

**INSTITUTIONAL FACTORS INFLUENCING STUDENTS'  
PREPAREDNESS ON INTEGRATION OF INFORMATION AND  
COMMUNICATION TECHNOLOGY IN TEACHING AND LEARNING:  
CASE OF EREGI TEACHERS TRAINING COLLEGE, KENYA**

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the Award of Master of Education Degree in Curriculum Studies**

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## **DECLARATION**

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

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## **DEDICATION**

I dedicate this research project to my wife Brenice, my mother Teclah Mukhwana, Roselyn Mukhwana and entire family of the late grandmother, Rebecca Mukhwana.

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## **ABBREVIATION AND ACRONYMS**

<b>ICT</b>	Information and Communication Technology
<b>KICD</b>	Kenya Institute of Curriculum Development
<b>MIT</b>	Massachusetts Institute of Technology
<b>MoE</b>	Ministry of Education
<b>NACOSTI</b>	National Commission for Science, Technology and Innovation
<b>NEC</b>	National Education Technology
<b>SMART</b>	Self-directed, Motivated, Adaptive Resources and Technology-embedded
<b>SPSS</b>	Statistical Package for Social Sciences
<b>TPACK</b>	Technological, Pedagogical, Content Knowledge
<b>TSC</b>	Teachers Service Commission

## ABSTRACT

The study purpose was to determine institutional factors that influence students' preparedness in integrating Information and Communication Technology (ICT) in teaching and learning: Case of Eregi Teachers' Training College, Kenya. Study objectives were to evaluate the extent ICT curriculum influence, determine the influence of college ICT infrastructure, and establish the extent of teacher educators teaching approaches on students' preparedness in teaching and learning with ICT integration at Eregi teachers' training college. Herein, a case study design was employed. The study population comprised of 565 people having 65 teacher educators and 500 second year students. A representative of 20 and 100% of the 2<sup>nd</sup> year students and teacher educators, respectively, were purposively sampled. Hence, with the said proportions, a response rate of 95 and 100% for second year students and teacher educators were achieved, respectively. Two sets of questionnaires on respective study participants were used in data collection. The data on college ICT infrastructure and indicators of ICT integration in teacher education were evaluated through a focused group discussion guide and observation checklist. Validity and reliability of research instruments was determined by incorporating recommendations from supervisors and piloted on a few identical subjects not part of sample of the study using 10 percent of the sample size. Based on the reliability, a correlation of 0.88 and 0.84 were obtained from the teacher educators and 2nd year students, respectively. SPSS version 20 was used to analyze the quantitative data and results presented in tables and pie charts, however, content analysis method was used to analyze qualitative data. As of the background information, basing on gender, the teacher educators was skewed towards the male while the student was skewed towards the females. Majority of teacher educators were above 40 years with a certificate in ICT. Notably, 61.6% of the teacher educators had teaching experience of over 20 years with either a Bachelor of Education or Masters in Education. However, with a combination of the factors, teacher educators appreciate the need of skills in teaching and learning using ICT. As worth mentioning, that from the study, students are fully exposed to the ICT curriculum design used; should be oriented in teaching and learning using ICT as it influences their preparedness. With adequate ICT infrastructure in college, students are likely to be trained on them. Despite teaching practice being compulsory in teacher education, ICT use in teaching and learning is not a component in assessment of teaching practice. Moreover, it is handled casually as is never assessed. In adoptive perspective, policy makers and curriculum developers of teacher education can infuse ICT in all subjects but retain ICT subject for basic ICT skills. As a result to make ICT subject examinable in PTE, they should introduce assessment on use of ICT in teaching and learning as a component of teaching practice assessment, invest more in college ICT infrastructure and teacher educators to train on teaching approaches that contribute to ICT use in teaching and learning. Previous studies as demonstrated on other colleges had shown that they influence the teaching practice on teaching and learning integrated with ICT.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background to the study**

Skilled nation (people) is shaped from teacher education hence ascertaining a sustainable development. As an emerging issue, ICT is highly advocated to be integrated in education system therefore resulting in the changing roles on teachers. On the dynamics of the 21<sup>st</sup> Century, teachers are trained to be confident, digitally competent and innovative in pedagogical approaches (MoE, Kenya, 2013).

Australia, Canada and Lebanon, have invested a lot of resources in upgrading their education system following the realization of benefits of teaching and learning integrated with ICT. In Canada, pre-service teachers labeled “digital natives” were not better at integrating ICT in teaching, it had been noted that skill-based ICT courses taught in isolation failed to develop pedagogical connections between subject matter content, pedagogy and technology (Ertmer et al, 2012). According to Baran, Chuang and Thomson (2011), teachers replicate their knowledge taught in college that include examining their teacher educators incorporate ICT in teaching and learning, develop related pedagogical skills of how ICT, pedagogy and content are interrelated in using ICT for teaching practice and later in their teaching profession. Failure in developing pedagogical connections between the subject matter, pedagogy and technology when ICT subjects are taught in isolation of subject content matter context

In Australia, Gill, Dalgano and Carlson (2015) observed that pre-service teacher education program had been integrated with ICT and appropriate pedagogical approaches suggested. Students have a specialized ICT subject in their first year for knowledge and skill development that should be incorporated in teaching and learning process. The ICT teaching and learning and incorporation of ICT resources during teaching practice are taught on in their second and third year, respectively. Moreover, they recommend students to learn about, with and to use ICT for teaching. Currently, there is a course on pedagogical ICT use in teaching unlike during the 1980s where skill-based courses on ICT were offered independently (Albion & Petrea, 2010).

National Education Technology (NEC) strategic plan in Lebanon emphasizes on improving, recruiting, preparing and supporting teachers on the pre-service front-end instead of addressing issues of poor quality instruction by in-service. Based on Technological Pedagogical Content Knowledge (TPACK) theory (Mishra and Koehler, 2006), it is evident ICT approaches are incorporated through programs of pre-service teacher education. Adoption of pre-service teacher education programs accounts to 44% in Lebanon in teaching and learning using ICT strategy, With focus in both meaningful and authentic problem-solving tasks (Chaaban & Robyn, 2016).

The ICT in education had shown significant importance and positive implications in Ghana; a Sub-Saharan nation (Afari-kumahand Tanye, 2009). As a result, people lacking ICT basic knowledge globally encounters difficulties in a knowledge-based economy. With low progress in ICT

integration in education; there is a requirement of changing the teaching and learning role of teachers to benefit from the potentials of ICT. Further, they found the ministry of education was promoting and initiating ICT use in teaching and learning by developing competencies in student teachers on ICT integration as indicated in the Information and Communication Technology for Accelerated Development (ICT4AD) policy of 2007. An impediment in teaching and learning using ICT has been shown to come from both national policies and curricula in most African countries (Hannessy, 2010).

The government of Kenya understands the positive effects associated with ICT in making the country be globally competitive and middle-income as envisioned in Vision 2030 (Republic of Kenya, 2007). However, according to the Kenya ICT Master Plan (2013/14-2017/18), it is evident that the advantages of the great potential of ICT were not utilized. One of the obstacles identified was ineffectiveness among teachers teaching and learning using ICT in our schools. Students undergo a pre-requisite ICT integrated pre-service education to be digitally competent with the necessary ICT pedagogical skills as to overcome the associated shortcomings.

The Digital Literacy Program (DLP) as reported in the Education Sector Report, 2016, states that ICT integration is a key pillar in a knowledge-based economy. Therefore, for its successful implementation in education, capacity building of teachers is a backbone. Over half of 212, 000 teachers in primary schools in Kenya have been in-serviced and spend 2.4 B with another 1.2B spend on ICT infrastructure development. Moulder, (2014) advises that

teacher preparation can do a better job for developing students' ICT use in teaching and learning in their pre-service teacher education, skills acquired tend to stick more in their profession and cash spend on in-servicing used on other education services.

The Education Sector Report, 2016, outlines benefits of teaching and learning using ICT which include improving pupils ICT competencies for a knowledge-based economy and understanding abstract concept better thus raising the quality of teaching by cutting down on teaching time. Further, the government has initiated programs as most of teacher training colleges in Kenya have a computer laboratory with 20-60 personal desktop computers and laptops, a curriculum guide for ICT integration in education (TSC, 2013), internet connectivity and trained teacher educators, digital PTE curriculum content and ICT curriculum aiming at developing ICT skills (a review is required to include ICT integration).

Teachers are central in implementing any curriculum innovation such as of ICT use in education; therefore, pre-service teacher education quality is important. Addressing effectively the issue of ICT uses in education in schools in Kenya, pre-service teachers have to be trained in a redesigned learning experience. It is on this background that the study is based on four variables; these are ICT curriculum design, college ICT infrastructure, teacher educators' teaching approaches and teaching practice and their influence on students' preparedness in teaching and learning using ICT in a case of Eregi teachers training college, Kenya.

## **1.2 Problem statement**

The Education Sector Report (2017/18 – 2019/20) identifies a shortage of skills in teaching using ICT among teachers. Hennessy, (2010) too noted a major obstacle in integrating ICT in teaching arises from the pre-service of most African countries regarding ICT as a discrete subject either as Information Technology or Computer studies whereas teaching and learning using ICT in pre-service teacher education is more effective in developing the students' competences.

Teachers being central in implementation of any curriculum innovation such as in teaching and learning using ICT, they are required to undergo pre-requisite skill-training on the same in their pre-service teacher education (Moulder, 2014; Kafu, 2011). Sessional Paper No. 14 Of 2012, observed that working skills of a teacher acquired in their initial teacher education become in-built and positively implemented throughout the teaching service compared to those acquired during in-service teacher education (INSET). Asiachi and Oketch (1988) advice that any curriculum implementation ought to link the training of teachers to the demands of the teaching profession and society, if they are expected to prepare and use improved teaching aids in schools, then it is proper for pre-service programs too to prepare and use such aids.

Primary school teachers in Kenya are about 212,000, of which half of them have been in-serviced with ICT integration in teaching and learning spending 2.4B (GoK, 2016). Unless these resources are utilized and obstacles arising from the training of teachers corrected from the starting point in their initial



teacher education, some learners leaving public primary schools may be disadvantaged in future as they shall be lacking ICT skills and therefore not competitive. Moulder, (2014) advocates pre-service teachers be better prepared in teaching and learning using ICT in their pre-service education.

Our study aims to address what happens in the pre-service teacher education in teaching and learning integrated with ICT to meet the current demands of the teaching profession. An instructional strategy should be organized around ICT curriculum design, a contextualized pedagogy and according to college ICT infrastructure that can support different types of learning (Spector, et al 2014). Four institutional factors influencing students' preparedness in integrating teaching and learning with ICT at Eregi teachers training colleges, Kenya informs the study.

