APPLICABILITY OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN ENRICHING CURRICULUM IMPLEMENTATION IN SELECTED TEACHERS COLLEGES IN TANZANIA

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APPLICABILITY OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN ENRICHING CURRICULUM IMPLEMENTATION IN SELECTED TEACHERS COLLEGES IN TANZANIA

By

Said Noyi

A Dissertation Submitted in Partial Fulfillment of the Requirements for Award of the Degree of Master of Science in Development Policy (MSc-DP) of Mzumbe University

2013

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CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled **"Applicability of Information and Communication Technologies in Enriching Curriculum Implementation in Teachers Colleges in Tanzania"** in partial fulfillment of the requirements for award of the degree of Master of Science in Development Policy of Mzumbe University**.**

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DECLARATION AND COPYRIGHT

I, Said Noyi, 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_____

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DEDICATION

This work is dedicated to the lovely family of **Mr. Noyi Selemani Fundi** that contributed to my well-being expressed through love, respect, moral and financial support which enabled me to accomplish this level of education. I appreciate you all, may almighty God bless you.

.

LIST OF ABBREVIATIONS

AISA	African Information System Association
CAE	Computer-Aided Education
CAI	Computer Aided Instruction
CLT	Constructivist Learning Theory
CTL	Conversational Theory of Learning
ECA	Economic Commission for Africa
ESDP	Education Sector Development Programme
GLOBE	Global Learning and Observations to Benefit the Environment
ICDL	International Computer Driving License
ICT	Information and Communication Technology
IDRC	International Development Research Centre
ILT	Independent Learning Theory
IT	Information Technology
ITU	International Telecommunication Union
MoEST	Ministry of Education, Science and Technology
MoEVT	Ministry of Education and Vocational Training
NGL	National Grid for Learning
NICI	National Information and Communication Infrastructure
NITDA	National Information Technology Development Agency
SIDA	Swedish International Development Cooperation Agency
TCs	Teachers Colleges
UK	United Kingdom
UN	United Nation
URT	United Republic of Tanzania
USA	United State of America

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ABSTRACT

This study investigated the applicability of Information and Communication Technologies in enriching curriculum implementation in teachers colleges in Mara Regions in Tanzania. The study specifically examined the extent to which the ICT is applied by tutors in teaching and learning process in TCs, identifies the challenges facing tutors when applying ICT in the teaching and learning process in TCs and establishes the strategies for effective use of ICT by tutors in the teaching and learning process in TCs.

A total of 46 participants from one diploma teachers colleges and grade A teachers college were used. The sample category involved 2 principals, 2 heads of ICT departments, 2 academic deans obtained through purposive sampling and 40 tutors obtained through simple random sampling. The study employed exploratory research designs, while the research approach involved qualitative and quantitative research techniques. The data were gathered through closed ended questionnaires, semi structured interviews, observation and documentary review. Data were analysed through quantitatively and qualitatively. Quantitatively data analysed by using SPSS version sixteen descriptive statistics such as mean and standard deviation was used to present data. Qualitatively data was analysed by using thematic and content methods and presented by statements.

The findings show that the tutors ICT applications commonly applied while the rest not because of lack of ICT knowledge or skills and infrastructure support. Major problems faced were personal or college based such as insufficiency in ICT knowledge and skills, lack technical support and inadequacy of ICT facilities. Strategies to be applied should be personal based, college based and ministry based. Study recommendations were based to teachers colleges includes principals of the college, academic deans, heads of ICT departments and tutors and Ministry of Education and Vocational Training include teachers departments and ICT units. Additional, there is a need to review education and training Policy (ETP) of 1995 in order to accommodate changes in time that are occurring everywhere in the world.

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CHAPTER ONE
INTRODUCTION AND OVERVIEW OF THE STUDY

1.0 Introduction

This study was about applicability of Information and Communication Technology (ICT) in enriching curriculum implementation in selected Teachers Colleges (TCs) in Tanzania. In this chapter, background to the problem, statement of the problem, research objectives, research questions, significance of the study, scope and delimitation of the study and justification of the study were presented.

1.1 Background to the Problem

Information and Communication Technology (ICT) has been a principal driver of education development worldwide (Anderson, 2002). In many countries, the need for ICT in education development and particularly in curriculum implementation is used to justify the social and economic investments in a certain country (UNESCO, 1998).
It is observed that ICT plays a major role in all aspects of curriculum implementations especially in teaching and learning activities within educational institutions in general and particularly in Teachers Colleges (TCs) (Avlos, 1985). On the other hand, ICT has the potential in increasing the efficiency and effectiveness of management and administration of TCs (Ayodo, 2009). Through ICT, database application, spreadsheets and statistical analysis make the work of educational manager easier in TCs. ICT has indeed more impact on administrative services such as admissions, registration, fee payment and purchasing than on the fundamentals of classroom teaching and learning in TCs (Blurton, 1999). In addition to that, Bof (2004) mentioned among other things the application of ICT in TCs as productivity enhancement of teaching and learning activities in which ICT act as a main tool.

On the other hand, the use of ICT in the world has brought the drastic changes that certainly affect the provision of education and curriculum implementation in general and particularly in TCs. It is observed that ICT issues have quickly moved from being special for preparing individuals to become ICT specialists into an issue and an important aspect in teachers' preparation so as to fit in their daily teaching activities

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(Göktaş et al, 2009). It is evident that most countries in world have integrated ICT in their educational system in general and particularly in TCs (UNESCO, 2003).

Various studies verified the role of ICT on tutors' attitudes, perception and performance of students in the world and Tanzania particular. For example a study conducted by Goktas (2009) on ICT uses on teacher educators ICT competencies, usage and perception in Russia found that, ICT motivates students to learn effectively. Moreover, Atkins (2003) assert that the use of ICT in any given education institution assists students to develop deeper understanding of concepts by engaging them in active learning practices. Fitzpatrick (2004) observes that technology in education may promote new learning environment in which enquiry and problem solving increase student achievement.

To integrate the ICT in educational system, different strategies have been deployed in the western countries. Turkey through a Computer-Aided Education (CAE) Project computers were first introduced to Turkish education institutions in general and particularly in TCs which took shape between 1984 and 1986 (Ozar & Askar, 1997). The aims were to spread computer literacy and the use of computers as one tool to compensate for the poor quality and persistent deficiencies of suitable teachers (Yedekcioglu, 1996). Apart from that, to make it effective, the government upgraded the curricula and instructional materials, revising student achievement tests, improving the teacher training system, and increasing the research component in TCs (Schware & Jaramillo, 1998). Moreover, teachers training, operating personnel, improving Computer Aided Instruction (CAI) parallel to technological advancements, and performing tasks related to information processing formed among the main responsibilities of government (Ozar & Askar, 1997).

As to other countries, from Western European countries, in Germany also there have been strong debates about the impact of the computers in TCs. In 1988 the broad concept of ICT started being discussed between ministries of education, and colleges (Ajayi, 2002). After four years of discussion it was agreed that ICT should be introduced in TCs and the importance of the new technologies for the future growth of

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the country was stressed and a computer literacy education for all teachers training was demanded (Ozar & Askar, 1997). In Germany, education in the teaching of ICT is one of the core curriculum options in teachers training. Consequently, the institutions of teacher education concerned are obliged to offer the subject as the compulsory, but it is left to the trainees to decide whether or not to include it in their overall course of education in TCs (Fishers, 1999).

Despite the number of challenges that the African countries are facing, the use of ICT has been introduced in TCs and other education institutions. The symposium organised by the Economic Commission for Africa (ECA), the International Telecommunication Union (ITU), UNESCO, the International Development Research Centre (IDRC), and Bella Net International, urged the Conference of Ministers in Africa to consider the importance for Africa of the global information revolution (Ajayi, 2002; ADF, 1999). Consequently, the African Information System Association (AISA) action plan framework called for the formation of National Information and Communication Infrastructure (NICI) plans and strategies in TCs and others education institutions (UNESCO, 2003).

Following the number of conferences held in Africa, most of the countries introduced ICT in the educational system. In Nigeria through the 2001 Federal Government National Policy for Information Technology (IT), and this was followed up with the establishment of the National Information Technology Development Agency (NITDA), which was charged with the implementation of the policy, introduced ICT in educational system and particularly in Teachers Colleges (Ajayi, 2002). This has impacted on the quality and quantity of teaching and learning process in Teachers Colleges (Hafkin, 2002). In concrete terms, ICT enhanced teaching and learning through its dynamic, interactive, and engaging content; and it can provide real opportunities for individualised instruction in Teachers Colleges (Yusuf and Onasanya, 2004).

In Rwanda, the Rwandan government views ICT as a key tool for transforming the economy, with the education sector playing an important role in developing the

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necessary human resources (Jensen, 2002). Since 2000 there has been a big push to introduce computers into TCs and integrate ICT into the education curriculum through a range of initiatives (Hall, 1998). However, it is realised that the potential of ICT will not be realised by the mere introduction of computers and ICT infrastructure in TCs (Ertemer et al, 2001). Thus Rwandan government implements ICT in TCs and other education institutions through engagement of pre-service and in-service training of teachers that can be reconceptualised as access to the capability of what Jenkins calls participatory culture (Dellit, 2001). It is also argued that without a shift in practices of teaching and learning with ICT in TCs and other education institutions, young people are not likely to learn how to exploit the capabilities offered by access to ICT (UNESCO, 2003).

In Kenya TCs, computers were introduced in the 1970s and the Internet became available in 1993 (UNESCO, 2008). The study by Ford (2007) on technologizing Africa found that computer use in Kenyan TCs is still in its early phases, and concluded that the perceptions and experiences of teachers and administrators in TCs do play an important role in the use of computers in Kenyan TCs. Kenyan government providing pre-service and in-service training programs to enable them to successfully teach using computers in the classrooms has been made pertinent (Momanyi, Norby & Strand, 2006). The government and the Ministry of Education, Science and Technology (MoEST) needed to review both teacher preparation and staff development programs, as well as develop a revised national plan to implement ICT into the curriculum (Wanjiku, 2008).

In Tanzania through Education Sector Development Programme (ESDP), the government has identified ICT as an education and training policy issue and has made the promotion of science and technology as a goal (Tilya, 2007; Nkumbi & Komba, 2006). However, despite the integration of ICT in all educational objectives in Tanzania, for almost a decade, ICT has not fully been a priority in Education Sector Development Program (ESDP) activities (Sakamato et al, 1995). Moreover, Tilya (2007) acknowledges that ICT can play an important role to achieve all ESDP

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objectives in both pre-service and in service training of teachers, not much ICT as a tool for teaching and learning is used.

As like in other sub Saharan countries, the use of ICT to enhance teaching and learning activities in TCs in Tanzania is supported by ICT Policy for Basic Education and the National ICT Policy of 2003 (URT, 2007, 2003). The ICT policy for Basic Education and National ICT Policy of 2003 is not only aimed at accommodating training in ICT but also ICT-enabled teaching and learning in TCs. ICT is taught as a subject in TCs and integrated as a pedagogical tool for teaching and learning in other subject areas (URT, 2007).

The objective of Teachers Colleges (TCs) in Tanzania is to prepare teachers for primary and secondary schools (URT, 1995). Graduates from the TCs are awarded certificates and diplomas in education. According to the education system of Tanzania, TCs are educational institutions that are at the third level of education, that is, tertiary level of education. TCs in Tanzania are classified into Diploma TCs offering diploma in secondary education and Grade A TCs offering Certificate in primary education.

On the other hand, the use of ICT in teaching and learning in Tanzania's (TCs) has been introduced (URT, 2007). A study by Hare (2007) showed that the Ministry of Education with support from the Swedish International Development Cooperation Agency (SIDA) initiated a program for introducing ICT in TCs in 2005. The program aimed at improving the quality of TCs by using ICT to both pre-service and in-service teachers (URT, 2007). Through this collaboration of Ministry of Education and Vocation Training (MoEVT) and the Swedish International Development Agency (SIDA) all 34 public TCs were equipped with thin client solutions and VSAT connectivity, tutors were trained in computer literacy and tutor technicians received training in technical maintenance support and networking essentials.

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1.2 Statement of the Problem

It is evident that the use of ICT in TCs helps both in making teaching and learning process to be effective. It has been established that ICT has the capacity to empower tutors and learners beyond traditional teaching and learning because ICT provides flexible teaching and learning (Khirwadkar, 2007). The strength of ICT in teaching and learning in education institution can be seen in its qualities such as interactivity, intelligent guidance and dynamic feedback, multiplicity of symbols and system interactivity (Dellit, 2001). The use of ICT enables tutors to support student teachers during the learning process where also both student teachers and tutors can have electronic discussions without meeting in face to face. It can also provide a potential means for addressing both access and quality in delivering of information (Evoh, 2009).

Despite the efforts done by the government and other stakeholders in continuing to make effective use of ICT in education like to train tutors in the TCs on the use of ICT in teaching and learning accompanied with provision of ICT facilities, there is still minimal use of ICT in teaching and instruction activities (Hare, 2007). Most TCs are already have ICT facilities and using ICT but mostly the TCs application of ICT is limited to basic applications such as administration, teaching of computer literacy and internet skills (Issa, 2007). In most cases, ICT has been reported not used as a medium of instructions to enhance curriculum delivery (Hare, 2007). Therefore, this study was intended to investigate the ICT applicability in enriching curriculum implementation in TCs in Tanzania.

1.3 Research Objectives

1.3.1 General objective

The general objective of this study was to examine the applicability of the ICT in enriching curriculum implementation in the TCs in Tanzania.

1.3.2 Specific objectives

1. To examine the extent to which the ICT is applied by tutors in teaching and learning process in TCs.

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2. To identify the challenges facing tutors when applying ICT in the teaching and learning process in TCs.
3. To establish the strategies for effective use of ICT by tutors in the TCs.

1.4 Research Questions

1. To what extent do tutors apply ICT in the teaching and learning process in TCs?
2. What challenges were faced by tutors when applying ICT in the teaching and learning process in TCs?
3. What strategies should be adopted to make effective use of ICT in the TCs?

1.5 Scope and Delimitation of the Study

This study was confined to the tertiary level of education, particularly in TCs where it examined the applicability of ICT in enriching curriculum implementations in Tanzania's TCs. At this level of education, the study was focused on two selected government TCs found in Mara Region in Tanzania mainland.

