INSTRUCTORS' EXPERIENCE ON THE USE OF INFORMATION COMMUNICATION TECHNOLOGY IN FACILITATING STUDENT -TEACHERS LEARNING IN TWO SELECTED TEACHERS' COLLEGES IN MOROGORO, TANZANIA

By

John Josephaty

A Dissertation Submitted in Partial Fulfilment of the Requirements for the Award of Degree of Master of Art in Education (MAED) of Mzumbe University

2020

CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a research proposal entitled; **Instructors' Experience on the use of Information Communication Technology in Facilitating Student-Teachers Learning in two selected Teachers' Colleges in Morogoro, Tanzania** in partial fulfillment of the requirements for the award of the degree of Master of Arts in Education (MAED) of Mzumbe University.

_____

Major Supervisor

_____

Internal Examiner

_____

External Examiner

Accepted for the board of Faculty of Social Science

_____

DEAN/BOARD/FACULTY CHAIRPERSON

DECLARATION
AND
COPYRIGHT

I, **John Josephaty** declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature ……

Date …….

ACKNOWLEDGEMENT

First and foremost, I would like to acknowledge the Almighty God for conceding me his forte in the preparation of this study. My sincere appreciation also goes to my supervisor Dr. Haruni Machumu from, Mzumbe University (MU) Tanzania, for his support and coaching. I extend my special regards to the Principals of Morogoro Teachers College (MOTCO) and Dakawa Teachers College (DATCO) for their support during data collection. Special appreciations go to all instructors/ICT experts, students-teachers, member of staff, and management for all two TCs for sparing their limited time to provide inputs which were very useful in my study.

I would also like to thank in a very special way my lovely wife Lilian Msoka and my kids (Ivan and Ian John Mbuya). Their support, unconditional love, and encouragement contributed much to the successful completion of this study. I am particularly thankful to Mr. Leudega Kisima, Mugisha Bandio, Michael Mwalupale, Shafi Pinda, Neema S. Kongojole, and Samson Saliboko for all assistance they used to support me during the whole period of my study. I also convey my genuine gratitude to Madam Grace John for her advice and support. Further, I am deeply grateful to my parents Dionista P. Kisaka and Josephaty J. Mbuya for all their assistance, advice, and encouragement. Further my warm gratitude goes to my lovely sisters Mariah J. Mbuya, Grace J. Mbuya, Regular J. Mbuya, and Joyce D. Kamugisha, who encouraged me to finish this dissertation.

My heartfelt thanks also go to the following. Dr. Jackson Sawe Jordan University College (JUCO), Dr. Chrisant Biamba (Gavle University), Dr. Flat Mfangavo Open University of Tanzania (OUT), Dr. Honest Ilomo University of Arusha (UOA) as well as to Mr. Yob Mwalufyagila and Baraka Mahenge (Nyandeo Secondary). Moreover, my appreciations go to my friend Jackson Kalalu, Joseph P. Mbuya, Gerald Sewando, Ramadhan Hamisi, Afidhi Suleiman, and Ignas Haule. I am obliged countless appreciation to my colleagues specifically my class met of 2018/2019, (MA-EDU) whose social and decent support was of paramount importance in the whole time of my research report writing.

DEDICATION

I dedicate this wok to my lovely Mother Dionista P. Kisaka who contributed to my well-being expressed through love, respect, moral and financial support which enabled me to accomplish this level of education. May almighty God bless you.

LIST OF ABBREVIATION

AISA	-	African Information System Association
BECTA	-	British Educational Communications and Technology Agency
CD	-	Compact Disc
CIL	-	Computer and Information Literacy
DATCO	-	Dakawa Teachers College
ECA	-	Economic Commission for Africa
E-Learning	-	electronic Learning
ESDP	-	Education Sector Development Programme
E-Systems	-	electronic Systems
I T/IS	-	Information Technology/Information System
ICILS	-	International Computer and Information Literacy Study
ICT	-	Information Communication Technology
ISPs	-	Internet service providers
ITU	-	International Telecommunication Union
LAN	-	Local Area Network
LMS	-	Learning Management Systems
MoEVT	-	Ministry of Education and Vocational Training
MOODLE	-	Modular Object-Oriented Dynamic Learning Environment
MOTCO	-	Morogoro Teachers college
NITDA	-	National Information Technology Development Agency
SIDA	-	Swedish International Development Agency
SPSS	-	Statistical Package for Social Sciences
TAM	-	Technology Acceptance Model
TCs	-	Teacher's Colleges
TRA	-	Theory of Reasoned Action
UNESCO	-	United Nations Educational Scientific and Cultural Organization
URT	-	United Republic Tanzania
VSAT	-	Very Small Aperture Terminal

ABSTRACT

This study mainly intended to examine instructors' experience on the use of ICT to facilitate student-teachers learning in two selected Teachers' Colleges in Morogoro, Tanzania. The study was guided by three specific objectives: (i) to identify instructors' teaching skills on the use of ICT in enhancing student-teachers learning, (ii) to assess instructors' gender differences on the use of ICT in facilitating student-teachers learning and (iii) to examine instructors' experiences and opportunities on the use of ICT in facilitating student-teachers learning in Teachers' Colleges in Morogoro region. The diffusion of innovation theory and technological acceptance model guided the current study. The study was conducted in two selected teachers' colleges of Morogoro and Dakawa teachers' colleges with a total of fifty (50) respondents who were obtained through simple random and purposive sampling procedures. The study used a descriptive survey design in gathering data through questionnaires, interview guides, and observation checklist. Qualitative data were thematically analysed while quantitative data were descriptively analysed, where frequency, percentage, mean and standard deviation were computed through SPSS version 20.

Quantitative data were presented in frequency, percentage, mean and standard deviation within the tables while those from the interview were presented in the quotations for explicit interpretation. The findings reveal varied instructors' teaching skills and experiences on the use of ICT in teaching and learning. The use of internet-based, word processing, and power point presentation skills were common while the use of web-based video conferencing skills was hardly used among instructors. Moreover, the findings found gender difference on the use ICT. The disparity among female and male instructors was contextualised as all had equal opportunities for ICT use in TCs. Theoretically, the study implies that the use of ICT as innovation is individuals' perceptions, hence should be timely adopted. Lastly, the study recommends that policymakers to establish guidelines that raise awareness to both instructors and students on the best ways to integrate and use ICT to facilitating T/L.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER ONE
PROLEM SETTING

1.0 Introduction

The focus of this study was to examine instructors' experience on the use of information communication technology (ICT) in facilitating student-teachers learning in two selected teachers colleges (TCs) Morogoro, Tanzania. The chapter describes the background of the study, statement of the problem, research objectives as well as the research questions guiding the study. The significance of the study, scope, and delimitation as well as the organisation of the study is also described in this chapter. The chapter ends by highlighting the conclusion of the chapter.

1.1 Background of the Study

In most of the developed and developing countries the use of ICT is considered to be essential in overcoming challenges associated with poor curriculum execution. The importance of ICT in education can be wide open through pedagogical use of ICT in education, that is, when ICT is used as instruments in teaching and learning activities can enhancing active learning. The instructional use of ICT is concerned fundamentally with more active learning and with the support of the different components of ICT (Gudmundsdottir & Vasbø, 2017). Pedagogical use of ICT includes active learning with the use of computers and other information technologies, assisting in meeting the objective of learning aids. For example, the study conducted by Köksal and Köseoğlu (2019) reveal that ICT acts as a source of motivation to students in increasing efficiency and effectiveness in learning.

On the one hand, the use of ICT in the world has brought the drastic changes that certainly affect the provision of education and curriculum execution in general and particularly in TCs. The European school's net report of 2017 describes that there is high level of ICT use in educational activities. Also, Kimmo (2017) reports that the teacher education in Finland has developed the strategic guidelines of the program that ensure pre-service teachers are developed with equipped ICT competencies to carry

their prospects careers adequately. In Turkey, the country report on ICT in education shows significant development of ICT use in colleges, however, they lack more advanced competence on the use of specific pedagogical content knowledge (Akdur, 2017). Voogt Knezek, Christensen, and Lai (2018) add that teacher education has an influential role in preparing teachers for socio-economic changes; hence instructors should be integrated with ICT. Sahito and Vaisanen (2017) recommend four factors when preparing pre-service teachers based on ICTs namely; infrastructure and physical resources, curriculum and policy development, training teachers and pedagogical training for teachers. Through a comparative analysis on International Computer and Information Literacy Study (ICILS) countries; Gerick, Eickelman and Bos (2017) report that Germany has a statistically significant relationship between instructors' use of ICT in schools and students' in computer and information literacy (CIL) compared to Australia, Norway and the Czech Republic. The described European contexts reveal that the use of ICT in all education levels is well established in terms of infrastructure and physical facilities, however, the challenges laid are based on differences in comparison criteria. For example, e-content has not been well developed in Turkey (Akdur, 2017; Forkosh-Baruch, 2018).

Despite of various existing challenges which are faced by African countries during adoption of ICT, there has been an increased introduction and use of ICT in TCs and other education institutions. For example, in Western African countries including Nigeria through the 2001 Federal Government National Policy for Information Technology (IT), initiated ICT in the educational system especially in teachers' colleges. After this initiative, the National Information Technology Development Agency (NITDA) was also established, which had the duty of executing the policy (Ugwu, 2017). This led to several impacts in the quantity and quality of teaching and learning process in Teachers Colleges. Moreover, Fomunyam (2019) maintain that ICT enhances teaching and learning through its dynamic, interactive, and engaging content; and it can provide real chances for individualized instruction in tertiary education. Ghana's report on ICT in education confirms that the use of ICT in education is meant to make ICT instructors apply ICT and employ the technology in their instructional

activities as opposed to almost all other subjects' instructors who do not use ICT in their instructional activities (Mereku et al., 2009). Although, Agyei (2013) reports that low use of ICT in Ghana education is hampered by a lack of ICT facilities and shortages of skilled human resources, the Ministry of education in Ghana has extended her ICT policy of 2009 to a new version of 2015 that has clear and relevant educational goals (Republic of Ghana, 2015). The ICT policy goals has put Ghana in high-level countries in Africa that have improved on ICT use in education for other sectorial development regardless of the internal and external pitfalls.

Additionally, in East African countries, the use of ICT in education notably on teacher education has given adequate considerations. Barakabitze et al. (2019) carried a study on Transforming African education systems in science, technology, engineering, and mathematics (STEM) using ICTs: Challenges and opportunities. Their findings revealed different stages reached in launching and integrating ICT in education. The findings show that inadequate ICT facilities, mismatch between ICT policies and practice, inadequate physical infrastructure, human resources, and personal attitudes triggered the variations on the use of ICT. For example, Rwanda which is seen as the hub for many socio-economic changes in East Africa, the use of ICT in pre-service teachers is oriented to ICT fundamental skills as an emphasis on technological literacy (UNESCO, 2017). The reports show that in-service training provided was limited to the technological literacy approach while knowledge deepening and creation were not integrated adequately. Despite the drawbacks encountered in implementing the ICT policy, Rwanda has recognized ICT as a vital tool in transforming its sectorial into a better standard (Twangilimana & Mannikko-Barbutiu, 2017; UNESCO, 2017). Currently, the Republic of Rwanda integrates ICT not only in education but also in all sectors as a stimulus to socio-economic development as stipulated to SDGs 2030 and its national development vision of 2020 (Republic of Rwanda, 2020).

In Kenya, usage of ICT in teacher education has been intensified due to its essential role. The uses of ICT in education act as relevant interventions in addressing the large instructional reforms (Piper et al. 2015). Omariba, Ayot, and Ondigi (2016) add that the

initiation and use of ICT in Kenyan teachers' colleges should be in line with the kinds of ICT available, the level of training of instructors, the attitude of instructors towards ICT and difficulties facing ICT integration. The government of Kenya provides pre-service and in-service training programs to enable instructors able to use computers in teaching in tutorial rooms (Ojina, 2017). However, Katitila (2020) maintains that to equip instructors with 21st-century skills, they are ought to be oriented to new technologies and incorporate it into classroom teaching. Studies on the type of ICT, attitudes, and hindrance ICT integration indicate low usage of ICT in teacher education. The ICT is left to only instructors who undertake the course in specific, other instructors use ICT for communication and enriching their instructional materials. Most instructors have fundamental ICT skills that inhibit them to develop into more advanced technologies relevant to their specific pedagogical content knowledge. All studies advocate for the review of the teacher education preparation and staff development programs as well as put in place the available ICT policy to suit the curriculum.

ICT is identified by the government of Tanzania as an education and training policy issue where the science and technology campaign (Komba & Nkumbi, 2008; Tilya, 2007). However, despite that ICT is applied in all institutions of education in Tanzania, it has not been considered as a priority in Education Sector Development Program (ESDP) activities. Although Tilya (2007) came up with the arguments that ICT is an important factor towards achievement of all ESDP objectives in both pre-service and in-service training of teachers. The use of ICT in enriching teaching and learning activities in TCs in Tanzania is boosted by the introduction of ICT Policy for Basic Education and the National ICT Policy of 2003 (URT, 2007; 2003). The policy does not only focus on accommodation of trainings in ICT but also put emphasis on ICT enabled teaching and learning in TCs. Most of TCs teach ICT as a subject and also consider ICT as a pedagogical tool which promotes teaching and learning in other subject areas (URT, 2007).

The purpose of Teachers Colleges in Tanzania is to ensure that teachers are prepared for serving in primary and secondary schools. There are certificates and diploma wards which are provided to graduates of TCs. As per the education system of Tanzania, TCs are institutions of education which are rated to the third level of education, that is, the tertiary level of education. There are two major classifications of TCs in Tanzania which include Grade A TCs which offer Certificates in primary education and also Diploma TCs which offer diploma in secondary education. Hare (2007) carried out a study which revealed that Ministry of Education under partnership of the Swedish International Development Cooperation Agency (SIDA) implemented a program which called for introduction of ICT in TCs in 2005. The general objective of the program was to make improvements in the quality of TCs through effective application of ICT in both pre-service and in-service teachers (URT, 2007). The program led to provision of client solutions and VSAT connectivity to all 34 public TCs. Furthermore, it is reported that the program led to provision of trainings to instructors as well as trainings to instructor technicians and also provision of technical maintenance support.

In a study by Machumu, Rabiel, and Almasi (2018) it was found that there is good use of ICT in education although there are hindrance parameters. The study highlights further that internet connectivity, inadequate skills and unreliable power supply hamper ICT use. In addition, Almasi, Machumu and Zhu (2017) report that internet-based skills dominates the use of ICT in education. These studies show that the most ingredients on ensuring ICT use in education are the internet, computers, and source of power (electricity). However, Machumu et al. (2018) and Mtebe (2020) reveal that instructors lack appropriate pedagogical content knowledge on facilitating specific subject content and recommend for professional development through training. The current study was carried out bearing that, there are overt initiatives taken by the MoEST on training the instructors in TCs. The motives behind tied the current study notably were to examine the instructors experience on the use of information and communication technology in facilitating student-teachers learning in two selected teachers' colleges in Morogoro, Tanzania. The study establishes instructors practice on the ICT use in facilitating learning focusing on instructors' experience, gender differences, and teaching skills.

1.2 Statement of the Problem

Information and Communication Technology (ICT) comprises all types of technology that are applied for communication purposes of transmission, storage, creation, sharing or exchanging information. It also includes vast technologies ranging from simple such as the radio and telephone to complex such as computer, network hardware and software as well as the associated equipment and services. These technologies make educators to achieve learning objectives since it enables them to have an experience on communication, creation, management, accessibility, gathering, and distribution of information.

One of the most important benefits of ICT in education is increased access to learning. Under the support of ICT, instructors and student-teachers are capable of browsing through e-books, sample examination and past papers. Instructors are also capable of accessing resource persons, mentors, experts, researchers, professionals, and peers all over the world. The evidences show that if it happens that ICT is effectively used in supporting teaching and learning in TCs, it can act as a significant tool in increasing the quality of content and pedagogy (Mtebe, 2020). Regardless its importance, the experience on the use of ICT by instructors in TCs is vague. This study addresses the problem of instructors' experience on the use of information and communication technology in facilitating student-teachers learning in two selected teachers colleges Morogoro, Tanzania.

Machumu et al. (2018) show that there is significant achievement on the use of ICT in education although there are hindrance parameters. The hindrances listed include inadequate skills, poor internet connectivity and unreliable power supply. Although the government and other education stakeholders have put in place deferent measures to address the mentioned parameters such as training instructors on the use of ICT in T/L and providing ICT facilities, there is still minimal experience on the use of ICT in teaching and instruction activities (Kafyulilo, Fisser & Voogt, 2016). For such circumstance, the current study sought to address this gap.

1.3 Objectives of the study

1.3.1 General objective

This study intends to examine instructors' experience on the use of ICT in facilitating student-teachers learning in Teachers' Colleges in Morogoro, Tanzania.

1.3.2 Specific Objectives

This study was specifically carried out to:

i. Identify instructors' teaching skills on the use of ICT in enhancing student-teachers learning in Teachers' Colleges in Morogoro region.
ii. Assess instructors' gender differences on the use of ICT in facilitating student-teachers learning in Teachers' Colleges in Morogoro region.
iii. Examine instructors' experiences and opportunities on the use of ICT in facilitating student-teachers learning in Teachers' Colleges in the Morogoro region.

1.4 Research Questions

The following research questions guided the current study:

i. What are the instructors' teaching skills on the use of ICT to facilitate student-teachers learning in Teachers' Colleges in the Morogoro region?
ii. Are there gender differences in the use of ICT to facilitate student-teachers learning in Teachers' Colleges in Morogoro region among instructors?
iii. What are the instructors' experiences and opportunities on the use of ICT to facilitate student-teachers learning in Teachers' Colleges in the Morogoro region?

1.5 Scope and Delimitation of the study

The study examined instructors' experiences on the use of ICT in facilitating student-teachers learning in TCs in Tanzania. The study was limited to two TCs namely; MOTCO and DATCO located in the Morogoro region. Both colleges were convenient-purposively selected because of being the beneficiaries of the ICT project introduced in

2005. The study was limited to explore the experience of instructors on the use of ICT based on skills, gender differences, and experience in teaching and learning in TCs.

1.6 Significance of the Study

The study builds a knowledge base of instructors' experiences and gender differences in the use of information communication technology in facilitating student-teachers learning. The knowledge may serve as a guide for overcoming challenges that instructor's face while using ICT to facilitate learning in TCs. The study also contributes to the existing literature on the use of ICT to facilitate the learning process in TCs.

The findings of the current study are the potential to guide policy-makers, decision-makers, investors of education, and other educational stakeholders to come up with better decisions on ICT policies and investment. The government and key educational players will be informed on the stages far taken to promote ICT in teacher education and other developmental sectors. The delineated skills, expertise, and gender differences on the use of ICT in teaching and learning will be used to couple the government mechanisms to ensure the successful use of ICT in TCs.

1.7 Organization of the study

The current study is organised into six chapters. The first chapter consists of an introduction and background information, the statement of the problem, research objectives, research questions, scope and delimitation of the study, as well as the significance of the study, and organization of the study. Chapter two presents a literature review that consists of conceptualization of key concepts, situational analysis of ICT in teacher education, theoretical framework, empirical literature review, research gap, and conceptual framework. Chapter three deals with research methodology under the following segments: research designs, study area, study population, sample size and sampling technique, data collection methods, and data analysis techniques. The issue of validity and reliability and research ethics are also presented. The fourth chapter presents the findings of the study as analysed from the collected data. Chapter five

presents the discussion of the findings while chapter six covers summary, conclusion, and policy implication as delineated from the findings.

1.8 Chapter conclusion

The chapter describes the background to the problem, statement of the problem, research objectives as well as the research questions guiding the study. The significance of the study, scope, and delimitation as well as the organisation of the study is also described in this chapter.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

This chapter provides an overview of the relevant literature regarding the use of information and communication technology in facilitating students-teachers learning by TCs in Tanzania. The review includes conceptualization of the key concepts and situational analysis of ICT in Tanzania. Theoretical framework, empirical literature review, research gap, and conceptual framework are also presented.

2.1. Conceptualization of the key concepts

The section presents definitions of various key terms as applied in the current study. The terms are such as ICT, TCs, ICT facilities, experience, opportunity and the section enlightens on forms of ICT use and their usages in Teacher Education.