The Analysis Report of Primary Teacher Education (PTE) Examination Performance in public teachers' training colleges, (KNEC, 2018) indicated that out of the 25 colleges that registered candidates for PTE examinations in 2017, Eregi Teachers' Training College (TTC) had the highest pass mark at 72.45% followed by Kamwenja TTC with 71.93% and Murang'a TTC was third with 70.11%. An indication of high-quality training of teachers having emerged top of others as seen despite the small range compared. These are some of the reasons for qualifying it as a case study.

### **1.3 Purpose of the study**

The study investigated institutional factors influencing students' preparedness in integrating Information and Communication Technology in teaching and learning at Eregi Teachers' Training College, Kenya.

#### **1.4 Objectives of the study**

The study was to achieve these specific objectives;

- i. To determine the extent to which ICT curriculum design influence students' preparedness in integrating ICT in teaching and learning in Eregi teachers' training college.
- ii. To determine the influence of college ICT infrastructure on students' preparedness in integrating ICT in teaching and learning in Eregi teachers' training college.
- iii. To establish the extent to which teacher educators' teaching approaches influence students' preparedness in integrating ICT in teaching and learning in Eregi teachers' training college.
- iv. To establish the extent to which teaching practice influence students' preparedness in integrating ICT in teaching and learning in Eregi teachers' training college.

#### **1.5 Research questions**

- i. To what extent ICT curriculum design influence students' preparedness in integrating ICT in teaching and learning in Eregi teachers' training college?

- ii. How does college ICT infrastructure influence students' preparedness in integrating ICT in teaching and learning in Eregi teachers' training college?
- iii. To what extent do teacher educators' teaching approaches influence students' preparedness in integrating ICT in teaching and learning in Eregi teachers' training college?
- iv. To what extent does teaching practice influence students' preparedness in integrating ICT in teaching and learning in Eregi teachers' training college?

### **1.6 Importance of the study**

The study results may enrich and advise teacher educators on the effective pedagogical approaches on ICT integration in teaching students for practical teaching at the college and teaching service thereafter. The scholars might benefit by using the findings as a foundational for further research on particular issues in education such as students on practical teaching and ICT integration.

Teachers Service Commission (TSC) as a policymaker in teaching profession may use the report when reviewing education and training standards on persons beginning the teaching profession and continuous professional development of teacher educators' skills for better preparation of students in integrating ICT in teaching. Kenya Institute of Curriculum Development (KICD) might use our results when making pre-service teacher curriculum for teaching and learning using ICT.

### **1.7 Study limitations**

Mugenda and Mugenda (2003) defined limitations as aspects or conditions in the study beyond the researcher control that places restrictions on the conclusion. Students may not be on teaching practice that time of data collection; therefore the researcher shall use focus group discussion guide to collect relevant data. Availability of all the 65 teacher educators at once on a single day may not be guaranteed. The researcher shall issue out the questionnaires to them on separate days within the week depending on their availability in the college and getting assistance from the college administration to reach all. Focus group discussion guide to be used as a strategy of ensuring the validity of data collected using questionnaires and checklist observation guide.

### **1.8 Study delimitation**

This study address four institution-related factors influencing students' preparedness on the integration of teaching and learning using ICT in Eregi teachers' training college. These factors were the ICT curriculum design, college ICT infrastructure, teacher educators' teaching approaches and practical teaching. Eregi teachers' training college in Kenya is the case study. Teacher educators and 2<sup>nd</sup> year students provided the sample size as are the only respondents with information dictated by the objectives of the study.

### **1.9 Study assumptions**

An assumption is fact taken by a researcher as true without verification, but facilitates the collection of data and lead to absolute findings (Mugenda and Mugenda (2003).

- i. Teaching and learning integrated with ICT by teacher educators of Eregi teachers' training college has made its students emerge top countrywide by registering the highest pass mark in PTE examinations in Kenya.
- ii. Teacher educators are trained and grounded in teaching and learning using ICT in Eregi teachers' training colleges in Kenya.

### **1.10 Terminologies**

The following are terms used in the study:-

**ICT** means technologies for gathering, storing, retrieving, processing, analyzing, and transmitting information.

**ICT Curriculum** is a written document outlining subject area content, professional preparation and teaching practice for a student to undergo and acquire the necessary knowledge, skills and desired attitudes after the course.

**ICT infrastructure** means the computer and communications hardware and software that support the flow and processing of information.

**ICT integration in education** refers to seamless use of technology to support and enhance student engagement in meaningful learning and for the attainment of curriculum objectives.

**Pre-service teacher education** means a two years fully institutionalized training in which student teachers participate on a full-time basis with a curriculum consisting of subject area content, professional preparation and teaching practice.

**Teacher preparedness** is the state of a student-teacher being able and ready to integrate ICT in teaching practice and profession thereafter.

**Teaching** is a professional human activity that encompasses learning whereby one creatively instructs somebody.

**Teaching approaches** refer to methods used by teachers to develop a learning environment and experience for students to be involved to learn the desired course content and gain knowledge, skills, attitudes and values.

**Teaching Practice** is a mandatory component of pre-service teacher education allowing students explore experiences of teaching under the guidance of a practicing teacher for a time, assessed and graded.

### **1.11 Study organization**

Our study contains 5 chapters. First chapter address the introduction of the study, while the second chapter focused on the background study, problem statement, purpose of the study, study objectives, research questions, study limitations, study delimitations, assumptions of the study, definition of terms and the study organization. The second chapter deals with literature review of the study. Third chapter focus on research methodology while the fourth chapter deals with data analysis, interpretation and presentation of results. The fifth chapter covers the summary of the study, conclusions, recommendations and suggestions for further studies.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

Teacher preparedness, the concept of integrating ICT in teaching and learning, ICT policy in education in Kenya, ICT curriculum design and integration of ICT in teaching and learning, college ICT infrastructure and integration of ICT in teaching and learning, teacher educators' teaching approaches and integration of ICT in teaching and learning and teaching practice and integration of ICT in teaching and learning are in-depth covered. Besides, a summary of the literature review, theoretical framework and conceptual framework had been captured as well.

#### **2.2 Teacher preparedness in teaching and learning using ICT**

The ability and readiness of student teachers to use ICT in teaching and learning during their teaching practice and the profession thereafter, it strongly depends on their training more so with the initial teacher education. Ertmer et al., (2012) observed that there are demands placed on young teachers beginning the teaching profession as they are labeled “digital natives”, increasing use of educational technology in schools and expectations of their appropriateness in teaching and learning. Unfortunately, their competencies have been disputed and research shows that they are not better at teaching and learning using ICT.

Currently, pre-service teachers must be prepared and developed not only to master content knowledge and pedagogical knowledge but also incorporate ICT with other key aspects of teaching and learning (Mulder, 2014).

Past studies have examined some factors hindering technology preparation in teacher education and offered approaches for preparation. However, other studies had shown that graduating pre-service teachers feel unprepared and require on-job training on ability to teach and learn using ICT at their workplaces (Chaaban, Y. & Robyn, 2016). Therefore, they find it necessary for further examination of factors that affect the preparation of pre-service teachers in teaching and learning using ICT and giving new versions for better pre-service teachers' preparations.

### **2.3 Concept of teaching and learning using ICT**

The ability of a teacher to teach and learn using ICT is turning out to be basic for one to function in the teaching profession and recognized across the world. MoE, Kenya (2013) defines ICT integration as the “seamless incorporation of technology to support and enhance student engagement in meaningful learning and for the attainment of curriculum objectives” pg 11.

Globally, expectations from the pre-service teachers are that they should graduate ready to teach and learn using ICT (Grimus, 2002). The ICT development is a global resolution and a subject of great importance to mankind. Therefore, 21<sup>st</sup> Century teachers have to be digitally competent with necessary ICT didactic skills. Major areas of interest in ICT integration are the learners, teachers, the learning environment, the school ICT capacity, the school organization and cultural values (Spector et al, 2014). These factors act as a basis for developing skills in teaching and learning using ICT, therefore some of them formed a base for the study



#### **2.4 ICT policy in Education**

According to UNESCO (2018), Singapore and the Republic of Korea are among countries in the Asia-Pacific region renowned for their education policies. The Republic of Korea has digitalized education through SMART education initiative since 2009. The idea was to teach and learn using ICT infrastructures such as digital content, digital textbooks and cloud storage of educational content. While in Singapore, the ICT policy encourages schools to experiment with new teaching methods through emerging technologies such as 3D virtual learning environment.

Educational policies should commit to assist teachers to teach and learn using ICT by aligning curricula, exams and incentives with the educational outcomes. The Malaysian's latest Education Blue Print (PPPM) (2013-2015) emphasized ICT integration to direct national education and development. Ministry of Education in Cameroon formulated ICT policy outlining guidelines for the development of technology in schools in 2007 to envisioning ICT-literate workforce production. Unfortunately, the ICT policy in Cameroon emphasizes only on ICT knowledge and training skills among student teachers and nothing on ICT integration in teaching (Ndongfack, 2015).

The foundational policy to integrating teaching and learning with ICT in all education levels has been provided by the Kenya ICT policy (2006). Currently, the National ICT Master Plan (2013/14-2017/18) principle objective is to integrate ICT to deliver education curricula.

## **2.5 ICT Curriculum design and ICT use in teaching and learning**

UNESCO's ICT Competency framework for teachers (2011) recommends ICT infusion in pre-service teacher education and not restricting it in a single subject course as in most cases. Gaps exist in pre-service teacher education, ICT curriculum designs and expectations in teaching and learning using ICT (Pope, Hare and Howard, 2011.) Gill, Dalgarno and Carlson (2015) found students from Riverina region of New South Wales, Australia, had a course of study; integration of ICT trained in the first semester of the second year in preparation for practical teaching.

Batane and Ngwako (2017) noted in the University of Botswana, the ICT curriculum design had opportunities for ICT incorporation in both class and teaching practice. The findings show for pre-service teachers that teaching and learning using ICT, the ICT curriculum design to promote integration of ICT instead of teaching ICT as a separate subject course. Technology affects the curriculum designs in terms of content, its organization and teaching approaches and evaluation.

The ICT subject in teacher education in Kenya does not enable students to teach and learn using ICT, hence, the ICT curriculum design should concern with, 'what' is learned, that is; the objectives and subject content, how learning and teaching occurs, that is; the teaching approaches, evaluation and resources such as ICT infrastructure (Kafu, 2011; Moulder, 2014). Therefore consider an ICT curriculum design that incorporates ICT in teaching and learning with content knowledge and teaching approaches.

## **2.6 College ICT infrastructure and ICT use in teaching and learning**

Technological infrastructure comprising of telecommunication networks and physical infrastructure are key drivers in developing digital skills (UNESCO, 2018). The ICT infrastructure cost is a factor obstructing ICT use, data from Asia-pacific countries show more than 90% in Bangladesh, Cambodia and Nepal schools lack internet connectivity and ICT devices (UNESCO, 2018). Access to internet connectivity and mobile systems, school ICT infrastructure, teachers and student ICT competencies are found to vary. Internet use in Japan schools is 91.06%, Republic of Korea 89.85% and Singapore 82.10%. Electricity is not fully secured in Cambodia, India and Nepal schools. In Malaysia, Singapore and the Republic of Korea all schools have computers (ITU, 2017). Adequate college ICT infrastructure for teacher education is a key requirement. According to Ertmer, et al., (2012) Technology is included in “how” part of the ICT curriculum, that is; teaching approaches and evaluation techniques, which are determined by the objectives, content and the physical setting (field experiences).