1.6 Significance of the Study

This study had the following significance in the improvement of ICT application in teaching and learning activities in TCs in Tanzania. The results of this study were expected to contribute to a significant change on the applicability of ICT to tutors, college management and student teachers. In addition, the knowledge obtained in this study will help other researchers and practitioners to learn more about and investigate further into the current status of tutors in regard to integration of ICT into the subject they teach at teachers colleges. The study also contributes to body of knowledge to the literature in the related field. The knowledge obtained in this study will help to contribute to the body of knowledge on the field of applicability of ICT in enriching curriculum implementation in TCs in Tanzania.

1.7 Justification of the Study.

This study was related with Tanzanian National ICT Policy published in 2003 that details a set of objectives related to the development and application of ICT in

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education and training. Among these and of direct bearing to TCs are to expand and develop the teaching of ICT at all levels of the national system of formal and informal education and training, use ICT to improve the quality of education and training in all areas including distance learning; as well as to enhance the learning experience itself; develop and deploy a national wide e-education system that supports TCs across the country by interconnecting them with each other and with relevant knowledge centers; and providing curriculum integration while also generating information to better shape policies; strategic plans and tactical decisions for developing education and vocational training in Tanzania.

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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter gives an overview of the relevant literature to the study. That was set to examine the applicability of ICT in enriching curriculum implementation in TCs in Tanzania. The literature review includes themes various borne in sections, namely, theoretical framework, definition of ICT, Applicability of ICT, TCs, and Curriculum implementation. Other areas such as synthesis of the literature, knowledge gap, conceptual framework and empirical studies about the applicability of ICT enriching curriculum implementation in TCs carried out in developed countries, in Africa, as well as in Tanzania have been presented.

2.1 Definitions of the Terms

For the purpose of this study, the following terms were defined as follows.

2.1.1 Information and Communication Technology (ICT)

The term Information and Communication Technology (ICT) refers to forms of technology that are used for communication and to transmit, store, create, share or exchange information (URT, 2007). Moreover, ICT refers to digital technology used for handling information and communication; examples of ICT are computers software, internet and mobile phone (Hafkin, 2002). However, in this study the broad definition of ICT includes technologies such as computers, internet, televisions, photocopiers, servers, radio, whiteboard, telephone, satellite, projectors and audiovisual equipments which were being used in enriching curriculum implementation in TCs.

2.1.2 Applicability of Information and Communication Technology (ICT)

The term applicability of ICT means the process of applying ICT facilities as the main tools in teaching and learning activities (URT, 2007). However, in this study applicability of ICT means the pedagogical application/use of ICT facilities such as computers, internet, television, radio, whiteboard, photocopies and projectors in

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enriching curriculum implementation including the teaching and learning process in TCs in Tanzania.

2.1.3 Teachers' Colleges (TCs)

TCs are educational institutions that are at the third level of education, that is, tertiary level of education; and in Tanzania are classified into Diploma TCs offering Diploma in secondary education and Grade "A" TCs offering Certificate in primary education (URT, 1995). The objective of TCs in Tanzania is to prepare teachers for Primary and Secondary Schools (URT, 1995) where graduates from the TCs are awarded Certificates and Diplomas in education (URT, 1995). In this study TCs are colleges which provide teachers education, whereby in Tanzania student teachers matriculate to teachers colleges after successful completion of O level/A level secondary education.

2.1.4 Curriculum Implementation

Curriculum implementation is the process which takes place as the learner acquires the planned or intended experiences, knowledge, skills, ideas and attitudes that are aimed at enabling the same learner to function effectively in a society (Tanner and Tanner, 1995). Apart from that, Urevbu (1985) argues that curriculum implementation is the manner in which the teacher selects and mixes the various aspects of knowledge contained in a curriculum document or syllabus. Implementation takes place when the teacher-constructed syllabus, the teacher's personality, the teaching materials and the teaching environment interact with the learner. In addition, Gatawa (1990) defined curriculum implementation as the process of putting into practice the officially prescribed courses of study, syllabuses and subjects. However, in this study curriculum implementation refers to how the planned or officially designed course of study is translated by the tutors into syllabuses, schemes of work and lessons to be delivered to students. The process involves helping the learner to acquire knowledge or experience during the teaching and learning activities in class room.

2.2 Theories related to Applicability of ICT

A theory is defined as "an explanation of particular phenomena in terms of a set of underlying constructs and a set of principles that relate the constructs to each other

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(Gray, 1998). This study was guided by three theoretical frameworks, namely Constructivist Learning Theory (CLT), Conversational Theory of Learning (CTL) and Independent Learning Theory (ILT).

2.2.1 Constructivist Learning Theory (CLT)

Constructivist Learning Theory (CLT) is a synthesis of multiple theories of cognitive constructivism by Piaget of 1971 and social constructivism by Vygotsky of 1978 diffused into one form. It is the assimilation of both behaviorialist and cognitive ideals. The "CLT stance maintains that learning is a process of constructing meaning; it is how people make sense of their experience" (Merriam & Caffarella, 1999 page 201). This is a combination effect of using a person's cognitive abilities and insight to understand their environment. This concept is easily translated into a self-directed learning style, where the individual has the ability to take in all the information and the environment of a problem and learn. Moreover the CLT is grounded in the ideas that learning is constructed by the individual through knowledge discovery or social interaction (Garvin, 1993). Where the CLT exists, there is agreement between the theories that learning is a process of constructing meaning; it is how people make sense of their experience (Merriam & Caffaerall, 1999).

The CLT has been used in different areas of the research to explain how different teaching methods enable learners to construct knowledge. However through CLT knowledge is constructed by the learner by drawing on prior knowledge and personal experience (Weick, 1993). Wheatley (2004) applied this theory on his diametric opposite in the objectivist epistemology according to which knowledge is external to the learner and is imposed upon him or her and then replicated under controlled condition.

A study conducted by Bof (2004) working on the distance learning for teacher training in Spain revealed that students learn more when teachers use ICT in teaching and learning process. This has to a certain degree influenced the ways of teaching ICT as a subject and using ICT facility to facilitate teaching and learning process during the

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curriculum implementation. Indeed, it seems that a combination of learning theories is more appropriate for using ICT in the teaching and learning process.

2.2.1.1 Applicability of Constructivist Learning Theory (CLT)

In this study knowledge on CLT helped to understand how tutors in TCs use ICT in task designer and knowledge facilitator. The tutors in TCs create the learning environment in such a way to enable the acquisition of new knowledge. From a CLT perspective, the primary responsibility of the tutors is to create and maintain a collaborative, problem-solving environment, where student teachers are allowed to construct their own knowledge, and the tutors act as facilitators and guides by using appropriate technology. Scholars have argued that pedagogical roles for tutors in TCs in a technology supported classroom include settings of joint tasks, rotating roles, and promoting student to be self-manager, supporting meta-cognition, fostering multiple perspectives and scaffolding (Daft, 1984). From this perspective of CLT, the use ICT in TCs enable to describe learning as a social interaction that occurs when learners exercise, test, and improve their knowledge through discussion, dialogue, collaboration, and information sharing between tutors and student teachers.

2.2.2 Conversational Learning Theory (CLT)

The profounder of the Conversational theory of Learning (CLT) is Pask in 1971. The main argument of CLT starts with that, at the start the learner comes in the learning process with his or her own preconceptions of the given subject (Pask, 1975). By setting a task, the teacher then engages the learner in further exploration of the subject. Having the teacher's feedback on the task, the learners will then reconsider prior understandings and knowledge and form new conceptions of the subject matter. The final part of the first 'cycle' of this model is the setting of a new task to guide the learner toward the next stage of subject enquiry. This stage is formulated in such a way as to account for the learner's response to the initial task (Pask, 1975).

A study conducted by Ernest (1994) on the role of CLT in teaching and learning in education recommended that teacher and learner must make their conceptions of the topic and task meaningful to one another. They must respectively generate and receive

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feedback on these descriptions. The teacher must adapt his or her tasks in light of the learner's actions to enable knowledge to be constructed in meaningful terms. The learner must receive feedback on his or her carrying out of the task in order for understanding to be achieved. The teacher must reflect on the way in which his or her feedback to the student is linked to the original task. The learner must be able to control the pace of the learning process in order for him or her to consider feedback and reformulate a new response (Ernest, 1994).

2.2.2.1 Applicability of Conversational Theory of Learning (CTL)

In this study, a CTL was intended to help to understand how tutors use educational media as a technological tool and programs to support teaching and learning which must be conceived in such a way as to simulate the tutorial-type exchanges information and ideas between tutors and student teachers by using ICT as a tool for curriculum implementation. Tutors in TCs when designing lessons must integrate ICT in all levels of curriculum implementation. Therefore today when tutor design lesson must refer to the type of tasks they will set to facilitate academic learning and the technological tools they will select to carry out these tasks, as well as the type of technical and administrative support mechanisms required for this to take place (Ford at el, 1964).

2.2.3 Independent Learning Theory (ILT)

According to Pask (1975) the concept of the independent learning is known in many forms: autonomous learning, flexible learning, open learning, resource-based learning, self-access learning, or self-directed learning to mention but a few. While some of them privilege the arrangement of the resources or the resources themselves, others focus on the role of the learner. However Biggs (2003) argued that ILT operates through low level of learner skills when learners have interest to learn, learner motivation for autonomy, interaction between learners and teachers. In ILT the role of the teachers is to provide guideline to help students to perform various tasks which are given by a teacher in the learners extra time. According to Blarton, (1999) teacher must give the student enough tasks to perform in his/her extra time outside of the normal class time.

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A study conducted Brockett at el (1991) on the perception and application of ILT in teaching and learning activities that ILT appears on the following situations in which learners study alone, skills associated with self-directed learning, inherent capacity suppressed by institutional teaching, students' responsibility for their own learning, students' right to choose how to proceed with their own learning. Beyerbach et al (1989) added that when providing motivation, collaborative modes of independent learning engender certain key skills such as interpersonal, communicative and learning management skills and increased metacognitive awareness. On the level of target language learning, pair and group work can also promote an environment conductive to knowledge construction through dialogue and negotiation. As such, this mode is entirely consistent with the conversational and constructivist theories of learning (Blahman, 1997).

2.2.3.1 Applicability of Independent Learning Theory (ILT)

In this study an ILT was discussed to help to understand how tutors in TCs use ICT to enable learners to acquire appropriate skills, familiarise with the available resources, consider how feedback will be delivered to students, contact with resources and technical staff. Moreover, there is rapid growing use of email exchanges, IRC (Internet Relay Chat) and text-based virtual reality environment which enable the student to perform various tasks in collaboration with others students.

2.3 Theoretical Framework

2.3.1 Contribution of ICT in Teaching and Learning

ICT is not a panacea for all educational problems but today's technologies are essential tools for teaching and learning. To use these tools effectively and efficiently, tutors need visions of the technologies' potential, opportunities to apply them, training and just-in-time support, and time to experiment. Only then can tutors be informed and confident in their use of new technologies (Beyerbach at el, 2001). ICT is used in education for supporting teaching and students learning in order to reach the goals of education. There is growing evidence that ICT application provides the means of gathering, connecting and analyzing data about teaching and learning in ways that

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enable educators to more accurately diagnose student need and evaluate programs (Dellit, 2001). Extensive researches have been done about the application of ICT in teaching and learning.

A study by Patton (2002) on ICT-Pedagogy Integration in Teacher Training in New Zealand using qualitative interview as a method of data collection, revealed that teachers believe integrating ICT tools into education is very important and necessary because it changes the quality of education. Patton shows that teaching is becoming one of the most challenging professions in our society where knowledge is expanding rapidly and much of it is available to students as well as teachers at the same time. However as through ICT as new concepts of learning have evolved, teachers are expected to facilitate learning and make it meaningful to individual learners rather than just to provide knowledge and skills. Also a recent study by UN Economic and Social Council (2000) of student achievement in mathematics and the use of ICT the first such study to document relationships between student use of technology across the United States and higher scores on a national standardized test concluded that "technology does matter to academic achievement, with the important caveat that whether it matters depends upon how it is used" page 78. In another recent study undertaken by the Bertelsmann Foundation of students in a German school and a school in the United States it was concluded "that the use of media and technology improves learning outcomes, instills key qualifications for the information age, and increases motivation" (Resta, 2002 Page 204).

Evidence from Abromovich (2006) shows that using a variety of ICT can facilitate not only delivery of instruction but also learning process itself in education institutions. Moreover, ICT can promote international collaboration and networking in education and professional development. There's a range of ICT options from videoconferencing through multimedia delivery to web sites which can be used to meet the challenges teachers face today. In fact, there has been increasing evidence that ICT may be able to provide more flexible and effective ways for lifelong professional development for today's teachers to support learning in student centered ways positively affects student performance (Abromovich, 2006; Lei and Zhao 2007). Lei and Zhao (2007) found that

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among 130 college students, those who used technology to manipulate data or to construct representations of their knowledge experienced an increase in grade-point average over the course of the year. For teachers, networks provide a medium to establish fluent links among peers from schools worldwide. Teachers can benefit greatly from sharing their experiences, problems and queries with colleagues in same situations. Similar importance is the growing field of e-learning, with the availability of a large number of training courses for teachers delivered through the Internet, thus providing new means for professional development regardless of the teacher's workplace.

Similarly, a study by Light (2009) on the role of ICT in enhancing education in developing countries the findings from an evaluation of the Intel reach essentials course in India, Turkey, and Chile found that, through ICT students can learn by exploring contents, conducting research, and applying knowledge to real problems. Giving example in History subject, Light (2009) delineates that by following a question students acquired a lot of content through research to learn more deeply and they were more motivated by the new ways of learning. In conclusion, evidence has consistently shown ICT-mediated instruction using conventional teaching methods is as good as traditional face-to-face instruction and, in the case of computer-based instruction, may in select instances improve student learning and attitudes towards learning. However, the picture is less clear but promising for more sophisticated uses of ICT in the classroom, especially for the host of applications and methods that support "constructivist" learning, in which students are encouraged to work in rich environments of information and experience to build their own understandings about them. Worldwide, research into the effectiveness of ICT-mediated instruction is continuing and should provide a clearer picture of the effectiveness of ICT in supporting constructivist pedagogy. For example, as part of the Helsinki 2000 project, Finnish investigators were conducting a five-year, multi-disciplinary investigation focused on analyzing innovative pedagogical practices through intensive case studies on computer-supported collaborative learning (Hedberg, 1996).