2.1.1 Information and Communication Technology **(ICT)**

ICT is defined as a "diverse set of technological tools and resources which are applied in communication, creation, dissemination, storage, and management of information (Ojo & Adediran, 2019). These technological tools include computers, the Internet, broadcasting technologies (radio and television), and telephone.

According to Dalal, Archambault and Shelton (2017), ICT has been considered as among important blocks of modern societies. Most of countries are currently considering the concept of ICT as a key towards education, alongside reading, writing, and numeracy. Kayisire and Wei (2016) describe that ICT covers provision of internet services, equipment of telecommunications and services, information technology equipments and services, media and broadcasting, libraries, and documentation centres, commercial information providers, network-based information services, and other related information and communication activities.

Information and Communication Technology is considered as the core of educational process especially considering that usage of ICT in education has its long history. There have been many writings on use of film, radio, telephones, and television in education. Considering that there has been an increased growth of networks as well as increased access to digital tools globally and there is increased availability of media in digital form, it has in turn led to increase in ICT in education.

There are different kinds of ICT essentials which are available and which are relevant to education including lessons in television, conferencing via audio, email, broadcasts of radio, interactive radio counselling, interactive voice response system, audiocassettes, video and audiotapes and CD ROMs.

2.1.2 Teachers colleges (TCs)

As per the education system of Tanzania, TCs are institutions of education which are rated to the third level of education, that is, the tertiary level of education. There are two major classifications of TCs in Tanzania which include Grade A TCs which offer Certificates in primary education and also Diploma TCs which offer diploma in secondary education. Hare (2007) carried out a study which revealed that Ministry of Education under partnership of the Swedish International Development Cooperation Agency (SIDA) implemented a program which called for introduction of ICT in TCs in 2005.

2.1.3 The Concept Instructor

As we consider teacher education in this study, two major questions become imperative. The first question is who is an instructor? And the second question is why it is necessary to develop instructors academically and professionally? According to Mkilindi (2016), an instructor is term used to refer to teaching assistant personnel in teachers colleges and some Universities whose main role is helping and guiding learners to learn about a subject. Moreover, the English Oxford Living Dictionaries (2017) defines an instructor as a tutor, especially one who teaches adult learners or who has a special role in a school or college.

In the light of the definitions above, an instructor is a person with required coaching qualifications attained at a legalized TCs or University and posted to a teacher college to facilitate T/L processes. She or He is a person required to consistently up-date and develops his or her knowledge, skills, values, and attitudes.

2.1.4 ICT facilities

In this study, the term ICT facilities mean all the digital equipments involved during the teaching and learning process. They include computers, printers, digital projectors, the internet, and the learning platform such as Modular-Object Oriented Dynamic Learning Environment (MOODLE).

2.1.5 Experience

Experience can simply be defined as knowledge or skills in a certain activity which are gained by an individual after perming such particular activity for a long period of time or is something which usually happens to an individual particularly the one with significant effect to a person. As per the light of this definition, ICT experience can simply be defined as knowledge or skills gained via application of ICT. Birgin, et al. (2020) contented that measurement of ICT can be in response to the level of knowledge, competence, and attitudes. Therefore, in this study, experience meant the ICT knowledge's, altitude, competences and skills that instructors had in carrying out their teaching and learning activities.

2.1.6 Opportunity

Opportunity, is a set of circumstances that makes it possible to do something or is a situation that makes it possible to do something that you want to do or have to do or the possibility of doing something (English Oxford Living Dictionaries, 2017). From the definition above it imply that opportunity on the use of ICT might attained through attending different ICT training and workshops for professional and carrier development. Opportunity in this study meant the favourable environment that

instructors had in ensuring the use of ICT in teaching and learning prosper. Such environment includes frequently ICT training, workshops, and seminars.

2.1.2 Forms of ICT use

2.1.2.1 E-learning

There is no clear universal definition of e-learning. However, according to Aparicio, Bacao, and Oliveira (2016), e-learning can be described as the use of ICT infrastructure to provide a great range of solutions on the traditional way of teaching to enhance knowledge and performance. E-learning could be introduced asynchronously and synchronously in education. E-learning can be described as conducive learning environment provided by the application of ICT and its integration through the curriculum to leap a modern learning approach for reflecting the main objective of learners. Further, E-learning restructures the traditional teaching and learning approach aiming to train a volume of learners with high quality of ICT use. Aparicio et al. (2016) point out that utilizing ICT is asynchronous. Using online facilities outside and inside the tutorial room contribute to improving the quality of education by integrating web services and using internet applications, tools, and learning management systems such as blackboards and online forums. Additionally, the use of e-learning systems helps in improving the learning environment by enhancing the efficiency and effectiveness of teaching for their learners (Lee & Bonk, 2016).

2.1.2.2 E-Learning Technologies

E-learning technologies include Television (TV), CD ROMs, Learning Management Systems (LMS), Context Management Systems (CMS), and virtual worlds as well as collaborative technologies. Although Ndonje (2013) argues that the application of various e-learning technologies is contextually determined, studies indicate that the most used LMS are Blackboard vista and Moodle (Odit-Dookhan, 2018).

2.1.2.3 Blended Learning

This is the type of learning which involves combining different approaches of learning such as tutorial room and e-Learning to create a single learning program (Zaim & Mudra, 2019). It is also called a hybrid type of learning. Through this approach, the needs of many learners and instructors have been greatly achieved through the use of ICT. Moreover, blended learning combines several event-based activities such as face to face tutorial, self-paced learning, and synchronous. However, the use of blended learning in TCs is not positive, so there is a need to enact policy and structure curriculum so the mechanisms of delivering through ICT become more positive in TCs in Tanzania (Kafyulilo et al., 2016).

2. 2 Situational analysis of ICT use in Teacher Education

Teacher education is a service activity for the education system. It is a in which prospective and in-service teachers are capable of acquiring knowledge, attitudes, behaviours, and skills which are essential in performing teaching tasks successfully in the classroom (Lukanga, 2013).

Initiation of ICT in TCs is considered as a factor which has led to increased motivation among instructors as well as students-teachers to undertake their duties of seeking for knowledge on their own. ICT is considered helpful in supporting learning tasks especially those which are self-driven and done individually due to absence of other sources of information like textbooks (Kafyulilo et al., 2016). ICT has shown a bright future as a reliable source of information regardless low bandwidth and power outages. It is expected that there shall be increased ability of TCs to produce teacher who are competent in ICT in the future if there shall be improved ICT infrastructure.

ICT can at the end be an important tool which supports teaching and learning. However, there are arguments currently that initiation of ICT in schools does not stand on its own in making improvements in the quality of education or raise attainment (Agyei, 2020). This is due to unstable infrastructures and contextually appropriate course content for either instructors or learners (Agyei, 2020). However, Teo (2008) points out that the

infrastructure is only half of the picture of ICT use. There should be increased investment in instructors in order to increase effectiveness in using ICT. It can therefore confirm that the experience of instructor is an important factor towards successful use of ICT.

According to Isman, Willis, and Dabaj (2009), ICT is significantly under-used by student-teachers and beginning instructors. This under utilization of ICT was evidenced by lack of resources, limited access to resources in teacher training institutions, lack of opportunity to use computers, and the lack of ICT experience and training at pre-service level. In addition, Agyei (2020) adds the lack of encouragement for the instructor to use ICT. These challenges call for colleges and government to provide instructors with the essential tools, skills, knowledge, and confidence to use ICT effectively in their teaching and learning. This can be done by developing high attitudes toward ICT in instructor and promoting its use in education. Scholars (Teo, 2008; Koro, 2012) uphold human factors are important variables in the change process and that staff development is one of the most important factors related to change in practice because the essence of educational change involves learning new ways of thinking and doing as well as new skills, knowledge and attitudes.

2.3 Theoretical framework

Theories are supposition or a system of ideas intended to explain something, especially one based on general principles independent of the thing to be explained (Zain, Hanafi, Don, Yaakob, & Sailin, 2019). Many theories can be used when conducting studies on ICT. There are different theories that can be used in ICT studies. The choice of the theory to use depends on institutional factors that are either internal or external for ICT use. Previous studies carried on ICT such as Minja (2015) and Noyi (2013) used various theories Systems theory and constructivist theory to examine the determinants of ICT use in TCs. The current study adopted the diffusion of innovation (DOI) theory pioneered by Rogers (1995) as a main theory complimented with technological acceptance model (TAM) by Davis (1989)

2.3.1 Diffusion of innovation (DOI) theory

Rogers (1995) defines diffusion as the process through which members of the social system communicate an innovation (new idea) is via various channels over time. Rogers lists four factors to interact the diffusion of an innovation; (1) the innovation (ICT in education), (2) the communication channel (media, word of mouth); (3) time, (4) the social system (school, college, and university). Different studies such as Innocent (2016), Ndonje (2013), and Akir (2006) adopted DOI theory. An innovation can be an object, technology, behaviour, practice, program, idea perceived as new to potential adopters.

Adoption is the decision to accept or reject and the sub sequent implementation discontinuance or modification by its users (Liang & Kee, 2018). The main assumption of the theory is that the diffusion of technology innovations follows a normal bell-shaped distribution pattern. In this diffusion pattern, the theory distinguishes between five adopter segments, for which the theory holds to fixed assumptions on their size, profiles and adoption determinants (Rogers 2003 as cited in De Marez, Evens & Stragier, 2011). According to Rogers (2003), innovativeness or the timing of one's adoption decision is assumed to be determined by the individual perception of a set of product features (relative advantage, complexity, compatibility, trialability and observability). Innovators and early adopters, for example, are assumed to have a higher perception of relative advantage than the majority segments and a lower complexity perception. The aggregation of adoption decisions for all individuals in a social system is assumed to result in a normal distributed diffusion pattern, in which innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%) are distinguished. It was found worthwhile to adopt DOI in the current study due to the following reasons.

The adoption of new technology in education like the Use of ICT as pedagogical tools is accepted doubtfully. Still there is uneven acceptance of the innovation. The innovators in the field of education are blamed that while incepting their innovation in education, there is no fair engagement of education stakeholders (Ziadi, 2006). This leads to varied

perceptions towards the use of ICT in teaching. The current study sought to explore the instructors' experience towards the use of ICT in teaching as new technology in TCs.

Education is an innovation-based field in which the products and methods used represent innovation for delivery of instruction. This study focused specifically on the ICT based learning. It could be argued that the use of ICT methods such as Power Point presentations, internet-based, word processing, and video conferencing among the products of innovation were considered relevant to Tanzanian TCs.

The execution of ICT in teaching and learning affect different members in an institution. Administration, working staff and students need to be an integral part of the new technologies. A change in any social system is inevitable and uncertainly accepted. It was delineated that since the inception of ICT as pedagogical tool in TCs by the MoEST 2005, there is observable variation due to the complex nature of instructors in TCs. This variation could also have been the result of fear of unknown and innovation (Cummings, Bridgman, & Brown, 2016). Thus, the adoption of DOI helped to develop models for the diffusion of education technology. The diffusion theory offers crucial guidelines for those interested in ensuring education technology is being adopted at all levels of education.

2.3.2 Technology Acceptance Model (TAM)

Davis (1989) introduced a technology acceptance model (TAM) which is based on the Theory of Reasoned Action (TRA). In TAM, the behavioural intention of people is to accept and use a particular technology which is determined by two paradigms namely; perceived usefulness and perceived ease of use. Users' attitude and belief are perceived to be a significant feature which manipulates the use of new technology. People having a positive perception of the use of innovation are said to have higher acceptance of the use of ICT than those having negative perceptions in using that innovation (Davis, 1989).

The study by Davis (1989) points out that through TAM; individuals may accept or reject a particular technology if and only if they believe it is advantageous in executing their job effectively. TAM proposes that when users are subjected to a new technology, several factors affect their decisions on how and when they will use it, particularly:

i. Perceived Usefulness (PU) – this is the degree or extent in which an individual has a belief that usage of a certain system could enrich his or her job performance".
ii. Perceived Ease-Of-Use (PEOU) – this is extent to which an individual has a belief that usage of certain system would be free from effort" (Davis, 1989).

The TAM can be simply captured through presented Figure 2.1.

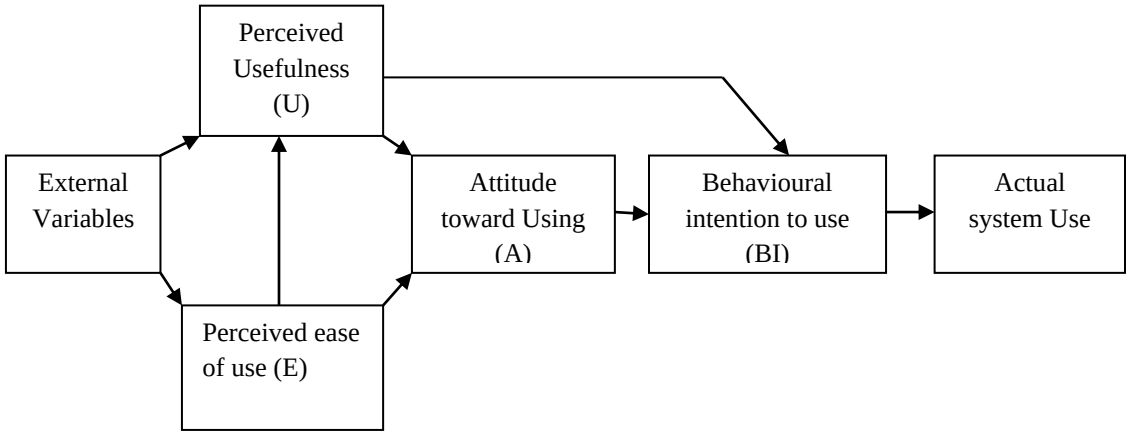


Figure 2.1: The Technology Acceptance Model

Source: Davis (1989)

2.3.2.1 Application of Technology Acceptance Model

Technology Acceptance Modes is among of models which have been tested scientifically and it became justified with its validation, application, and replications (Lee, Hsieh & Hsu, 2011). Thus, TAM is among the strong and vigorous model for predicting user acceptance of innovations in education institutions.

2.4 Empirical Literature Review

This section attempts to review studies and academic writings from previous researchers who did their studies in a similar problem related to the use of ICT in TCs particularly the utilization of ICT infrastructure and facilities. The review is conceptualized according to the objectives of the study.

2.4.1 Instructors' teaching skills on the use of ICT in Teaching and Learning

UNESCO has developed a framework for assessing ICT use in educational institutions (Hine, 2011; Kozma, 2011). This framework emphasizes the development of knowledge producers as the most important goal of educational systems in the Knowledge era in contrast to the development of knowledge consumers, as was typical for the Industrial Era. ICT plays a major role in achieving this goal. Three levels of ICT use are indicated in the framework: Technology literacy, knowledge deepening, and knowledge creation. Technology literacy enables learners to find and process information, thus allowing them to learn. Knowledge deepening relates to using knowledge and applying it in solving complex problems relevant to a learner. The focus of the knowledge creation level is producing new knowledge relevant for the community. According to UNESCO's framework, application of new technologies in education indicates the new roles of teachers, and the new approach to teacher education (Uerz, Volman, & Kral, 2018). Teacher education is expected to develop these kinds of literacy among pre-service teachers as well as enable them to develop new skills among their learners. These goals require a change in traditional teaching and learning methods.

Instructors at teacher education institutions are expected to renew their teaching methods towards a constructivist approach while using appropriate new ICT learning environments. Alharb (2014) and Prestride (2012) outline some of the ICT packages required for a TCs instructor as data processing, word processing, use of the internet, use of spread sheets, and use of presentation software like power point, e-mail and video chat/conferencing.

2.4.1.1 Internet-based skills

Internet skill is vital in downloading educational resources and sharing information. Studies (Alharb, 2014; Ghasia, et al. 2018) indicate common usage of internet-based skills among teachers and university students. The high usage was based on two main factors namely; easily available internet and accessibility via mobile phones. However, Ali, Mahmood, Anwar, Khan, and Hussain (2019) maintain that although the internet-based skill was predominant towards integrating and use of ICT, there is inadequate investment done. The cost of bandwidth is high with low speed. Also, studies done in Tanzania uphold that smooth use of ICT in teaching and learning is hindered by various factors including failure of the internet, poor connectivity and limited coverage (Agyei, 2020; Ndibalema, 2014). Therefore, due to the geographical dispersion of the district, the study objective sought imperative to identify the degree of internet as a basic skill in enhancing instructors in surfing educational resources.

2.4.1.2 Word processing skills

The implementation of ICT integration in teaching and learning activities mainly are predominated by the use of internet and word processing. The study conducted by Agyei, and Voogt (2012), Lee, Longhurst, and Campbell (2017) reveal that teachers who are competent in the use of ICT in teaching were also conversant on word processing skills in preparing lesson notes, grading students' results, preparation of lesson plans and scheme of works. Cubukcuoglu (2013) adds that, the use of word processor skills like writing tests, database management, and spreads sheet is a priority set of skills required by instructors in education to cope with technological dynamics. Further, Farmery (2014) maintains that use of Microsoft word is basic computer skills required to integrate other skills such as web-based skills and data management. Recently, the MoEST and other educational stakeholders have launched various ICT trainings on capacitating the instructors to be part of the technological change. It is argued that instructors need to excel and master the ICT skills to influence their students in new technologies. It was due to the outlined reasons that intensified the current study to explore the instructors' experience on the required ICT teaching skills.

2.4.1.3 Power Point presentation skills

The use of power point presentation method has transformed the instructor's traditional teaching to learner-centred. The skill is common in colleges and university. Studies (Kennah, 2016: Alharb, 2014) demonstrate that teachers have shown strong acceptance of the use of projectors in their classrooms and that use of projector-based software is now common among teachers. They uphold that the skills are easy to use depending only on the availability of computers, projectors, and sources of energy. Alkash, and Al-Dersi (2017) add that the use of power point slides is considered a modern teaching method. Moreover, it is reported that the mastery of power point presentation skills reduces teacher talk teaching strategies, serves time, and provided adequate concentration of students in the lesson (Han, Shin & Ko, 2017). .However, the use of projectors is context-based as in most cases it requires suitable screen for clear projection, availability of power and access to computers.

2.4.1.4 Web conferencing/video chat skills

According to Innocent (2016), there is high difference in the use of video conferencing in teaching and learning. Similarly, Tseng, Cheng, and Yeh, (2019) demonstrate that video conferencing is not common skills in teaching and learning in TCs due to high cost, limited internet bandwidth, and low speed of internet. Further, Alazzam, Bakar, and Asmiran (2012) illustrate moderate usages of digital video and animation in teaching. These studies show limited usage of web conferencing/ video skill in TCs regardless its potentialities in enhancing distance learning. Video conferencing skills are not common among instructors although they have a great chance to enhance lively teaching and learning with people from different places at a time. It should be taken into account as academic platforms on sharing knowledge and experience.

2.4.2 Instructors' gender differences in the use of ICT in Teaching and Learning

Since the mid-20th century, there had been an increased focus on the issues of gender and ICT. There has been an interchangeably use of the concept of gender and sex. However, the two concepts have certain and slightly difference. The English Oxford Living Dictionaries (2017) differentiates two that sex refers to 'the state of being male

or female' considering that it is all about biological differences, while sometimes gender refers to cultural or social differences.

Information Communication Technology (ICT) is slowly acting as replacement of the traditional teacher-centred teaching and learning environment in education, and there has been shifting of emphasis from the instructor to the learner. It is said that there is an increased adoption of ICT in facilitation of learning process among both male and female instructors. This is the reason as to why the government has been ken in equipping TCs with ICT infrastructures and facilities. The Government also recognizes that improved ICT skills among instructors can be an important factor towards increased access and use of educational materials which will in turn bring about sustainable development. To that effect, there were increased trainings to instructors. The problem is: has the training given rise to gender equality in the use of ICT among instructors in the TCs? This is what necessitated this objective.

2.4.2.1 Gender differences in accessing digital tools

Darma and Aliyu (2018) found that the gender differences in accessing digital tools are associated with patriarchal values. They maintain that most women lag behind in technology due to the biasness definition of technology as an activity suitable for men. Moreover, in 2003, the former UN Secretary-General, Kofi Annan observed "The so-called digital divide is several gaps in one here is a gender divide, with women and girls enjoying less access to information and communication technology than men and boys" (Fomsi & Emeka, 2017). Sanda and Kurfi (2013) reveal that regardless of the significant contributions of women in socio-economic development, women have less access to digital tools. Furthermore, Mahmood and Bokhari (2012) show that existing gender inequity in ICT use is due to inadequate access and experience of learning opportunities with ICT.