## **2.7 Teacher educators’ teaching approaches in teaching and learning using ICT**

UNESCO’s ICT Competency Framework for Teachers (2011) addresses all aspects of teacher’s work in three approaches to ICT integration in teaching. These are technological literacy, knowledge deepening for in-depth application of ICT in solving complex problems and knowledge creation.

In Australia, teacher educators provide learning experiences that allowed pre-service teachers to develop capacities in teaching and learning using ICT (Gill

et al., 2015). Teaching and learning using ICT success depends on the ability in structuring learning environment that encourages cooperative, inquiry-based and problem-based learning with cognitive apprenticeships from the TPACK theoretical framework, blend Technology, Pedagogy and Content knowledge.

Worldwide, Ministries of Education have developed ICT infrastructure in educational institutions with incoherent strategies to fully integrate ICT as pedagogical tools in the classroom (Kozma, 2005). Teacher educators need to decide on the skills students need and deliberately provide opportunities for them to learn (Spector et al., 2012) Further, they state students have to see teacher educators integrate ICT in their teaching and actively involved to develop pedagogical skills such as using project-based working, questioning skills for the inquiry-based classroom. (Drent and Meelisen, 2008; Mishra and Koehler, 2006) Teacher institutions continue to teach ICT skills on computer applications such as word processing, spreadsheets, email and graphic design rather than on how to teach and learn using ICT. Although they comprise the cornerstone knowledge of ICT and skill, they are limited in preparing pre-service teachers in skills of teaching and learning using ICT as they are taught in isolation from pedagogical context (Harris & Hoffer, 2011)

## **2.8 Teaching practice and teaching and learning using ICT**

Teaching practice or practical teaching is the first platform where pre-service teachers practice the skills and knowledge acquired in the classes. Simply learning how to use various ICT tools will not lead to ICT integrated with teaching and learning; their use has to be contextualized in a real setting of a

school (Moulder, 2014). Most studies on the ICT use in education have focused on primary and secondary school levels with a few on teacher educations and a component of practical teaching by pre-service teachers (Liu, 2012). Majority of pre-service teachers do not incorporate ICT in their practical teaching even after studying ICT as a subject (Moulder, 2014).

Comparatively, in Australia, there is clear alignment in ICT curriculum design factors, ICT integration and ICT-related assessment in practical teaching (Batane and Ngwako, 2017).

Pre-service teachers should have opportunity to put into practice the ICT integration skills acquired in college, assessed on the same to establish they are getting off well and if not, given remedies before they graduate from college. Assessment requirement in teaching and learning with ICT integration makes students and teacher educators have efforts in developing skills on teaching and learning integrated with ICT for their teaching practice and later teaching profession (Kafu, 2011)

## **2.9 Literature Review Summary**

The 21<sup>st</sup> century need teachers to teach and learn using ICT has proved a challenge yet society demands that they possess the competencies for that (Mishra & Koehler, 2006; Education Sector Report (2017/18 – 2019/20)).

Reviewed literature shows more studies done so far on ICT use in teaching and learning focus on primary and secondary schools; Wakhu, 2013 and Hannessy, 2010 among others. Gill et al, (2015) did a study closer to this one but on pre-primary school teachers' preparedness to use ICTs in teaching. The

findings were that graduating teachers were computer literate having learned ICT as a subject in college feel unprepared and require on-job training for them to teach and learn using ICT.

Comparatively, countries such as Australia where teaching and learning using ICT is done in the pre-service education, student teachers do integrate it in their practical teaching and later in their teaching service. In answering the question on what is or is not happening in teacher education colleges for them to teach and learn using ICT. Therefore, the study aimed in filling the knowledge gap by focusing on teacher preparation in teaching and learning using ICT in pre-service education and gives a better version for the preparation of pre-service teachers. TPACK theoretical framework provides a structure for examining the training of students in teaching and learning using ICT in teacher education. For successful teaching and learning using ICT, pre-service teachers have to be trained to start on an enriched ICT curriculum design, adequate college ICT infrastructure, teacher educators' teaching approaches and practical teaching.

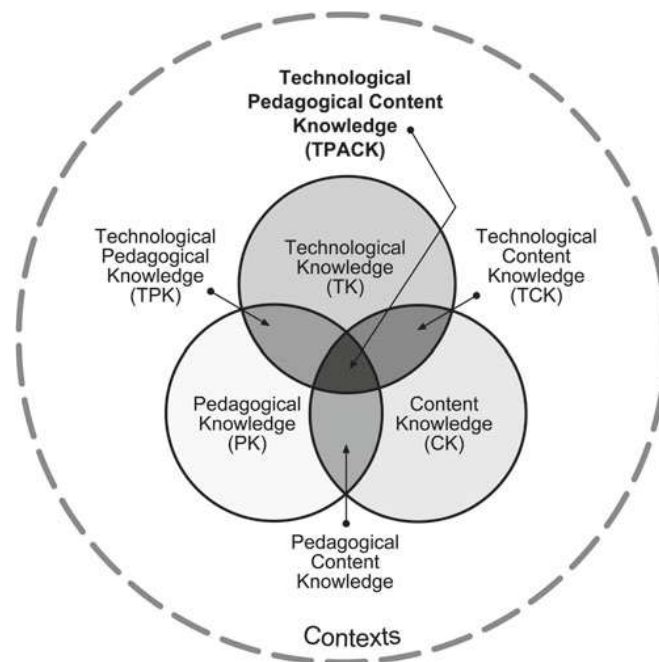
### **2.10 Theoretical framework**

The study is based on Technological Pedagogical Content Knowledge (TPACK) theoretical framework of Mishra and Koehler (2006). It is a contextualizing approach for guiding the preparation of students in developing abilities in teaching and learning using ICT. Learning ICT skills in isolation

from pedagogy and content as is the current case are unlikely to result in teaching and learning using ICT (Spector et al., 2014).

The theory uses three sets (components) of knowledge; Pedagogy, Content and Technology. The theory was developed based on Pedagogical Content Knowledge (PCK) of Shulman (1986). Mishra and Koehler (2006) found teachers struggling in teaching and learning using ICT, therefore they introduced Technology to PCK resulting in TPACK framework.

The three sets of knowledge depicted in the TPACK framework are demonstrated in Venn diagram;



**Figure 2.1: TPACK diagram (Spector et al, 2014)**

Ndongfack (2015) noted pre-service education being concurrent in terms of Content Knowledge (CK) and Pedagogy Knowledge (PK) resulting in their

mastery by students; therefore he recommends the integration of ICT in entire teacher education. PK, CK and TK are the three main components of TPACK. Equally important are four intersections; PCK, TCK, TPK and TPACK (Spector et al, 2014). TK involves modern technologies such as computers, internet connections and e-learning to digital skills and ICT integration in teaching. PK is all about processes and practices or teaching approaches and their theories. CK includes knowledge of concepts, theories, ideas and established practices in knowledge development (Harris and Hoffer, 2011). TCK is how ICT and content are blended in the teaching and learning. TPK is the understanding of teaching approaches used in teaching and learning using ICT.

TPACK acknowledges the interrelationships of the three sets of knowledge for an effective learning environment. TPACK doesn't exist in a vacuum as observed in the diagram but specific contexts as shown by the outer dotted circle of the TPACK diagram. The context factor for this study refers to practical teaching.

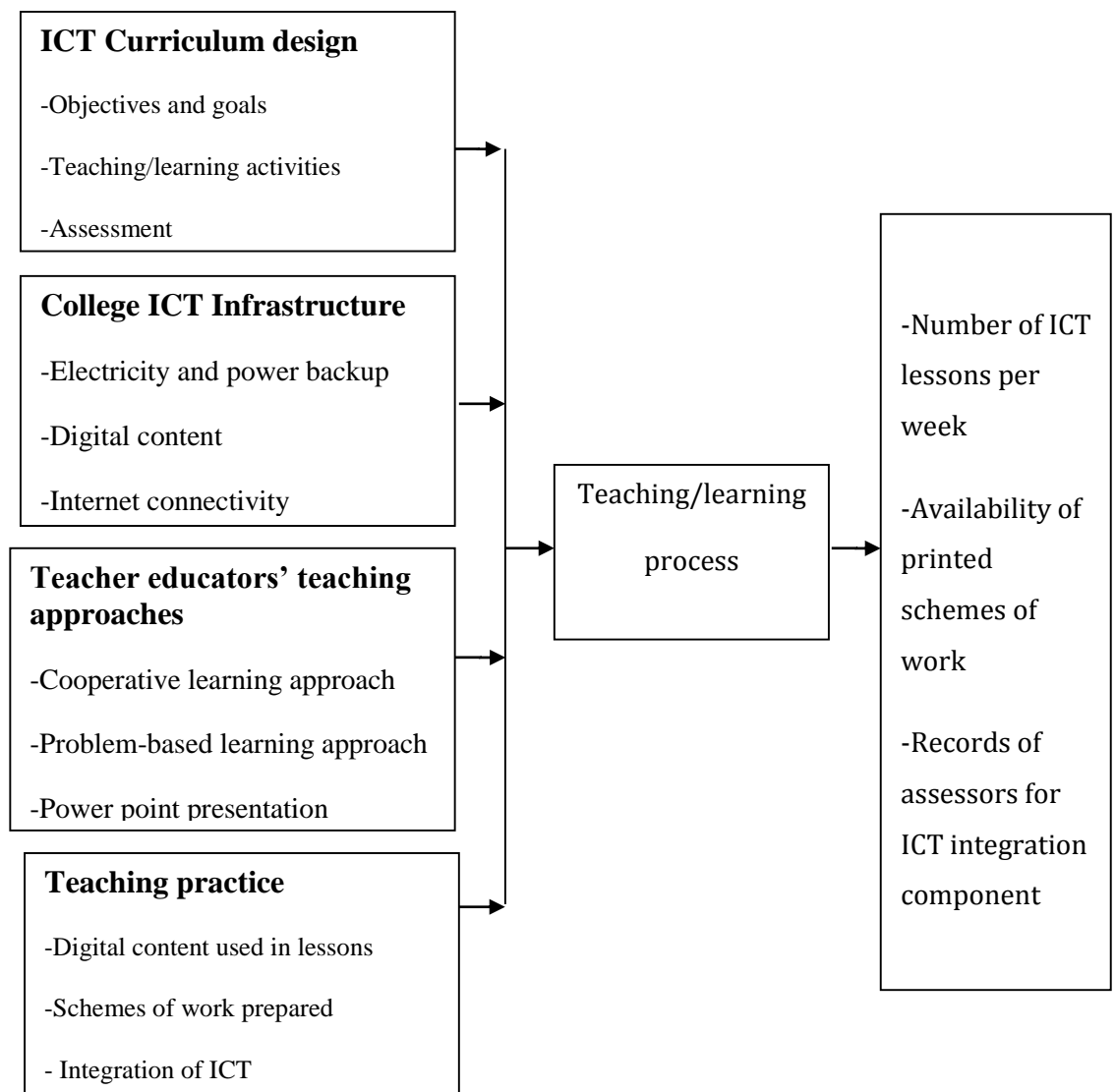
Alternatives of TPACK theory include the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and use of Technology (UTAUT). They agree that pre-service teachers need to learn the teaching and learning using ICT while in college (Wakhu, 2013). However, TPACK greatly models essential approaches in teaching and learning using ICT by teacher educators when preparing student teachers for technology-driven society (Spector et al, 2014)



## 2.11 Conceptual framework

Conceptual framework refers to a graphical diagram illustrating relationships between independent variables and dependent variables in a study (Mugenda and Mugenda, 2003).