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2.3.2 The extent of application of ICT in Teachers Colleges

The use of ICT in developing countries like Tanzania is considered to be necessary in order to overcome the challenges related to poor curriculum implementation (Resta, 2002). The meaningful use of ICT occurs only when there is effective pedagogical use of ICT in education. The potential of ICT in education can be unlocked through pedagogical application of ICT in education, that is, when ICT are used as tools in teaching and learning activities. In this regard UNESCO (2003) explained that the pedagogical applicability of ICT is concerned essentially with more effective learning and with the support of the various components of ICT.

Pedagogical application of ICT involves effective learning with the aid of computers and other information technologies, serving the purpose of learning aids. According to Daft at el (1984) the potential of information and communication technologies in enhancing teaching and learning can only be realized when the technologies have been well and appropriately adopted and integrated in the pedagogical process in the TCs.

The available literature such as that of Issa (2008) shows that available ICT infrastructures are not used primarily for classroom teaching in TCs in Tanzania. According to Hare (2007), most schools in urban areas already use ICT; however, in most cases ICT has not been integrated as a medium of instruction. In many developing countries like Tanzania, the potential of ICT to support pedagogy is yet to be fully realized.

2.3.3 Technology Integration for Instructional Preparation

Thousands of websites now exist that contain collections of high quality curriculum guides, lesson plans, and instructional activities. For example, the United Nations Cyber School Bus website contains teaching units on urbanization, disease, the environment, and women and politics, as well as interactive games, maps, databases, and quizzes (Zhao et al. 2001). Specialized websites designed to provide information and assistance in specific subject areas are also proliferating. Lingu@NETis a website developed by the British government to provide “quality-assured resources for language teachers and learners worldwide” (Ala-Mutka, 2008 Page 67). And finally,

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remote access to expensive scientific instrumentation is also possible. In the United Kingdom, the Virtual Microscope of the Open University can be used by students to view slides over the Internet (Ala-Mutka, 2008). The Hands-On Universe project at the Lawrence Berkeley National Laboratory, co-funded by several USA government agencies, has developed and piloted an educational program that enables high school students to request their own observations from telescopes at professional observatories. Students download digital images to their classroom computers and use powerful image processing software to visualize and analyze their data (Hayes, 2007).

Previous studies show that educators use technology in different ways in teaching**.** A study by Ala-Mutka (1998), on teacher perceptions of information and communication technologies in Samoa, found that ICT were mainly used to support teacher-centered pedagogies and contributed to the efficiency of teacher preparation. Regardless of teaching subject, he noted that teachers predominantly use technology for preparing examinations and lesson notes by obtaining information from the internet regarding teaching topic. The explored uses of technology are important in the process of instructional preparation in developing learning objectives, selecting methods of instruction, feedback, and evaluation and assessment strategies including follow-up activities (Zhao et al. 2001).

In a similar study conducted by Issa (2008), on the use of ICT in teaching and learning in public teachers' colleges in Tanzania, indicates that tutors have access to computers and they do use them for various purposes relating to teaching and learning such as accessing materials relating to their subjects (searching websites related to their subjects of specialization), preparation of lesson notes, lesson plans and schemes of work which facilitate lesson presentation. He adds that they use computer for preparation of daily classroom exercises, monthly tests, and any examinations and for keeping students' records. Such uses hinge to technology for instructional preparation. Furthermore, Hayes (2007) describes such integration of ICT as teaching preparation tasks which fall outsides the delivery of instruction while Kopcha (2010) identifies technology integration as undoubtedly that improves workload of teachers, but far from the student-centered approaches. By 1997, about 20% of libraries in the United

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Kingdom are connected to the Internet. The British government's National Grid for Learning (NGL) initiative was expected to connect all British libraries and museums to the Internet (Yusuf at el, 2004). In the United States, a 1998 survey sponsored by the American Library Association found 73% of the nation's public libraries offered basic Internet access to the public (Zemke, 2002). This connection is to enable teachers during the preparation of the lesson.

However, although digital ICTs are quickly becoming more accessible, it is important to note that earlier ICT continues to play a critical role in education worldwide. Access to films, videotapes, telephones, television or radio is still far more commonplace than access to a computer or the Internet and World Wide Web. For example, the Telesecundaria Project in Mexico, which began in 1965 as a closed-circuit pilot project, presently delivers classes designed for Colleges leaver level to over 12,000 rural communities enrolling more than 800,000 students. The Mexican government plans to open an additional 4,500 Telesecundaria TCs enrolling 250,000 more students between 1998 and 2002 (Dellit, 2001). The Gobi Women's Project is using radio to deliver instruction including livestock rearing techniques, family care, income generation, and basic business skills to 15,000 nomadic women in Mongolia (UNESCO, 2003). Additionally, according to a World Bank (1998) the China TV University system enrolls over half a million students in Colleges programs and graduates over 100,000 per year.

2.3.4 Technology Integration for Curriculum Implementation

Modern constructivist educational theory emphasizes critical thinking, problem solving, "authentic" learning experiences, social negotiation of knowledge, and collaborative pedagogical methods that change the role of the teacher from disseminator of information to learning facilitator, helping students as they actively engage with information and materials to construct their own understandings. That is, students learn how to learn, not just what to learn (Ford, 2007).Integration of technology into teaching is viewed in the perspective of instruction presentation through Information delivery (Inan and Lowther, 2010). It employs all of the

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technological capabilities to deliver, animations, text, audio, and video as well as Computer assisted instructions (CAI) to enhance learning.

Research carried out in the USA by Blarton (1998) to examine technology applications in social studies teacher education on the curriculum implementation found that, instructors' perceived technology to have had beneficial impacts on the instructional setting. Within the teaching context of instructional technology delivery, they found lecturer facilitating the clear and elaborated presentation of information to students through digital projector. The technology enabled showing of numerous, complex examples and enhanced the engagement/attention of students and attracted students. In Europe, more than 80% of TCs in Slovenia have access to the Internet 93% of TCs and 80% of other education institutions which is similar to the percentages of developed countries. Nearly two-thirds of Colleges have a website (Beyeberch, 2001). In the United Kingdom, the pupils to computer ratio is 16:1 in primary schools and 9:1 in secondary schools, while 43% of Colleges in the United Kingdom have been connected to the internet (UNESCO, 2003). The British Government planned to connect all schools, colleges, universities, libraries, and as many community centers as possible to the Internet by 2002 (United Kingdom Department for Education and Employment, 1997). In Germany, the Schulen and Netz initiative (http://www.san-ev.de) begun in 1996, was expected to connect 10,000 colleges to the internet by mid- 1999. As of late 1997, of approximately 6,500 were connected and 1,700 had their own website (UNESCO, 1998). In Italy, a national program in 1995 resulted in 120 schools being supplied with multimedia equipment. By 1999 ICTs plans were announced for the installation of computer and multimedia facilities in 15,000 Italian schools to be carried out by the year 2000 (UNESCO, 2003). At the end of the programme, approximately 25% of all Italian state schools were expected to have access to on-line facilities and the internet and to be equipped with advanced hardware and multimedia educational software (UNESCO, 2003).

In Asia, similar developments are taking place. In Japan, as of 1997, over 94% of public colleges were computer equipped and 10% were connected to the internet. The Government planned to provide pupils to computer ratio of 2:1 in middle schools and

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1:1 in colleges by 1999. All of the public colleges in Japan were to be connected to the internet by 2003 (UNESCO, 1998). In the People's Republic of China, the central government was increase funding for basic, vocational and higher education projects. These plans included strategies to make increasing use of internet-based educational programs in college level (UNESCO, 2003).

In South America, in 1993, the Chilean government established the Enlaces (Links) project to connect all colleges and related institutions to Chile's national computer network. By 1996, over 35 colleges,180 primary schools and 62 secondary schools had been connected and, by the year 2000, the Chilean government had planned to have 50% of the 8,250 primary schools and 100% of the 1,700 secondary schools connected. The Enlaces initiative also includes equipping schools with computers and a combination of locally produced educational software and commercial products that are available in Spanish language versions (UNESCO, 2003).

Also Virtual Design Studios, begun in 1993, are collaborations between teams of architecture students in universities worldwide (arch.hku.hk/projects/vds/). Teachers and students, on different continents and in different time zones, work on a common design project using computer-aided design systems, email, a central database, and video-conferencing. Participants use the World Wide Web to display their designs and a virtual international jury of architects and teachers judge the relative merit of the work. Past student projects included re-designing housing in Shanghai and designing a centre for cultural and religious studies in Japan. A similar effort took place in 1996 between students and teachers at Union College (USA), METU (Turkey), and Queen's University of Canada (design.me.metu.edu.tr/vds/). Virtual Design Studio techniques are being utilized by other disciplines, such as Engineering (UNESCO, 1998). The Global Learning and Observations to Benefit the Environment (GLOBE) program, sponsored by the U.S. Government, links students, teachers and the scientific research community worldwide in a virtual learning community to study the global environment. Internationally, GLOBE is being implemented through bilateral agreements between the U.S.A government and governments of partner nations. As of December 1998, thousands of Colleges in 74 countries have registered as participants.

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In the GLOBE program, scientists design protocols for specific measurements they need for Earth Science research that can be performed by college students. Teachers are trained in the GLOBE protocols and teach them to their students. Students make the measurements, enter data via the internet to a central data archive, and the data become available to scientists and the general community. Scientific visualizations of the data are provided over the internet. Students benefit by having a "hands-on" experience in science, math, and technology, using their own local environment as a learning laboratory. Students also benefit from the opportunity to communicate with their peers around the world, thus increasing not only their environmental understanding but also their understanding of other cultures and their sense of global community.

However, a study by Teacher Training Agency (1998), examined the effects of computer-animated instruction on a group of students conceptual change progress by teaching complex, abstract and dynamic concepts of electrochemistry at a matriculation center in Malaysia. Using a sample of 120 subjects, comprising 60 high and 60 low achiever students found that the use of animations not only facilitated understanding and provided clear presentation but it made instruction more interesting. In this aspect the teacher's presentation using animations represented technology instructional delivery to fulfill lesson objectives. The presentation of lesson by animation facilitated students conceptual change by presenting constructivist animations which are comprehensible and plausible, thus supporting knowledge construction and the lesson is well attractive.

Similar to that, according to Wilson,(2003), it is important for teachers not be overwhelmed by trying to master all the details of the form of technology but to focus on the main functions and principles of the technology that help to solve the problem. In line with a number of researchers in ICT education (Blurton, 1999), teaching approaches that are based on the understanding of technology principles for problem solving involve three major components: First, It is important to generate understanding using situated examples, visualization, and dialogues. By using situated examples, the teacher should enable the students to understand the ICT facilities

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problem. The principles of the ICT facilities are then explained through visualizations. Finally, the teacher gives the right sequence of technology instructions showing the main implementation steps of the problem solving process. Second students use technology principles to construct solutions to the problem through involvement in realistic task-based activities. The goal is for students to construct their knowledge and to work at their own pace from their prerequisites. The teacher works as a mentor and guide of learning rather than as a transmitter of knowledge. Third students get the opportunity to raise questions regarding the specific problem solving process or more general problems related to software use. Students might for example discuss how the software could be used in similar situations. The teacher can then provide supplementary information.

Another, technology integration in the form of instructional delivery is through computer assisted instruction such as tutorial, simulation and drill and practice (Becta, 2002). Cohen, (2002) points that computer-assisted instruction (CAI) could be of great help because of the drill-and-practice, tutorial, or simulation activities offered either by themselves or as supplements to traditional teacher directed instruction. Bof (2004) add that computer-based learning has the potential to facilitate development of students' decision-making and problem-solving skills, data-processing skills and communication capabilities.

A study by Yusuf & Afolabi (2010) investigated the effects of computer assisted instruction (CAI) on secondary school students' performance in biology. Using a quasi-experimental involving a 3 x 2 factorial design and sample of 120 first years from senior secondary school students in Oyo State, Nigeria, found that the performance of students exposed to CAI either individually or cooperatively was better than that of their counterparts exposed to the conventional classroom instruction. The results of their analysis revealed that performance of students taught biology using computer assisted instructional packages was higher than those taught with convectional classroom instruction. They concluded that technology delivery through computer assisted instruction supports student performance.

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2.3.5 Challenges Facing ICT in Education

In a study conducted by Calderoni (1998) on integration of ICT in pedagogical use in Singapore it was revealed that, modern developments of innovative technologies have provided new possibilities to teaching professions, but at the same time have placed more demands on teachers to learn how to use these new technologies in their teaching. These challenges ask teachers to continuously retrain themselves and acquire new knowledge and skills while maintaining their job. In that regard, Jonassen et al. (2008) who suggest that using technology in student-centered ways it need teacher to be current with technological issues. In another development Kulik's meta-analyses were conducted on studies of computer use prior to the 1990s. Such use was often limited to drill and practice and tutorial software programs. In the 1990s, use of ICT in colleges is moving toward engaging students in "authentic" learning tasks in which students use computers, software, and network access to simulate events, communicate, collaborate, analyses data and access information resources (UNESCO, 2003). For these applications of ICT in schools, the research data are less extensive. However, some individual studies have been conducted that demonstrate positive learning and affective outcomes (Calderoni, 1998).

However a study conducted by Jung (2001) on the ICT-Pedagogy Integration in Teacher Training in Singapore's viewed that if teachers have narrow view of what educational technology is and do not know how the technology is used in the classroom, they see technology as hampering teaching and learning activities. Jung adds that if teachers have a wider view of what educational technology is and how it might be used in various ways in the classroom, they will see the technology as an empowering tool. Calderon (1998) argue that it is important to move educators' perceptions from a narrow view to a wider view so that they should see the technology as an empowering tool and not a hamper. In this regard, evaluation is a crucial process to assess how and when to use ICT to achieve desired outcomes and to what degree perception and reality align.

