwololo@gmail.com> Wed, May 11, 2016 at 6:25 PM
To: nicolle@lsu.edu

I am a graduate student in the school of education, department of early childhood studies of Kenyatta University. My thesis is on:

DETERMINANTS OF INFORMATION COMMUNICATION AND TECHNOLOGIES INTEGRATION IN INSTRUCTION IN EARLY CHILDHOOD TEACHER EDUCATION IN SELECTED UNIVERSITIES IN KENYA

.Have gone through your dissertation on TECHNOLOGY ADOPTION INTO TEACHING AND LEARNING BY MAINSTREAM UNIVERSITY FACULTY: A MIXED METHODOLOGY STUDY REVEALING THE 'HOW, WHEN, WHY, AND WHY NOT' (2005) and found the tools used most relevant in my study.

This is to humbly request your permission to allow me to adopt your research tool and tailor it to suit the circumstances.

I look forward to getting your permission.

Regards.

Josephat Nzika Mwololo
REG NO: E83/24901/2012

Pamela S Nicolle <nicolle@lsu.edu> Wed, May 18, 2016 at 3:56 PM
To: josephat mwololo <makaumwololo@gmail.com>

Josephat,

You are more than welcome to use and adapt tools from my study. Please cite your usage appropriately within your own work.

Sincerely,
Pam Nicolle

Pam S. Nicolle, Ph.D.
Executive Director
User Support Services
Information Technology Services
Louisiana State University
203A Frey Computing Center
Baton Rouge, LA 70803

Gmail **josephat mwololo <makaumwololo@gmail.com>**

PERMISSION

4 messages

josephat mwololo <makaumwololo@gmail.com> Sun, May 31, 2015 at 8:25 PM
To: reillyc214@aol.com

Dr. Catherine Reilly

I am a doctoral student in the School of Education, Department of Early Childhood Studies of Kenyatta University, Kenya. In reviewing literature for my thesis, I have extensively read your work on 'ICT USE IN THE COLLEGE CLASSROOM' and found your survey tool applicable to my intented thesis.

This is to request your permission to adapt part of your dissertation survey tool and make it part of my appendices in my research topic 'Teachers' perception and preparedness on use of ICT in university early childhood education in Kenya'.

May you let me know by return of email whether to use your survey tool.

Regards.

Josephat Mwololo

Cathy <reillyc214@aol.com> Mon, Jun 1, 2015 at 1:23 AM
To: josephat mwololo <makaumwololo@gmail.com>

Josephat

It is my pleasure to grant you permission to adapt part of the survey tool used in my dissertation,"ICT Use in the College Classroom: Adjunct Faculty Perspectives", for your research on teachers' perceptions and preparedness of use of ICT in university childhood education in Kenya.

Good luck with your studies

Regards,
Catherine A Reilly, PhD
[Quoted text hidden]

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josephat mwololo <makaumwololo@gmail.com> Mon, Jun 1, 2015 at 12:40 PM
To: Cathy <reillyc214@aol.com>

Dr Cathy

I do appreciative your support in granting me permission in adopting part of your research survey tool and good luck wishes in pursuit of my studies. Once more thanks.

Regards.

Gmail josephat mwololo <makaumwololo@gmail.com>

PERMISSION TO ADAPT YOUR DATA COLLCTION TOOL

3 messages

josephat mwololo <makaumwololo@gmail.com> Sun, May 31, 2015 at 8:10 PM
To: musabbir@axiomadvice.com

Deat Dr Musabbir Chowdhury

I am a doctoral student in the school of Education, department of Early Childhood Studies of Kenyatta university, Kenya. I am humbled to have read your suvey tool used in collecting data for your dissertation entitled 'The relatioship between ICT integration and improvement in teaching as perceived by college instructors' (publication No. AAT 3355030).

This is to request your permission to adapt part of your dissertation survey tool and make it part of my appendices in my research topic 'Teachers' perception and preparedness on use of ICT in university early childhood education in Kenya'.

May you let me know by return of email whether to use your survey tool.

Regards.

Josephat Mwololo

Musabbir Chowdhury <musabbir@axiomadvice.com> Mon, Jun 8, 2015 at 4:29 PM
To: josephat mwololo <makaumwololo@gmail.com>

Dear Josephat,

Sorry about the late response, I was traveling last week. Please feel free to use my survey tool for your paper or research. Good luck.

Kind regards,

Dr. Musabbir Chowdhury
Professor, Small-Medium Enterprises
Project Director, Business Productivity Initiative
School of Business and Management
135 Taylor Road, S.S. # 4
Niagara-on-the-Lake, ON L0S 1J0

T/ 905-641-2252 ext. 4144
M/ 289-208-0801
F/ 905-988-4307
E/ mchowdhury@niagaracollege.ca
[Quoted text hidden]

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