The diagrammatic representation is as follows;



**Figure 2.2: Conceptual framework on institutional-related factors influencing students' preparedness in integrating ICT in teaching.**

The conceptual framework describes the interrelationships among the institutional factors influencing students' preparedness in teaching and learning using ICT. The institutional factors are; ICT curriculum design, college ICT infrastructure, teacher educators' teaching approaches and practical teaching as independent variables and use ICT in teaching and learning as a dependent variable. Each independent variable has indicators as shown in figure 2.1. They describe the preparation of students in teaching and learning using ICT that involve an enriched pre-service teacher education that requires emphasizes on the independent variables hence leading to the development of skills in teaching and learning using ICT in students.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Herein, research design, target population, sample size and sampling procedures, research instruments, instrument validity, instrument reliability, data collection procedure, data analysis techniques and ethical considerations are covered.

#### **3.2 Research design**

Work plan deliberately selected to guide the research process in answering the research problem was defined as a research design by Orodho (2009). A case study design is used at Eregi teachers training college or programs to bring out the story behind the results, its success or failure from a broad field into one easily researchable. Detailed data is collected which may involve observing or discussing and administering questionnaires to respondents. The process of the study may take longer to achieve even with smaller samples.

#### **3.3 Target population**

A full set of cases from which a representative is obtained for study was referred as a target population by Kombo and Tromp (2006). In our case, the target population is a total of 565 persons categorized as 65 teacher educators and 500 second-year students of Eregi teachers' training college, Kenya.

### 3.4 Sampling size and procedure

A collection of observations representing a target population was defined as a sample size. Sampling involved selecting a given number of subjects from the target population. Mugenda and Mugenda (2003) provided reasons to use 20% sample size for a population of approximately 1000 and 100 per cent for smaller samples. Therefore, 100 (20%) of 2<sup>nd</sup> year students based on the latest merit list is sampled. 2<sup>nd</sup> year students were picked because they have had several teaching practices, micro-teaching and are almost graduating. The college has 65 teacher educators; therefore 100 per cent of them were purposely used in collecting data.

**Table 3.1: Sampling frame**

<b>Category</b>	<b>Target population</b>	<b>Sample size</b>	<b>%</b>
Teacher educators	65	65	100
2 <sup>nd</sup> year student teachers	500	100	20
	<b>565</b>	<b>165</b>	

### 3.5 Research instruments

Questionnaires, observation checklist and focused group discussion guide were used in collecting descriptive data in social sciences as advocated by Kombo and Tromp (2006). Two questionnaires sets were used, one for teacher educators and the other for students having 5 sections (Section A; background information, section B; ICT curriculum design, section C; college ICT

infrastructure, section D; teacher educators' teaching approaches and section E; practical teaching). Focus group discussion guide and observation checklist were used in collecting data from lecture halls, computer laboratories and library on college ICT infrastructure and indicators in teaching and learning using ICT in pre-service teacher education in the college.

### **3.6 Research instruments validation**

Validation of instrument was defined by Kothari (2013) as the extent to determine what it is supposed to. Supervisors' recommendations were incorporated to adequately cover the research objectives. The questionnaires, observation checklist and focus group discussion guide were piloted on a few identical subjects not part of a sample of the study using 10 per cent of the sample size. The research instruments were administered twice to a pilot sample in a period of one to two weeks. Therefore, 10 per cent for both 65 teacher educators and 100 2<sup>nd</sup> year students was used in the pilot study in validating the research instruments (Mugenda and Mugenda 2003).

### **3.7 Research instruments reliability**

Orodho (2009) refers to instruments reliability as the ability to measure and yield consistent results when administered to the same respondents repeatedly. The test-retest method was used. It involves administering the same instruments twice to a few identical subjects not part of the sample for the study in an interval period such as two weeks. Thereafter, two scores were correlated using Pearson product-moment correlation coefficient. Notably, with "r" close to 1, it demonstrates research instrument reliability (Mugenda and Mugenda, 2003). The formula for the coefficient is given as follows:-

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

Where,

r = Correlation coefficient

X = each respondent first test score

Y = each respondent second test score

n = respondents number

The correlation obtained from the pilot study was that teacher educators' questionnaires had 0.88 and students' questionnaires had 0.84, hence reliable instruments.

### **3.8 Data collection procedure**

An introductory letter and research permit were obtained from the University of Nairobi, Department of Educational Planning and Administration and NACOSTI, respectively. Thereafter, the researcher reported to the County Commissioner (CC) in Kakamega County and Sub County Director of Education (SCDE) in Kakamega South Sub-county before reporting and collecting data from the college.

Teacher educators were briefed on the study from their staffroom by the researcher and assisted by the college Dean of Curriculum. Data confidentiality was assured to the participants. While students were brief was

done in their classes by the researcher with assistance from the Dean of Curriculum. The researcher administered the questionnaires to teacher educators in their staffroom to be filled and returned on completion as the researcher went round the college filling-in the observation checklist. While students filled-in their questionnaires from their classes as the researcher collected them upon completion by each. A focus group discussion was held in a lecture hall with students only in the evening.

### **3.9 Data analysis techniques**

Qualitative data collected was subjected to content analysis method. Thereafter, the data was categorized into themes and reported in narrative and presentation form (Orodho, 2009). Analyzed quantitative data from the return rate of the research instruments was entered in Ms-Excel and imported into SPSS Version 20 for descriptive data analysis. Tables, pie chart and graphs are used in results presentation.

### **3.10 Ethical considerations**

On the attendance at interview, the participants were invited to sign a consent form for the study that was inclusive of non-disclosure. The research permit was obtained from NACOSTI to meet legal requirements and ethical conditions stated in the permit.

## **CHAPTER FOUR**

### **DATA ANALYSIS, INTERPRETATION AND PRESENTATION**

#### **4.1 Introduction**

Aspects of data analysis, interpretation and results presentation from the assessment of institutional factors influencing students' preparedness on the use of information and communication technology in teaching and learning: Case of Eregi teachers training college were assessed.

Questionnaires were administered and participants allowed to fill in at their own pace and submit it to the researcher. Thereafter, the quantitative data was arranged in MS Excel and subjected to SPSS Version 20 for coding and analysis. Pie charts and tables (frequencies and percents) were used for data presentation. The qualitative data from the questionnaires, focus group discussion guide and observation checklist was analyzed using content analysis method and results written as per the objectives and integrating with quantitative data and inferences drawn.

#### **4.2 Return rate of questionnaires**

Data collection was conducted using two questionnaires sets. One questionnaire was for teacher educators and the other for students. A total of 65 (100%) and 95 (95%) of teacher educators and students completed and submitted their questionnaires, respectively (Table 4.1).



**Table 4.1: Questionnaire return rate**

	Frequency	Per cent
Students	95	95
Teacher educators	65	100
Total	160	96.96

Each of the 65 teacher educators issued with questionnaires completed and submitted to the researcher in their staffroom. Of the 100 students issued with questionnaires, only 95 returned them to the researcher. With this return rate, provided satisfactory results for generalization.

### **4.3 Respondents demographic information**

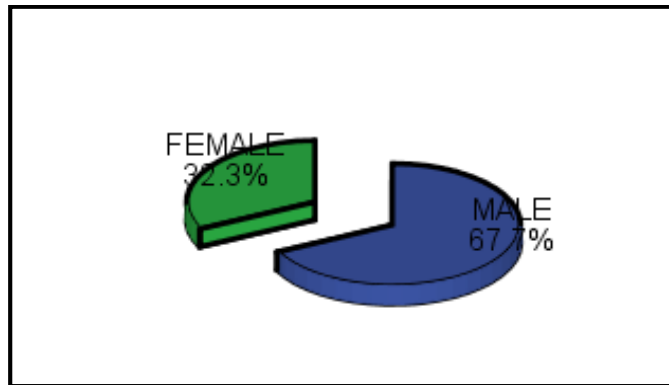
The study aimed on two categories of respondents; the teacher educators and 2<sup>nd</sup> year students. To understand their background associated with teaching and learning using ICT, gender, ICT course done and the type of certificate awarded were requested from the 2<sup>nd</sup> year students. However, the teacher educators were to indicate their gender, age bracket, ICT course done and type of certificate awarded, years of teaching. All these background information are discussed in subsequent subtopics.

#### **4.3.1 Gender of the respondents**

##### **a) Teacher educators**

Teacher educators' genders were requested to determine their distribution in the college as associated to teaching and learning using ICT and ensuring a fair presentation of the discussions and results of the study. Previous studies

had demonstrated that males have superior skills in teaching and learning using ICT as compared to female counterparts (Volman and Eck, 2001) (Figure 4.1).

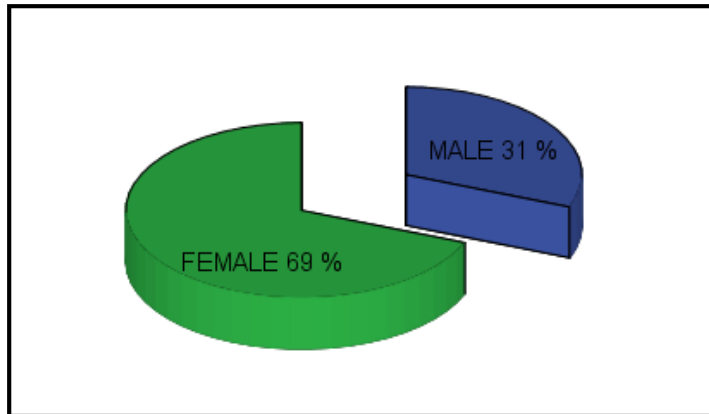


**Figure 4.1: Teacher educators' gender distribution**

From figure 4.1, approximately 32.3 % indicates female teacher educators and 67.7 % are the males. The distribution shows that teacher educators are skewed towards the male gender. However, this is a cause of the Teachers Service Commission (TSC) who does their posting. Volman and Eck (2001) and other studies showed male teacher educators being better off in the integration of ICT than their female counterparts. Therefore, results showed skills in teaching and learning using ICT are high in the college.