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2.3.6 Strategy to Improve ICT Use in Education

In Great Britain, the Department for Education and Employment has established a "UK Lifelong Learning" website (http://www.lifelonglearning.co.uk) that provides news, reports, and lists of lifelong learning opportunities as the strategy to ensure effective use of the technology in education (Akir, 2006). Earlier this year, the Dutch government launched a national program for lifelong learning "to ensure that better use is made of the country's intellectual resources." As part of the program, teacher-training colleges will receive extra funding to experiment with ICT (Hayes, 2007). The European Lifelong Learning Initiative (http://www.ellinet.org/elli/home.html) makes use of ICT, "to initiate the dissemination of information, the co-ordination of projects and studies, the mobilisation of actions, people and organisations to bring Europe into the Lifelong Learning Age it covers all sectors and all countries" (UNESCO, 1998).

The Asia Pacific Economic Cooperation (APEC) Forum has established three mechanisms to assist countries across the area to establish lifelong learning projects: the creation of a database of Asian scholars, researchers and practitioners involved with lifelong learning issues and programming across the region; the development and publication of a book of papers on lifelong learning policies, practices and programs across the Asia Pacific region; and a lifelong learning conference for APEC members to discuss issues identified in the book (UNESCO,2003)

In Africa, African network forum is supporting the implementation of "Multipurpose Community Telecenters" in five countries (Benin, Mali, Mozambique, Tanzania, and Uganda) at which locals could have affordable access to ICT. By enabling users to share the costs of facilities and support, the telecentres were also to offer low-cost means of internet access as well as information support for literacy campaigns, basic and non-formal education, and information on government programs. The telecenters will also provide facilities for the generation and exchange of community-based information (Hayes, 2007).

Atkins, (2003) argued that although there are several strategies outlined in the ICT use, those touching on the curriculum and training of teachers in ICT skills and

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pedagogical application of ICT seem to have been singled out as basic to the implementation of ICT. Atkins (2003) add that there is some recognition that merely providing equipment is insufficient to promote educational change and the policies should point to a desire for a nationally coordinated effort in the creation, dissemination and sharing of e-learning content to improve the quality of teaching and learning in schools.

Yusuf and Afolabi (2010) argued that teachers are expected to be the curriculum implementers in the classroom and it is expected that their sound knowledge on ICT and how to use it in teaching and learning will not only go a long way in achieving this goal, but also improve the standards of education. However, while the ICT policies are indeed comprehensive statements of intention, the implementation of such ambitious intentions is a cause for concern. Finally, one concern often expressed about ICT is that its use will isolate students from each other and from their teachers. However, in a 10-year longitudinal study undertaken by Apple Computer, unlike widespread myths, the researchers found that "instead of isolating students, access to technology actually encouraged them to collaborate more than in traditional classrooms. And instead of becoming boring with use, technology was even more interesting to students as they began using it for creating and communicating" (Apple Computer, Inc., 1995 cited in UNESCO, 2003). It appears, therefore, that ICT, properly used, may enhance and increase communications between people.

Different TCs in Tanzania led their own initiatives mainly funded on bilateral terms between the college and their donors. In 2007, a national ICT policy framework was put in place in Tanzania. The strategic objective of this policy highlighted the need for literacy improvement and human resource capacity building. Among the strategies for attaining this objective were to integrate ICT in mainstream educational curricula as well as other literacy programs and provide for equitable access by pupils or students at all levels (Issa, 2008). URT (2007) retrieved from this, an educational sector ICT policy was formulated in 2007 aimed at rationalising and harmonising ICT-related activities within the educational sector which were uncoordinated and fragmented. The policy also underscored investing in ICT in education right from primary to tertiary

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levels in Tanzania education institutions. ICT program had been initiated at secondary and tertiary institution level, though on a much-limited scale compared to the demand for such services (URT, 2007). The role of government in partnership with the private providers of ICT is mentioned as being crucial in narrowing student/computer ratio deficiency (Issa, 2008).

2.4 Empirical Studies

2.4.1 Empirical Studies Conducted in Developed Countries

A number of studies in the world on applicability of ICT in education developing countries Light (2019) conducted a study in northern Israel on the role of ICT enhancing education: Finding from an evaluation of the Intel teach essentials course. The purpose of this study was to investigate the role ICT in teaching and learning in elementary schools. A sample consisted of 1478 teachers from 104 elementary schools. The study concluded that ICT had crucial impacts in the teaching and learning process.

McKenzie (1998) conducted research in American Community Colleges in which he studied the role of web based staff development on the education technology. Mason surveyed the chief academic officers of 500 community colleges and requested them to rate the role of the web based staff development on the education technology. The findings were then compared and regression models were developed that combined role of web based staff development variables associated with application of ICT to determine the role of ICT in staff development. Mason's study indicated that the role of ICT in staff development have the greater impact in the facilitation of teaching and learning activities.

2.4.2 Empirical Studies Conducted in Africa

Ajay (2002) conducted a study in African response to the information communication technology revolution in Nigeria. The objective of the study was to survey the African response to the information communication technology in secondary schools aided by the government. A sample of the study comprised of teachers and heads of school from ten schools. The study was interpretive in orientation. Data were collected

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through qualitative techniques. Findings showed that teachers and heads of the schools respond positive on the role of information communication technology revolution in education activities. The study further reported that although the school teachers accepted this new technology in teaching and learning but faced with a lot of challenges.

Another study was done by Wanjiku (2008) in Vihiga District in Kenya. The purpose of the study was to investigate the Kenya rolls out digital village project in secondary schools. A sample for the study consisted of 396 respondents in which 44 were head teachers elicited from 44 schools and 352 teachers taken from 44 schools, where each school provided 8 teachers. Data of the study were collected using two methods, namely questionnaire and documentary analysis and the sample was selected through saturated and stratified method. The findings of the study showed that digital technology improve the provision of education services.

2.4.3 Studies Conducted in Tanzania

Issa (2008) conducted a study in three regions of Tanzania, namely Dodoma, Morogoro and Singida. The objective of the study was to investigate the use of ICT in teaching and learning: A case study of public teachers colleges in Tanzania. A sample for the study consisted of 66 respondents. Data were collected using questionnaire and interview methods. The findings of the study revealed that in Kinampanda Teachers' College, 6 out of 19 respondents (31.6%) showed that the use of ICT was dominant down loading materials, 11 out of 19 respondents (59.9%) showed that there was somewhat ICT is used in instructional preparation during teaching and learning process and 2 out 19 respondents (10.5%) showed that ICT is used in classroom presentations.

At Mpwapwa Teachers' College, 3 out of 28 respondents (10.7%) showed that the use of ICT was dominant down loading materials, 11 out of 28 respondents (39.3%) showed that there was somewhat ICT is used in instructional preparation during teaching and learning process and 6 out of 28 respondents (21.4%) showed that ICT is used in classroom presentations. In this context, at Mpwapwa Teachers' College there

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was no dominant application of ICT. This was due to the fact that the ICT facilities was not enough At Mororogoro Teachers' College, the study showed that application of ICT was dominant by 23 (85%) out of 27 respondents.

2.5 The Conceptual Framework

In order to understand the applicability of ICT in enriching curriculum implementation in TCs in Tanzania, there was a needed to have a comprehensive conceptual framework. According to Smyth (2004) as cited in Kombo and Tromp (2006), a conceptual framework had assisted researcher to organize his or her thinking and complete an investigation successfully. This study conceptual framework hypothesized causal relationships between factors that previously were reported to be important in technology integration which is extended from Brockett and Hiemstra, (1991) path model. Thus the study examined the applicability of ICT in enriching curriculum implementation in TCs in Tanzania by being guided by the model which was adapted from Brockett and Hiemstra (1991).

The model consists of three parts. The first part consists of infrastructure support, multi support and ICT training. The second part of this model is comprised of ICT practice, readiness and ICT competence and the last part consists of enrichment of curriculum implementation.

In this model, it was assumed that the presence of infrastructure and multi support leads to ICT training in the college among tutors. In the second part, it was assumed that both infrastructure and multi support and ICT training lead to ICT practice, readiness and ICT competence among tutors. Moreover, in this part it also assumed that the ICT practice among tutors leads to readiness to apply the ICT it resulting into ICT competence and vice versa. In the third part, it was assumed that all the ICT practice, readiness and ICT competence among tutors in the colleges were leading to effective enrichment of curriculum implementation in their respective colleges. The relationship among these factors is shown in the model using both single and double headed arrows.

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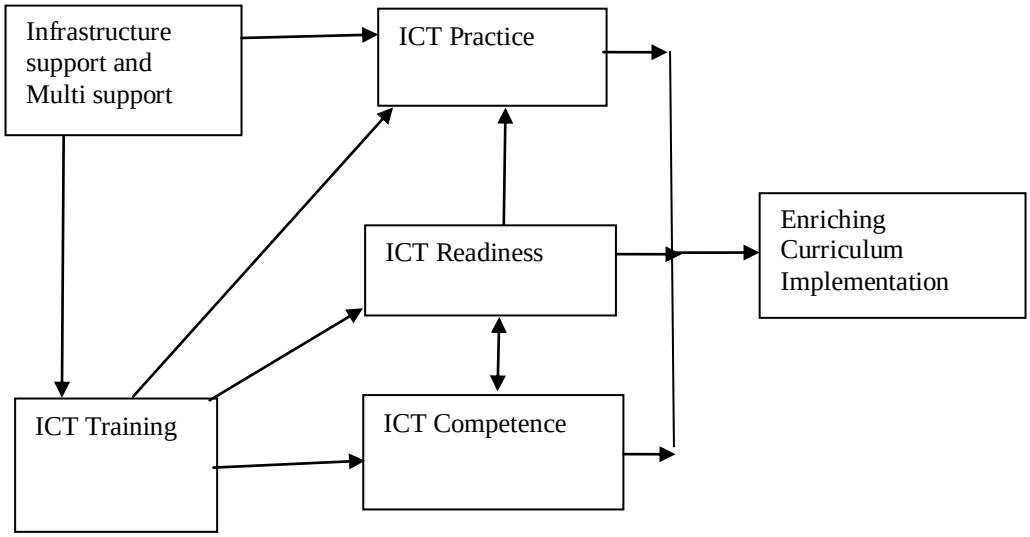
Figure 2. 1: Conceptual Framework for Applicability of ICT in Enriching Curriculum Implementation in TCs in Tanzania



Source: Adapted from Brockett and Hiemstra (1991).

2.6 Knowledge Gap

The literature review provides various studies on contribution of ICT teaching and learning. However, very few studies have been conducted in Tanzanian context to explore the role of ICT in teaching and learning process in TCs. A study by Issa (2008) on ICT use in teaching and learning in public teachers colleges in Tanzania found out that even if tutors have attended several sessions of training in ICT still they are not effectively integrating ICT in teaching and learning meanwhile the study by Mswanyama (2004) on the role of ICT on learning and training in teachers colleges found that ineffective training in ICT for tutors hinders effective use of ICT in teaching and learning. In these two studies conducted in Tanzania context none of them focused on the applicability of ICT in enriching curriculum implementations in TCs in Tanzania. Therefore the study was conducted on applicability of ICTs in enriching curriculum implementation in TCs in Tanzania.

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CHAPTER THREE
RESEARCH METHODOLOGY

3.0 Introduction

This study was examining the applicability of ICT in enriching curriculum implementation in TCs in Tanzania. In this chapter, research design, research approach, area of the study, population of the study, sample and sampling procedures, research ethics, data collection methods, validity and reliability of the instruments and data analysis have been presented.

3.1 Research Design

Research design is a roadmap which helps researchers to understand where they are and where they want to be at the completion of the journey. As a roadmap, it helps to determine the best way to reach the destination (Komba at el, 2006). Apart from that, a research design refers to the arrangement of conditions for the collection and analysis of data in a manner that aims to combine relevance with research purpose. It is the conceptual structure within which research is conducted and constitutes a blueprint for the collection, measurement and analysis of data (Kothari, 2004). Moreover, research design is referred to as a framework used as a guide to collect and analyze data (Adam at el, 2008). In this study, exploratory research design was deployed so as to get accurate information. Exploratory research design is a type of research design which is conducted to explain the behaviors in the societies (Loudon et al., 2007). It is used when a researcher wants to get enough information on a topic under study and is sometimes referred to as a probing research design because it allows flexibility to explore the issue (Waller & Polonsky, 2010). The choice of this type of research design is due to the reason that it helps the researcher to deeply discover ideas and insights about the research problem due to its flexibility (Holloway at el, 2010).

3.2 Research Approach

In conducting this study, both qualitative and quantitative research approach as were employed. Best and Khan (2004) assert that research methods can be divided into two broad categories which are qualitative and quantitative research. Quantitative research

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involves the study of samples and populations, and relies heavily on numeric data and statistical analysis. In that regard, quantitative analysis is the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect (Kothari, 2004). In contrast, Qualitative research approach is the one that seeks to understand the phenomenon in specific setting such as real world setting (Coolican, 1994). Moreover, qualitative research was makes little use of numbers or statistics and instead relies heavily on verbal data and subjective analysis (Adam at el, 2008). These was helped the researcher to get rich information from the respondents. The need for rich information is very pivotal as it helps the researcher to gain deeper and clear understanding of knowledge, experience and feelings of the topic under the study.

3.3 Location of the Study

Kombo and Tromp (2006) contend that selection of the research area is important and it influences the usefulness of information produced. However, the area should be relevant to the research questions and objectives. In this study, the area of the study was Mara Region constituting only the districts in which the selected TCs are situated. Thus, the study was conducted at Bunda and Tarime districts in Mara Region, focusing on both from each of the two districts respectively.

Bunda district is one of the five districts in Mara region. It is bordered to the north by Musoma rural district, to the south by Lake Victoria and Mwanza region and to the east by Serengeti district. According to the 2002 Tanzanian National Census, the population of Bunda district was 264,000 (Renatus, 2010). The district has 153 pre-primary schools, 151 primary schools, 27 secondary schools, 1 Focal Development College and 1 TCs called Bunda TC. Bunda TC is the Diploma TC that prepares teachers who are to teach in Tanzania secondary school (BEST, 2008 in Renatus, 2010).

Tarime district is one of the five districts in Mara region. It is bordered to the north by Migori district in Kenya. To the south it is bordered, across the Mara River, by Musoma urban and Serengeti district, to the west by Rorya district. Tarime district has

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got only one TC called Tarime TC. Tarime TC is the Grade "A" TC preparing teachers who are to teach in Tanzania primary schools (Best, 2008 in Renatus, 2010).