However, gender differences being discussed are associated with the historical phenomenon that women are culturally alienated to access to education, in one objective the study focused on assessing the degree of difference among instructors in learning

institutions. It was assumed that, the ICT policy for basic education of 2007 that stipulates the integration of ICT to reach all tertiary education by 2015 streamlines gender equality in its implantation. .

2.4.2.2 Gender differences in possession of ICT gadgets

Van Dijk (2017) demonstrates that female teachers less often have computers in their classrooms, and thus they have limited practices to ICT application. Indeed, the United Nations (2014) on measuring ICT and gender: an assessment reported that, in developing countries few women had smart phones and computers as the means of accessing the internet. The reasons given are accompanied by the gender inequality in accessing education as many boys are favoured in education than girls. Similarly, Drabowicz (2014) carried a comparative study in the Programme for International Student Assessment countries where he found that the rate of possession and use of ICT devices is greater among boys. Such findings entail that, there is an existing gap between males and females on ownership of ICT facilities. The findings as revealed have significance implication that, the gaps in possessing ICT gadgets like computers, and smartphones exist in developing countries. However, the gap being addressed is aligned with gender stereotyping regarding unequal access to education. The current study was triggered by different contexts particularly in TCs in Tanzania bearing in mind that both females and males have equal opportunities to possess ICT facilities.

2.4.2.3 Gender differences regarding attitude in ICT

As observed by Fomsi and Emeka (2017), there was no significant difference between the mean scores of the male and female in model primary school teachers in the use of ICT. This means both female and male teachers have developed positive attitudes toward technology. However, Mahdi and Al-Dera (2013) maintain that the disparity in ICT use between male and female teachers is the result of limited interest and motivation. Simiarly, Guillén-Gámez, Romero, and Camacho (2020) demonstrate that, males exhibit positive attitudes towards technology compared to females. In the same vein, the current study maintained the assumption that, the gender imbalance on ICT use

in TCs might have a link with a lack of motivation and interest. Such penultimate necessitated the exploration of the current study.

2.4.2.4 Gender differences in ICT competences

Ilomaki (2011) subscribe that there is slight difference on the high level of computer skills and competence between male and female. Similarly, Mafang'ha (2016) illustrates that digital divide, between males and females is higher among female than male teachers in Tanzania. Mahdi and Al-Dera (2013) report that male teachers prefer to use ICT in their instruction to female teachers in Saudi Arabia. These studies reveal the disparity of females and males on competences regarding ICT even in digital society like Finland. It the fact that, regardless of the efforts carried out by TCs on empowering women in ICT use, the question of interest in the current study embedded on uneven opportunities for strengthening their competences.

2.4.3 Instructors' experiences and opportunities on the use of ICT in facilitating student-teachers learning

Under this section the reviewed literature was related to determinant factors that qualify the instructors to be experienced. The following were sought basic under the current study:

2.4.3.1 Instructors attitudes towards ICT use

It is argued that attitude of teachers differs with their tenure of experience and levels of knowledge on ICT use (Birgin, Uzun, & Akar, 2020). This means positive views towards ICT applications which affect positively the attitude of teachers towards computers and the internet. Similarly, it was maintained that personal beliefs, attributes, knowledge, competence, and confidence have a great influence on instructors toward the use of ICT in teaching and learning (Agbo, 2015; Ndibalema, 2014). This implies that acceptance of any innovation like ICT use can be better adopted only when people have developed positive attitudes towards it. The current study has been carried out to scrutinise the instructor's experience regarding the newly introduced ICT integration in the pedagogical process.

2.4.3.2 Instructors competence in ICT use

According to Pollacia and McCallister (2019), most of teachers who have limited skills ICT are unwillingly to use ICT in classroom or in front of students who might probably be more skilled than them. It is further contended that lack of competence in the use of ICT accounts for the discrepancy between training and usage. It is maintained further that, even if most teachers have received training in the use of ICT, they fail to practice ICT into the teaching and learning process (Pollacia & McCallister, 2019). Birgin, et al. (2020) found out that the commonly used and well known kinds of ICT include word processing, internet as well as e-mail. Joel and Mungwabi (2015) demonstrate that ineffective usage of ICT in TCs is due to inadequate pedagogical competence among instructors in Tanzanian TCs. They uphold further that instructors in Tanzania contexts have inadequate experience in the use of ICT. The current study sought to establish the instructor's experience regarding ICT skills, competence, knowledge, and attitudes towards the new technology.

2.4.3.3 Accessibility of technological facilities

It is established that the level of ICT use in teaching and learning is diminishing in TCs (Noyi, 2013). For example, the study illustrates ratio of ICT devices in Bunda and Tarime TCs being 1:20. This is also echoed in Karimi (2012) who demonstrated that existing discrepancies in ICT facilities is due to failure of the government to invest adequate funds in technologies. Similar findings have been reported by Joel and Mungwabi (2015) that the government does not provide timely fiscal resources for repairing and maintenance on the available ICT facilities. They maintain further that there is no replacement for old devices. However, the current study focused on instructors' experiences regarding the use of ICT facilities in teaching and learning. The matter of fact is that, the instructors' inexperience on the use of ICT is accelerated by the inadequate ICT facilities.

2.4.3.4 Instructors ICT trainings and professional development

In their study, Dooley, Lewis Ellison, Welch, Allen, and Bauer (2016) reveal that whether novice or experienced ICT related training programmes develop instructors' competences in computer use, affect instructors' attitudes on computers as well as assist instructors in adjusting task of technology and the extent to which new technology tools are important in teaching and learning. Atabek, (2020) indicates that although instructors desire to apply technology and have adequate technical skills, they lack knowledge on how to use technology in teaching and learning. Scholars urge instructors to use ICT in their programmes when teaching in TCs as it enables to use the technology to supplement their teaching activities (Tosuntaş, Çubukçu, & İnci, 2019). This idea is also supported by Almerich, Orellana, Suárez-Rodríguez, and Díaz-García (2016) and Mtebe (2020) who argue that there should be increased priority to instructors in provision of education. There should also be increased encouragement by teacher education departments and also motivation to instructors in order to make them increase usage of ICT in teaching and learning. The question of interest regarding pre-service and in-service trainings toward ICT is spiralling instructors' professional development. However, there are various initiatives carried out by the MoEST to provide ICT trainings, seminars, and workshops, yet the degree of ICT use in TCs is uncertain.

2.5 Research Gap

The analysis of the reviewed literature has revealed that, previous studies explored beneficiaries and challenges that encounter developing countries in the adoption and integration of ICT in education. Among the significance portrayed includes the enhancing pedagogical process. The challenges include inadequate investment in terms of ICT infrastructure and facilities in TCs. However, at the individual level the questions of inadequate skills and interest have been delineated as obstacles towards the smooth adoption of ICT in teaching and learning. For example, Kahiigi (2013), Rhema and Miliszewska (2014) delineated that inadequate knowledge, attitudes, and beliefs are setbacks about ICT in developing nations. Moreover, Machumu et al. (2018), Mafang'ha (2016), and Ndonje (2013) depict that the level of ICT integration in education has been done, however; the instructors have inadequate skills in specific

content areas. The analysis of ICT for basic education of 2007 lags behind because of its complexity and openness from which the institutional policies and plans are drawn for effective implementation. It has been described that, the late decisions responding to technologies have created the gap between the technology and its users. However, previous studies have not systematically addressed the problems due to the use of inadequate theories; this also constitutes the gap in the current study. Indeed, little has been done on the specific skills required to meet the demand of the instructors in their specific area of specialisation. Previous studies have tried to establish that there are still contingencies where the use of ICT is gender attached phenomenon while reducing the female participation in ICT in their teaching process. For such circumstances, the current study sought to examine the experiences of instructors in the use of ICT in teaching and learning bearing in mind that, every TC had been integrated with ICT as a pedagogical tool. Due to limited practices on ICT use among instructors in TCs, the current study sought motivated to explore on experiences, sorts of ICT teaching skills, and the contexts of gender differences in ICT use in TCs.

2.6 Conceptual Framework

The conceptual framework is the theoretical structure of assumptions, principles and rules that hold together the ideas of the study (Kumar, 2002). The framework below indicates both independent and dependent variables that influence on the use of ICT in facilitating student-teachers learning. Independent variables include teaching skills on the use of ICT; such as internet-based skills, word processing skills, power point presentation skills and web conference/video chat skills, gender differences on the use of ICT. These differences are such as; accessing digital tools, possession of ICT gadgets, attitude in ICT use, and levels of ICT competence. Also experience and opportunities on the use of ICT; such as attitude towards ICT use, competence in ICT use, accessibility of ICT facilities, and ICT training and professional development are accounted for. The dependent variable includes degree of ICT use in teachers' colleges (TCs). The framework assisted in investigating other related factors which have an influence on influence application of ICT in learning which have never been presented in previous contexts. Moreover, the framework shows that the knowledge gained from

previous experiences on usage of ICT in learning can have an important contribution on future activities. Figure 2.2 shows the conceptual framework of the current study.

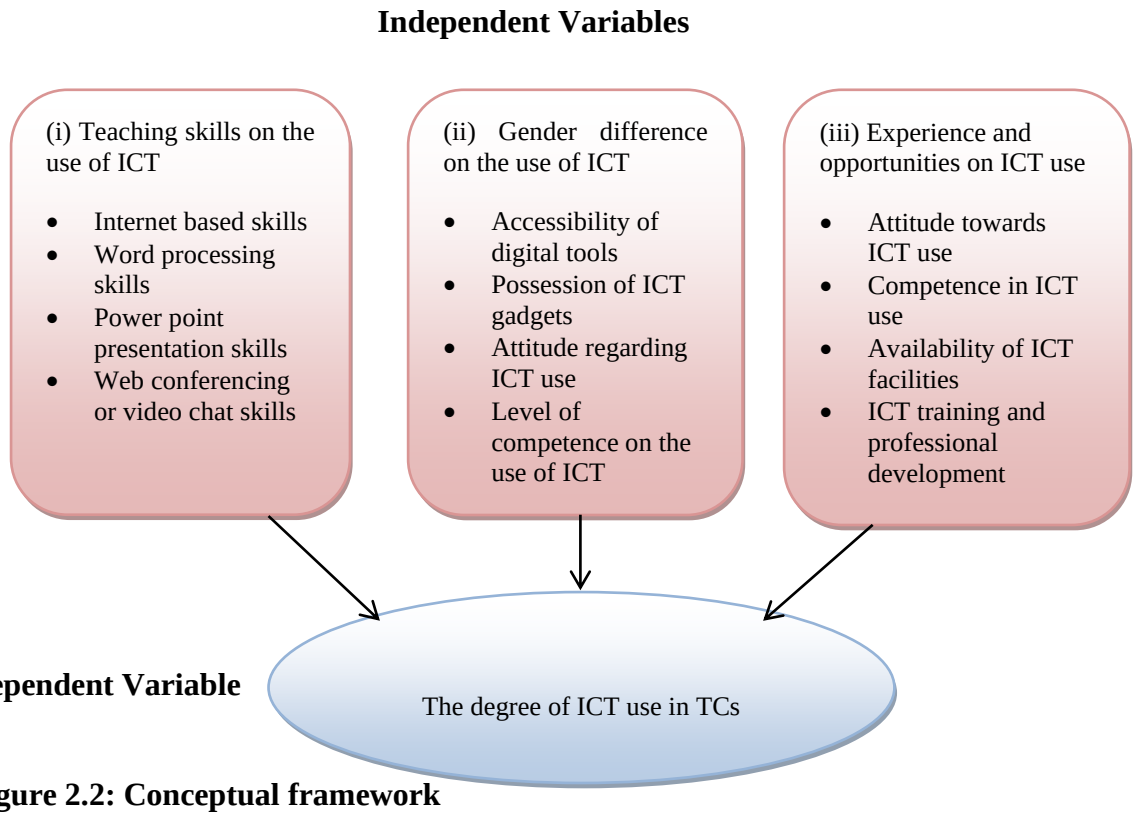


Figure 2.2: Conceptual framework

Source: Researcher construct (2020)

2.6.1 Description of the variables from the conceptual framework

The use of ICT is determined by independent and dependent variables within the institutions itself as well as learner's characteristics and instructors characteristics in the learning process in TCs. The independent variables are described in sub-headings below.

2.6.1.1 Teaching skills on the use of ICT

Teaching skills on the use of ICT helps instructors in interacting with students, during preparation of their teaching, and in provision of feedback. It is also useful in increasing effectiveness in usage of ICT software and hardware for teaching and learning process.

The following teaching skills are required by instructors for effective use of ICT as the pedagogical tool.

Internet- based skills; the concepts include browser navigation, bookmarks, search terms, web addresses and hyperlinks. In teaching they imply the skills of the instructor on mastering basic issues on the use of those concepts.

Word processing skills; involve the skills and knowledge of using MS word in appropriate manner i.e. in the composition, edition, and formatting of text. Word processing programs, such as Microsoft Word, working with text and provides tools to insert pictures, edit photos, draw objects, and produce graphic organizers.

Power point presentation skills; these are skills which are applied during delivery of an effective presentation to a particular audience. The coverage of these skills is in different areas which include the structure of a presentation, the designing of slides, the tone of voice and the body language you convey.

Web conferencing or Video chat skills; Web conferencing/Video chat is a vital technology to the instructors and students-teachers since it allows instructors/students, in different locations, to hold face-to-face meetings without having to move to a single location together.

2.6.1.2 Gender differences on the use of ICT

The use of ICT in education improves the motivation and attainment of both male and females' instructors and hence here are the determinant indicators for the existence of gap between male and female on the use of ICT in teachers' colleges.

Accessibility of ICT tools; ICT tools refers to the common technology-based tools that are used in colleges such as Video devices, multimedia projector Laptop, LCD, digital camera, digital photocopy machine, DVD player, digital Audio and, scanner.

Possession of ICT tools; involves the ownership of common ICT tools like, Video devices, multimedia projector Laptop, LCD, digital camera, digital photocopy machine, DVD player, digital Audio and, scanner.

Attitude regarding the use of ICT; Involve the instructors' perceptions in using ICT tools in teaching and learning processes. For instance, their perception on the use of common ICT tools like, Video devices, multimedia projector Laptop, LCD, digital camera, digital photocopy machine, DVD player, digital Audio and, scanner.

Level of competence on the Use of ICT; Here the measurement based on how competent instructors are in using of common ICT tools like, Video devices, multimedia projector Laptop, LCD, digital camera, digital photocopy machine, DVD player, digital Audio and, scanner.

2.6.1.3 Experience and opportunities on the use of ICT

ICT especially computers and internet technologies enable new ways of teaching and learning and simply allow instructors and student-teachers to do what they have done before in a better way. ICT not only impacts has what student-teachers should learn, but it also plays a major role on how the student-teachers should learn. The attributes of instructors' experiences and opportunities is here under.

Attitude towards ICT use; Under this context it explains on instructors' perceptions on the use of common ICT tools like, Video devices, multimedia projector Laptop, LCD, digital camera, digital photocopy machine, DVD player, digital Audio and, scanner.

Competence in ICT use; entails how instructors are capable of using common ICT tools like, Video devices, multimedia projector Laptop, LCD, digital camera, digital photocopy machine, DVD player, digital Audio and, scanner.

Availability of ICT facilities; involves the presence of common ICT tools like Video devices, multimedia projector Laptop, LCD, digital camera, digital photocopy machine, DVD player, digital Audio and, scanner.

2.7 Chapter conclusion

The chapter has presented various aspects regarding ICT application in teaching and learning. The chapter started with conceptualisation of key concepts and analysis of ICT situations in Tanzania teacher education contexts. The chapter also presented the relevant theoretical framework whereby DOI and TAM were reviewed regarding the ICT as a new innovation in education. Moreover, the empirical literature review per objective was exhausted for establishing the research gap under the current study. The conceptual framework was finally presented for establishing the variables considered influential for complementing the current study.

CHAPTER THREE
RESEARCH METHODOLOGY

3.0 Introduction

This chapter focuses on describing various methods and techniques used in collecting and analysing the data. The chapter encompasses of research design, area of the study, study population, sample and sampling procedures, data collection methods, and analysis procedures. It further presents the issue of validity and reliability, ethical consideration, and ends with the chapter conclusion.

3.1 Research design

Research design is the roadmap that determines the best way to reach the destination. Akhtar (2016) defines research design as a plan, structure, and strategy during particular investigation for the purpose of coming up with answers on particular existing problem. Bryman (2008) adds that research design comes up with a framework which is useful in collecting and analysing data. Creswell and Creswell (2017) came up with a description of research design as a blueprint for conducting a study which increases control over factors that could interfere with the validity of the findings. Moreover, design is referred to as a framework used in guiding collection and analysis of data. Therefore, the research design acts as guidance to the researcher in planning and implementing the study to achieve the intended objective. Considering that the design provides control, it is obvious that there is an increased probability for accurate results which reflect the real situations. The current study opted for the descriptive survey design.

The descriptive survey was used to gather information on instructors' experiences on the use of information communication technology in facilitating student-teachers learning in TCs in Tanzania. The descriptive survey research design was preferred simply because it was easy to obtain information directly from instructors, student-teachers, and colleges' administration in their natural environment, concerning their attitudes or beliefs on certain issues of the study. A descriptive survey research design presents an opportunity to collect both quantitative and qualitative data as a means to

reconstruct the "what is" of a topic or study. Trochim (2006) upholds that a descriptive survey research design is very useful when in need making an assessment on the opinions and trends. The general objective of a descriptive survey design is to come up with information from specific people to generalize the outcomes of the sample to the population. As for this study, descriptive survey design was considered useful simply because it is less costly during its representation, convenient data gathering and little or no observer subjectivity.