#### **b) 2<sup>nd</sup> year students**

Gender of the 2<sup>nd</sup> year students were used to determine their distribution in college and as related to teaching and learning using ICT to minimize results biasness (Figure 4.2).



**Figure 4.2: The 2<sup>nd</sup> year students' distribution by gender**

From figure 4.2, 31% and 69% represented male and female students, that is, 29 students and 69 female respectively of the respondents who returned their questionnaires. Notably, the distribution of gender among teacher educators and students is skewed oppositely. This may result from the notion of the male gender that teaching profession belongs to the female gender and few males apply to join the training at this level. Volman and Eck (2001) showed male teachers being better off in using ICT than female teachers. This may explain the low skills in ICT integration in teaching and learning among students.

#### **4.3.2 Respondents age**

##### **a) Teacher educators**

The distribution of teacher educators by age and their relation to teaching and learning using ICT were determined. This assisted in inferring the distribution of skills in teaching and learning using ICT in different age brackets and value attached to ICT skills (Table 4.2).

**Table 4.2: Age distribution of teacher educators**

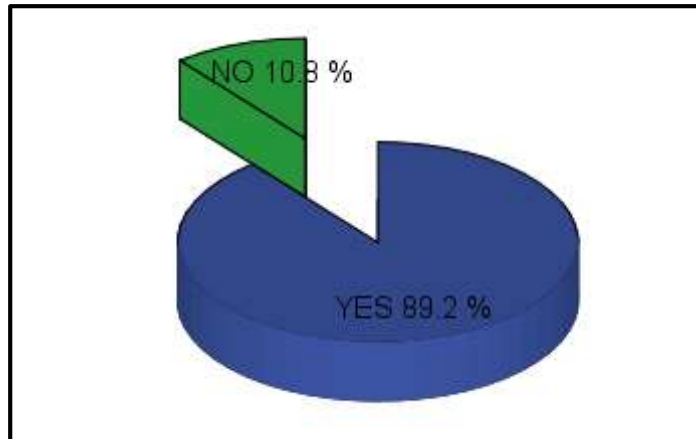
	Frequency	Percent
20-29	16	24.6
30-39	9	13.8
40-49	19	29.2
50-60	16	24.6
Other	5	7.7
Total	65	100.0

From table 4.2, 16 teacher educators represented 24.6%, 9 by 13.8%, 19 by 29.2%, 16 by 24.6%, 5 by 7.7% across all the age brackets; a fair distribution enabling generalization of the findings. In life it is believed that respondent age indicates maturity level, therefore, it is assumed that the mature the teacher educator is, she/he understands better the significance of developing skills in teaching and learning using ICT and therefore prepare students adequately.

### **4.3.3 ICT course done**

#### **a) Teacher educators**

The researcher wanted to know whether teacher educators have done any ICT course that can provide basic foundation skills for using ICT in teaching and learning (Figure 4.3).

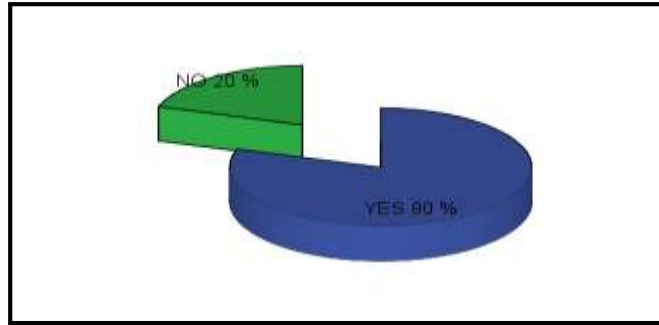


**Figure 4.3: Distribution of teacher educators by ICT course done**

From figure 4.3, 89.2% of 65 teacher educators have at least done a course in ICT and while 10.8% have not. Despite, the majority of them are at a certificate level in ICT skills; this is a better indicator of the presence of foundational skills in most of the teacher educators for teaching and learning using ICT, hence, good in preparing students on the same.

**b) 2<sup>nd</sup> year students**

The researcher wanted to know whether the 2<sup>nd</sup> year students have done any ICT course that can provide basic foundation skills in using ICT in teaching and learning (Figure 4.4).



**Figure 4.4: Distribution of students by ICT course done**

From figure 4.4, 80% of 95 students have done a course in ICT and while 20% have not done any. This is a good indication of the presence of foundational skills in most students using ICT IN teaching and learning as they prepare for teaching practice and profession later.

#### **4.3.4 Type of ICT certificate awarded**

##### **a) Teacher educators**

The researcher wanted to know the type of certificate acquired by the teacher educator and their distribution. This was to gauge the level of ICT skills that could enhance ICT use in teaching and learning (Table 4.3).

**Table 4.3: Types of certificate awarded to teacher educator**

	Frequency	Percent
Certificate	43	66.2
Diploma	6	9.2
Others	16	24.6
Total	65	100.0

From table 4.3, 66.2% of the 65 teacher educators have done ICT course at certificate level, while 9.2% have done it at diploma level as others fall in 24.6 % category. From the results, majority of teacher educators have ICT skills at certificate level, the lowest level, meaning their ICT skills are limited when it comes to student preparation in teaching and learning using ICT. These demands for more training of teacher educators in teaching approaches by the stakeholders that promote teaching and learning using ICT.

**b) 2<sup>nd</sup> year students**

The researcher wanted to know the ICT course done by the 2<sup>nd</sup> years and its distribution as related to the use of ICT in teaching and learning. However, it assess the ICT skills level that could promote the development of skills on the use of ICT in teaching and learning while still in college (Table 4.4).

**Table 4.4 Types of certificates awarded to 2<sup>nd</sup> year students**

	Frequency	Percent
Certificate	76	80.0
Diploma	2	2.1
Not done any	17	17.9
<b>Total</b>	<b>95</b>	<b>100.0</b>

From table 4.4, 80% of the 95 students who returned their questionnaires have at least done an ICT course at a certificate level, only 2.1% have a diploma while 17.9 % have not done any. These results show a majority of students having a certificate, the lowest level, therefore, most are have limited basic

ICT skills as 17.9% having done nothing, this means the ICT skills among the 2<sup>nd</sup> years are limited or lacking to provide foundational ICT skills to develop skills in teaching and learning integrated with ICT.

#### 4.3.5 Teacher educators by years of teaching

The researcher wanted to know the distribution of teacher educators by the years in the teaching profession and as related to the use of ICT in teaching and learning; therefore, requested to indicate their teaching years in bracket (Table 4.5).

**Table 4.5: Teaching years distribution of teacher educators**

	Frequency	Percent
1-5	19	29.2
11-15	6	9.2
21-25	17	26.2
26-30	12	18.5
Others	11	16.9
<b>Total</b>	<b>65</b>	<b>100.0</b>

A total of 61.6%, 29.2% and 9.2% of teacher educators had an experience of over 20 years, few than five years and between 11-15 years, respectively (Table 4.5). The implication of these results is that majority of teacher educators are more experienced and should be in a position to appreciate the importance developing students with skills in using ICT in teaching and learning and therefore prepare them adequately.



#### 4.3.6 Subjects taught by teacher educators

The researcher wanted to know the distribution of teacher educators by the subjects they teach (Table 4.6).

**Table 4.6: Distribution of teacher educators by the subjects they teach.**

	Frequency	Percent
ART	3	4.6
BUSINESS STUDIES	4	6.2
CHILD PSYCHOLOGY	2	3.1
CRE/IRE	4	6.2
EDUCATION	6	9.2
ENGLISH	7	10.8
ICT	2	3.1
KISWAHILI	7	10.8
MATHEMATICS	8	12.3
PHYSICAL EDUCATION	8	12.3
SCIENCE	8	12.3
SOCIAL STUDIES	6	9.2
Total	65	100.0

Subjects taught in the college such as Mathematics, Science, English, Physical education, Social studies have a higher presence of teacher educators compared to ICT subject which has 3.1% only (Table 4.6). The implication is that we cannot only rely on the ICT subject for the development of skills in teaching and learning using ICT among the students. Subjects having a higher

number of teacher educators take a leading role in developing skills of teaching and learning using ICT in students for any success.

#### **4.3.7 Position of teacher educators in the college**

The researcher aimed at determining the positions held by teacher educators in the college and as related to teaching and learning using ICT. Their distribution has a significant contribution to the development of skills in teaching and learning using ICT (Table 4.7).

**Table 4.7 Positions held by teacher educators in college**

	Frequency	Percent
Principal and Deputy Principal	2	3.1
ICT Teachers	2	3.1
Dean of Students and Dean of Curriculum	2	3.1
Lecturers	58	89.2
<b>Total</b>	<b>65</b>	<b>100.0</b>

From table 4.7, it is observed that lecturers account 89.2%, ICT teacher educators account 3.1% while the college leadership accounting 6.2%. This implies that we cannot rely on ICT teacher educators only for the development of skills in teaching and learning using ICT. Those lecturers who account a high per cent have to take a leading role in developing skills of teaching and learning using ICT in students for any success.

#### 4.3.8 Teacher educators professional qualification

It is presumed that teacher educators with higher professional qualification had previously used ICT as they pursue further academic qualifications and therefore mastered ICT skill, appreciate and ready to teach and learn using ICT (Table 4.8).

**Table 4.8: Teacher educators professional qualifications distribution**

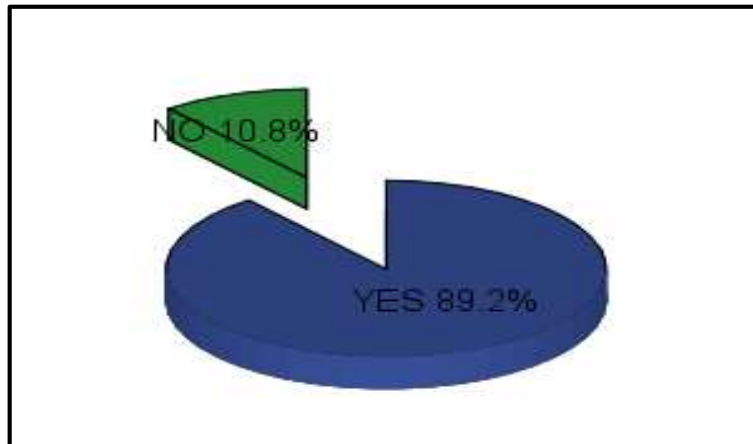
	Frequency	Percent
Diploma in Education	6	9.2
Bachelor of Education	28	43.1
Masters in Education	26	40.0
Others	5	7.7
Total	65	100.0

From table 4.8, teacher educators above Masters in Education account 47.7%, followed with those with Bachelor of Education at 43.1%. This implies that majority of teacher educators have acquired substantial ICT skills as they advance their studies and should be ready and able to adequately prepare students in teaching and learning using ICT for teaching practice and later in the profession.