The choice of these colleges was based on to the familiarity of the area by the researcher and that they have ICT facilities. This was provided as a clue that most tutors could be familiar with ICT. Thus studying applicability of ICT in enriching curriculum implementation in the two TCs was bringing insight on how the two colleges applied ICT in enriching curriculum implementation.

3.4 Population of the Study

Komba and Tromp (2006) define population as a group of individuals, objects or items from which samples are taken for measurements. Mugenda and Mugenda (1999) also define population as a complete set of individuals, cases or objects with some common observable characteristics. Apart from that, Christensen and Johnson (2010) define population as a large group of people to whom the results of the study are to be generalized. Therefore, the target population for this study constituted tutors, heads of ICT departments, academic deans and principals in the respective TCs. The selection of tutors, heads of the ICT departments, academic deans and principals was considered appropriate because there were assumed the main stakeholders directly involved in the teaching and learning, thus they could provide information on potential in applicability of ICT in enriching curriculum implementation in TCs. As Komba and Tromp (2006) suggest, effective population sample should have some idea of the topic being investigated. Student teachers was excluded from the study because the researcher was intended to see the actual behaviors of principals, academic deans, heads of ICT departments and tutors as the part of the teaching staff in TCs.

3.5 Sample and Sampling Procedures

A sample is a representative part of the population through which the results of the study are generalized. Kothari (2004) defines a sample as a set of respondents selected from a large population for the purpose of collecting information. Similarly, Adam et al (2008) defines a sample as a group of respondents drawn from a population in which the researcher is interested in collecting information and drawing conclusions.

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Sampling procedures are the ways or techniques used by the researcher to get the sample for data collection. The significance of sample and sampling procedures in this study involved that it minimized cost, was time saving, had fair representation of population, it helped also to avoid bias and halo effects. Generally, the study of whole population is impossible.

3.5.1 Sample Size

In this study the sample constituted 46 respondents (Table 3.1). The rationale for this choice is that it ensured representative of the sample as well as accessing the relevant data sources of applicability of ICT in enriching curriculum implementation ICT in TCs. However, the practical reason governing this selection was to learn the basic skills 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.

Furthermore, the sample size for this study was drawn from first the complete list of all ordinary teaching staff from Bunda TC and Tarime TC and second those with specific positions who had required information and these included principals, academic deans, heads of ICT department**.** A simplified formula for proportions by Yamne (1967) was adopted to obtain the desired sample size for tutors, assuming 95% confidence level and precision of 0.05: n=N/1+N (e2) where n is the sample size for tutors and e is the level of precision: n = 67/ (1+67*(0.05^2), Sample size for tutors (n) = 40. The sample size for tutors (n) 40 was divided by 2 to get equal chance of the respondents from Bunda and Tarime TC. Therefore, the sample size selected included 2 principal, 2 academic dean, 2 head of ICT department and 40 tutors which make the total of 46 respondents as represented in table 3.1.

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Table 3. 1 Number of Respondents

Category of respondents	Target Population	Sample Size Selected			
		Bunda TC	Tarime TC	Total	Percentage (%) of the Total Size
Principals	2	1	1	2	4.35%
Academic Deans	2	1	1	2	4.35%
Heads of ICT Departments	2	1	1	2	4.35%
Tutors	67	20	20	40	86.95%
Total	73	23	23	46	100%

Source: Field Data (February 2013)

3.5.2 Sampling Procedure

Two sampling procedures, namely simple random sampling and purposive sampling, were used in this study.

3.5.2.1 Simple Random Sampling

The researcher used simple random sampling with the aim to select a reasonable number of principals, academic deans, and heads of ICT department and tutors that represents the intended population. This was employed because it provides the concise information (Adam & Kamuzora, 2008). This method was used because of its advantage where every element of the population was given an equal chance of being selected. In this case for example, the researcher used pieces of paper bearing "yes" or "no" in which 40 tutors out of 67 tutors were randomly selected, who got "yes" pieces of paper.

3.5.2.2 Purposive Sampling

Purposive sampling is a process of choosing key informants in the field work for depth study (Adam and Kamuzora, 2008). It was through this method that 2 Principals of the college, 2 Academic Deans, as well as 2 Heads of ICT Department were selected for the study. The selected sample in this category was considered to possess information of this study as they are supervisors in the organization or its units.

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3.6 Research Instruments

These are the ways used by the researcher to collect data from the respondents (Kothari, 2004). It is observed by Jourard (1966) that, no single technique or instrument may be considered to be adequate in itself in collecting valid and reliable data. The instruments that were used for this study are questionnaires, documentary review, observation and interview.

3.6.1 Questionnaire

Questionnaire is regarded as a series of questions, each one providing a number of alternative answers from which the respondents can choose (Renatus, 2010). Moreover, questionnaire is considered in general term to include all techniques of data collection in which each person is asked to respond to the same of questions in a predetermined order. In this study were deployed self-administered questionnaires which comprised closed ended questions to all 46 respondents (Appendix A questionnaire for tutors, principals, heads of ICT department and academic deans).

Closed ended questionnaires were used as it allowed respondents to choose between numbers of alternatives. The questionnaires were prepared and used to collect information on extent of application of ICT by tutors in teaching and learning process, challenges faced when applying ICT in teaching and learning process and what should be done to improve applicability of ICT in enriching curriculum implementation in TCs with specific reference to Bunda TC and Tarime TC in order to suggest appropriate strategies that would help to solve that problem. The reason for using this method is that, it is less expensive in terms of time and financial, it upholds confidentiality, is free from bias, easier to arrange and it supplies standardized answers in terms of administration and processing of data.

3.6.2 Documentary review

This is a data collection method that helps the researcher to have deep ideas and insights about the topic to be studied. Hutchinson (1990:130) as cited in Mtahabwa (2007:106) asserts that documentary analysis expands and further clarifies the data base. The type of data that were collected using this method were the applicability of

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ICT in enriching curriculum implementation in TCs and the data were recorded through the note taking. The reason for using this method was that, they have accessed the researcher to vast amount of information on the matter concerned as it contained permanent source of data that would be checked by the researcher and sometime gave verification on the matter concerned with applicability of ICT in enriching curriculum implementation in TCs.

3.6.3 Observation

Observation is systematically planned and recorded and is subjected to check and controls on validity and reliability (Kothari, 2004).There are two types of observation participant observation and non-participant observation (structured observation). Participant observation is a method of data collection whereby the investigator becomes totally involved in the situation being researched (Adam and Kamuzora, 2008). Moreover, participant observation is the process whereby the researcher joins group, does everything carried out by the group and in the process examines what is going on (Kothari, 2004). Apart from that, non-participatory observation (structured observation) is set up to record behaviors that may be difficult to observe using naturalistic observation (Shaughnessy, 2000). However, non-participatory observation (structured observation) is the process whereby the observer remains detached from the situation happening (White, 2000).

Participant observation was used in this study to obtain information particularly when the researcher visited computer laboratories, classrooms and tutors' offices during the normal working hours' time table (see Appendix B). The main focus was to see actual applicability of ICT in enriching curriculum implementation in TCs. However, the main reason to use the participatory observation included to see actual behavior of tutors in the use of ICT in teaching and learning process where pictures were taken to reveal the real situation.

3.6.4 Interviews

Interviews method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses (Kothari, 2003). There are two type of

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interview face-to-face versus telephone interview. Personal interview there is a face to face contact between interviewer and interviewee (Adam and Kamuzora, 20008). This can take place at home (door-to-door interviewing), office (executive interviewing) or even at the shopping centers depending on the nature of the respondent (Adam and Kamuzora, 2008). However, telephone interview is the process of collecting information by making a call to sampled respondents (Kothari, 2003).

Semi-structured interview was conducted to access additional information to complement where questionnaires could not get desired responses nor needed more clarification. Kothari (2003) explained that interviews method is suitable for intensive investigation. In this study, the researcher used semi-structured interview to collect data from top management of Bunda TC and Tarime TC: like the Principals (C1), head of ICT department (C2) and Academic deans (C3) in order to get information which address issues on the applicability of ICT in enriching curriculum implementation in TCs in Tanzania. The reason for using this method based on the assumption that Principals of the colleges, Academic Deans and the ICT head of Departments had enough information on applicability of ICT in enriching curriculum implementation in TCs.

3.7 Validity and Reliability

According to Kavale (1996), validity refers to the issue of truth and knowledge. Validity in other words refers to the quality that a procedure or an instrument (tool) used in the research is accurate, correct, true, meaningful and right. Also validity is the ability of a particular instrument to measure what is supposed to measure. The validation of instrument is the process of establishing document evidence, which provides high degree of accuracy that specific process consistently produces meeting its predetermined specification and quality attributes (Cohen et al, 2000). In order to ensure validity of instruments, a multiple data collection technique known as triangulation applied in this study (Patton, 1997; Gall et el, 1996; Cohen et al, 2000). This technique was involved the use of more than one method of data collection such as questionnaire, interview, documentary review and observation. This permits the

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researcher to combine strength and correct some of the deficiencies of some source of data.

Reliability, on the other hand refers to the consistency of research findings (Kavale, 1996). Thus reliability refers to how consistent a research procedure or instrument is. In short reliability means the degree of consistency demonstrated in the study. The reliability of the instruments was checked by comparing the results of the respondents. In order to improve reliability the researcher observed the following: the length of the instrument (the longer the instrument, the greater is its reliability), heterogeneity of the subject (the more the heterogeneous the subject is, the more likely reliability will increase). Also the researcher observed the clarity of instructions given to those using the instrument (the clearer the instruction, the higher the reliability will be). Language used is English because is the professional language of the tutors in TCs.

3.8 Ethical Issues

The ethical part of the research process involved obtaining respondents' informed consent, observing their right to privacy, protecting them from harm which may be physical or emotional by the way a researcher asks questions and reports findings (Potton, 1998). Before going to the field for data collection, the researcher obtained research clearance letter from the Director of Postgraduate Studies Mzumbe University. The letter stated the purpose of the study and its importance in order to justify the need for data collection. The clearance letter was then forwarded to the Principals of the Bunda TC and Tarime TC to allow the researcher to collect data in their colleges. While in the study, before starting data collection, participants were informed about the aim of the study, its significance and the way they were to be involved in the study.

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3.9 Data Analysis Process

Bogdan and Biklen (1992) as cited in Kasonde (2010) define data analysis as a systematic process of working with data, organizing and breaking them into manageable units, synthesizing them, searching for patterns, discovering what is important and what is to be learned and deciding what to tell others. In addition, data

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analysis refers to the computation of certain measures along with searching for patterns of relationship that exist among data groups (Kothari, 2004). Moreover, data analysis is the process of bringing order, structure and meaning to the mass of information collected (Jourard, 1966). Thus the process of data analysis aims at determining whether our observations support the hypotheses we formulated before going into the field to collect the information or reject them (Adam & Kamuzora, 2008). For the purpose of this study quantitative data collected through questionnaires was analysed by using Statistical Package for Social Science (SPSS) software version sixteen, descriptive statistics such as mean and standard deviation was used to present data.

Qualitative data obtained through interview and observation were analysed through semantic and content and presented by statement. In addition data collected by documentary method were subjected to these three steps of this method as they were applied by Mtahabwa (2007).These steps are extraction and summarisation. In the first step, the documents that explain the role of ICT in education were extracted thoroughly; in the second step the main ideas from these documents were summarized.

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CHAPTER FOUR

PRESENTATION OF FINDINGS

4.0 Introduction

This chapter presents the findings of the study conducted to examine the applicability of ICT in enriching curriculum implementation in TCs. The study results presented in this chapter are based on primary and secondary data sources. The chapter provides biographic data, the extent to which ICT is applied in teaching and learning process in Bunda TC and Tarime TC, challenges faced by tutors when applying ICT in teaching and learning process and strategies to be taken in order to make effective use of ICT in teaching and learning process at Bunda TC and Tarime TC.

4.1 Biographic Data

This involved three parts; the gender of the respondents, the teaching experience of respondents, and education qualification of respondents.

4.1.1 Gender of the Respondents

Gender of the respondents who were involved in the provision of this data for this research was vital in order to know if the information was given by both males and females and therefore, the suggestions of the researcher on applicability of Information and Communication Technology in enriching curriculum implementation in Tanzania Teachers Colleges could be free from bias. The research results regarding the gender of respondents are as presented in table 4.1 below.

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Table 4. 1Gender of the Respondents

Categories of Respondents	Bunda TC			Tarime TC			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Principals	1	-	1	1	-	1	2	-	2
Academic Deans	1	-	1	1	-	1	2	-	2
Heads of ICT Department	1	-	1	1	-	1	2	-	2
Tutors	12	8	20	14	6	23	26	14	40
Total	15	8	23	17	9	23	32	14	46
Percentage (%)							69.6%	30.4%	100%

Source: Field Data (February 2013)

Table 4.1 above shows that 69.6% of respondents were male while 30.4% of respondents were female. This indicates that probably there is the mixture of gender in Bunda and Tarime TC, although males were dominating the study than female and this entail that applicability of ICT in enriching curriculum implementation discussed in this chapter might have greater meaning to both male and female since they were the mixtures of gender.

4.1.2 Teaching Experiences of the Respondents

Data on the teaching experiences of respondents are presented into four categories: those who had worked between 1-2 years, 3-4 years, 5-6 years and more than 7 years. The research results regarding teaching experiences of principals, academic deans, head of ICT departments and tutors are as presented in table 4.2 below.

Table 4. 2Teaching Experiences of the Respondents

Teaching Experiences (in years)	Principals	Academic Deans	Heads of ICT Departments	Tutors	Total	
					Number	Percentage (%)
1-2	-	-	1	5	6	13.0%
3-4	-	-	-	6	6	13.0%
5-6		1	-	14	15	32.6%
7+	2	1	1	15	19	41.3%
Total	2	2	2	40	46	100%

Source: Field Data (February 2013)

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Table 4.2 above shows that, respondents who had a teaching experience between 1-2 and 3-4 years were 13.0% for each, followed by 32.6% of respondents who had a teaching experience between 5-6 years and 41.3% of respondents who had a teaching experience for 7 years or more. Therefore, being more experienced at work they were expected by the researcher to provide reliable and valid information on this study since they might have been with enough direction exposed to the applicability of ICT in enriching curriculum implementation in TCs.