3.2 Study Area

The current study was conducted in two government-owned Diploma Teachers' Colleges (TCs) in Tanzania Mainland, which is, Morogoro and Dakawa TCs. The two colleges are located in Morogoro Urban and Kilosa Districts in the Morogoro Region. The TCs were selected purposively because of being among of thirty-four (34) TCs that benefited the ICT project launched by the government in collaboration with developmental partners in 2005. Thus, they are relatively well-established with ICT infrastructures. It was assumed that their level of use of ICT in teaching and learning are relatively matured. Therefore, the selection of the study area was deemed appropriate to collect data on the instructor's experiences, teaching skills, and gender differences in ICT use in teaching and learning. The map of Morogoro region showing the area where the study was conducted are presented in Figure 3.1

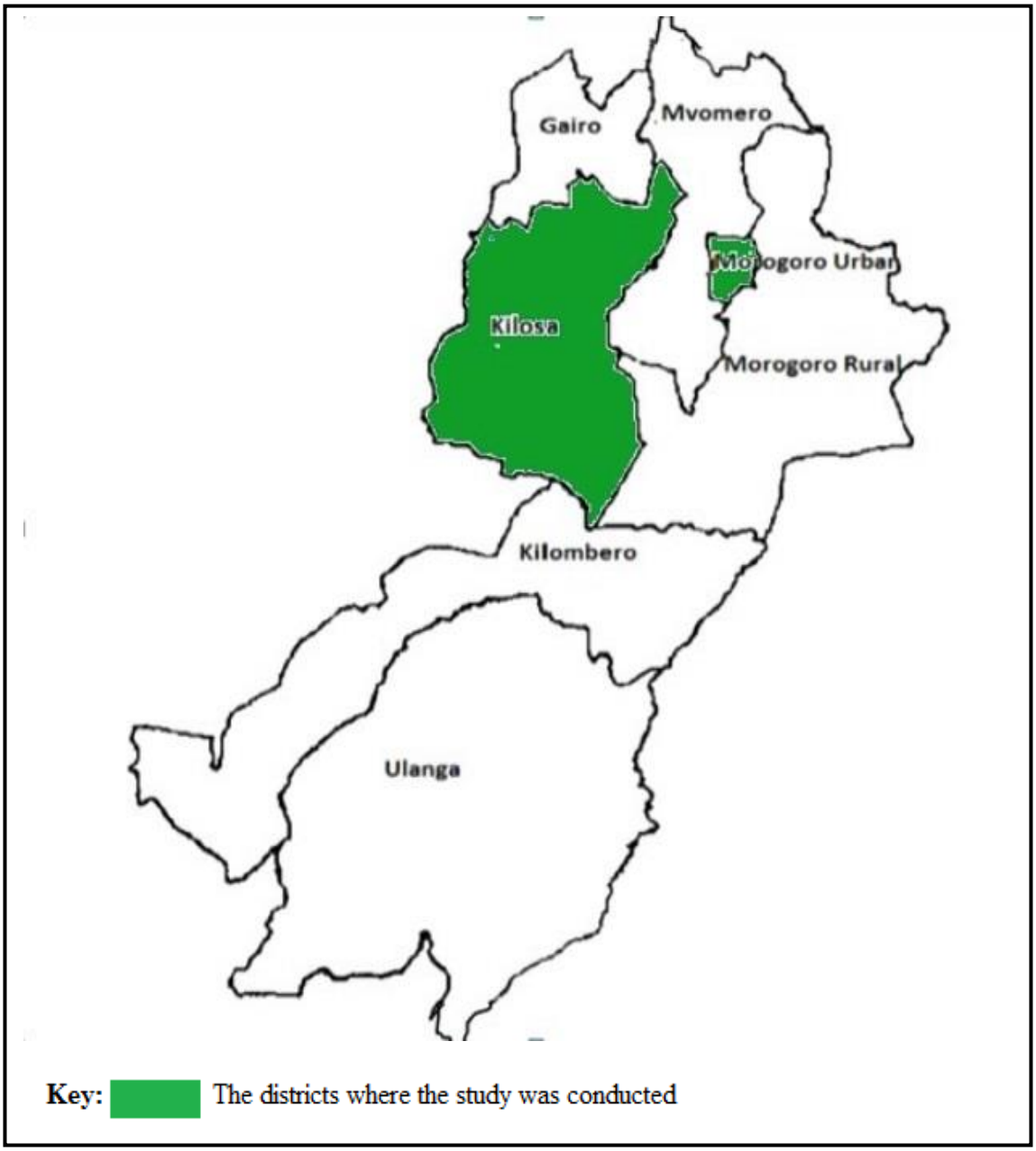


Figure 3.1: Map of Morogoro region showing administrative districts

Source: Morogoro profile (2020)

3.3 Study Population

The target populations for this study were the instructors, student-teachers, ICT technicians, and two principals in the two respective colleges. The colleges had a total of 106 staff of which 8 are administrative, and 98 teaching staff, with a total student-teachers enrolment of about 1200. The selection of instructors and student-teachers were

based on the fact that they are key stakeholders directly involved in the teaching and learning process. Their directly involved in the teaching and learning process assists them to provide potential information on their experiences on the use of ICT in facilitating learning in TCs. The instructors were considered the key representative population and they have more experience based on ICT use in facilitating learning process. Moreover, the selection of principals and ICT technicians were based on the fact that they are custodian of ICT issues in their colleges.

3.4 Sample Size and sampling technique

3.4.1 Sample size

A sample is a part of a population used to represent a whole (Opie, 2019). In this study the sample constituted 50 respondents (Table 3.1). The sample size of 50 respondents was selected because the researcher was interested in carrying out in-depth examination of the study problem which could not easily be achieved with huge sample of respondents. It was possible to avoid financial, time and security implications which could have been brought by long stay in the field area as a result of selection of larger sample.

Furthermore, the sample size for this study was drawn from first the complete list of all ordinary teaching staff and student-teachers from Morogoro TC and Dakawa TC and purposeful sampling was done to those participants who directly involved in the day to day ICT monitoring. These include Principals, and ICT Technicians**.** Generally, the sample size was composed to 2 instructional Principals, 2 ICT technicians, 10 student-teachers and 36 instructors which make the total of 50 respondents as represented in Table 3.1. The sample is said to be representative as Kothari (2007) points out that a sample size of more than 30 respondents is representative and guarantees for the study to be conducted.

3.4.2 Sampling technique

The current study employed two sampling techniques; simple random sampling and purposive sampling to select a total of fifty (50) respondents. The rationale for this choice is that it ensured representative of the sample as well as accessing the relevant data sources of instructors experience on the use of ICT in facilitating student-teachers learning in TCs. However, the practical reason governing this selection was to learn the basic experience rather than to produce results that are generalized to large populations. Indeed, a large sample need enough time and therefore, this would mean prolonged stay in the field, which could have both financial time and security implications.

3.4.2.1 Simple random Sampling technique

The current study used a simple random sampling technique to select forty-six (46) respondents from the two teachers colleges. The technique was considered suitable because every individual in the targeted population had an equal chance to be involved in the study. Indeed, the method was effective in the large population where the population is heterogeneous (Adam & Kamuzora, 2008). The sample size was drawn from the first complete list of 36 ordinary teaching staff and 10 student- teachers from the two TCs.

3.4.2.2 Purposive Sampling technique

The current study employed purposive sampling to select one head of department/ ICT technicians and one principal from each college. The total of four (4) sample size was selected based on the virtual position they occupy in their institutions. This sampling method was used in the study in order to allow the researcher put more concentration on people with certain characteristics who would be helpful in providing related information (Kusaga, 2019). The procedure was found relevant to the current study because of the rich and appropriate information and knowledge on ICT in education activities. It was further found imperative to use purposive sampling technique because it provides control over significant variables of the study and homogeneity of subjects in the sample. Furthermore, purposive sampling is more advantageous in the manner that it was easy to select a sample, it is not expensive and a short time is used to select a

sample and, the results of purposive sampling are usually more representative of the target population compared to other sampling methods. The Sample Size and sampling technique are summarised and presented in Table 3.1

Table 3.1: Sample Size and sampling technique

Category of respondents	**Sample Size Selected**			**Sampling technique**
	Morogoro TC	**Dakawa TC**	**Total**	
Instructors	18	18	36	Simple random sampling
Student – Teachers	5	5	10	
Principals	1	1	2	Purposive sampling
ICT Technician	1	1	2	
Total	**25**	**25**	**50**	

Source: Field Data (2020)

3.5 Types and Source of Data

Kothari (2007) defines primary data as data which are collected freshly and for the first time and which happen to be original. This study used primary data obtained through observation, questionnaires, and interview guide in lively contexts. According to Dawson (2007), primary data are information collected by researcher specifically to obtain valid information for his/her research study.

3.6 Data collections methods/instrument

The current study employed observation, questionnaires, and interviews as methods of gathering data for the study.

3.6.1 Observation

Observation seeks to ascertain what people think, do by watching them in action as they express themselves in various situations and facilities. In a way, we all observe things around us but this is not scientific observation it becomes a scientific tool when deserved formulated research purpose and when it is systematically planned and recorded (Christensen & Johnson, 2010). The researcher should have certain things in mind: What should be observed, how the observations should be recorded, how the

accuracy of the observation can be ensured. More, Christensen and Johnson (2010) describe observation in research as the direct way through which all senses be used to determine all issues which are happening to the particular area where the study is conducted. The researcher used observation checklist to verify some of the ICT facilities like computer laboratories and wireless internet connectivity in TCs to justify the use of it. Borrowing inventory was also observed to compare the level of use of ICT among female and male instructors. Therefore, the method was found powerful in complementing the information given through other methods (interviews and questionnaires) to verify their rationality.

3.6.2 Questionnaires

Questionnaires normally contain a set of series questions designed to gather information to the particular study/phenomena (Christensen et al. 2014). Cozby (2007) defines questionnaires as well-organized written documents consisting of questions to be answered by respondents. Therefore, questionnaires can be defined as a set of questions that are appropriately written and organized to be answered in a written form by respondents. Therefore the current study used closed and open-ended questionnaires, open-ended questionnaires was used to solicit information related to gender differences among instructors on the use of ICT and opportunities attained on the use of ICT in TCs. While close-ended questionnaires respondents given questions in form of likert scale and yes and no.

The reasons behind usage of questionnaires include that it was helpful in increasing confidence among individuals are reducing their fear especially in the presence of the researcher due to increased freedom and time. The tool was also helpful in serving time especially when the number of respondents was higher. Also, the method was helpful in ensuring that information collected can last for a long period and can also be used in the future without changing the presented truth.

3.6.3 Interview

Interview comprises a live conversation between the researcher and respondent where the researcher asks the question to the respondent concerning the study intended (Creswell & Poth, 2016). A semi-structured interview was used to gather information from key informants in this study, included ICT technicians and Principals together with some of student-teachers and instructors. This method was used to solicit information, views, and opinion from the respondents. It was used for triangulation so as to compliment information collected via observation and questionnaires. Interview methods also involved obtaining information through face to face conversation between the researcher and the above-targeted respondents. This method allowed respondents freedom to air out their views and explanations about issues relating to instructor's experiences on the use of ICT in teaching and learning in TCs. Also, this study being both quantitative and qualitative research study, the interview approach intended to be as naturalistic as possible, which in turn created and encouraged a relaxed and friendly atmosphere to respondents for providing depth and detailed information about the study problem.

3.7 Data Analysis Techniques

Data analysis involves uncovering, extraction of important variables, detection of any variances, and testing of any underlying assumptions (Kombo & Tromp, 2006). Both quantitative and qualitative data gathered in this study were descriptively and thematically analysed. Primary data collected from the field were transcribed and edited first to eliminate the inappropriate responses provided during data collection. There was appropriate coding of responses for analysis. Coding helped to summarise the responses given by the respondents for analysis. The coded data were arranged according to themes and subthemes per specific objective. The descriptive analysis through frequency, percentage, mean and standard deviation were computed through the Statistical Package for Social Sciences (SPSS) version 20. Moreover, frequency, percentage, mean and standard deviation were presented in tables for easing interpretation. The patterns of narration from the interview were presented in quotations that reflect the originality of the insights given in the natural settings.

3.8 Validity and Reliability

Validity refers to the extent to which a test measures what we wish to measure while on the other hand, reliability refers to a measurement that supplies consistent results (Raudeliuniene, 2018). The validity and reliability of this study were ensured through the use of multiple data collection techniques known as triangulation. Triangulation techniques involved the use of more than one method of data collection such as observation, questionnaire, and interview to collect the same data under a single phenomenon. Consequently, the technique permits the researcher to combine strength and correct some of the deficiencies of some source of data. This technique helped to overcome the problem of relying on only one method while at the same time increased the validity of the data. Similarly, the study adopted the standard questionnaire used by previous studies on the topic of ICT use in education integration and use in TCs.

3.9 Ethical Issues

In adhering to ethical issues, the researcher after a successful presentation of the proposal, the researcher adhered to research ethical considerations. Firstly, the researcher sought a clearance letter for data collection permission issued by the Directorate of publication and postgraduate studies of Mzumbe University. The letter introduced the researcher to other authorities who issued the permission letter for data collection in the two selected teachers colleges. In the field the researcher familiarised with the respondents by informing the goal of the study. As far as data collection is concerned, the researcher has not included personality of the respondents in the questionnaire. That is, the respondents were anonymous to researcher. In the current study, the names of instructors were named as R, students as S while principals and ICT technicians were named as P and T respectively. Similar, data collected were used for this study purpose and were not being disclosed for anyone at any place for any purpose. The researcher practiced high level of opportunity to respondents. This means respondents were not forced to share what they shared, they were at liberty to with held any information they felt was not worth sharing.

3.10 Chapter conclusion

In this chapter, the research design of the study has been presented. The reasons why descriptive design was adopted have already been mentioned. The chapter provides the population of the study, procedures for sample selection, and research instruments that were employed under this study. The methods of data collection; observation, questionnaires, and interviews are precisely described. The chapter has discussed the validation and reliability of the instruments and methods used as well as the data analysis approach and ethical issues.

CHAPTER FOUR
PRESENTATION OF FINDINGS

4.0 Introduction

This chapter presents the findings of the study that examined instructors' experiences on the use of ICT to facilitate student-teachers learning in TCs. The chapter starts by presenting the demographic characteristics of respondents. Then, the findings presented per specific objectives including (i) instructors' teaching skills on the use of ICT, (ii) instructors' gender differences o n the use of ICT and (iii) instructors' experiences and opportunities on the use of ICT in facilitating student-teachers learning in Dakawa and Morogoro TCs. Finally, the conclusion of the chapter is highlighted.

4.1 Description of the demographic characteristics of the respondents

This section presents respondents' demographic characteristics that include sex, ages, academic rank and working experience. The presentation is based on the type of the respondents, that is, instructors and student-teachers.

4.1.1 Demographic characteristics of the instructors

The section presents instructors' demographic information mainly their sex; age, academic rank, and teaching experience as presented in Table 4.1 below.

Instructors' sex; Table 4.1 illustrates the dominance of male instructors over the female. This is because out of 36 instructors involved in the current study, 20 (55.6%) were male and 16 (44.4%) were female.

Age of the Respondents; information regarding the age of respondents was presented into four categories; 15-25 years, 26-35 years, 36-45 years, and more than 46 years. Table 4.1 demonstrate that majority of the respondents are above 35 years old. Similarly, respondent's age had a great influence on determining the level of interest, skills, and experience on ICT use among instructors.

Instructors' academic rank; the information concerning the level of education of the instructor was presented into three categories; bachelor degree, master degree, and Ph.D. holder, and Professor. In Table 4.1, none of the instructor was a PhD holder and very few respondents were bachelors' degree holder. This means majority (80.6%) have master degree. The information provides the insights that the instructors involved in the current study had a relative awareness of ICT use in different fields because of the level of education attained. Thus, their opinions, views, and perceptions given had enriched the current study.

Teaching experience of instructors; The information concerning the teaching experiences of the instructor was presented into four categories; 0-10 years, 11-20 years, 21-30 years, 31 years, and above. Table 4.1 demonstrates that few respondents had teaching experiences of 10 years and above. This, information reflects the ages of the respondents.

Table 4.1: Instructors Demographic characteristics

Categories	Frequency	Percentage (%)
Sex		
Male	20	55.6
Female	16	44.4
Total	36	100
Age of respondents		
15-25	0	0
26-35	9	25
36-45	26	72.2
46 And Above	1	2.8
Total	36	100
Academic rank		
Bachelor degree	7	19.4
Master Degree	29	80.6
PhD Holder	0	0
Professor	0	0
Total	36	100
Teaching experience		
0-10	13	36.1
11-20	23	63.9
21-30	0	0
31 and above	0	0
Total	**36**	**100**

Source: Field Data (2020)

4.1.2 Demographic characteristics of the student-teachers

The section presents the demographic characteristics of the student-teachers based on their sex; age and year of study of respondents as presented in Table 4.2 above.

Sex of the Respondents; Table 4.2 illustrates 10 student-teachers who were randomly selected in the current study in which 6 (60%) were female and 4 (40%) were male. Their selection was based on the criteria that male is relatively preferred to ICT use to female notably, on educational matters. Hence, female was preferred as to gain their insights on the use of ICT in teaching and learning.

Year of Study of the Student-teachers; as indicated in Table 4.2, 4 (40%) of respondents were first year and 6 (60%) second year**.** Being with more 60% of respondents who are second year provide remark to reliable and valid information on this study since they might have been faced with or experienced on the use of ICT in facilitating learning activities in TCs.

Age of the student-teacher respondents; as presented in the Table (4.2), the age of the respondent, which the number of years that one possess, indicate that most respondents in the TCs are in the age of digital generation. Thus, the information solicited from them would be valid and useful in this study.

Table 4.2: Student-teachers' demographic characteristics

Category	Frequency	Percentage (%)
Sex of respondents		
Male	4	40
Female	6	60
Total	10	100
Year of study		
First Year	4	40
Second Year	6	60
Total	10	100
Age of respondents		
20-25	8	80
26-35	2	20
Total	**10**	**100**

Source: Field Data (2020)

4.2 Instructors' ICT teaching skills in enhancing student-teachers learning in TCs

The objective intended to identify the instructors' ICT teaching skills in enhancing student-teachers learning in TCs. Data were gathered from 36 instructors through closed questionnaires. The findings are presented in Table 4.3 below.

Table 4.1: Instructors ICT teaching skills f in facilitating learning in TCs

SN	ICT teaching skills	RESPONSES 1	2	3	4	5	N	SD	MS
1	I create teaching aid like visual graphics, charts, and drawings	1 2.7%	-	-	7 19.4%	28 77.8%	36	.75	**4.69**
2	I apply power point presentation	1 2.7%	-	1 2.7%	6 16.7%	28 77.8%	36	.79	**4.67**
3	I use a computer to prepare teaching professional documents (schemes of work, lesson plans, lesson notes)	1 2.7%	-	2 5.5%	10 27.8%	23 63.8%	36	.85	**4.50**
4	I use a scanner or digital camera to import graphics, photos and text for presentation	12 33.3%	2 5.5%	5 13.8%	15 41.7%	2 5.5%	36	1.43	2.81
5	I use the internet to search for educational resources that support teaching and learning in my subject	-	-	-	6 16.7%	30 83.3%	36	.38	**4.83**
6	I use web conferencing/video chat to communicate/collaborate with my students	13 36.1%	7 19.4%	9 25%	5 13.8%	2 5.5%	36	1.27	2.33
7	I provide students marks/results through the email/text message on their phone	11 30.5%	8 22.2%	4 11.1%	8 22.2%	5 13.8%	36	1.48	2.67
8	I use the word processor (writer), database (base), and spread sheets	3 8.3%	2 5.5%	1 2.7%	8 22.2%	22 61.1%	36	1.27	**4.22**
	Grand Mean Score								**3.84**

Source: Field Data (2020)

Response key: 5 Strong Agree; 4: Agree; 3: Not Sure; 2: Disagree; 1: Strongly Disagree;

N**:** Total number of respondents**;** SD = standard deviation; MS = mean score

From the findings, it was illustrated that the mean score of 3 is the decision point to judge the extent of instructors teaching skills on the use of ICT in facilitating student-teachers learning. The decision point was obtained by adding number of response key and divided by total number of response key 1+2+3+4+5 = 15/5 = 3. Therefore, mean score of responses above 3 shows that instructors strongly agreed on the variable.

The results in Table 4.3 establish that instructors ICT teaching skills on the use of internet to search for educational resources and download materials that support teaching and learning had high mean score 4.83. This finding was agreed by 83.3% of respondents who rated strongly agreed. Creating teaching aid like visual graphics, charts, and drawings and use of power point presentations had high mean score of 4.69 and 4.67; these results were strongly agreed by 77.8% of respondents. Similarly, the results established that instructors had skills on wording because the use of computer to prepare teaching professional documents (schemes of work, lesson plans, and lesson notes) and use of the word processor, database, and spread sheets had high mean score of 4.50 and 4.22 as they were supported by 63.3% and 61.1% of respondents respectively. These findings establish the confidence to argue that, instructors' had basic ICT skills as rated variables were above 3 mean score (Grand mean score from respondents = 3.84).

However, other variables rated below 3.0 mean score shows that instructors have limited such ICT teaching skills. As presented in Table 4.3, these variables were using scanner or digital camera to import graphics, photos and text for presentation (Mean score from respondents = 2.81), in providing students marks/results through the email/text message on their phone (Mean score from respondents = 2.67), followed by use web conferencing/video chat to communicate/ collaborate with their students (Mean of respondents = 2.33). These imply that variables are less used by the instructors regardless of their potentialities in teacher education.

Furthermore, the observation revealed that the use of ICT in the two teachers colleges had fairly indicators on the application of ICT in educational activities because of the presence of ICT devices. Figures 4.1, 4.2, and 4.3 are presented below to justify.

Figure 4.1: Computer lab at MOTCO showing ICT facilities

Source: Field Data (2020)

Figure 4.2: Computer lab at DATCO showing ICT facilities

Source: Field Data (2020)

Figure 4.3: ICT Server at DATCO

Source: Field Data (2020)

In the same way, through observation, instructors primarily, used projectors in teaching their courses. However, due to lack of clear screen projector, the projection done on a polished wall or manila sheet as the means of improvisation. Figure, 4.4 indicates one of instructor at MOTCO using PowerPoint presentation in teaching a course.

Figure 4.4: An instructor using PowerPoint presentation in teaching

Source: Field Data (2020)

4.3 Gender differences among Instructors on the use of ICT in facilitating learning

The objective sought to assess gender differences among instructors on the use of ICT in facilitating student-teachers learning. An open-ended questionnaire was used to solicit information related to this aspect. Specially, the questions asked were; "Is there any differences between male and female instructors on the use of ICT in facilitating student-teachers learning?" was administered.