#### 4.4 ICT curriculum design and teaching and learning using ICT

##### 4.4.1 ICT curriculum design

Teacher educators were required to indicate whether the ICT curriculum used in college helps in developing teaching and learning skills using ICT (Figure 4.5).



**Figure 4.5: ICT curriculum design develops skills of ICT integration by teacher educators**

From figure 4.5, 89.2% of teacher educators agree that the ICT curriculum design used in college to train students in skills of teaching and learning using ICT where only 10.8% disagreeing. This implies if the students are fully exposed to the ICT curriculum design they should be fully prepared in teaching and learning using ICT. However, Kafu, 2011 and Moulder, 2014 recommends that the ICT curriculum design should concern with, ‘what’ is learned, that is; the objectives and subject content, how learning and teaching occurs, that is; the teaching approaches, evaluation and resources such as ICT infrastructure.

#### **4.4.2 Objectives of teaching and learning using ICT in the ICT curriculum design.**

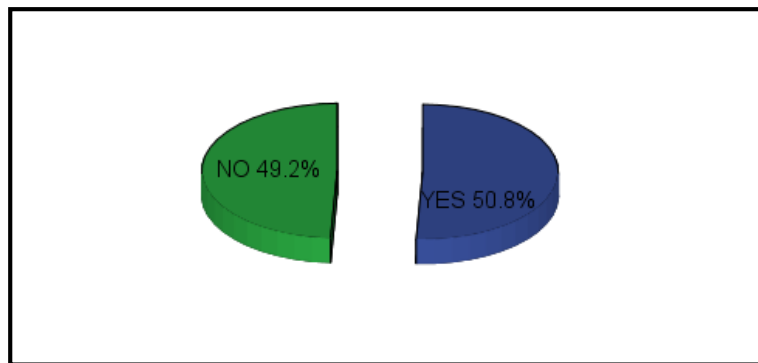
Teacher educators and students were requested to identify objectives in the ICT curriculum design that contribute in teaching and learning using ICT. Objectives mentioned include equipping student teachers with relevant skills in teaching and learning using ICT, to train teachers for a digital literacy

program in Kenya, to develop ICT compliant teacher who meets the needs of a global world, to develop teaching and learning skills using ICT in respective subjects in primary school. From the students focused group discussion, results showed that some objectives encourage teaching and learning using ICT despite their dependency on subject teacher educators.

#### 4.3.9 Technical support on teaching and learning using ICT

Teacher educators and students were requested to indicate whether they receive any technical support in teaching and learning using ICT and for further skill development (Figures 4.6 and 4.7).

a) Teacher educators

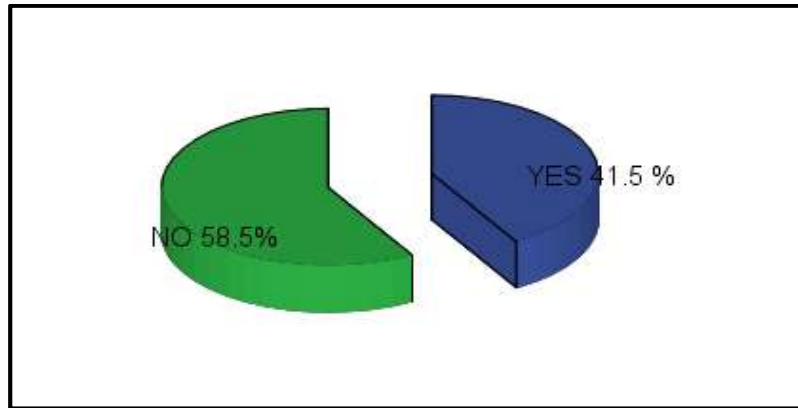


**Figure 4.6: Presence of technical support by teacher educators**

From figure 4.6, there was no real agreement on the presence of technical support to promote the preparation of students in teaching and learning integrated with ICT. However, 50.8% of teacher educators agree to have received technical support as 49.2% disputed. There is a need for technical support to check on the breakdown of ICT infrastructure as these specialized

skills are not necessary for teacher educators to train in but crucial in integrating ICT in teaching and learning.

**b) 2<sup>nd</sup> year students**



**Figure 4.7: Presence of technical support by 2<sup>nd</sup> year students**

There was no real agreement on the presence of technical support to promote the preparation of students in teaching and learning using ICT (Figure 4.7). Besides, 41.5% of students agree to have received technical support while 58.5% disputed. There is a need for technical support to assist in checking breakdown in ICT infrastructure as these specialized skills may not be available with teacher educators but crucial in developing skills of integrating ICT in teaching.

**4.3.10 Shortcomings in the ICT curriculum design to teaching and learning using ICT.**

The researcher examines the shortcomings encountered on training students in teaching and learning using ICT. Shortcomings encountered included inadequate ICT tools, for example, the college has only one LCD projector, lack of technical support and material, students joining college are ICT illiterate and therefore lack foundational know on ICT, high cost of acquiring ICT tools and infrastructure, inadequate resources and ICT training of teacher educators, inadequate training of teacher educators in integration of ICT, students have no access to ICT facilities within the college, for example, the computer lab is under lock and key, some teacher educators have a negative attitude on teaching and learning using ICT. This follows the claim that ICT subject in Primary Teacher Education (PTE) examinations is not examinable by the Kenya National Examination Council (KNEC). Students focused group discussion showed no assessment factor in the ICT curriculum that contribute to teaching and learning using ICT.

#### **4.3.11 Possible evaluation measures to be included in the ICT curriculum design.**

The researcher sought to know from both teacher educators and students possible evaluation measures to be included in the ICT curriculum design used in preparing students in teaching and learning using ICT. The measures included making ICT subject examinable by KNEC in P.T.E., this was to make students and teacher educators put in substantial effort in the subject, the ratio of computers was suggested to be raised to ratio 1:1, one computer one student, manipulation skills in practical be assessed as part of tests, having

integrated ICT in practical activities and include the element of teaching and learning using ICT during teaching practice assessment in all subjects.

Students focused group discussion suggested that the ICT subject to be examinable in PTE, students to access the internet, computer lab during teaching practice preparation, other subjects to intensively teach and learn using ICT as done in physical education in the college.

#### **4.5 College ICT infrastructure and teaching and learning using ICT**

The researcher examine ICT infrastructure available in college and whether the respondents have been trained on them. Therefore, the researcher provided a list of ICT tools believed to be central in use of ICT in teaching and learning (Figure 4.8).



**Figure 4.8: The available ICT infrastructure and training on the same**



From figure 4.8, college ICT infrastructure available and students trained were 82% compared to 18% that are not available and not trained. The most college ICT tools available are; desktop computers, laptops, digital cameras, television radio, one LCD projector, printers and photocopier machines, scanner and internet

From the observation checklist, it was shown that desktop computers are accessible to students during lessons only, LCD projector is accessible to teacher educators only and not to students, internet connectivity/local area network is available and accessible to both teacher educators and students, not all subjects have digital content, the college has no whiteboard and interactive smart boards, therefore, students not trained on.

Students focused group discussion observed the desktop computers are enough if students attend the ICT lesson as a stream, LCD projector is one and limited for use by teacher educators only, teacher educators are the only ones allowed to use the internet which contradict information in the questionnaire, students are not aware of any digital content in the college. According to Ertmer, et al., (2012) Technology is included in 'how' part of the ICT curriculum, that is; teaching approaches and evaluation techniques, which are determined by the objectives, content and the physical setting.

#### **4.6 Teacher educators' teaching approaches and teaching and learning using ICT**

##### **4.6.1 Teaching students in teaching and learning using ICT**

Teacher educators were requested to indicate whether they teach their students teach and learn using ICT. Decision on the skills students need and deliberately provide learning opportunities would be determined by teacher educators (Spector et al., 2012). Students expect to train on skills in teaching and learning using ICT from their teacher educators. As an opportunity, students need to clarify on what they observe from their teachers (Table 4.9).

**Table 4.9 Teaching students to teaching and learning using ICT**

	Frequency	Percent
Often	13	20.0
Sometimes	40	61.5
Never	12	18.5
Total	65	100.0

From table 4.9, 61.5% of teacher educators do sometimes teach students how teaching and learning using ICT, with only 20% who often does, with 18.5% who never do. From this table a majority, 80% don't teach their students in teaching and learning using ICT in Eregi teachers training college with only 20% doing it. This is against the observation by Baran, Chuang and Thomson (2011) who noted teacher teach the way they were taught and saw their teachers teach while in college yet it is missing.

#### **4.6.2 Teaching and learning using ICT by teacher educators**

Teacher educators were requested to indicate how they sometimes teach and learn using ICT. Amongst the instruments used mentioned by teacher

educators were smartphones/ video clips, PowerPoint presentation, through an audio-visual display on television in dining halls, analyzing poetry and research work using computers programs, project-assignments on ICT-related topics from the computer lab, using LCD projectors to present lessons, downloading notes from the internet, e-communication by social media and emailing. Some teacher educators have their lesson notes and schemes of work printed by a word processor, ICT teachers and physical education teacher commonly project their work from the ICT room and dining hall.

#### **4.3.12 Venues of teaching and learning using ICT in college**

The researcher assessed venues of teaching and learning using ICT in college. Both teacher educators and students listed the ICT Lab, classrooms or lecture halls, wireless hotspots, conference or dining halls and teachers' staffroom as common venues to use ICT in teaching and learning. Students focused group discussion mentioned ICT teachers and physical education teachers using the ICT room and dining hall frequently.

#### **4.3.13 Development of skill in teaching and learning using ICT by teacher educators**

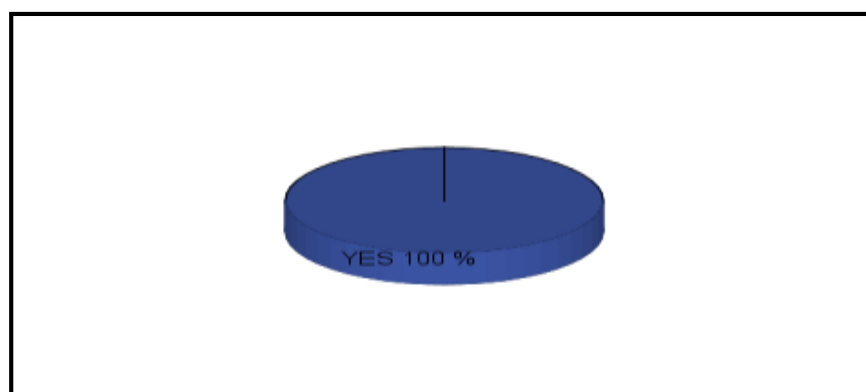
The researcher evaluate instances teacher educators develop the skill of teaching and learning using ICT in students. They listed demonstration, practical, teaching student basics of ICT such as word processing, spreadsheets, making and presenting PowerPoint presentations and emailing, research on electronic search engines such as Google, creating video clips for

learning, facilitate teaching and learning using ICT in practical teaching and for future. Harris and Hoffer, 2011 advice teacher training colleges to computer applications such as word processing, spreadsheets, PowerPoint presentation not in isolation from pedagogical context.