4.1.3 Education Qualification of the Respondents

Data concerned the education qualifications of respondents were presented into four categories; which includes those who had Diploma, Degree, Masters and PHD. The research results regarding education qualification of respondents are as presented in table 4.3 bellow.

Table 4. 3 Education Qualification of Respondents

Education Qualifications	Principals	Academic Deans	Heads of ICT Department	Tutors	Total	
					Frequency (N)	Percentage (%)
Diploma in education	-	1	-	14	15	32.6%
Bachelor in education	2	2	2	18	24	52.2%
Master's in education	-	-	-	7	7	15.2%
Total	2	3	2	39	46	100%

Source: Field Data (February 2013)

Table 4.3 above shows that 32.6% of respondents had a Diploma in education, 52.2% of respondents who had a Bachelor degree in education and 15.2% of respondents who had a Master degree in education. Thus the findings show that, majority of respondents had a Bachelor degree in education. Being with more bachelor degree holders at work (67.4%) it was expected of them to provide reliable and valid information on this study since they might been faced or are experienced in applicability of ICT in enriching curriculum implementation from the professional training in TCs.

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4.2 Extent of Application of ICT in Teaching and Learning Process

The study wanted to identify the extent of application of ICT in the teaching and learning process in TCs. The researcher met respondents at their work place and managed to extracted information from all 46 respondents to eventually come out with the level of application of ICT at Bunda and Tarime TC. In accomplishing this specific objective tutors, principals, academic deans and heads of ICT departments was given questionnaire to indicate the extent of application of ICT in teaching and learning process. Additionally semi-structured interview were conducted to principal, academic deans and heads of ICT departments on the extent of application of ICT in teaching and learning process in TCs. The results are as depicted in table 4.4 below.

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Table 4. 4 Extent of Application of ICT in Teaching and Learning Process at Bunda TC and Tarime TC

Application of ICT	Responses			Total	Std. Deviation	Mean
	1	2	3			
To create teaching aid like visual graphics, charts and drawings.	21	16	9	46	.773	1.74
To carry out power point presentation	15	21	10	46	.737	1.89
To use scanner or digital camera to import graphics, photos and text for presentation	9	20	17	46	.739	2.17
To use computer to prepare schemes of work and lesson plans.	13	19	14	46	.774	2.02
To use search engines to find educational resources that support teaching and learning in my subject.	28	15	3	46	.622	1.46
To use the word processor (writer), database (base), presentation (Impress) and spreadsheets (calc) into my subject area curriculum	12	21	13	46	.745	2.02
To use ICT to download resources useful for teaching in my Subject	31	14	1	46	.526	1.35
Other applications of ICT	-	-	-	-	-	-
Grand Total Mean						1.807

Responses key :
1: Large Extent (51% - 100% of lessons taught in an academic year) which means in every preparation of lesson notes/plans/scheme of work, in daily presentation of the lessons, in assessing students, in suffering materials.
2: Small Extent (10 – 50% of lesson taught in an academic year) which means in every preparation of lesson notes/plans/scheme of work, in daily presentation of the lessons, in assessing students, in suffering materials.
3: None (0% - 9% of lesson taught in an academic year) which means in every preparation of lesson notes/plans/scheme of work, in daily presentation of the lessons, in assessing students, in suffering materials.

Source: Field Data (February 2013)

From the findings it was found that the mean score of 2 is the decision point to judge the extent of ICT applicability in teaching and learning process (decision point was obtained by adding number of response key and divided by total number of response key 1+2+3 = 6/3 = 2). Therefore mean score of responses below 2 shows that ICT is being applied to large extent in every preparation of lesson notes/plans/scheme of work, in daily presentation of the lessons, in assessing students, in download materials and caring out power point presentation while the mean above 2 shows that ICT is

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applied to small extent or not all which means in every preparation of lesson notes/plans/scheme of work, in daily presentation of the lessons, in assessing students, in suffering materials and power point presentation. The research findings show there is large extent of ICT application by the tutors in teaching and learning process (Grand mean score from respondents = 1.807). The mean score of 1.807 shows that tutor used ICT facilities in teaching and learning process to some extent in preparation of lesson notes/plans/scheme of work, in daily presentation of the lessons, in assessing students and in download materials but not in all educational activities. Additionally, the research results show that the extent of ICT application by the tutors was found to be large when they used ICT facilities to download resources which are useful in teaching subjects (Mean response score = 1.34) and to use ICT facilities as a search engine to find educational resources that support teaching and learning activities (Mean response score = 1.46). Furthermore, the respondents pointed out that the large extent application of ICT in the teaching and learning process is in creating teaching aids like visual graphics, charts and drawing (Mean score from respondents = 1.74), followed by using ICT in carrying out power point presentation (Mean response = 1.89).

However the research study show small extent of application of ICT in the teaching and learning process in using scanner or digital camera to import graphics, photos and text for presentation (Mean of respondents = 2.17), in using computer to prepare schemes of work and lesson plans (Mean of respondents = 2.02) as well as using word processor (writer), database (base) presentation (impress) and spreadsheets (calc).

Biographic data also show large extent of application of ICT in teaching and learning process is based on the gender (69.6%) of male applied more ICT in teaching and learning process than (30.4%) female. Educational qualifications show that those who hold bachelor degree in education (52.2%) and master's in education (15.2%) were applied ICT in teaching and learning process. Additional, teaching experiences on the observation which were conduct revealed that those who had 1-2, 3-4 and 5-6 used ICT to make power point presentation and downloading material which is useful in teaching and learning process to large extent because they possessed enough knowledge on how to use ICT facilities and ICT was taught during their studies in

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bachelor degree in education and master's degree in education. Thus, who had 7+ teaching experience applied ICT in small extent or non because they lack knowledge on how to use word processor (writer), database (base) presentation (impress) and spreadsheets (calc) into the subject areas, to use computer to prepare schemes of work and lesson plans, use of scanner or digital camera to import graphics, photos and text for presentation, carrying out power point presentation.

On the other hand, the data extracted through the interview guide revealed that, Principals, Academic deans and heads of ICT departments in the two TCs were aware the application of ICT in teaching and learning process, that is why when they were asked to outline in which ways the available ICT facilities were currently used in enriching curriculum implementation in the colleges they indicated that available ICT was used in the teaching and learning process during their lessons, especially before the class and during the class hours. Therefore, the study shows that majority of tutors in Bunda TC and Tarime TC applied ICT in teaching and learning process as commented by Teachers Agents (1998) that the use of ICT not only facilitated understanding and provided clear presentation but it made instruction more interesting.

Furthermore, through observations, the researcher noted some tutors using ICT facilities such as the power point presentation, search engine to surf materials for their lessons and preparing their schemes of work, lesson plans and lesson notes see figures 4.1, 4.2 and 4.3).

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Figure 4. 1: A tutor in Bunda TC using power point presentation in the teaching curriculum subject

Source: Field Data (February 2013)

In figure 4.1 a tutor at Bunda TC teaching curriculum subject using ICT facilities to make power point presentation on the topic of curriculum theories and practices. Thus, observation revealed that in the lesson plans reflect that ICT presentation methods applied by a tutor.

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Figure 4. 2: A tutor from Tarime TC using ICT as a search engine to surf materials on the subject areas of communication skills

Source: Field Data (February 2013)

In figure 4.2 a tutor at Tarime TC teaching communication skills subject using ICT facilities to surf materials on the topic of nature of theories of communication. Observation shows that the lesson plans reflect that ICT is the teaching and learning resources methods.

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Figure 4. 3: A tutor of Bunda TC uses ICT in preparing lesson notes

Source: Field Data (February 2013)

In figure 4.3 a tutor at Bunda TC teaching English subject using ICT facilities to prepare lesson notes on the topic of nature of language. Thus, observation revealed that in the lesson plans reflect that an ICT facility is one of the methods used by a tutor.

Moreover, the researcher deployed also the documentary review to find out the extent of application of ICT in teaching and learning process in TCs. Such documents that were reviewed included: a book Lei and Zhao (2009) entitled Technology Uses and Student Achievement in Teachers Training: A longitudinal study of computers and

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education. London: Kogan Publication it was observed that in the process of applicability of ICT in enriching curriculum implementation in teachers training it was used different in teaching and learning process. The following messages were apparent that ICT is used to facilitate professional development and networking, ICT were used to connects tutors and teachers to a larger international teaching community, ICT used to promote learning activities, developing new methods of facilitating learning and evaluating student performance in TCs, ICT is used as the tool of knowledge sharing and training in TCs and ICT is used as the one of the communication tool in TCs.

4.3 Challenges Facing Tutors when Applying ICT in Teaching and Learning Process.

The study intended to examine the challenges faced by tutors as they apply ICT in teaching and learning process in TCs. Through questionnaires and interviews data findings revealed 16 challenges that faced tutors as they apply ICT in teaching and learning process respective TCs. These challenges were classified into two major categories according to the filled data, the personal challenges which had been indicated by 100% of respondents and similar the college challenges identified by 100% of all respondents. The results on personal challenges toward effective applicability of ICT in teaching and learning activities are as presented in table 4.5 below.

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Table 4. 5: Personal Challenges towards Effective Applicability of ICT in Teaching and Learning Activities

Personal Challenges	Responses		Total	Std. Deviation	Mean
	1	2			
Lack of skills with ICT	26	20	46	.501	1.43
Lack of confidence in using ICT	19	27	46	.498	1.59
Insufficient knowledge of appropriate software	31	15	46	.455	1.28
Insufficient knowledge of how to use ICT equipment.	31	15	46	.474	1.33
Lack of knowledge of how to evaluate the use and role played by ICT in teaching and learning	33	13	46	.455	1.28
Lack of technical support	37	9	46	.401	1.20
Other application	-	-	-	-	-
Grand Total Mean					1.35
Responses Key: 1: Yes 2: No					

Source: Field Data (February 2013)

From the findings it was found that the mean score of 1.5 is the decision point to judge the personal challenges towards application of ICT in teaching and learning process. (decision point was obtained by adding number of response key and divided by total number of response key 1+2 = 3/2 = 1.5). Therefore mean score of responses below 1.5 show more personal challenges facing tutors towards application of ICT in teaching and learning process while the mean above 2 shows that small personal challenge or not all. The research findings show more personal challenges facing tutors in application of ICT in teaching and learning process (Grand mean score from respondents = 1.35). The mean score of 1.35 shows that tutors were faced by many personal challenges in application of ICT facilities in teaching and learning process.

Furthermore, as indicated the personal challenges towards application of ICT in teaching and learning process involved lack of technical support (Mean of response score = 1.20), lack of knowledge of how to evaluate the use and role played by ICT in teaching and learning (Mean of response score = 1.28), the lack of insufficient knowledge of appropriate software (Mean response score = 1.28), proceeded by insufficient knowledge of how to use ICT equipment's (Mean response score = 1.33)

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and lack of skills with ICT (Mean score from respondents = 1.43) as are presented in table 4.5 above.

These findings have revealed that lack of technical support with ICT seemed hinder tutors to use ICT in teaching and learning process. For instance, the use of power point in presentation, the use of scanner or digital camera to import graphics, photos and text for presentation and to create teaching aid like visual graphics, charts and drawings needs technical support from ICT experts. This implies that tutors are had lack of technical support in using ICT in teaching and learning process.

It also indicates that they were likely to possess some required knowledge and skills about ICT facilities. These findings resemble to Goktas and Yildirim (2009) study on teacher educator ICT competencies usage and perception which found teacher educators with positive perception on the internet and they used it as a supporting tool and as communication tool for their courses. This finding also implies that tutors are not confident in using complicated emerging technologies because ICT has been considered as science subjects.

On the other hand, the only significant variation in ICT confidence was observed in the use of scanner or digital camera to import graphics, photo and text for presentation and in the use of multimedia presentation. All tutors seemed to be uncomfortable in these two categories. Tutors appeared to have no confidence to use input hardware scanner and digital camera. Together with competencies for using power point presentation tutors possess, it seems that the presentation may not incorporate multimedia (video, picture, text, audio, and animations) as long as they possess required competencies and confidence in those technologies. This will likely make them ignore the use of ICT in teaching.

Biographic data also show personal challenges of application of ICT in teaching and learning process is based on the male more than female because observation conducted during the normal working hours researcher didn’t see any female applying ICT in teaching and learning activities. In term of educational qualifications show that

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those who hold diploma in education were faced intensity personal challenges compared to those who hold bachelor degree in education and master's in education which possessed enough knowledge and experiences. Additional, teaching experiences on the observation which were conduct revealed that those who had 1-2, 3-4 and 5-6 have small intensity personal challenges in the use ICT in teaching and learning process because had possessed enough knowledge of ICT facilities.

Interview conducted to Principals depicted that various tutors they resist to change from traditional teaching of using chalk to modern way of using ICT facilities for instance the use of power point in teaching process and in making assessment of the students teachers because mostly of the tutors they did not know the role-played by ICT in teaching and learning lack of technical support. This resulted into tutors to ignore the use of ICT in teaching and learning process in TCs.

Moreover, the researcher deployed also the documentary review to find out the personal challenges towards application of ICT in teaching and learning process in TCs. Such documents that were reviewed included: a book by Resta (2002) entitled Information and Communication Technologies in Teachers Education. UNESCO: Paris it was observed that in the process of applicability of ICT in enriching curriculum implementation in TCs. The following personal challenges observed fear of some tutors to use ICT in teaching and learning activities, lack of insufficient knowledge on the proper use of ICT facilities and on how to use special program like malt media and video conferencing in teaching and learning activities.

Furthermore, the study intended to know college challenges faced by tutors as they apply ICT in the teaching and learning in TCs. Through questionnaires and interviews, the findings revealed that respondents pointed various college challenges. Thus, in questionnaires respondents were required to point yes or no toward the proposed and required to give any college challenges towards effective application of ICT in teaching and learning process in TCs. The results of the finding are as presented in table 4.6 bellow.

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Table 4. 6 College Challenges and others factors towards Effective use of ICT in Enriching Curriculum Implementation in TCs.