Table 4.2: Gender difference among Instructors on ICT use

Responses	Frequency	Percentage (%)
Yes	23	63.9
No	13	36.1
Total	**36**	**100.0**

Source: Field Data (2020)

The findings, as presented in Table 4.4, revealed that there is difference between female and male instructors towards the use of ICT in facilitating student-teachers learning. Furthermore, interviews were conducted to fourteen (14) respondents from both Morogoro Teachers College (MOTCO) and Dakawa Teachers College (DATCO). The interview that aimed to get respondents' deeper understanding and experiences related to gender and ICT use in accessing digital tools, possession of ICT gadgets, attitude in ICT use and ICT competence to facilitating student-teachers learning included 6 instructors, 4 student-teachers, 2 ICT technicians and 2 college principals. The findings from the interview were coded and analysed through thematic analysis method and are presented in form of quotes from interviewees.

When these respondents asked about gender differences regarding attitude in ICT use, respondent R1 who was also the classroom instructor from DATCO having the experience of ICT use in facilitating teaching activities at the college had the following views:

> *Female instructors still lag behind in integrating classroom technology due to anxiety. They have developed the negative stance that ICT is for science instructors. During classroom interaction, they merely rely on downloading materials rather than applying different*

multimedia in teaching (Field Data: Response from R1; March, 2020).

Moreover, respondent R2 who was female classroom instructor from different college when asked about gender differences in ICT competence had the following to say:

The female instructors have less opportunity for the ICT because most of the training provided considered science instructors. Also, most female instructors are endowed with home chores as the results they have less time to prepare themselves into ICT for advanced classroom (Field Data: Response from R2; March, 2020).

In another interview with male instructor (R4) from MOTCO about gender differences in possession of ICT gadgets reveled following:

Most female instructors in our colleges don't have their own computers. If you don't have your own computer even if you attend trainings on ICT is effortless. We need computers to flourish the skills we learned during pre- and in-service trainings (Field Data: Response from R4: March, 2020).

Furthermore, when asked about gender and ICT use in facilitating the student-teachers learning, respondent S1 who was also a student-teacher having the experience of ICT use in learning activities at DATCO argued:

In our college, the ICT courses are being taught by male instructors. This led me to believe there is gender difference in the ICT use (Field Data: Response from S1: March, 2020).

When respondent S3 who was female student-teacher from the DATCO was asked about gender differences regarding attitude in ICT use had the following to offer:

For a few days that I have been here, I have seen that male instructors prefer using ICT to females. Male instructors always encourage us to use ICT for accomplishing our learning tasks (Field Data: Response from S3: March, 2020).

Similarly, another female student-teacher S4 from MOTCO when asked about gender differences regarding attitude in ICT use, she revealed that:

For my views, I can see the difference between male and female instructors in using ICT. The reasons can be associated with the nature of the responsibilities of female instructors that endow them.

> *They lack adequate time to prepare lessons based on ICT integration and use. (Field Data: Response from S4; March, 2020).*

The findings above imply that the inequalities in ICT use between female and male instructors exist by nature and gender stereotype. The female instructors are endowed by various matriarchal based activities. Similarly, issues related to personal tacit knowledge including attitudes were observed apart from gender stereotyping.

To attain other context in which gender differences manifest on ICT competence use in learning activities, the college principals and ICT technicians who are custodian of ICT issues at MOTCO and DATCO were interviewed about gender and ICT use in facilitating student-teachers learning. The following responses were highlighted: ICT technician revealed that:

> *The ICT in our college seems to be gender biased, many male instructors use computers to prepare their lesson and teaching while few female use or show little interest in using ICT in lesson preparation and teaching (Field Data: Response from T1; March, 2020).*

Similarly, respondent P2 from DATCO when asked about gender difference regarding attitude in ICT use revealed the following:

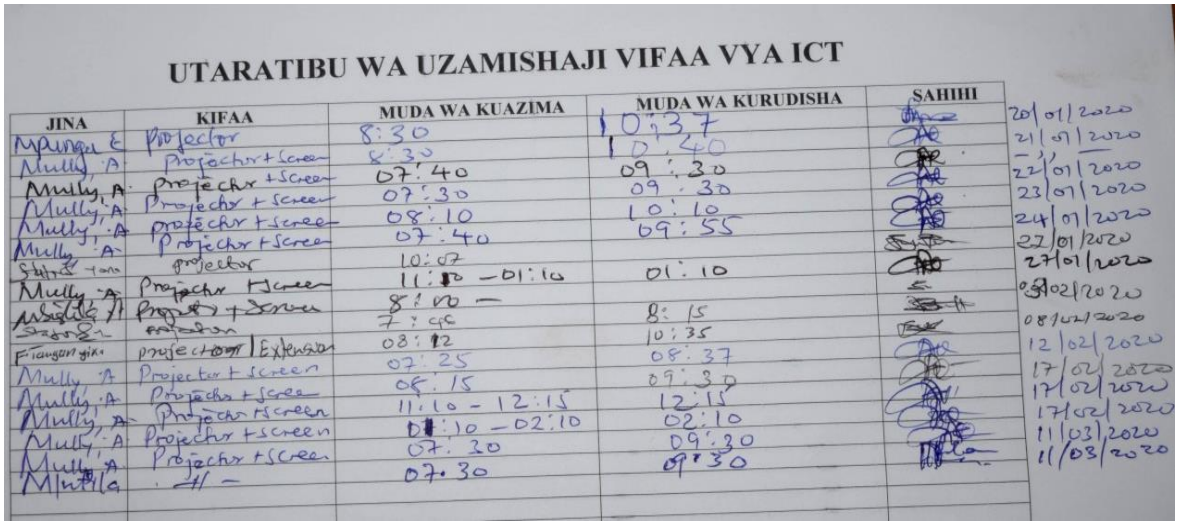
> *The difference between males and females on the use of ICT in learning is not socio-cultural practices rather is an individual based. Female instructors fear to use ICT in teaching and learning. They have inadequate skills regarding the ICT use in pedagogical issues. However, there have various trainings on ICT use in teaching; the female instructors do not take it seriously. The gap prevailing is due to ones negligence. Indeed, female instructors have developed little competence and confidence in ICT use (Field Data: Response from P2; March, 2020).*

On the contrary, respondent P1 at MOTCO when asked about gender differences in accessing digital tools, he had the following to say:

> *In my opinion, I cannot see any gender difference in ICT use. The differences being witnessed are being due to motivation, interests, and time spared by females and males in using the technology in teaching and learning. Every instructor in our college has an equal chance to use ICT because their circular requires them to integrate and use ICT as a pedagogical tool (Field Data: Response from T1; March, 2020).*

Therefore, the emerged themes under this finding had varied contexts as the question was perceived differently. The contradictions are resolved as it was general found that, male instructors are relatively many compared to females. However, this study established that, the ICT use among females and males in teaching and learning deemed contextual and individual-based. The justifications of the findings could be better argued that, gender differences are observed in terms of attitude, competence, access, motivation, and interests.

Similarly, to ensure the rigour of the findings, triangulation was made through the observation checklist. The observation aimed to verify the information given through other methods (questionnaires and interviews). The findings in Figure 4.5 and 4.6 respectively show ICT devices borrowing inventory (projector and screen) as devices for teaching and learning from 28th October 2019 to 11th March 2020. The analysis revealed that out of 37 instructors only 2 (14%) female instructors had borrowed a projector and screen as opposed to male 12 (86%). This also enabled the study to establish that, the use of ICT is gendered in terms of interests, passion, attitudes, competence and confidence of the instructors not as gender stereotypes. This is because both female and male instructors had equal access to use institutional ICT devices as enhancement of teaching and learning.



UTARATIBU WA UZAMISHAJI VIFAA VYA ICT

JINA	KIFAA	MUDA WA KUAZIMA	MUDA WA KURUDISHA	SAHIHI
Mpunga E	Projector	8:30	10:37	20/01/2020
Mully A	Projector + Screen	8:30	10:40	21/01/2020
Mully, A	Projector + Screen	07:40	09:30	22/01/2020
Mully, A	Projector + Screen	07:30	09:30	23/01/2020
Mully, A	Projector + Screen	08:10	10:10	24/01/2020
Mully, A	Projector + Screen	07:40	09:55	27/01/2020
	projector	10:07		27/01/2020
Mully, A	Projector + Screen	11:10 – 01:10	01:10	05/02/2020
		8:00 –		08/02/2020
		7:05	8:15	12/02/2020
	projector	08:12	10:35	17/02/2020
Mully, A	Projector + Screen	07:25	08:37	17/02/2020
Mully, A	Projector + Screen	05:15	09:30	17/02/2020
Mully, A	Projector + Screen	11:10 – 12:15	12:15	11/03/2020
Mully, A	Projector + Screen	01:10 – 02:10	02:10	11/03/2020
Mully, A	Projector + Screen	07:30	09:30	
Mully, A		07:30	09:30	

Figure 4.5: List showing level of using ICT facilities between male and female Instructor

Source: Field Data (2020)

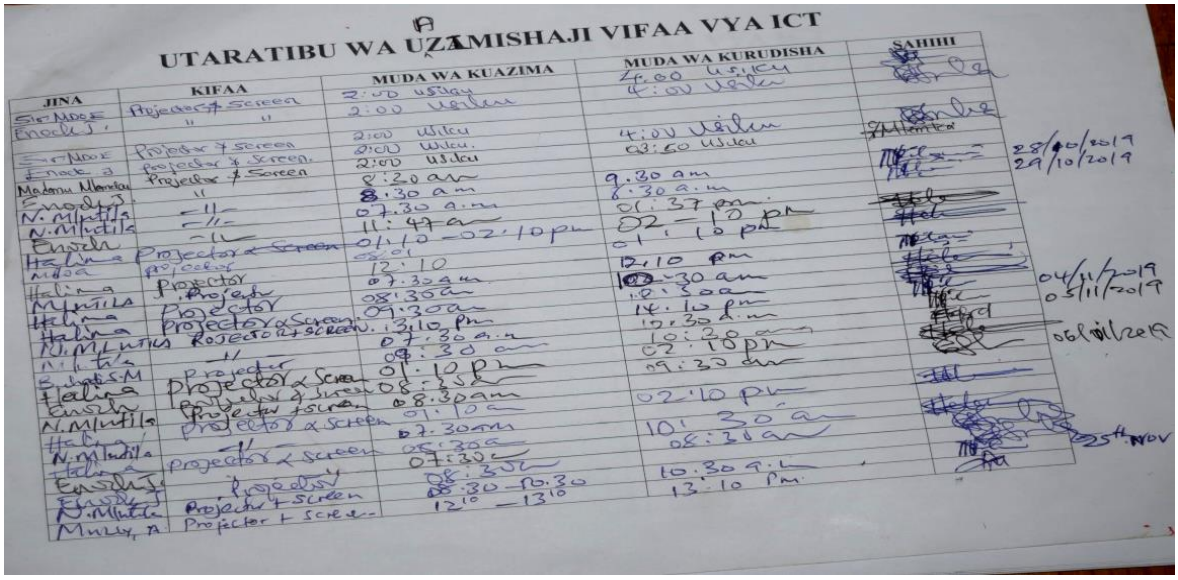


Figure 4.6: List showing level of using ICT facilities between male and female Instructor

Source: Field Data (2020)

Conversely, the findings from the questionnaires show that, there are no gender differences among instructors in TCs. The matter of fact is that, there are various ICT initiatives in the TCs including training on preparation of multimedia, integrating apps, text, video and audio preparation. The efforts aim to ensure that instructors are not left behind in classroom technologies. The gap is associated with a lack of interests, confidence, competence, and fear of technology between female and male instructors.

4.4. Instructors' experiences and opportunities on the use of ICT in facilitating student-teachers learning

The objective was attained through gathering data from 36 instructors (20 males and 16 females) through closed questionnaires. The findings are presented in Table 4.5 below.

Table 4.3: Instructors' experiences and opportunities on the use of ICT

S/N	Instructors experience/ opportunities	RESPONSE							
		1	**2**	**3**	**4**	**5**	**N**	**S.D**	**MS**
1	Do you have your own personal computer?	1 2.7%	-	-	7 19.4%	28 77.8%	36	.75	4.69
2	I feel confident using the computer	1 2.7%	-	1 2.7%	6 16.6%	28 77.8%	36	.79	4.67
3	I enjoy using ICT in teaching	1 2.7%	-	2 5.5%	10 27.7%	23 63.8%	36	.85	4.50
4	I do provide assignment to my students through ICT	2 5.5%	2 5.5%	5 13.8 %	15 41.7%	12 33.3%	36	1.1 1	3.92
5	I use internet to search educational resources that support teaching and learning	1 2.7%	-	1 2.7%	11 30.5%	23 63.8%	36	.89	4.36
6	I have access to a networked computer at my office	4 11.1 %	5 13.8 %	6 16.6 %	7 19.4%	14 38.8%	36	1.4 2	3.61
7	I use web conferencing/video chat to communicate/collaborate with my students	13 36.1 %	7 19.4 %	8 22.2 %	5 13.8%	3 8.3%	36	1.3 4	2.39
8	I provide students grades/marks through the email/text message on their phone	11 30.5 %	8 22.2 %	4 11.1 %	8 22.2%	5 13.8%	36	1.4 8	2.67
9	Have you ever taken a training course in ICT?	3 8.3%	2 5.5%	1 2.7%	8 22.2%	21 58.3%	36	1.2 8	4.20
10	Do you usually read about ICT?	0 -	1 2.7%	4 11.1 %	21 58.3%	10 27.7%	36	.71	4.11
	Grand total mean								3.91

Source: Field Data (2020)

Response key: 5 Strong Agree; 4: Agree; 3: Not Sure; 2: Disagree; 1: Strongly Disagree

N**:** Total number of respondents; SD: standard deviation; MS**:** mean score

The mean score of 3 is the decision point to judge the extent of instructors' experiences and opportunities on the use of ICT in facilitating student-teachers learning. The decision point was obtained by adding number of response key and divided by total number of response key 1+2+3+4+5 = 15/5 = 3. Therefore, mean score of responses above 3 shows that instructors have experience and opportunities in using ICT in teaching and learning.

The findings as presented in Table 4.5 establish that majority (77.8%) of the instructors own their personal computers. It was then established that, instructors' are confident and enjoy when using computers in their pedagogical processes because the data had found that high mean score of 4.67 and 4.50 and are supported by 77.8% and 63.8% of respondents strongly agreed. It was further revealed that most instructor have opportunity to use internet in searching for educational resources and had attended ICT training courses because had high mean score 4.36 and 4.20. Furthermore, the study demonstrate that instructors having opportunity to read about ICT has high mean score 4.11 and were supported by 58.1% of the respondent agreed. Finally, the findings revealed that instructors have access to a networked computer at their office while provide assignment through ICT with a mean score of 3.61 and 3.92. This could be argued as opportunities of instructors in ICT use. These findings imply that the instructors had varied experience and opportunities to ICT use in teaching and learning processes.

However, other variables like opportunities to use web conferencing/video chat to communicate/collaborate with student-teachers and providing students' marks/results through the email/text message on their phone as shown in Table 4.5 had weakest agreement and were rated not sure, disagree and strongly disagree at the mean score 2.39 and 2.67 respectively.. Generally, it is established that instructors have varied experiences in terms of knowledge, competence, and attitudes in deploying ICT in teaching.

To attain context of training and professional development based on ICT use in a stage head-on empowering instructors on ICT use, 2 colleges principal and 2 ICT technicians who having custodian of ICT issues at MOTCO and DATCO were interviewed. The following responses were highlighted:

> *Currently, there are various initiatives carried out by MoEST in providing training on ICT as a pedagogical tool. Every individual ought to attend the trainings. This has given a room for an individual instructor to upgrade their skills on computer studies (Field Data: Response from P1; March, 2020).*

It was also revealed that there are indoor instructors' trainings and professional developments on the use of ICT given by ICT technician (T1) instructors. A technician from MOTCO had this to say:

> *Apart from the training rendered by the government on ICT use as a pedagogical tool, other initiatives include the indoor training that is rendered with our department to the instructors on basic of computer including installation, troubleshooting, updating, and recovery programme. We have a schedule at least twice per week (Field Data: Response from T1; March, 2020).*

Similarly, respondent T2 who was ICT technician from DATCO when asked the same question have revealed the following:

> *The indoor training has helped the instructors to gain more opportunities and experience in ICT use in teaching and learning activities. The questions of minor technical support are addressed through such an institutional-based programme (Field Data: Response from T2; March, 2020).*

In cementing the finding, the open-ended question was administered regarding the trainings, seminars, and workshops based on ICT use. The findings revealed that all 36 (100%) respondents had attended various training on ICT use in teaching and learning. Meanwhile, in 2019, MoEST carried out instructors/tutors educational support projects (TESP) to all instructors in which 29 (80.5%) attended. The training capacitated them on how best to use integrating apps to improve teaching and learning and preparation of multimedia. The findings are summarised in table 4.6 below.

Table 4.4: Categories of ICT training attended by the instructors

S/n	Training categories	Frequency	Percentage (%)
1	Tutors educational support project (TESP)	29	80.5
2	Science, Mathematics and English ICT training	6	16
3	Computer troubleshooting and networking	21	58
4	CISCO academy ICT essentials	21	58
5	International computers driver's license (ICDL)	6	16
6	Mobile learning	6	16

Source: Field Data (2020)

4.5 Chapter conclusion

This chapter presented the findings of analysed data as they were gathered from questionnaires, interviews, and observation. It started by presenting the respondents' demographic information followed by analysis of the findings that was presented based on the specific objectives of the study.

CHAPTER FIVE
DISCUSSION OF THE FINDINGS

5.0 Introduction

This chapter presents the discussion of the findings as revealed in chapter four. The discussions presented are in line with the demographic data and research objectives. The research objectives for the current study were including: (i) Identify instructors' teaching skills on the use of ICT in enhancing student-teachers learning in Teachers' Colleges in the Morogoro region, (ii) Assess instructors' gender differences on the use of ICT in facilitating student-teachers learning in Teachers' Colleges in Morogoro region and (iii) Examine instructors' experiences and opportunities on the use of ICT in facilitating student-teachers learning in Teachers' Colleges in the Morogoro region. The chapter ends by presenting the conclusion as generated from the discussion.

5.1 Reflection of Demographic Characteristics of the respondents

It was revealed by the data that there is awareness toward ICT use to both genders. It was further demonstrated that respondents display different demographic information ranging from ages, academic rank, and teaching experience. This information was relevant in the current study as it proved the validity and reliability of the data collected from respondents with varied characteristics. With regards to demographic data obtained from the student-teachers and instructors, the findings stipulate that the experience toward ICT use in Teachers Colleges (TCs) is positive in mind set but to the aspect of putting that idea to the implementation is vital challenge.

5.2 Instructors' teaching skills on the use of ICT in enhancing student-teachers learning

The findings identified various skills that are common to instructors in TCs. The mentioned skills included; internet-based skills in searching educational resources, creating teaching aids such visual graphics, charts, and drawings, application of power point presentation, and word processing-based skills to prepare teaching documents

(schemes of work, lesson plans, and lesson notes). The discussion regarding this objective is well addressed under the following sub-heading;

5.2.1 Internet-based skills

The majority of the instructors showed awareness of computer-based skills regarding teaching and learning processes. The findings illustrate that most instructors are curious about internet-based technologies due to its explicit accessibility and usage. This conclusion is reached based on fact that it had a mean score of 4.83. The same findings are reported by Alharb (2014) who found that in Kuwait, the use of the internet as methods in teaching in secondary schools are largely used because it is freely provided by the government. Moreover, Ghasia et al. (2018) and Mtebe (2020) revealed that, the use of internet-based technology in teaching and learning is higher because of its accessibility.

The findings in the current study are congruent to the previous studies, however; the provision of internet services does not rely on the government only rather the capability of the institutions. It is argued in the current study that the use of the internet in searching education resources, communication, and knowledge dissemination are important, yet the availability of the network is limited. Although the TCs provide free internet services such as Wi-Fi, this study reveal that this service is faced with low speed and limited area of coverage. In this regard, instructors fail to carry out smoothly their teaching activities that demand internet. The internet-based skills is very important to instructors if accessed because it improve access to learning resources, teacher-student and student-student interaction without being restricted by time or place. Thus, internet-based skills is considered to have the potential to address issues of crowded classrooms, expertise access to learning materials, flexibility of the learners as well as distant connectivity.