#### **4.7 Teaching practice and ICT use in teaching and learning.**

##### **4.7.1 Teacher educators on teaching practice assessment.**

Teacher educators were requested to indicate if they had been to teaching practice assessing students. It is a background question to subsequent questions and answers, a link to whether teaching practice assessment had a component in teaching and learning using ICT (Figure 4.9).



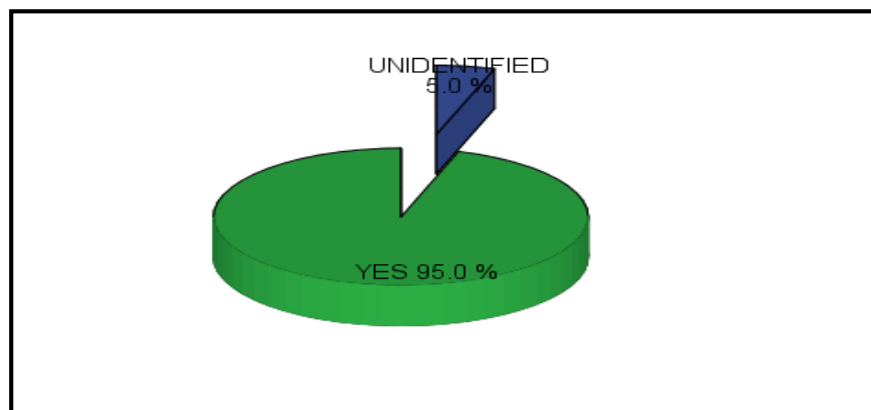
**Figure 4.9: showing if teacher educators have been to teaching practice**

Figure 4.9 revealed that 100% of teacher educators participated in assessing students on teaching practice. This is because, as a compulsory component of teacher training in Kenya, all students are expected to undergo teaching practice and pass to qualify as teachers. As an opportunity, pre-service

teachers should put into practice use of ICT skills acquired in college, assessed on the same before graduation to establish they are getting off well and if not, given remedies before they graduate (Kafu, 2011)

#### 4.7.2 2<sup>nd</sup> year students on teaching practice

The researcher examined for students that had underwent teaching practice (Figure 4.10).



**Figure 4.10: 2<sup>nd</sup> year students underwent teaching practice**

Figure 4.10 it was revealed that 95% of students have been in teaching practice with five percent not indicating. This is because, as a compulsory component of teacher training in Kenya, all students are expected to undergo teaching practice and pass to qualify as teachers.

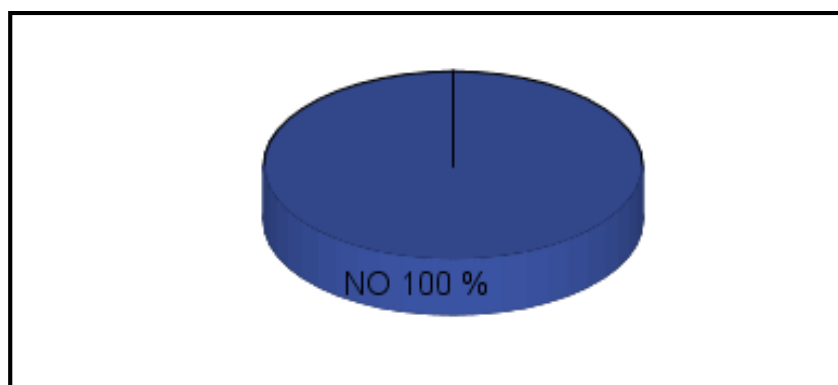
#### 4.7.3 Ways the 2<sup>nd</sup> year students teach and learn using ICT on teaching practice.

The researcher requested 2<sup>nd</sup> year students and teacher educators to mention ways students teach and learn using ICT in their teaching practice. They listed use of video clips and photos on their smartphones, projecting PowerPoint presentations, researching subject matters on the internet to beef up content in textbooks, language teachers used ICT to teach sounds/phonetics.

From the observation checklist, there were no schemes of work, lesson notes, lesson plans by a word processor, training on PowerPoint presentations inadequate, video clips and pictures on smartphones, teaching practice assessment forms have nothing in teaching and learning using ICT. Teacher institutions continue teaching ICT subject in isolation rather than teach/learn using ICT (Harris &Hoffer, 2011)

#### **4.7.4 Teaching and learning using ICT during teaching practice assessment.**

Teacher educators were requested to indicate whether teaching practice assessment of students on teaching practice has a component of teaching and learning using ICT (Figure 4.11).



#### **Figure 4.11: Teaching and learning using ICT during teaching practice by teacher educators**

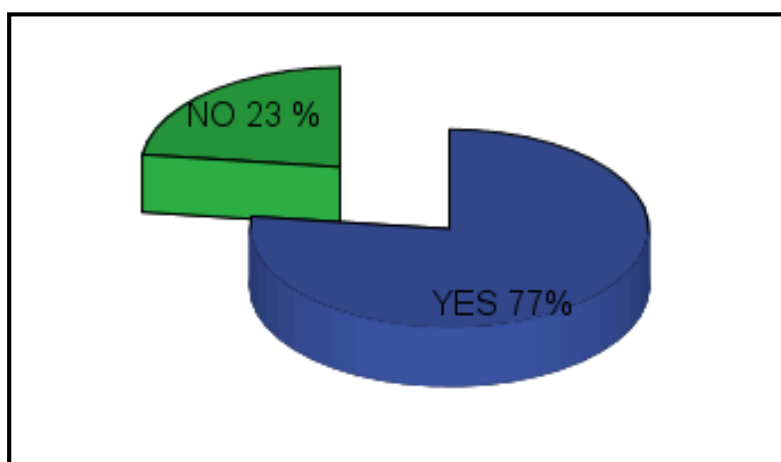
Teaching practice assessment of students on teaching practice has no component in using ICT in teaching and learning as confirmed during students focused group discussion (Figure 4.11). This implies that little or no effort is put in by both teacher educators and students in developing the skills of teaching and learning using ICT as there is no assessment on the same. Kafu, (2011) says assessment requirement on skills in teaching and learning using ICT makes students have efforts to learn and integrate it while in teaching practice and later after graduating from college.

#### **4.7.5 What makes students not to teach and learn using ICT during teaching practice**

Teacher educators were requested to give reasons why students may not teach and learn using ICT during teaching practice. They identified lack of enough ICT facilities in college and in practical schools, preparation for the integration of ICT is time-consuming, power blackouts, inadequate knowledge on teaching and learning using ICT, inadequate practice and innovation on mastering ICT integration skills, ICT facilities not accessible to students, negative attitude on use of ICT in teaching and learning, expensive ICT facilities like smartphones. It also concurred in the focus group discussion with the students.

#### **4.7.6 Preparedness in teaching and learning using ICT by students in future**

Students were requested to indicate whether they feel prepared in teaching and learning using ICT in future (Figure 4.12).



**Figure 4.12: Students preparedness in teaching and learning using ICT in future.**

Students that indicated whether they feel prepared in teaching and learning using ICT in future were 77% compared to 23 % who were not (Figure 4.12). This contradicts from their inadequate preparation, lack of assessment on the same while on teaching practice and the ICT subject being a non-examinable at PTE level leading to limited skill in using ICT in teaching and learning development.



#### **4.8 Summary**

Our results from the two sets questionnaires focus group discussion guide and observation checklist helped in answering the research questions. Background information from both students and teacher educators has a significant influence on students' preparedness in teaching and learning using ICT. Teacher educators are mature enough in experience, professional qualification to appreciate more the need of having skills of integrating ICT, therefore prepare students adequately. This is incognizant with the finding of Hannessy (2010). The study found ICT curriculum design influencing students' preparedness in teaching and learning using ICT. If students were fully exposed to it, then they should be well prepared. The study also found college infrastructure a determinant factor in student's preparedness in teaching and learning using ICT. The ICT infrastructure present in college was being used. If the infrastructure is present it is likely to be used in training as for the case of Eregi teachers training college. The ministries of education need to invest more in the college ICT infrastructure. Teaching approaches influence students' preparedness in the sense that students gain knowledge by observing how their teachers teach and learn using ICT. Unfortunately, it was evident most of teacher educators do not teach students on teaching and learning using ICT. Teaching practice has a significant influence on students' preparedness in ICT use in teaching and learning. As a compulsory in teacher education in Kenya, teaching and learning using ICT is still not a component in teaching practice assessment or no element of it on the assessment sheet.

## **CHAPTER FIVE**

### **CONCLUSION AND RECOMMENDATION SUMMARY**

#### **5.1 Introduction**

A summary of study findings, conclusions, recommendations and suggestions for further studies have been covered here.

#### **5.2 Summary of the study**

Objective of the study was to investigate institutional factors influencing students' preparedness in integrating Information and Communication Technology in teaching and learning in Eregi teachers training college, Kenya.

However, the specific objectives were 1) to determine the extent to which ICT curriculum design influence students' preparedness in integrating ICT in teaching and learning in Eregi teachers' training college, 2) to determine the influence of college ICT infrastructure on students' preparedness in integrating ICT in teaching and learning in Eregi teachers' training college, 3) to establish the extent to which teacher educators' teaching approaches influence students' preparedness in integrating ICT in Eregi teachers training college, and 4) to establish the extent to which teaching practice influence students' preparedness in use of ICT in Eregi teachers' training college.

A case study design was used to allow a comprehensive study of a particular situation or institution such as Eregi teachers training college or programs to bring out the story behind the results and by representing a broad field into one easily researchable. A total of 565 persons categorized as 65 teacher educators and 500 2<sup>nd</sup> year students of Eregi teachers training college, Kenya. 20 % of

students and 100% teacher educators were purposively sampled as recommended by Mugenda and Mugenda, 2003. The study used two questionnaires set, observation checklist and focused group discussion guide as research instruments for data collection. Supervisors' recommendations were incorporated to adequately cover the research objectives to attain validity. A pilot study was conducted in identical subjects not part of the sample of the student. 10 % of the sample size to ascertain the reliability of research instruments.

From the administered questionnaires on 65 teacher educators, the return rate was 100%, while on the 100 students, it was 95%. As the students were filling in the questionnaires, the research went around the college filling-in the observation checklist and later on held a focus group discussion with students in a lecture hall. The SPSS Version 20 was used to analyze the quantitative data and results presented in tables and pie charts. Moreover, content analysis method was used in qualitative data analysis.

The literature review addresses a global, regional and local perspective. From the review ICT curriculum design, college ICT infrastructure; teacher educators teaching approaches, teaching practice has a great influence on student's preparedness in use of ICT in teaching and learning. The study was based the theory of Technological Pedagogical Content Knowledge (TPACK). It is a contextualizing approach for guiding student and teacher educators in developing ability in teaching and learning using ICT. It uses three set (components) of knowledge; pedagogy, content and technology.