College Challenges	Responses		Total	Std. Deviation	Mean
	1	2			
Inadequate ICT infrastructures	36	10	46	.417	1.22
Lack of technical support	37	9	46	.401	1.20
Restrictions in ICT access	22	24	46	.505	1.52
Frequent electricity interruption	27	19	46	.498	1.41
Absent of college ICT plan	32	14	46	.465	1.30
Non integration into the college curriculum	33	13	46	.455	1.28
Poor ICT policy/project implementation strategy	36	10	46	.417	1.22
Inadequate ICT manpower in the college	31	15	46	.474	1.33
Limited college budget	35	11	46	.431	1.24
Poor management on the parts of college administrators and government	34	12	46	.444	1.26
Others college challenges	-	-	-	-	-
Grand Total Mean					1.298
Responses Key 1: Yes 2: No					

Source: Field Data (February 2013)

From the findings it is indicated that the mean score of 1.5 is the decision point to judge the college challenges towards application of ICT in teaching and learning process (decision point was obtained by adding number of response key and divided by total number of response key 1+2 = 3/2 = 1.5). Therefore mean score of responses below 1.5 shows more intensity of college challenges facing tutors towards application of ICT in teaching and learning process while the mean above 1.5 shows that less intensity of college challenge. The research findings show there were more of college challenges that were facing tutors in application of ICT in the teaching and learning process (Grand mean score from respondents = 1.298 were obtained by all mean scores of respondent). The mean score of 1.298 shows that tutors were faced with many college challenges in application of ICT in teaching and learning process as presented in table 4.6 above.

Furthermore, as indicated from finding respondents pointed out intensity of college challenges towards application of ICT in teaching and learning process involved

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college had lack of technical support (Mean of response score = 1.20), college had inadequate ICT infrastructures (Mean score from respondents = 1.22), poor ICT policy/project implementation strategy (Mean of response score = 1.22), limited college budget (Mean of response score = 1.24), non-integration into the college curriculum (Mean of response score = 1.28), absent of college ICT plan (Mean of response score = 1.30). The research results further shows that less intensity college challenges is restrictions in ICT access (Mean of response score = 1.52), as presented in table 4.5 above.

These findings have revealed that administrative issues lack of strong policy in TCs and poor management on the parts of TCs seemed to hinder effective use ICT in teaching and learning process. For instance, there is no ICT policy at the college level which explains on how tutors were engaged in teaching and learning process by using ICT in TCs. This implies that administrative issues had greater impact on the applicability of ICT in teaching and learning process.

It also indicates that they were likely to possess some required knowledge and skills about ICT facilities. These findings resemble to Murphy and Gunter (1997) study on technology integration: The importance of administrative support of Educational Media which found teacher educators needs more knowledge and experience on how to use ICT facilities in teaching and learning activities. This finding also implies that tutors are not confident in using complicated modern technologies because ICT has been considered as science subjects as the result of lack knowledge and skills.

Biographic data also shows college challenges of application of ICT in teaching and learning process is based on both male and female respective. Observation conducted during the working hour researcher didn’t see any tutors used scanner to import graphic in subject but few tutors use white board in teaching and learning activities instead large intensity of tutors were used traditional way of teaching by using chalk board. In term of educational qualifications show that those who hold diploma in education were faced intensity personal challenges compared to those who hold bachelor degree in education and master’s in education which possessed enough

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knowledge and experiences. Therefore, college should provide special training to tutors who had diploma in education they need intensity training on how to use ICT facilities in teaching and learning activities. Additional, teaching experiences on the observation which were conduct revealed that those who had 1-2, 3-4 and 5-6 have small intensity college challenges in the use ICT in teaching and learning process because had possessed enough knowledge of ICT facilities.

These findings have revealed that lack of enough infrastructures support seemed hinder tutors to use ICT in teaching and learning process as presented in table 4.7 below.

Table 4.7 1Observation checklist

Availability										**Condition**					
ICT facility	**Bunda TC**			**Tarime TC**			**Total**			**Bunda TC**			**Tarime TC**		
	R	A	S	R	A	S	R	A	S	G/O	P/N	NA	G/O	P/N	NA
Computers laboratories	2	2	-	2	2	-	4	4	-	2	-	-	2	-	-
Computers	160	80	80	150	50	I00	310	130	180	42	30	8	34	12	4
Projectors	5	2	3	5	1	4	10	3	7	1	1	-	1	1	-
White boards	10	3	7	10	4	6	20	7	13	3	-	-	4	-	-
Scanners	3	2	3	3	3	-	6	5	1	1	1	-	3	-	-
Photocopies	3	2	1	3	1	2	6	3	3	2	-	-	1	-	-

KEY: R = Required A = Available S = Shortage NA= Not Applicable G = Good O = Operating P = Poor N= Not NA = Not Applicable

Source: Field Data (February 2013)

These findings have revealed that lack of enough infrastructures support seemed to hinder tutors to use ICT in teaching and learning process for instance computers was not enough for instance the total number of required computers is 310 but the total number of available computers were 130 while the total number of shortage computers 180 of Bunda and Tarime. Moreover, projectors are not enough total number of required projectors were 10 while total available projectors were 3 and shortages of projectors were 3. Additional, total available required white boards were 10 but

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available were 7 and total shortage white boards were 13. However, total numbers of required scanners were 6 but available 5 while shortage was 1. Thus, the numbers of required photocopies were 6 but available were 3 while shortage was 3 as presented in table 4.7 above.

On the other hand, the data extracted from the interview guides revealed that Principals, Academic deans and Heads of ICT department mentioned that there were major challenges faced by tutors which hinder effective application of ICT in teaching and learning process in Bunda TC and Tarime TC; pointed challenges such as reluctance by tutors to use ICT in the teaching and learning process in their respective subjects, donor funded project which might affect the project, lack of enough knowledge, the use of out dated technology, lack of enough ICT facilities compared to the number of tutors and student teachers, stability of the network provider and power interruption.

However, in secretarial application there was a problem related with photocopying machines. Through interviews Academic dean from Tarime TC said:

> *''Here in our college photocopying is a problem. We have two photocopying machines but they have not been serviced hence they are functionless. Currently we have only one photocopying machine and when we beg from the college to use it we are normally answered by harsh language and we are refused us to use it".*

Thus implies that photocopies machine is one of the problem in both Tarime TC and Bunda TC. Observation (Appendix B) revealed that the required photocopy machine in Tarime TC is 3 while available is 1 and the available photocopy machine did not work proper.

Moreover, the researcher deployed also the documentary review to find out the personal challenges towards application of ICT in teaching and learning process in TCs. Such documents that were reviewed included: a book by Resta (2007) entitled Survey of ICT in in Education in Africa: A survey of ICT and Education in Africa 53 Countries Reports. Washington DC. Englewood Cliffs Publication, it was observed

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that the application of ICT in education was faced by college challenges. The following college challenges observed inadequate infrastructure, power interruption, shortage of man power and poor ICT policy.

4.4 Strategies for Effective use of ICT in Teaching Learning Process by Tutors

The study intended also to elicit appropriate strategies that would help to improve effective use of ICT in enriching curriculum implementation in TCs. The findings were collected from all 46 respondents. Through questionnaires and interviews were data integrated in order to come up with alternative strategies for the effective use of ICT in enriching curriculum implementation in TCs. The results of the findings collected through questionnaires are as presented in table 4.8 bellow.

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Table 4.7 2 Strategies for Effective use of ICT in Teaching Learning Process in TCs

Appropriate strategies	Responses					Total	Std. Deviation	Mean
	1	2	3	4	5			
Classrooms to be well-equipped with ICT facilities	29	11	1	3	2	46	1.385	1.76
Organize more courses and seminars to help to change the mindset of the tutors by exposing them to current development in the ICT field	30	13	1	-	2	46	.751	1.46
Provide more teaching materials to tutors, e.g. PowerPoint to replace/complement textbook/ hand notes	30	12	2	1	1	46	.863	1.50
More training to tutors on pedagogical use of ICT	25	18	2	-	1	46	.690	1.54
Wireless Internet access at college	26	13	6	-	1	46	.802	1.61
College should have college level ICT plan	29	15	1	-	1	46	.655	1.43
More human Resources in ICT and technical support	31	14	-	-	1	46	.610	1.37
College should organize staff development programs regularly, sharing skills and ideas among staffs	34	11	-	-	1	46	.591	1.30
Conduct Monthly meetings on discussion regarding ICT use	22	18	5	1	-	46	.840	1.70
Others Strategies	-	-	-	-	-	-	-	-
Grand Total Mean								1.518
Responses Key 1:Strong agree 2:Agree 3:Not sure 4: Strong disagree 5: Disagree								

Source: Field Data (February 2013)

From the findings it is indicated that the mean score of 3 is the decision point to judge the strategies which should be done in order to make effective application of ICT in teaching and learning process (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 below 3 shows tutors agreed in large extent the proposed strategies towards effective application of ICT in teaching and learning process while the mean above 3 shows that tutors agreed in less and the mean below 3 show tutors agreed in large intensity the proposed strategies of application of ICT in teaching and learning process as presented in table 4.6 above.

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However, the respondents were not convinced much on that the proposed strategies towards application of ICT in teaching and learning process is classrooms should be well-equipped with ICT facilities (mean of response score = 1.76). Furthermore, the research results show that the proposed strategies that were agreed to large extent included that colleges should organize more courses and seminars to help to change the mindset of the tutors by exposing them to current development in the ICT field (mean score of respondents = 1.46), followed by college should provide more teaching materials to tutors, for instance PowerPoint to replace textbook/ hand notes (mean of response score = 1.50). On the other hand, the research findings depicted that the proposed strategies were agreed to small extent included college should have wireless internet access at college (mean of response score = 1.64). College should have more human resources in ICT and technical support (mean of response score = 1.37) and college should organize staff development programs regularly, sharing skills and ideas among staffs (mean of response score = 1.30). Additional, the research findings depicted that the respondents agreed to in less extent that college should conduct monthly meetings on discussion regarding ICT use (mean score of respondents = 1.70) as presented in table 4.7 above.

On the other hand, interview was used to get in depth information from the respondents. The interview guide was conducted to Principals, Academic deans and Heads of ICT departments mentioned several strategies in order to make effective applicability of ICT in enriching curriculum implementation in TCs. That is when they were asked to outline what should be done to improve the use of ICT in enriching curriculum implementation in TCs respondents were able to mentioned several strategies such as government to buy new computers to replace the old ones, to encourage in house training and peer to peer learning, to make the use of ICT in enriching curriculum implementation to be compulsory for all tutors, the government to provide enough computers and other ICT facilities like projectors and government should increase funds to support sustainability of ICT facilities, government should provide financial support to TCs, ICT should be taught in all levels of education, ICT should be examinable like other subjects and to encourage tutors to interact with ICT in their daily life.

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Government could by new computers to replace the thin client computers. These findings have revealed that thin client computer very complicated and need enough knowledge, experiences and special attention. For instance when the server getting problems also thin client computers didn't operates. This implies that thin client computers had greater impact on the applicability of ICT in teaching and learning process.

To encourage in house training and peer to peer learning in TCs. Government could put greater intensity in house training and peer to peer learning in TCs in order to enable tutors to acquire enough ICT knowledge in how to use ICT facilities in teaching and learning activities. For instance in house training enable tutors to be current on the technological development of ICT. This implies that in house traing and peer to peer training of ICT facilities had greater impact on the applicability of ICT in teaching and learning process.

Government should provide financial support to TCs. Government could provide financial support to TCs so as to by new ICT facilities and to make services for the ICT facilities which were corrupted or damaged. Financial support also leads TCs to conduct in house training, pear to pear training and to prepare workshops or seminars which could enable tutors to acquire basic skills of ICT use in teaching and learning process.

ICT should be taught in all levels of education. Government through MoEVT could make sure that ICT is taught in all level of education from primary school to higher level of education. This could enable tutors students to have enough knowledge and experience of the modern technology hence could make effective integration of ICT in education.

Moreover, the researcher deployed also the documentary review to find out the strategies towards application of ICT in teaching and learning process in TCs. Such documents that were reviewed included: a book by Hayashi (2007) entitled ICT use in

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Education and teacher training in Japan: Retrieved from World Wide Web: http://www2unescobkk.org/education/ict/v2_2/inf it was observed that in the process of application of ICT in teachers training there are various strategies. The following strategies observed provision of training to teacher educators, insisting in the use of ICT in teaching and learning activities and making of ICT is the compulsory course for all students.

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CHAPTER FIVE

DISCUSSION OF THE RESEARCH FINDINGS

5.0 Introduction

This chapter presents the discussion of the research findings. It discusses what was revealed after analyzing the research data in relation to the research topic, conceptual framework and literature review. It further gives an interpretation of the study findings.

5.1 The Extent to which ICT is Applied in Teaching and Learning Process by Tutors

From the findings, it was seen that at least each respondent pointed one or more than one application of ICT in teaching and learning process in TCs. However, among the applications of ICT in teaching and learning process in TCs were: ICT was used to create teaching aid like visual graphics, charts and drawings, carrying out power point presentation, ICT was used as a search engines to find educational resources that support teaching, ICT was used to download resources which is useful for teaching in subject area, the use of scanner or digital camera to import graphics, photos and text for presentation, the use of computer to prepare scheme of work and lesson plan and the use of word processor (writer), database (base), presentation (Impress) and spreadsheets (calc) into subject area curriculum.

Other applications of ICT in TCs according to the interviews were DVDs was used to study various materials, keeping students records, ICT used to interact with other institutions, ICT being used to compare and contrast students' performance that were pointed out by respondents as others application of ICT in enriching curriculum implementation in TCs.

In brief, 1.807 grand mean score from responses indicates out that there is the large extent of application of ICT in teaching and learning process. For instance during interviews one of the Academic deans from Bunda TC illustrated that ICT facilities is more applicable in teaching and learning process for instance tutors uses ICT to

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download materials which is useful in their subject, the researcher discovered that one of the respondents use ICT to facilitate teaching and learning process.