5.2.2 Word processing skills

The findings revealed that word processing skills was common among the instructors as it scored the mean of 4.22 and supported by 77.8% of the respondents. This means that, instructors can prepare professional documents such as schemes of work, lesson plans, and lesson notes. The findings maintain that the use of word processors in the teaching and learning process was mutual among instructors. Studies by Agyei, and Voogt (2012) and Lee, Longhurst, and Campbell (2017) report the same findings that teachers use of ICT in teaching mainly used word processing skills in preparing lesson notes, grading students results, and preparing lesson plans and scheme of works. Cubukcuoglu (2013) maintain that the use of word processor skills such as writing tests, database management, and spreads sheet are priority set of skills required by instructors in education to cope with technological dynamics.

Correspondingly, the word processing skills can be regarded as the pillar of all computer skills that bridge instructors to other advanced applications. The applications of basic computer skills that enable a person to type in Microsoft word enhance instructors to share materials in sophisticated ways. Instructors need to orient themselves either through indoor, in-service trainings, or online channels tutorials to sharpen their understanding. Therefore, it was concluded that most of the instructors are versed with application computer skills.

5.2.3 Power point presentation skills

The results unveiled power point presentation skills with high mean score 4.69. This means that, power point presentation as a common teaching method that most instructors are experienced to enhancing teaching and learning process. This finding is supported by Alharb (2014) who argues that the use of projector-based software was common among teachers in Kuwait and Kennah (2016) who report teachers' strong acceptance of the use of projectors in their classrooms. Both findings maintain that the use of power point presentation skills was preferred due to reducing teachers' talk, accommodating a large number of students in lecture theatres.

Through borrowing inventory (projectors and screens), it was established that the instructors in TCs commonly borrowed the projector and screen. The commonly practiced ICT skills taught during teacher education in Tanzanian is the use of the projector. The reasons embodied such practices included its simplicity, being most early introduced skills in teacher education, and its effectiveness in developing countries with congested classes.. The conclusions are in line with Alkash, and Al-Dersi (2017) who found that power point presentation technologies not only that it is modern technology in the place but also addresses the challenge of crowded classes.

The findings also established that power point presentation is an easy program to use and a powerful tool for giving presentation. The method gives room for collaboration, easy access and share information beyond the initial meeting. It even helps instructors to reduce speaking anxiety by drawing eyes away from the speaker and towards a screen; therefore this skill should be possessed by majority of instructors.

5.2.4 Web conferencing/video chat skills

The finding illustrates that instructors hardly exhibit web conferencing/video skills with mean score 2.33. The finding implies that, instructors are limited to more advanced ICT teaching skills. It should be noted that web conferencing/video is a sophisticated forum for ensuring distance sharing information among instructors and students at once at time. The limitation of web conferencing/video teaching skills in this study can be debated for; firstly, it could be due to limited internet coverage and speed that has a signpost in ensuring communication and traditional inherited ICT teaching and learning strategies during teacher education. This problem limits both instructors and learners to have fully application of web-based conferencing.

The findings are in line with Innocent (2016) who found that the use of video conferencing in three selected universities in Tanzania was low. Innocent maintains that there was a great difference in the use of video conferencing skills. Similar findings are reported by Alazama et al. (2012) that teachers demonstrate moderate skills in the use of digital video and animation in the teaching and learning process. On the other hand,

Tseng, Cheng and Yeh, (2019) uphold that the low level of use of video conferencing skills in teaching and learning is due to high cost, limited internet bandwidth, and low speed of internet. The current study in particular established that the technology was not common because it is not given equal weight as other applications. Web conferencing/Video chat would have a panacea to the current prevailing COVID-19 pandemic. This is because it could serve as e-schooling with student-teachers taught at their homes. Therefore, it is high time now for instructors to venture on ICT use to enhance distance learning due to enriched digital society.

5.3 Gender differences among Instructors on the use of ICT in facilitating learning

This objective sought to assess instructors' gender differences in the use of ICT in facilitating student-teachers learning in TCs in Morogoro region. The discussions are presented under the following subheadings.

5.3.1 Gender differences in accessing ICT tools

The findings revealed that there is a difference between female and male instructors towards the use of ICT in facilitating student-teachers learning. It was demonstrated that most (63.9%) male instructors possess ICT devices like laptop computers relatively to female. Further, the study revealed the dominance of male instructors in TC however the disparity in owning computers is undisputable. The findings are symmetrical with Mahmood and Bokhari (2012) who found significant difference between males and females on the use of ICT in learning activities. These findings are established in teaching colleges contexts where, the ICT policy is given adequate considerations.

Through interviews, it was revealed that female instructors still lag behind in integrating classroom technology. This situation is embedded with limited ICT competence and skills, anxiety and negative stance among female teacher. It was established female developed the negative stance that ICT is for science instructors because in the early stages of integration of ICT as pedagogical tool, science instructors were mainly the focus. The findings reveal further that the disparity that exists between female and male instructors on the use of ICT is not grounded from the historical and cultural

phenomenon rather on individual perspective. Lastly, it was established in the current study that the context of fear is due to inadequate competence which is endowed by various factors including instructors' ICT background.

5.3.2 Gender Differences on the possession of ICT gadgets

The findings revealed that the existing gender inequality on ICT use between male and female instructors is associated with limited possession of ICT gadgets particularly computers. The findings are in line with Drabowicz (2014) and Van Dijk (2017) who revealed that limited number of female teachers owned computers which limited practices to ICT use their classrooms. This implies that, if you don't have your own computer even if you attend trainings on ICT is effortless. Instructors need computers to flourish their skills learned during in-service trainings.

Practically speaking, one cannot be well versed in ICT use depending only on the office devices such computers. In due regard, males are better positioned for ICT use compared to females because of devices possession. This conclusion is based on UN's (2014) reports that, in developing countries, few women have smartphones and computers devices for communication as opposed to men. In this regard the current study conclude that gender differences among instructors hamper the broad goal of the ICT policy for basic education regarding ICT use in TCs in Tanzania.

5.3.3 Gender Differences regarding attitude in ICT use

The study has established that differences among female instructors are results of negligence, lack of interest and motivation. This establishment contradicts Fomsi and Orduah (2017) who found insignificant difference in attitudes on the use of ICT among primary school teachers in Nigeria. However, the findings are in line with Guillén-Gámez et al. (2020) and Mahdi and Al-Dera (2013) who observed limited interest and lack of motivation as the main determinants of disparity among female and male instructors. The current study reveal further that, although there are various ICT initiatives in TCs that require all instructors to use ICT in pedagogical processes, the efforts are less productive regarding the varied attitudes of instructors as most of the

female instructors fear to use ICT in T/L. Female instructors have inadequate skills regarding the ICT use in pedagogical issues. Therefore, the study articulates that gender differences that exist between female and male instructors is due to individual lazier faire policy, which do not take into account serious matter such as the tremendous merit of ICT as pedagogical tool. The gap prevailing is due to one's negligence, limited competence and confidence in ICT use.

Negative attitudes developed by female instructors have unconstructive implication on the ICT use. New technology can be well transformed only if people develop positive attitudes and interests. The existing gender differences are not contextualised based on gender inequality of ICT access rather personal beliefs, mind-set, efforts, and motivation.

5.4 Instructors' experiences and opportunities on the use of ICT in facilitating student-teachers

The objective sought to examine instructors' experience on the use of ICT in facilitating student-teachers learning in TCs in the Morogoro region. The strapline of discussion is as follows:

5.4.1 Instructors Attitudes towards ICT use

It was found that positive attitudes influence instructors experience on ICT use in teaching and learning. The findings show that, Mean score of respondents = 4.50 strongly agreed that they enjoy using ICT in teaching. The study establishes that the positive attitude demonstrated is a product of different ICT initiatives that are on-going on in TCs. The findings are congruent to Agbo (2015) and Ndibalema (2014) who found that positive attitudes have constructive influence on newly introduced innovation. In most developing countries, integration and use of ICT in education is unevenly distributed, for such a stance, its acceptance also varies. According to Birgin, et al. (2020), ICT experience is measured on the level of knowledge, competence, and attitudes. Unquestionably, instructor's attitude is one of the most significant aspects that enhance or constrain integration of ICT and use it into teaching and learning processes.

Instructor's attitude and competence ensure ICT execution and pledge further ICT innovation. The current study establishes in the same vein that the experience of instructors in ICT use in TCs is accredited not only with their tenure but also their positive attitudes.

5.4.2 Instructors competence in ICT use

The findings ascertained being competent in ICT use had significant relation with instructor's confidence as the mean score from respondents = 4.50 strongly agreed. Instructors' competencies are built on the basis of confidence. This is similar to Joel and Mungwabi (2015) who found that instructor's inadequate pedagogical skills and competence impaired the use of ICT in teaching and learning activities. The fear and anxiety developed by instructors on the use of ICT are resulted due to inadequate skills in classroom integration. Mahdi and Al-Dera (2013) established that the digital divide among instructors in ICT use is linked to the limited knowledge and investment in technologies. Both studies establish that teacher education has a great role to ensure that instructors are equipped with relevant ICT pedagogical knowledge to incalculate their experiences. Birgin et al. (2020) points out that the instructors experiences are animated with proper training not only to the novice but also to in-service instructors. Therefore, to create competent, confident, and experienced instructors the basics should be laid from the teacher-education where primarily, teachers are made.

5.4.3 Accessibility of technological facilities

It was established that accessibility to technological facilities has an influence of strengthening ones experience and opportunities. The contention is strongly agreed at mean score of 4.69, and supported by 77.8% respondents. The findings particularly showed that instructors' owning ICT facilities such as computers have positive implications toward strengthening their experience on ICT use in teaching and learning. The current findings are similar to Karimi (2012) who ascertains that instructors who possess their own personal ICT devices demonstrate competence and experiences on ICT use in teaching and learning. However, it was portrayed that the deficiency of

computers in TCs in Tanzania deteriorates the efforts of the instructors in integrating and use of technologies in the classroom (Noyi, 2013).

The findings reveal further that having ICT devices has an opportunity to use the internet to search for educational resources that support teaching and learning. These finding echoes the UN report of 2014 which indicate that instructors with ICT devices that are connected with the internet like computers and smartphones in developing countries are less obstructed in ICT use (UN, 2014). Bearing in mind that most instructors merely rely on the institutional ICT devices, they also get limited time to practice ICT as the means of building their experience. The presence of ICT facilities from individual level to institution-level motivates instructors to properly use their time in preparing lesson plans, schemes of works, and other teacher professional documents comfortably. Therefore, the instructors' experiences are determined and well-articulated when instructors change their habit by creating efforts to have their own devices not relying on institutional devices. Such changes of mind will grant them adequate time and space for orienting themselves on the new innovation concerning ICT use in educational activities.

5.4.4 Instructors ICT training and professional development

An opportunity to ICT training has shown progress indicator among instructors toward use of ICT in their pedagogical processes. The findings depicted that, instructors who had attended ICT training courses in their career are confident and demonstrate positive attitudes towards the technology. The training courses with their associated seminars and workshop offered in TCs had increased instructors willingness and interest in the use of ICT in teaching and learning. This is similar to Dooley et al. (2016) who report that experience of novice and in-service instructors does not end in the teachers' colleges, rather through professional development programmes. Currently, the MoEST have taken different initiatives on ICT use in TCs. For example, it was found that most of the instructors had attended the TESP that aimed to equip them with the skills to effectively use technology in the classrooms while certifying their computer skills to international standards. Mtebe (2020) highlight that educational institutions have an

imperative role in developing the quality of instructors. Moreover, the findings suggest that teacher education departments should encourage and motivate instructors to use ICT in teaching and learning. In due course, the current study noted that training acts as a means of instructors' professional development and motivation as instructors are being well oriented to teach through technologies.

Practically speaking, the provided training should match with the student-teachers necessary skills on the ICT use. The study argues for intensification of institution-based professional development (indoor training) to include more instructors. The bases of indoor trainings were found strong not only due to its nature of inclusiveness but also its delivery techniques that make participants feel part and parcel of the programme. Thus, when indoor trainings are well administered and conducted, instructors are likely to share their experience in lively contexts which in turn creates a sense of knowledge creation and ownership.

5.5. Chapter conclusion

The chapter delineated the discussion of the finding guided by the study's objectives, conceptual framework and empirical literature review. The chapter provided the interpretation of the findings as analysed in chapter four.

The chapter concluded that instructors have varied teaching skills on the use of ICT in teaching and learning. The use of power point presentations that was applied by the majority dominates the ICT application in classroom. Although integration and use of ICT in teaching and learning aimed to transform traditional to modern teaching, it was revealed that use of internet-based technologies meant searching and downloading educational materials, while the web conferencing and video chat skills that also use the internet to enhance remote learning were hardly practiced. Thus, the study suggests that outlay of ICT facilities in teaching and learning should keep pace with the enhancement of internet speed and network.

Moreover, this study found gender difference in ICT application where male instructors were preferred ICT to female instructors. The difference between female and male instructors was contextualised as all have equal opportunities for the use of ICT in TCs. The findings acknowledged that there are substantial initiatives undertaken by the MoEST on trainings all instructors in integration and use of ICT in pedagogical processes. The disparities were stranded on the bases of attitudes, competence, use, and possession of ICT facilities, but not on sex stereotypes. Differences in ICT access and usage by female and male instructors advocate the need for brilliant consideration to attitudes issues which are individual-based. In the same way, being female is negatively related to computer use for teaching activities, but no relationship was found between genders and study-related.

Lastly, the study found that majority of instructors had varied experiences in terms of ICT competence, accessibility of technological facilities, and attitudes. The findings conclude that the experiences on the use of ICT in teaching were not related to tenure, but with the time, resources and efforts invested at an individual level. Moreover, it could be argued that the experiences demonstrated by the instructors were measured on the confidence level of an individual.

CHAPTER SIX
SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

6.0 Introduction

This chapter presents a summary of the study, conclusions and policy implications bearing the discussions in the preceding chapter. The summary and conclusion are made focusing on the deployment of ICT in teaching and learning activates in Tanzanian TCs. The chapter also outlines the policy implications of the study to educational stakeholders and necessary recommendations for further research.

6.1 Summary

The study investigated instructors' experiences on the use of ICT to facilitate student-teachers learning in two selected Teachers' Colleges in Morogoro, Tanzania. The study was guided by three specific objectives: to identify instructors' teaching skills on the use of ICT in enhancing student-teachers learning, to assess instructors' gender differences on the use of ICT in facilitating student-teachers learning and to examine instructors' experiences and opportunities on the use of ICT in facilitating student-teachers learning in Teachers' Colleges in Morogoro region. The study was conducted in two selected teachers' colleges of Morogoro and Dakawa teachers' colleges with a total of fifty (50) respondents who were obtained through simple random and purposive sampling procedures. The diffusion of innovation theory and technological acceptance model guided the current study. The study used a descriptive survey design in gathering data through questionnaires, interview guides, and observation checklist. Qualitative data were thematically analysed while quantitative were descriptively analysed using frequency, percentage, mean and standard deviation through SPSS version 20.

Quantitative data were presented in frequency, percentage, mean and standard deviation within the tables while those from the interview were presented in the quotations for explicit interpretation. The findings reveal varied instructors' teaching skills and experiences on the use of ICT in teaching and learning. The use of internet-based, word processing, and power point presentation skills were common while the use of web-

based video conferencing skills was hardly used among instructors. Moreover, the findings found gender difference on the use ICT. The disparity among female and male instructors was contextualised as all had equal opportunities for ICT use in TCs.

6.2 Conclusion

The segment comprises the conclusions based on the findings as presented and discussed on the bases of study objectives; the following conclusion was made.

6.2.1 Instructors' teaching skills on the use of ICT

The findings conclude that instructors had positive attitudes on the use of ICT in teaching and learning. The use of power point presentations dominates ICT application. Although the integration and use of ICT in teaching and learning aimed to transform traditional teaching to learner-cantered, the practice as revealed in the field establishes that the use of internet based-technologies were mainly used in searching and downloading educational materials, while the web base and video conferencing skills that also use the internet to enhance remote learning were hardly practiced. The study also noted insufficient ICT facilities in the TCs and limited internet speed as hindrance to ICT application. Therefore, investment of ICT facilities in teaching and learning should keep pace with the improvement of internet speed and network.

6.2.3 Instructors' gender differences on the use of ICT in facilitating learning

The study concludes that gender differences are stranded on the bases of attitudes, competence, use, and possession of ICT facilities, but not on sex stereotypes. However, it is acknowledged that there are substantial initiatives undertaken by the MoEST to train instructors in the integration and use of ICT in pedagogical processes. Discrepancies in ICT access and usage by female and male instructors advocate the need for brilliant consideration to attitudes issues which are individual-based. Moreover, the study concludes that female instructors in TCs need to change their mindset on dedicating themselves to ICT use in teaching and learning to meet the rationale of the ICT policy for basic education.

6.2.4 Instructors' experiences and opportunities on the use of ICT

The study found that majority of instructors had varied experiences in terms of competence, accessibility, and positive attitudes. It was therefore concluded that experiences on the use of ICT in teaching were not related to tenure, but with the time, resources and efforts invested on an individual level. Moreover, the study argues that experiences demonstrated by instructors are measured on the confidence level of an individual. Further the study conclude that in-service trainings opportunities rendered in all TCs towards consolidating the instructors on ICT; competence, confidence, and experience are enhanced by possessing own ICT facilities. Thus, it was concluded that the possession of the ICT gadgets had a positive correlation with experience because, one gets the abundant time to practices various skills.

6.3 Implications of the study

The findings of the current study are found worthwhile in raising awareness on the use of ICT in teaching and learning in TCs due to the world's technology dynamics. Therefore, the findings of the current study have various implications based on theory and significance to various educational stakeholders including instructors, student-teachers. Policy implication has been delineated followed by limitations and recommendation areas for further studies.

6.3.1 Theoretical implications

The current study adopted DOI and TAM as theory and model guiding the study. Both DOI and TAM were found relevant to the current study notably due to varied skills, competence, attitude, and experience that instructors have on the use of ICT in teaching and learning. Particularly, DOI calls the social system such as the TCs as a whole to be an integral part of the innovation (use of ICT) in educational activities. Because, education involves different coordinated systems, ICT should be taken into special consideration from primary throughout the education system. The theory implies that the gap that prevails in the use of ICT among instructors is due to resistance and negative attitudes towards the technology. The findings revealed that gender difference in the use of ICT was not because of gender stereotype rather it was an individual's

perception and context-based. Theoretically, this implies that to ensure changes in educational technology, there should be timely notification while debriefing instructors on its usefulness to avoid the gap and grievances between the innovator and users.

6.3.2 Implications for instructors

The study illustrated that instructors in TCs are aware of the rationale, integration, and use of ICT in teaching and learning. The exhibited instructors' skills call for the establishment of ICT guidelines and framework that is appropriate to Tanzanian contexts. The study implies that limited resources and infrastructures available should be maximally used while improvising the technology to fit their needs. It could be argued that the instructors' awareness on the use of ICT has been due to intensive trainings handed by MoEST and donor partnerships such as SIDA. Instructors are supposed to ensure that they sustain the trainings rendered in case the developmental partners cease to support the programme. Indoor training should be encouraged on the specific subject content while designing subject specific ICT framework.

6.3.3 Implications for student-teachers

The study implies that the student-teachers are an integral part of instructors in implementing ICT application in teaching and learning. Surprisingly, the findings revealed that there is an ambiguity institutional policy on the possession and use of mobile phones by student-teachers. In the same vein, the findings recommend that the TCs administrative should lay down favourable conditions that ensure that pre-service teachers complete their studies while competent enough to apply ICT in teaching and learning. Such observations imply lessening the gap that always prevails between the theory and practices among in-service instructors on the use of ICT in the pedagogical process.

6.3.4 Policy implications

The current study maintains that the implementation of ICT policy for basic education in TCs shows good indicators besides the challenges encountered. Nevertheless, there is a mismatch between the policy guidelines and practices. The experiences gained from the field evidenced that priorities are given to instructors with less consideration to student-teachers who are prospective teachers. It should be noted that the role of teacher education is to prepare competent teachers, yet the institutional policy does not allow student teachers to use mobile phones which are identified as the common ICT devices accessed by the majority. The policy should establish the guidelines that give freedom to the students over such accessible devices. Indeed, to ensure that both instructors and pre-service teachers become an integral part of digital society, the findings recommend for practical action plans for every college. These plans have implications that, the TCs should create their raising standards and awareness by utilising the few available resources to ensure that there is a proper link between the policy guidelines and practices. Among others, the plan should ensure that there are indoor training policies for strengthening an individual's professional development. Similarly, the findings also imply that, for smooth integration and use of ICT in education as a pedagogical tool, there should be harmonisation of different policies such as education policy, energy policy, and private partnership service providers' policy. Therefore, practical application of ICT in teaching and learning will be harnessed when there are inclusive and collaborative efforts between the TCs and service providers. TCs ought to be innovative on suitable skills based on their contexts but not depending only on the handed down national ICT policy which is bureaucratically implemented.