### **5.3 Conclusions**

ICT curriculum design influence students' preparedness in teaching and learning using. Students fully exposed to the ICT curriculum design and other subjects should infuse ICT in their subjects for students to learn from the subjects. ICT subject should be examinable in PTE and teaching practice assessment. The results shall be teachers with adequate skill and ready to teach and learn using ICT in future.

The ICT infrastructure in college greatly influences the skills developed in teaching and learning using ICT. If the college has adequate ICT infrastructure such as computers, internet connections, scanners, interactive smart boards, students are likely to be trained on them. Teacher educators teaching approaches greatly impact the preparation of students in teaching and learning using ICT. Teacher educators to decide on the skills students need and deliberately provide learning opportunities for their acquisition. Teaching practice influence students preparedness in teaching and learning using ICT. Teaching practice is compulsory in teacher education. However, so far teaching and learning using ICT is not yet a component in a teaching practice assessment. There is a need for introducing assessment ICT use in teaching and learning in teaching practice and examining ICT subject in PTE to increase seriousness in mastering basic ICT skills.

### **5.4 Recommendations**

The study recommendations include;

From the recommendations, policymakers and curriculum developers of teacher education may infuse ICT in other subjects taught for development of

skills and students preparedness in teaching and learning using ICT. Furthermore, policymakers may consider making ICT subject examinable in PTE to increase seriousness in mastering basic ICT skills necessary in teaching and learning using ICT.

As for the Ministry of Education, the study recommends introduction component of ICT use in teaching and learning on assessment sheets for teaching practice, an assessment done and awarded during the teaching practice assessment.

The study recommends the Ministry of Education to invest more in college ICT infrastructure as is the first platform students encounter ICT tools, learn and practice on them before they enter the profession.

The study recommends that teacher educators be trained on different teaching approaches of teaching and learning using ICT as students learn from teachers and how they are taken through.

### **5.5 Suggestions for further studies**

Suggestions for further studies are as follows;

- i) Further studies are suggested in other colleges as this study was limited to Eregi teachers' training college.
- ii) Further studies should be done as a follow-up study on teachers' experience (less than 3 years after graduation) in use of ICT in teaching and learning.

- iii) Further assessments should be done to establish the influence of teaching practice in teaching and learning using ICT in teacher education to establish acquisition of relevant skills.
- iv) Further studies to consider use interview of ICT experts in the college and library and head teachers of where student do their teaching practice.

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**APPENDIX I: Letter of introduction**

AMBROSE KIPRISTA AMTALLAH  
P.O. BOX 258- 30106,  
TURBO.

CHIEF PRINCIPAL,  
EREKI TEACHERS TRAINING COLLEGE,  
P.O. BOX 100,  
MARAGOLI.

Dear Sir/Madam,

**RE: PERMISSION TO CONDUCT ACADEMIC RESEARCH**

I am a postgraduate student of the University of Nairobi pursuing a degree of Master of Education in Curriculum studies. Kindly allow me to collect data from the college on, “Institutional-related factors influencing students’ preparedness in integrating Information and Communication Technology in teaching and learning: Case of Eregi teachers’ training college, Kenya”. The collected data will be used for academic purpose only and the identity of respondents shall be treated with at most confidentiality.

Thank you.

Yours faithfully,

AMBROSE KIPRISTA AMTALLAH



- a.) ICT teacher ( ) b.) Dean of students ( ) c.) Dean of curriculum ( )
- d.) Deputy Principal ( ) e.) Principal ( ) f.) Other (please specify).....

9. Please indicate your level of professional qualification.

- a) Diploma in Education ( )
- b) Bachelor of Education ( )
- c) Post-Graduate Diploma in Education ( )
- d) Masters in Education ( )
- e) Other, (please specify).....

**SECTION B: ICT CURRICULUM DESIGN AND INTEGRATION OF ICT IN TEACHING AND LEARNING**

10 ICT curriculum design develops ICT integration skills.

YES ( ) NO ( )

11. From the ICT curriculum design, what are the objectives on the integration of ICT in teaching.....?

12. You receive technical support in integrating ICT in teaching for skill development?.....

13. What are the shortcomings in the ICT curriculum design hindering ICT integration?.....

14. What possible evaluation measures should be placed in the ICT curriculum design for preparation of students in ICT integration in teaching?.....

**SECTION C: COLLEGE ICT INFRASTRUCTURE AND INTEGRATION OF ICT IN TEACHING AND LEARNING**

15. Kindly tick on the tool you use in integrating ICT in teaching.

Tool	Available	Not available	Trained	Not trained
Desktop computer				
Laptop				
Digital camera				
Television				
Radio				
Video camera				
LCD projector				
PowerPoint				
Word processor				
Spreadsheets				
Flatbed scanner				
Printer				
Interactive whiteboard				
Internet				
Antivirus usage				
Digital content				

**SECTION D: TEACHER EDUCATORS' TEACHING APPROACHES AND INTEGRATION OF ICT IN TEACHING AND LEARNING**

16. Do I teach students how to integrate ICT in teaching?

Often ( )      Sometimes ( )      Never ( )

17. How do you integrate ICT in teaching?.....

18. State venues where the integration of ICT in teaching happens.....

19. How do you develop the skill of integrating ICT in teaching in your students?.....

**SECTION E: TEACHING PRACTICE AND INTEGRATION OF ICT IN TEACHING AND LEARNING**

20. Have you been to teaching practice? Yes ( ) No ( )

21. Did your assessment of students have the component on ICT integration in teaching?.....

22. In which ways do students integrate ICT in teaching while in teaching practice?.....

23. What makes students not integrate ICT into teaching while on teaching practice?.....

**Thank you for your cooperation and participation**

**APPENDIX III: Questionnaire for 2<sup>nd</sup> years students**

This research intends to collect data on institutional-related factors influencing students' preparedness in integrating ICT in teaching. Kindly respond honestly by ticking ( ) appropriately or filling in the information in the spaces provided.

**SECTION A: BACKGROUND INFORMATION**

1. What is your gender? Male ( ) Female ( )
2. Have you done any ICT course before? YES ( ) NO ( )
3. Indicate the type of certificate awarded if the answer to question 2 is "YES"  
a.) Certificate ( ) b.) Diploma ( ) c.) Other (please specify).....
4. If your answer to question 2 is "NO" what was the reason?.....

**SECTION B: ICT CURRICULUM DESIGN AND INTEGRATION OF ICT IN TEACHING AND LEARNING**

5. From the ICT curriculum design, what are the objectives on the integration of ICT in teaching?.....
6. What are the shortcomings in the ICT curriculum design that hinder the integration of ICT?.....

7. Suggest possible measures to be included in the ICT curriculum design to integrate ICT in teaching.....

**SECTION C: COLLEGE ICT INFRASTRUCTURE AND INTEGRATION OF ICT IN TEACHING AND LEARNING**

8. Kindly tick on the tool used in integrating ICT as applied

Tool	Available	Not available	Trained	Not trained
Desktop computer				
Laptop				
Digital camera				
Television				
Radio				
Video camera				
LCD projector				
PowerPoint				
Word processor				
Spreadsheets				
Digital content				
Internet				
Interactive whiteboard				

**SECTION D: TEACHER EDUCATORS' TEACHING APPROACHES AND INTEGRATION OF ICT IN TEACHING AND LEARNING**

9. Teacher educators are integrating ICT in teaching? Yes ( ) No ( )

10. How do teacher educators integrate ICT in their teaching?.....



11. State the venues from where teacher educators integrate ICT in teaching.....

**SECTION E: TEACHING PRACTICE AND INTEGRATION OF ICT IN TEACHING AND LEARNING**

12. Have you been to teaching practice? Yes ( ) No ( )

13. In which ways did you integrate ICT in teaching in your teaching practice.....

14. Which technical support you receive when integrating ICT in teaching?.....

15. What made you not integrate ICT in teaching practice?.....

16. Do you feel prepared to integrate ICT in teaching in future?.....

**Thank you for your cooperation and participation**

#### **APPENDIX IV: Focus group discussion guide for students**

The purpose of this focus group discussion guide is to collect data on institution-related factors influencing students' preparedness in integrating ICT in teaching and learning.

#### **SECTION A: INFLUENCE OF ICT CURRICULUM FACTORS ON ICT INTEGRATION IN TEACHING**

1. How do the objectives of the ICT curriculum influence ICT integration in teaching?
2. How do the teaching/learning activities outlined in the ICT curriculum influence integration of ICT in teaching?
3. How is the assessment factor in the ICT curriculum influence integration of ICT in teaching?

**SECTION B: INFLUENCE OF COLLEGE ICT INFRASTRUCTURE  
IN INTEGRATING ICT IN TEACHING**

**Available=A Not Available= NA**

4. What is your opinion on the college ICT infrastructure?

INFRASTRUCTURE	A	NA	COMMENT
Desktop computers/Laptops			
LCD projectors			
Internet connectivity/Local Area Network			
Digital content			

**SECTION C: INDICATORS OF TEACHER EDUCATORS' ICT  
INTEGRATION IN TEACHING**

INDICATOR	A	NA	COMMENTS
Schemes of work, lesson notes, lesson plans prepared by word processor			
PowerPoint presentations notes			
Video clips and pictures downloaded from the internet			
Assessment forms			
ICT tools			
Teaching approaches used			

**SECTION D: INFLUENCE OF TEACHING PRACTICE ON ICT  
INTEGRATION IN TEACHING**

7. Are you assessed on ICT integration in teaching practice?
8. How would you rate your level of competency in ICT integration?
9. Do you use the computer lab when preparing ICT integrated lessons for teaching practice?
10. Which challenges did you experience in the integration of ICT in teaching?
11. Suggest measures to counter challenges in the integration of ICT in teaching?

### APPENDIX V: Observation checklist

The following areas will be observed and commended on accordingly

#### SECTION A: ICT INFRASTRUCTURE AND ICT INTEGRATION IN TEACHING

Available=A Not Available= NA

INFRASTRUCTURE	A	NA	COMMENT
Desktop computers/Laptops			
LCD projectors			
Internet connectivity/ Local Area Network			
Digital content			
Interactive smart boards			

#### SECTION B: INDICATORS OF ICT INTEGRATION IN TEACHING

INDICATOR	A	NA	COMMENTS
Schemes of work, lesson notes, lesson plans prepared by word processor			
PowerPoint presentations notes			
Video clips and pictures downloaded from the internet			
Assessment forms			
ICT tool and strategy used in the lesson			

## APPENDIX VI: Research permit

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 822968	Date of Issue: 21/August/2019
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<p>This is to Certify that Mr. AMBROSE AMTALLAH of University of Nairobi, has been licensed to conduct research in Wakarusa on the topic: INSTITUTION-RELATED FACTORS INFLUENCING STUDENTS, PREPAREDNESS ON INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHING AND LEARNING: CASE OF EREGI TEACHERS TRAINING COLLEGE, KENYA for the period ending : 21/August/2020.</p>	
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