6.3.4 Limitations

The study was conducted in Morogoro Teachers College (MOTCO) and Dakawa Teachers College (DATCO) in Morogoro Region, focusing on instructors experiences on the use of information communication technology in facilitating student-teachers learning. The findings of this study were limited to descriptive survey design that it was confined to MOTCO and DATCO. Thus, the generalization possibility is low and that the findings may not reflect the characteristics of the entire Teachers colleges (TCs) on

the use of ICT in Tanzania. To solve such drawback further study can be conducted to capture many TCs with larger sample size as well as wider geographical coverage in order to increase the reliability and ability to generalize the research findings.

However, the completion of the current study encountered some limitation during data collection: First, some of the respondents provided irrelevant information based on the real experience of ICT use in their colleges. To ensure relevance data is found, the researcher used more than one method (triangulation) to collect data in the same phenomenon. Secondly, the researcher encountered time and financial constraints from the data collection process to the compilation of the research. To solve such encountered the researcher scheduled more than one activity to be conducted in one visit.

6.3.4 Area for further studies

Because this study was delimited to only two TCs in Tanzania among thirty-four (34) TCs focusing on the instructor's experience on the use of ICT in facilitating student-teachers learning. In the same way, the study aimed to gain insights from a theoretical perspective, a similar study can be conducted to assess the practical classroom applications of ICT in TCs. Moreover, it is recommended that a similar study be conducted on developing and designing materials based on the specific subject contents.

6.4 Chapter conclusion

This chapter presented a summary of the study, conclusions and policy implications bearing the discussions in the preceded chapter. The summary and conclusion are made focusing on the deployment of ICT in teaching and learning activates in Tanzanian TCs. The chapter also outlines the policy implications of the study to educational stakeholders and necessary recommendations for further research.

REFERENCES

Adam, J., & Kamuzora, F. (2008). *Research methods for business and social studies*. Mzumbe: Mzumbe Book Project.

Agbo, I. S. (2015). Factors influencing the use of information and communication technology (ICT) in teaching and learning computer studies in Ohaukwu local government area of Ebonyi state-Nigeria. *Journal of Education and Practice*, *6*(7), 71-86.

Agyei, D. D. (2020). Integrating ICT into schools in sub-Saharan Africa: From teachers' capacity building to classroom implementation. *Education and Information Technologies*, *25*(5), 1-20.

Agyei, D. D., & Voogt, J. (2012). Developing technological pedagogical content knowledge in pre-service mathematics teachers through collaborative design. *Australasian Journal of Educational Technology*, *28*(4), 547-564.

Akdur, T. E. (2017). *Turkey: Country report on ICT in education*. Brussels: European schoolnet (EUN).

Akir, Z. I. (2006). Impact of information and communication technology on teaching and training: A qualitative systematic review. Unpublished doctoral dissertation, Ohio University.

Alazzam, A. O., Bakar, A. R., Hamzah, R., & Asimiran, S. (2012). Effects of demographic characteristics, educational background, and supporting factors on ICT readiness of technical and vocational teachers in Malaysia. *International Education Studies*, *5*(6), 229-243.

Alharbi, E. (2014). A Study on the use of ICT in teaching in secondary schools in Kuwait. Unpublished doctoral dissertation, Cardiff metropolitan University.

Alkash, K. A. M., & Al-Dersi, Z. E. M. (2017). Advantages of using power point presentation in EFL classroom & the status of its use in Sebha University. *International Journal of English Language & Translation Studies, 1*(1), 3-16.

Almasi, M., Machumu, H., & Zhu, C. (2017). Internet use among secondary schools students and its effects on their learning. In *Proceedings of INTED2017 Conference 6th-8th March*. 2379-2390.

Almerich, G., Orellana, N., Suárez-Rodríguez, J., & Díaz-García, I. (2016). Teachers' information and communication technology competences: A structural approach. *Computers & Education*, *100*(3), 110-125.

Aparicio, M., Bacao, F., & Oliveira, T. (2016). An e-learning theoretical framework. *An E-Learning Theoretical Framework, 19*(1), 292-307.

Atabek, O. (2020). Experienced educators' suggestions for solutions to the challenges to technology integration. *Education and Information Technologies*, *25*(5), 1-17.

Barakabitze, A. A., William-Andey Lazaro, A., Ainea, N., Mkwizu, M. H., Maziku, H., Matofali, A. X., & Sanga, C. (2019). Transforming African education systems in science, technology, engineering, and mathematics (STEM) using ICTs: Challenges and opportunities. *Education Research International*, *20(9)*, 1-29.

Bernacki, M. L., Greene, J. A., & Crompton, H. (2020). Mobile technology, learning, and achievement: Advances in understanding and measuring the role of mobile technology in education. *Contemporary Educational Psychology*, *60*(3), 101-117.

Birgin, O., Uzun, K., & Akar, S. G. M. (2020). Investigation of Turkish mathematics teachers' proficiency perceptions in using information and communication technologies in teaching. *Education and Information Technologies*, *25*(1), 487-507.

Bryman, A. (2016). *Social research methods*. London: Oxford university press.

Bwire, A. M., Nyagisere, M. S., Masingila, J. O., & Ayot, H. O. (2015). *Proceedings of the 4th International conference on education*. Nairobi: Kenyatta University.

Christensen, L. B., Johnson, R. B., & Turner, L. A. (2014). *Research methods, design, and analysis* (12th ed). Boston, MA: Pearson.

Cozby, P. (2007). *Methods in behavioural research*. New York: McGraw.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. New York: Sage publications.

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. New York: Sage publications.

Cubukcuoglu, B. (2013). A study of teachers' use of ICT in a secondary school in north Cyprus. Unpublished doctoral dissertation, University of Sheffield.

Cummings, S., Bridgman, T., & Brown, K. G. (2016). Unfreezing change as three steps: Rethinking Kurt Lewin's legacy for change management. *Human Relations, 69*(1), 33-60.

Dalal, M., Archambault, L., & Shelton, C. (2017). Professional development for international teachers: Examining TPACK and technology integration decision making. *Journal of Research on Technology in Education, 49*(4), 117-133.

Darma, S. A., & Aliyu, F. (2018). The role of social media in empowering the involvement of women in information technology: A case study of al-qalam and umaru musa Yar'adua Universities. *American International Journal of Social Science Research, 2*(1), 7-27.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–339.

Dawson, C. (2007). *A practical guide to research methods*. Tennessee: Spring hill House.

De Marez, L., Evens, T., & Stragier, J. (2011). Diffusion theory vs today's ICT environment. *Observatorio (OBS), 5*(3), 175-202.

Dooley, C. M., Lewis Ellison, T., Welch, M. M., Allen, M., & Bauer, D. (2016). Digital participatory pedagogy: Digital participation as a method for technology integration in curriculum. *Journal of Digital Learning in Teacher Education, 32*(2), 52-62.

Drabowicz, T. (2014). Gender and digital usage inequality among adolescents: A comparative study of 39 countries. *Computers & Education, 74*(4), 98-111.

Farmery, R. (2014). The integration and use of ICT across the secondary school. Unpublished doctoral dissertation, Cardiff University.

Fomsi, D. E. F., & Orduah, S. E. (2017). Teachers' access to and use of information and communication technology (ICT) in model primary schools in rivers state, Nigeria. *Journal of Resourcefulness and Distinction, 14*(1), 88-94.

Fomunyam, G. (2019). The role of information and communication technology in tertiary education in Africa. *International Journal of Civil Engineering and Technology, 10*(12), 60-69.

Forkosh-Baruch, A. (2018). Preparing pre-service teachers to transform education with information and communication technologies. *Second Handbook of Information Technology in Primary and Secondary Education*, *25*(4), 1-18.

Gerick, J., Eickelmann, B., & Bos, W. (2017). School-level predictors for the use of ICT in schools and students' CIL in international comparison. *Large-scale Assessments in Education, 5*(1), 1-13.

Ghasia, M., De Smet, E., Machumu, H., & Musabila, A. (2018). Towards mobile learning deployment in higher learning institutions: A report on the qualitative inquiries conducted in four Universities in Tanzania. *Afrika Focus, 31*(1), 115-132.

Gudmundsdottir, G. B., & Vasbø, K. B. (2017). *Toward improved professional digital competence: The use of blended learning in teacher education in Norway*. Waynesville, NC USA: Association for the advancement of computing in education (AACE) publications.

Guillén-Gámez, F. D., Martínez, S. J. R., & Camacho, X. G. O. (2020). Diagnosis of the attitudes towards ICT of education students according to gender and educational modality. *Apertura*, *12*(1), 307-315.

Han, I., Shin, W. S., & Ko, Y. (2017). The effect of student teaching experience and teacher beliefs on pre-service teachers' self-efficacy and intention to use technology in teaching. *Teachers and Teaching*, *23*(7), 829-842.

Hare, H. (2007). *Survey of ICT in education in Tanzania*. Survey of ICT and education in Africa 53 country reports. Washington DC: Englewood cliffs Publication.

Ilomäki, L. (2011). Does gender have a role in ICT among Finnish teachers and students? *Scandinavian Journal of Educational Research*, *55*(3), 325-340.

Innocent, W. A. (2016). Application of e-learning in higher learning institutions: A case of three selected universities in the Morogoro region. Unpublished master dissertation, Mzumbe University.

Isman, A., Willis, J., & Dabaj, F. (2009). A diagnostic study of computer application of structural communication grid. *The Turkish Online Journal of Educational Technology – TOJET, 8*(2), 5-11.

Issa, B. G. (2008). The use of ICT in teaching and learning: A case study of public teachers‟ colleges in Tanzania. Unpublished master thesis, University of Dar es Salaam.

Joel, N. F., & Mungwabi, H. (2016). Factors constraining effective application of ICT's in teachers training colleges in Tanzania. *University of Dar es Salaam Library Journal*, *11*(1), 53-70.

Kafyulilo, A., Fisser, P., & Voogt, J. (2016). Factors affecting teachers' continuation of technology use in teaching. *Education and Information Technologies, 21*(6), 1535-1554.

Kahiigi, E. (2013). Collaborative e-learning approach in higher education in Uganda. Unpublished doctoral thesis, Makerere University.

Karimi, G. A. (2012). Factors affecting the use of information and communication technology in teaching and learning in secondary schools in Kangema-Murang' a county. Unpublished master thesis, Kenyatta University.

Katitia, D. M. O. (2015). Teacher education preparation program for the 21st century. Which way forward for Kenya? *Journal of Education and Practice, 6*(24), 57-63.

Kayisire, D., & Wei, J. (2016). ICT adoption and usage in Africa: Towards an efficiency assessment. *Information Technology for Development, 22*(4), 630-653.

Kennah, M. R. (2016). The use of ICT in the teaching and learning process in secondary schools. Unpublished master dissertation, University of Jyvaskyla.

Kimmo, K. (2017). *Finland: Country report on ICT in education*. Brussels: European Schoolnet (EUN).

Köksal, M. S., & Köseoğlu, P. (2019). Intellectual risk taking when learning about technology: Case of prospective science teachers. *Gazi University Journal of Gazi Educational Faculty (GUJGEF), 39*(1), 37-61.

Komba, W. L., & Nkumbi, E. (2008). Teacher professional development in Tanzania: Perceptions and practices. *Journal of International Co-operation in Education, 11*(3), 67-83.

Kombo. K. D., &Tromp, L. A, (2006). Proposal and thesis writing. Don Bosco printing press, Kenya learning in Oman. *Computers and Education, 53*(3), 575-590.

Koro, C. (2012). Factors influencing teachers use of ICT in education. *Education Inquiry, 3*(1), 93 - 108.

Kothari, C. R. (2007). *Research methodology: Method and techniques*. New Delhi: Sarup and sons publications.

Kumar, A. (2002). *Research methodology in social science*. New Delhi, India: Sarup and sons publications.

Kusaga, M. H. (2019). Teaching poetry differently in Tanzania secondary schools. A language supportive pedagogical approach. Unpublished master dissertation, University of Dodoma.

Lee, H., Longhurst, M., & Campbell, T. (2017). Teacher learning in technology professional development and its impact on student achievement in science. *International Journal of Science Education, 39*(10), 1282-1303.

Lee, J., & Bonk, C. J. (2016). Social network analysis of peer relationships and online interactions in a blended class using blogs. *The Internet and Higher Education, 28*(3), 35-44.

Lee, Y. H., Hsieh, Y. C., & Hsu, C. N. (2011). Adding innovation diffusion theory to the technology acceptance model: Supporting employees' intentions to use e-learning systems. *Journal of Educational Technology & Society*, *14*(4), 124-137.

Liang, Y., & Kee, K. F. (2018). Developing and validating the ABC framework of information diffusion on social media. *New Media & Society, 20*(1), 272-292.

Lukanga, A. L. (2013). Teacher education in Tanzania: The experience of pre-service and in-service teacher preparation for quality education. *Centre for International Education*, *21*(5), 221-322.

Lwoga, E. T. (2011). Making web 2.0 technologies work for higher learning institutions in Africa. In the 7th international conference on ICT for development, education and training, Dar es Salaam, Tanzania.

Machumu, H. J., Zhu, C., & Sesabo, J. K. (2016). Blended learning in the vocational education and training system in Tanzania: Understanding vocational educators' perceptions. *International Journal of Multicultural and Multireligious Understanding, 3*(2), 30-45.

Mafang'ha, M. (2016). Teachers' experience on the use of ICT to facilitate teaching: a case of ilala district secondary schools. Unpublished master dissertation, Open University of Tanzania.

Mahdi, H. S., & Al-Dera, A. S. A. (2013). The impact of teachers' age, gender and experience on the use of information and communication technology in EFL teaching. *English Language Teaching, 6*(6), 57-67.

Mahmood, A., & Bokhari, N. H. (2012). Use of information and communication technology: Gender differences among students at the tertiary level. *Journal of Educational and Instructional Studies, 2*(4), 100-108.

Mereku, D. K., Yidana, I., Hordzi, W., Tete-Mensah, I., Tete-Mensah, W., & Williams, J. B. (2009). *Ghana report*. Winneba, Ghana: ERNWACA University of education.

Minja, E. S. (2015). Contribution of information and communication technology (ICT) on service delivery in secondary schools in Tanzania: A case of Karatu district council. Unpublished master dissertation, Mzumbe University.

Mkilindi, S. Z. (2016). Training on behaviour management for promoting effective teaching-learning: A case of Dakawa and Morogoro teacher colleges in Tanzania. Unpublished master dissertation, Mzumbe University.

Mtebe, J. S. (2020). Applying UNESCO ICT competency framework to evaluate teachers' ICT competence levels in Tanzania. *In Handbook of Research on Innovative Pedagogies and Best Practices in Teacher Education, 28*(5), 350-366.

Ndibalema, P. (2014). Teachers' attitudes towards the use of information communication technology (ICT) as a pedagogical tool in secondary schools in Tanzania: The case of Kondoa district. *International Journal of Education and Research, 2*(2), 1-16.

Ndonje, T. (2013). Factors for e-learning adoption in Tanzania. Unpublished master dissertation, Mzumbe University.

Noyi, S. (2013). Applicability of information and communication technologies in enriching curriculum implementation in selected teachers colleges in Tanzania. Unpublished master dissertation, Mzumbe University.

Odit-Dookhan, K. (2018). Attitude towards e-learning: The case of Mauritian students in public TEIS. *People: International Journal of Social Sciences, 4*(3), 628-643.

Ojina, O. W. (2017). Perceived influence of information and communication technology adoption on teacher performance in public secondary schools in Emuhaya sub-county, Vihiga county. Unpublished doctoral dissertation, University of Nairobi.

Ojo, F. F., & Adediran, E. M. (2019). Information and communication technology: A synergy for gender differences among students at tertiary institution. *South Eastern Journal of Research and Sustainable Development (SEJRSD), 2*(1), 251-268.

Opie, C., & Brown, D. (2019). *Getting started in your educational research: Design, data production and analysis*. New York: SAGE Publications Limited.

Piper, B., Jepkemei, E., Kwayumba, D., & Kibukho, K. (2015). Kenya's ICT policy in practice: The effectiveness of tablets and e-readers in improving student outcomes. *In FIRE: Forum for International Research in Education, 2*(1), 1-9.

Pollacia, L., & McCallister, T. (2019). Using Web 2.0 technologies to meet quality matters (QM) requirements. *Journal of Information Systems Education, 20*(2), 1-5.

Prestride, S. (2012). The beliefs behind the teacher that influences their ICT practices, Griffith University Brisbane Australia. *Journal of Computer Education, 58*(2), 449-458.

Raudeliuniene, J. (2018). Basic research methods: Modernizing the academic teaching and research environment. *Methodologies and Cases in Business Research, 7*(3), 47-59.

Republic of Ghana. (2015). *ICT in education policy*. Accra: Ministry of education.

Republic Of Rwanda. (2017). UNESCO-Korean republic funds-in-trust (KFIT) project: ICT transforming education in Africa mapping of ICT for teacher training activities in Rwanda April. *Education Research International, 1*2(4), 14-38.

Republic of Rwanda. (2020). *Rwanda Vision 2020*. Kigali: Ministry of finance and economic planning.

Rhema, A., & Miliszewska, I. (2014). Analysis of student attitudes towards e-learning: The case of engineering students in Libya. *Issues in Informing Science and Information Technology, 11*(1), 169-190.

Rizvi, S. N. A., & Bhardwaj, G. (2019). Role (utility) of research design. *Journal of the Gujarat Research Society, 21*(5), 24-34.

Rogers, E. M. (1995). *Diffusion of innovations* (4th ed). New York: Free press.

Sahito, Z., & Vaisanen, P. (2017). Effect of ICT skills on the job satisfaction of teacher educators: Evidence from the Universities of the Sindh province of Pakistan. *International Journal of Higher Education, 6*(4), 122-136.

Sanda, H. U., & Kurfi, M. H. (2013). Gender and information communication technologies (ICTS) in Nigeria: Challenges and prospects. *Global Journal of Human Social Sciences, Sociology and Culture, 13*(6), 33.

Teo, T. (2008). Pre-service teachers' attitudes towards computer use: A Singapore survey. *Australasian Journal of Educational Technology, 24*(4), 413 - 424.

Tilya, F. (2007). ICT in education in Tanzania: Lessons and experiences from IICD-supported projects. *International Institute for Communication Development, The Hague, 2*(1), 1-8.

Tosuntaş, Ş. B., Çubukçu, Z., & İnci, T. (2019). A holistic view to barriers to technology integration in education. *Turkish Online Journal of Qualitative Inquiry, 10*(4), 439-461.

Trochim, W. M. (2006). *The research methods knowledge base*. (2nded). Cincinnati: Atomic dog publishing.

Trucano, M., Hawkins, R., & Iglesias, C. J. (2012). Ten trends in technology use in education in developing countries that you may not have heard about. *EduTech: A World Bank Blog on ICT Use in Education, 23*(4), 584-621.

Tseng, J. J., Cheng, Y. S., & Yeh, H. N. (2019). How pre-service English teachers enact TPACK in the context of web-conferencing teaching: A design thinking approach. *Computers & Education, 128*(5), 171-182.

Twagilimana, I., & Mannikko-Barbutiu, S. (2018). ICT in education policy in Rwanda: Current situation, challenges and prospects. *Research, Innovation and Development for Africa, 4*(2), 360-371.

Ugwu, M. S. (2017). Information and communication technology competencies of teachers for the implementation of government curriculum in Obollo-Afor education zone of Enugu state. *Online Submission, 3*(4), 231-238.

UNESCO. (2017). UNESCO-Korean republic funds-in-trust (KFIT) project: *ICT transforming education in Africa mapping of ICT for teacher training activities in Rwanda*. Retrieved October 25, 2019 from world wide web: http://unesdoc.unesco.org/images/ 0026/002614/261449E.pdf.

United Nations. (UN). (2014). *Report on measuring ICT and gender: An assessment*. New York: United Nations Publications.

United Republic of Tanzania. (2003). *National ICT policy*. Dar es Salaam: Ministry of work, transport and communication.

United Republic of Tanzania. (2007). *ICT policy for basic education*. Dar es Salaam: Ministry of education and vocational training.

United Republic of Tanzania. (2007). *Walimu kuboresha ualimu kwa tehama* (WAKUTE). Dar es Salaam: MoEVT.

Van Dijk, J. A. (2017). Digital divide: Impact of access. *The International Encyclopedia of Media Effects, 7*(2), 1-11.

Voogt, J., Knezek, G., Christensen, R., & Lai, K. W. (2018). *Information and communication technology and education: Meaningful change through teacher agency*. Geneva: Springer International Publishing.

Zaim, M., & Mudra, H. (2018). Blended English language learning as a course in an Indonesian context: An exploration toward EFL learners' perceptions. *Journal of Foreign Language Education and Technology, 3*(2), 28-51.

Zain, F. M., Hanafi, E., Don, Y., Yaakob, M. F., & Sailin, S. N. (2019). Investigating student's acceptance of an EDMONDO content management system. *International Journal of Instruction, 12*(4), 1-16.

APPENDICES

Appendix 1: Observation checklist

1. Internet connectivity

- Service provider
- Bandwidth
- Reliability
- Wi-Fi

2. Electricity Supply

- Main power source
- Capacity or reliability
- Alternative power source

3. Computer /Network equipment used (sever desktop, laptop printers, projectors etc)

Item	**Brand and Model**	**Number of item**	**Condition**

Condition G = Good, P= Poor X= not in used

4. ICT infrastructures

5. Gender difference among the instructors on ICT use in facilitating student – teachers learning.

6. Trend of borrowing of ICT facilities

Appendix 2: Survey Questionnaires for Instructors

Research Questionnaires on the " INSTRUCTORS' EXPERIENCES ON THE USE OF INFORMATION COMMUNICATION TECHNOLOGY IN FACILITATING STUDENT-TEACHERS LEARNING: A CASE OF TEACHERS' COLLEGES IN MOROGORO, TANZANIA

Dear Participant: Instructor

My name is John Josephaty, a master degree student at Mzumbe University. I am currently conducting a research titled ''Instructors' Experiences on the Use of Information Communication Technology in facilitating Student-Teachers Learning. The study is under the supervision of Dr. Haruni Machumu. You are requested to spare your valuable time to fill this questionnaire so that I can get useful information to accomplish the study being carried. Please feel free to fill this questionnaire and I assure you and your office that the information provided will be kept confidential and will be used for academic purposes and not otherwise

Thank you for your participation and interest in this research.

PART ONE- QUESTIONS RELATED TO DEMOGRAPHICAL DATA:

For each statement, please choose beside the item that best fits your answer.

Please answer the following questions:

PART A: PERSONAL IDENTIFICATION

1. Gender:

a) Male

b) Female ( )

2. Age:-

a) 15-25

b) 26-35 ( )

c) 36-45

d) 46 and above

3. Level of education

a) Degree Holder

b) Master Degree

c) PhD Holder ( )

d) Professor

4. Teaching experience

a) 0-10 years

b) 11-20 ( )

c) 21-30

d) 31 and above

PART B.

5. Please circle your responses on a scale of 1- 5

Instructors' ICT use in TCs

Please circle your responses on a scale of 1- 5

s/n	Instructors' ICT teaching skills	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
1	I create teaching aid like visual graphics, charts, and drawings	5	4	3	2	1
2	I apply power point presentation	5	4	3	2	1
3	I use a computer to prepare teaching professional documents (schemes of work, lesson plans, lesson notes)	5	4	3	2	1
4	I use a scanner or digital camera to import graphics, photos and text for presentation internet connectivity	5	4	3	2	1
5	I use the internet to search for educational resources that support teaching and learning in my subject	5	4	3	2	1
6	I use web conferencing/video chat to communicate/collaborate with my students	5	4	3	2	1
7	I provide students marks/results through the email/text message on their phone	5	4	3	2	1
8	I use the word processor (writer), database (base), and spread sheets	5	4	3	2	1

PART C:

For each statement, please put (√) beside the item that best fits your answer.

Please answer the following questions:

6. Is there any difference between Male and Female instructors on ICT use in facilitating learning activities?

Yes ( ) No ( )

PART D: Instructors' experience on the use of ICT

7. Please circle your responses on a scale of 1- 5

S/N	Instructors Experience on the use of ICT	Strongly Agree	Agree	Not sure	Disagree	Strongly disagree
1	Do you have your own personal Computer?	5	4	3	2	1
2	I feel confident using the computer	5	4	3	2	1
3	I enjoy using ICT in teaching	5	4	3	2	1
4	I do provide assignment to my students through ICT	5	4	3	2	1
5	I use the internet to search for educational resources that support teaching and learning in my subject	5	4	3	2	1
6	I have access to a networked computer at my office	5	4	3	2	1
7	I use web conferencing/Video chat to communicate/collaborate with my students	5	4	3	2	1
8	I provide students grades/marks through their email /text message on their phone	5	4	3	2	1
9	Have you ever taken a training Course in ICT?	5	4	3	2	1
10	Do you usually read about ICT?	5	4	3	2	1

16. Have your ever-attended seminars, training, or workshops based on ICT use in facilitating students- teachers learning?

Yes ( ) No ( )

If selecting Yes, mention them

(1) ……

(2) ……

(3)…….

Interview guide for instructors

1. In your opinion, is there any difference between Male and Female instructors on ICT use when facilitating learning activities?

   Based on accessibility of digital tools, possession of ICT gadgets, attitude in ICT use and ICT competence

'' Thank you for your cooperation''

Appendix 3: Interview Guide for student-teachers

Research Questionnaires on the " INSTRUCTORS' EXPERIENCES ON THE USE OF INFORMATION COMMUNICATION TECHNOLOGY IN FACILITATING STUDENT-TEACHERS LEARNING: A CASE OF TEACHERS' COLLEGES IN MOROGORO, TANZANIA.

Dear, participants: Student- Teacher

My name is John Josephaty, a master degree student at Mzumbe University. I am currently conducting a research titled " instructors' experiences on the use of information communication technology in facilitating student-teachers learning: a case of teachers' colleges in Morogoro, Tanzania. The study is under the supervision of Dr. Haruni Machumu. Therefore, I request you to spare your valuable time to attend the interview so that I can get useful information to accomplish the study being carried. Please feel free to give correct answers and I assure you that the information provided will be kept confidential and will be used for academic purposes and not otherwise

Thank you for your participation and interest in this research.

Your participation in this study will be greatly appreciated.

PART A-DEMOGRAPHICAL INFORMATION:

College ---------- Sex ---------- Age----------Year of study ----------

PART B: Interview Guiding Questions

2. Is the ICT taught as a course in your college?
3. What are the common ICT teaching methods used by your instructors in teaching their specific course?
4. In your college, are you allowed to possess ICT devices particularly mobile phones and personal computers?
5. In your opinion, is there any difference between Male and Female instructors on ICT use when facilitating teaching activities?

Based on accessibility of digital tools, possession of ICT gadgets, attitude in ICT use and ICT competence

6. In your opinion can you outline challenges do face as a student-teacher when using ICT in facilitating learning activities.

“Thank you for your cooperation”

Appendix 4: Interview for ICT department/technician in TCs

Research Questionnaires on the " INSTRUCTORS' EXPERIENCES ON THE USE OF INFORMATION COMMUNICATION TECHNOLOGY IN FACILITATING STUDENT-TEACHERS LEARNING: A CASE OF TEACHERS' COLLEGES IN MOROGORO, TANZANIA.

Dear Participant: ICT department/technician in TCs

My name is John Josephaty, a master degree student at Mzumbe University. I am currently conducting a research titled ''Instructors' Experiences on the Use of Information Communication Technology in facilitating Student-Teachers Learning. The study is under the supervision of Dr. Haruni Machumu. You are requested to spare your valuable time to attend the interview so that I can get useful information to accomplish the study being carried. Please feel free to fill this questionnaire and I assure you and your office that the information provided will be kept confidential and will be used for academic purposes and not otherwise

Thank you for your participation and interest in this research.

PART A-DEMOGRAPHICAL INFORMATION:

Sex ---------- Age----------Education Level---------- Working experience-------

PART B: Guiding Questions

1. What are ICT services that Instructors and student- teachers can access in your college?

a) .....

b) .....

c) .....

2. In your opinion, is there any difference between Male and Female instructors on ICT use when facilitating learning activities?

Based on accessibility of digital tools, possession of ICT gadgets, attitude in ICT use and ICT competence

3. What kind of training opportunities are provided to instructors to acquire more skill in the use of ICT in facilitating student-teachers learning?

a) .....

b) .....

4. What do you think are the major challenges towards the effective use of ICT among the female instructors in your college in enhancing student-teacher learning?

a) .....

b) .....

c) .....

5. Which strategies do you employ to improve the use of ICT in your college?

a) .....

b) .....

c) .....

"Thank you for participation"

Appendix 5: Interview questions with Principal and Academic Dean in TCs

Research Questionnaires on the " INSTRUCTORS' EXPERIENCES ON THE USE OF INFORMATION COMMUNICATION TECHNOLOGY IN FACILITATING STUDENT-TEACHERS LEARNING: A CASE OF TEACHERS' COLLEGES IN MOROGORO, TANZANIA.

Dear Participant: Principal and Academic Dean in TCs

My name is John Josephaty, a master degree student at Mzumbe University. I am currently conducting a research titled ''Instructors' Experiences on the Use of Information Communication Technology in facilitating Student-Teachers Learning. The study is under the supervision of Dr. Haruni Machumu. You are requested to spare your valuable time to attend this interview so that I can get useful information to accomplish the study being carried. Please feel free to provide relevant information and I assure you and your office that the information provided will be kept confidential and will be used for academic purposes and not otherwise

Thank you for your participation and interest in this research.

A. Biographic data

1. Sex: male [ ], female [ ]
2. Age_____
3. Number of years in the post_____
4. Academic qualification_____

B. Interview questions

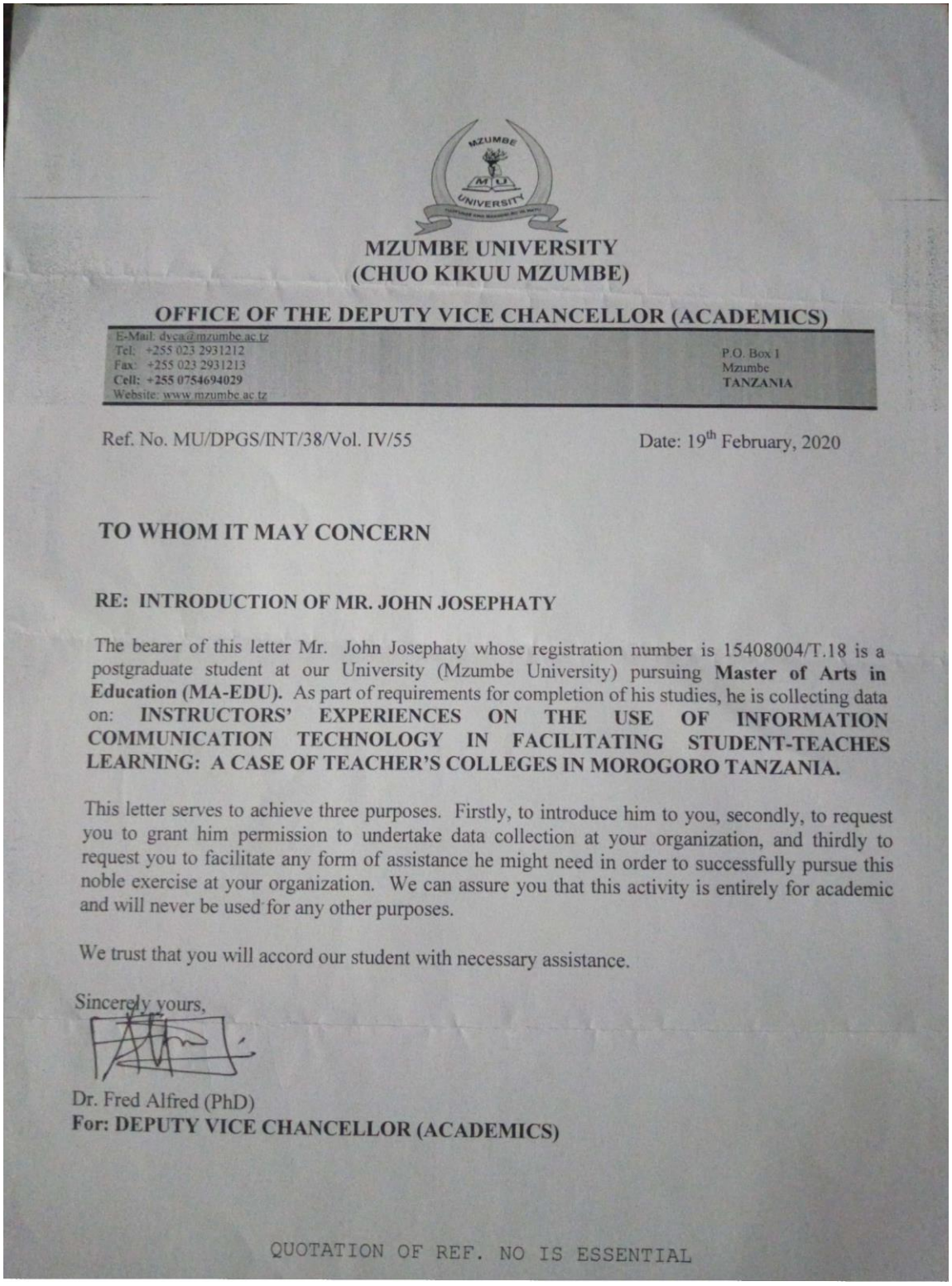
1. How the uses of ICT in TCs facilitate the teaching and learning process?
2. How do you empower and encourage instructors to use ICT in their daily teaching and learning activities based on their gender?
3. In your opinion, is there any difference between Male and Female instructors on ICT use when facilitating learning activities?

Based on accessibility of digital tools, possession of ICT gadgets, attitude in ICT use and ICT competence

4. What kind of training opportunities you do for instructors to acquire more skill in the use of ICT?
5. What do you think are the major challenges towards the effective use of ICT in your college in enriching curriculum implementation?
6. Which strategies do you employ to improve the use of ICT in your College?

“Thank you for your participation”.

Appendix 6: University research clearance letter



MZUMBE UNIVERSITY
(CHUO KIKUU MZUMBE)

OFFICE OF THE DEPUTY VICE CHANCELLOR (ACADEMICS)

E-Mail: dvca@mzumbe.ac.tz
Tel: +255 023 2931212
Fax: +255 023 2931213
Cell: +255 0754694029
Website: www.mzumbe.ac.tz

P.O. Box 1
Mzumbe
TANZANIA

Ref. No. MU/DPGS/INT/38/Vol. IV/55

Date: 19th February, 2020

TO WHOM IT MAY CONCERN

RE: INTRODUCTION OF MR. JOHN JOSEPHATY

The bearer of this letter Mr. John Josephaty whose registration number is 15408004/T.18 is a postgraduate student at our University (Mzumbe University) pursuing **Master of Arts in Education (MA-EDU).** As part of requirements for completion of his studies, he is collecting data on: **INSTRUCTORS' EXPERIENCES ON THE USE OF INFORMATION COMMUNICATION TECHNOLOGY IN FACILITATING STUDENT-TEACHES LEARNING: A CASE OF TEACHER'S COLLEGES IN MOROGORO TANZANIA.**

This letter serves to achieve three purposes. Firstly, to introduce him to you, secondly, to request you to grant him permission to undertake data collection at your organization, and thirdly to request you to facilitate any form of assistance he might need in order to successfully pursue this noble exercise at your organization. We can assure you that this activity is entirely for academic and will never be used for any other purposes.

We trust that you will accord our student with necessary assistance.

Sincerely yours,

Dr. Fred Alfred (PhD)
For: DEPUTY VICE CHANCELLOR (ACADEMICS)

QUOTATION OF REF. NO IS ESSENTIAL

Appendix 7: Research permit letter

THE UNITED REPUBLIC OF TANZANIA

PRESINDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

Telegraphic Address: "REGCOM"
Phones: 2934306/2934305
Fax No: 2601308/2604988
Website: www.morogoro.go.tz
Email: ras.morogoro@tamisemi.go.tz
In Reply please quote:

Regional Commissioner's Office,
Boma Road
P. O. Box 650,
67117 MOROGORO

Ref. No: AB. 175/245/01/15

24th February, 2020

District Administrative Secretary,
Morogoro and Kilosa.

Re: RESEARCH PERMIT

Please refer to the above mentioned subject.

I am introducing to you **Mr. John Josephaty** a student from Mzumbe University pursuing Master of Arts in Education (MA-EDU), with registration number 15408004/T.18, who at the moment is required to conduct a research.

The title of the research is **"Instructors' Experience on the Use of Information Communication Technology in Facilitating Student-Teaches Learning: A case of Teacher's colleges in Morogoro, Tanzania"**

The permit is granted **from 24th February 2020 to March 2020.** The study will cover **Morogoro Municipal and Kilosa District Council.**

Please provide necessary assistance to enable the accomplishment of the research.

Thank you for your cooperation.

Emmanuel P. Mazengo
For; **Regional Administrative Secretary**

Copy: Deputy **Vice** chancellor
Mzumbe University,
P.O. Box 1,
Morogoro

" **Mr. John Josephaty** **- Researcher**

Appendix 8: Research permit letter

THE UNITED REPUBLIC OF TANZANIA
PRESIDENT OFFICE
REGIONAL ADMINISRATION AND LOCAL GOVERNMENT

Telegraphic address: "ADMIN"
Telephone No : 2614096
Fax No.: 2613848

District Commissioner Office,
P .O. Box. 681,
MOROGORO.

In reply please quote:

Ref: No. AB.210/249/01/66

DATE: 27th February, 2020

The Principal,
Morogoro Teachers College,
P. O. Box 691
MOROGORO.

RE: RESEARCH PERMIT

Please refer to the above mentioned subject.

I am introducing to you **Mr. John Josephaty,** a student from Mzumbe University, pursuing Master of Arts in Education (MA-EDU), with Registration number 15408004/T.18, who at the moment is required to conduct a research. The title of the research is "**Instructors' Experience on the use of Information Communication Technology in Facilitating Student-Teachers learning: A case of Tearcher's Colleges in Morogoro, Tanzania.**"

The permit is valid from **24th February, 2020 to March, 2020**. Please provide necessary assistance to enable the accomplishment of the research.

Thank you for your cooperation.

Hilary B. Sagara
For: DISTRICT ADMINISTRATIVE SECRETARY
MOROGORO

DISTRICT ADMINISTRATIVE SECRETARY MOROGORO

Copy: Vice Chancelor
Mzumbe University
P. O. Box 1
MOROGORO

Mr. John Josephaty
RESEARCHER - After completing the research work, you have to return your research report to the District Commissioner's Office.

Appendix 9: Research permit letter

THE UNITED REPUBLIC OF TANZANIA
PRESIDENT'S OFFICE
REGINAL ADMINISTRATION AND LOCAL GOVERNMENT

Tel. No. 2623005
Fax No: 2623646

District Commissioner's Officer,
P.O. Box. 8,
KILOSA.

Ref. No. AB. 365/455/01B

27TH February, 2020

The Principal,
Dakawa Teachers College,
P.O. Box 94,
Kilosa - Morogoro.

RE. RESEARCH PERMIT

Please refer to the above mentioned subject.

I am introducing to you **Mr John Josephaty** a student of Mzumbe University, who is at the moment require to conduct a research.

The title of the research is "**Instructors' Experience on the Use of Information Communication Technology in Facilitating Student – Teaches Learning: A case of Teacher's Colleges in Morogoro Tanzania.**"

The permit is valid from **24th February, 2020** to **March 2020,** and the research will cover Kilosa District.

Please provide necessary assistance to enable accomplishment of the research

Thank you for your cooperation.

Yohana M. Kasitila
District Administrative Secretary
KILOSA

KATIBU TAWALA WILAYA
KILOSA

Copy: - Vice Chancellor,
Mzumbe University,
P.O. Box 1,
Morogoro.

- **Mr. John Josephaty - Reseacher**