Another interviews of Academic dean at the Tarime TC confirmed that ICT was used in teaching and learning process. He said that: "*Now a day the work was more interesting because the projector is used to make presentation instead of using traditional way of teaching by using blackboard and chalk".*

Moreover, according to study findings, application of ICT in the teaching and learning process in Bunda and Tarime TCs increase interaction in the classrooms, ICT contribute to the sharing of different ideas between tutors and student teachers, ICT simplifies the teaching and learning process and encourage and support independent learning to students. One of the Principal from Bunda TC said that: *"ICT enables to interacts with my student and facilitates independent learning"*

Furthermore, the study result indicates that ICT facilitate in teaching and learning activities because tutors use ICT to down load materials which is useful in their subject areas and use ICT facilities like computer to make power point presentation, videoconferencing through multimedia delivery to web sites which can be used to meet the challenges tutors face today. One interviews of Head of ICT department from Tarime TC said: *"ICT helps student teachers and tutors to interact nicely with the materials compared to previously time".*

It was also revealed that the perceived benefits of using ICT in Bunda TC and Tarime TC include making teaching-learning interesting; helping the distance learning programme; helping tutors to be updated; enhancing quality of work by both teachers and students. This finding corroborates with what Dellit (2001) agreed that the application of ICT makes institutions more efficient and productive and enhances and facilitate pedagogical activities. Similarly, Evoh (2009) posited that the fact that ICT is accurate, fact and reliable and has the capacity to store and disseminate large information within the shortest periods, makes it a veritable and indispensable instrument for distance education programme.

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Through documentary review, because of rapid development of ICT especially the internet, traditional initial teacher training chalk and blackboard as well as in service continued training institutions worldwide are undergoing a rapid change in the structure and content of their training and delivery methods of their courses (Evoh, 2009). However, combining new technologies with effective pedagogy has become a daunting task for both initial teacher training and in-service training institutions. The researcher discovered that tutors have positive views on the application of ICTs in teaching and learning process at Bunda TC and Tarime TC but they still cannot fully maximize the potential of ICT in teaching and learning process because they do not have enough skills and knowledge on pedagogical use of ICT especially in teaching and learning activities. This is in agreement with Issa (2008) who asserts that clearly TCs can go only so far to encourage ICT use, but actual take-up depends largely on tutors' personal feelings, knowledge, ability, skills and attitude to ICT in general. It is a common misconception that access to technology on its own motivates tutors to apply it in their teaching (Goktas et al, 2009). Blurton (1999) argued that the current belief is that ICT is not only the backbone of the information society but also an important catalyst and tool for inducing educational reforms that change our students into productive knowledge workers. In fact, application of ICT in teaching and learning process in Bunda TC and Tarime TC needs acquisition of sufficient knowledge in using ICT in the teaching and learning of various subject areas.

5.2 Challenges facing Tutors when Applying ICT in Teaching Learning Process at Bunda TC and Tarime TC

From the findings, it was seen that at least each respondent mentioned one or more than one challenges facing when applying ICT in teaching and learning process in TCs. However, among the prevailing challenges in TCs were personal and college challenges.

Others personal challenges facing tutors when applying ICT in the teaching and learning process in Bunda TC and Tarime TC according to the research findings were that teaching is becoming one of the most challenging professions in our society where knowledge is expanding rapidly and much of it is available to student teachers as well

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as tutors at the same time. As new concepts of learning have evolved, tutors are expected to facilitate learning and make it meaningful to individual learners rather than just to provide knowledge and skills. Modern developments of innovative technologies have provided new possibilities to teaching professions, but at the same time have placed more demands on tutors to learn how to use these new technologies in their teaching in TCs. These challenges ask tutors to continuously retrain themselves and acquire new knowledge and skills while maintaining their jobs.

Apart from that, lack of enough knowledge and experience brings discornfort to tutors in using ICT, which poses as great personal challenge to the applicability of ICT in enriching curriculum implementation in TCs. Tutors admitted that they do not have enough pedagogical skills on how to use ICT in enriching curriculum implementation. The successful integration of ICT into the classroom depends on the ability of tutors to structure their learning environments in non-traditional ways and merging technology with new pedagogies (Issa, 2008).

Moreover, the research findings show that lack of enough knowledge and experience can be a necessary but not sufficient factor since there are other personal challenges which can hinder or discourage tutors to use ICT in teaching and learning process. The research finding shows that other personal challenges constituted lack of competence to tutors and resistance to change among tutors. It is also noteworthy observed that in Bunda and Tarime TCs there is a huge gap between ideal and reality of application of ICT. The knowledge of the technical support personnel regarding instructional use of computers may be an important condition for facilitating staff development in the TCs which help effective utilization of ICT facilities in the teaching and learning process.

Issa (2008) asserted that resistance to change among tutors is inevitable. Even if ICTs are available in every corner of the TCs in Tanzania, the pedagogical use will still be minimal if tutors in TCs were not ready for changes. The Academic dean from Tarime during the interview had the following to say: *"Resistance for changes among the tutors leads to fear to use ICT because most of the tutors they believe that the use of*

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ICT in classroom can also replace them as the result of the lack of proper knowledge on how to use ICT facilities in teaching and learning activities".

On the other hand, it was depicted that a 1.298 grand mean score from response in TCs shows that there were confirmed more college challenge faced by tutors when applying ICT in the teaching and learning process. The college challenges such as financial constraints like limited budget to control ICT facilities and lack of financial to conduct in house training, peer to peer training. Administrative constraints like poor management implementation of the ICT project in TCs and poor coordination between MoEVT and the Principals of the TCs. Technical problem like lack of technical support, inadequate ICT manpower in the TCs and lack of technical knowledge on how to use ICT facilities in the teaching and learning activities. Policy issues like, poor ICT policy/project implementation strategy in TCs.

However, according to the research findings (1.33 mean scores of response) agreed limited budget in TCs towards implementation of ICT project identified as the main college challenge. This went hand in hand with the level of the country's economy and income and conforms to what by Best (2004) who indicated that infrastructure necessary for deploying technological resources is lacking in low-income countries. Principal from Bunda TC in interviews said that:

> *"ICT in TCs is the donor oriented project which depends on them for funds from the fund".*

Furthermore, observation revealed that ICT facilities were not enough in Bunda TC and Tarime TC that acts as obstacle towards effective applicability of ICT in enriching curriculum implementation. For instance computers was not enough the total number of required computers is 310 but the total number of available computers were 130 while the total number of shortage computers 180 of Bunda and Tarime. The shortage of 180 computers is very high which hinder applicability of ICT in teaching and learning activities at Bunda and Tarime TCs.

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The study indicated that irregular power supply is a major challenge facing the application of ICT in TCs in the country. The power interruption is a national phenomenon that has a detrimental effect on all sectors of the economy. This can also be attributed to low level of funding in the college system for if TCs are well funded, the management of the TCs could always make provision for alternative power supply in the TCs. This finding supports Issa (2008) observed that irregular power supply in the country is a major obstacle to the usage of ICT in all TCs.

Despite the challenges hindering the effective use of ICT in curriculum implementation in TCs, the study revealed that ICT to some extent is applied, integrated and had added value in enriching curriculum implementation in the studied TCs. Tutors indicated a wish to see classrooms equipped with computers, projectors and television so that they could fully utilize ICT in enriching curriculum implementation. One the interviews Heads of ICT department from Tarime TC said that:

> *"To some extent ICT has been integrated but not as effectively as we wish or needed due to various problems happening".*

Therefore, although there is the problems facing tutors in the use of ICT in teaching and learning process but tutors continue to use ICT facilities in enriching curriculum implementation in TCs.

5.3 Tutors Strategies for Effective Use of ICT in the Teaching and Learning Process in TCs

The research findings provided 1.518 grand mean scores of response in TCs showing that respondents agreed with the identified strategies for effective applicability of ICT in the teaching and learning process in TCs. These strategies were that provision of training/development programs, supply of teaching and learning materials, brings in/supply technical support, creation of strong policy, emphasis on the interactional skills. Others strategies mentioned during interviews were:

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5.3.1 College should provide ICT facilities

TCs should provide more teaching materials to tutors, e.g. PowerPoint to replace textbook/ hand notes and traditional way of teaching. ICT teacher training can take many forms. Tutors can be trained to learn how to use ICT or tutors can be trained VIA ICT. ICT can be used as a core or a complementary means to the teacher training process (Jung, 2001).

5.3.2 College should provide training to tutors/ Staff development program

Effective use of ICT in enriching curriculum implementation in TCs is without tutor's ability to use, integrate and evaluate ICT use pedagogically. It is essential that potential users have a sound understanding of how to use new ICTs beneficially and a cultural view of the relationship between learning and technology (Sakamoto, 1995). Many efforts are needed especially in teacher education and ongoing teacher professional development. Issa (2008) insist that two of the most important supports for ICT integration into teaching and learning are effective Initial Teacher Education (ITE) and Continuing Professional Development (CPD). There should also be continuous and periodic training of tutors on computer and ICT skills acquisition. This helped to provide them with practical and functional knowledge of the computer, the internet and associated areas of ICT with the hope of integrating it with instructional methods of teaching and learning process.

5.3.3 Cost effective strategies

On the other hand, the study showed that TCs needed to adopt cost-effective strategies because most of TCs have limited resources and must make decisions based on cost-effectiveness. The teacher training experiences provide several cost-saving strategies (Jung, 2001). The government should increase funding for the entire TCs with emphasis on ICT which would help to improve the level of ICT facilities in the TCs.

5.3.4 Government support and investment of ICT in TCs

Support and investment in teacher trainer training is important for the adoption of ICT for teacher training. TCs in Tanzania indicate the importance of providing a variety of both formal and informal TCs systems so that trainers could take advantage of the

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methods which suit them best. According to Issa (2008) shows that to enlist staff support and involvement, it is useful to: Employ a variety of teacher trainer training methods ranging from face-to-face workshops to online self-study programs depending on training objectives and environments, and integrate informal support into the formal teacher trainer training system so that the less experienced tutors can obtain timely assistance.

5.3.5 Corroboration with other international agencies

National and international partnerships across public and private sectors need to be formed to share resources; knowledge and experiences in providing effective and efficient ICT in TCs. Issa (2008) asserted that ICT teacher training efforts made by organizations have shown training advantages of international collaborations and benefits of using ICT for teacher training. One of such advantages of international collaboration is to bridge the gap between ICT haves and have-nots. Governments or teacher training institutions should promote national and international partnerships so as to provide incentives for private participation and investment of ICT in TCs.

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CHAPTER SIX

SUMMARY, CONCLUSION AND POLICY IMPLICATION

6.0 Introduction.

This chapter aims at concluding what have been discussed in the preceding chapters and making necessary conclusion and recommendations for dealing with applicability of ICT in enriching curriculum implementation in TCs in Tanzania. This chapter will also provide areas of further research.

6.1 Summary of the Study

The objective of the study was to investigate the applicability of the ICT in enriching curriculum implementation in the TCs in Tanzania. It examined tutors access to modern technology, to examine the extent to which the ICT is applied by tutors in the teaching and learning process in TCs, to identify the challenges facing tutors when applying ICT in the teaching and learning process in TCs and to establish the strategies for effective use of ICT by tutors in the TCs.

The study was framed within constructivist learning theory by Piaget (1971), as well as conversational learning theory by Pask (1971) and independent learning theory by Pask (1971). The study covered theoretical framework related to the applicability of ICT in teaching and learning, categories of contribution ICT in teaching and learning process, applications of ICT in TCs, technology integration for instructional preparation, technology integration for curriculum implementation, challenges facing ICT in education and strategies to improve ICT use in education. This discussion focuses on research findings specific to the role of ICT in teaching and learning. Evidence from the literature establishes the following conclusions regarding the ways in which ICT could transform education.

- ICT is useful and relatively easy to transform educational activities.
- There were no researches conducted in Tanzanian context to explore tutors applicability of ICT in teaching and learning activities that promote the use of ICT in TCs context. This justified knowledge gap to be filled in this study.

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The study drew an exploratory research designs to accomplish its objectives. It employed both quantitative and qualitative research approach. There were 46 respondents who included 2 principals, 2 Academic deans, 2 ICT heads of departments and 40 tutors. The disclosed information in this study was sought through questionnaires, interviews and observation. The quantitative data were analyzed by using SPSS and presented by using descriptive statistics such as mean and standard deviation while qualitative data were analyzed through content and thematic analysis.

6.1.1 Tutors extent of application of ICT in teaching and learning process

The findings disclosed that were ICT is used to create teaching aid like visual graphics, charts and drawings, carrying out power point presentation, ICT is used as a search engines to find educational resources that support teaching and ICT is used to download resources which is useful for teaching in my subject, use of scanner or digital camera to import graphics, photos and text for presentation, use of computer to prepare scheme of work and lesson plan and use of word processor (writer), database (base), presentation (Impress) and spreadsheets (calc) into the subject area in teaching and learning activities.

6.1.2 Challenges facing tutors when applying ICT in teaching and learning process

The findings revealed that there are personal challenges facing tutors in the teaching and learning activities. These personal challenges were lack of skill with ICT, lack of confidence in using ICT, insufficient knowledge of appropriate software, and insufficient knowledge of how to use ICT equipment's, lack of knowledge of how to evaluate the use and role-played by ICT in teaching and learning lack of technical support. Lack of knowledge indicates inability to use ICT in teaching.

The findings continued to reveal that the college challenges were college had inadequate ICT infrastructures, college had lack of technical support, restrictions in ICT access, frequent electricity interruption, absent of college ICT plan, non-

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integration into the college curriculum, poor ICT policy/project implementation strategy, inadequate ICT manpower in the college, limited college budget poor management on the parts of college administrators and government. Inadequate ICT infrastructures indicate inability to integrate ICT in teaching and learning activities.

6.1.3 Tutors strategies for effective use of ICT in teaching learning process

Findings disclosed that the majority of tutors agreed that government to buy new computers to replace the old ones, to encourage in house training and peer to peer learning, to make the use of ICT in enriching curriculum implementation to be compulsory for all tutors, the government to provide enough computers and other ICT facilities like projectors and government should increase funds to support sustainability of ICT facilities, government should provide financial support to TCs, ICT should be taught in all levels of education, ICT should be examinable like other subjects and to encourage tutors to interact with ICT in their daily life.

6.2 Conclusion

In this study an attempt was made to find out the role of ICT in teaching and learning activities through the applicability of ICT in enriching curriculum implementation in the teaching and learning activities of the tutors. Although ICT facilities have been associated with computers, printers, scanners, televisions, radios, projectors and white boards. I wanted to find out whether ICT facilities applied in teaching and learning activities. However, the findings did not intend to generalize all Tanzanian TCs simply because applicability of ICT in enriching curriculum implementation may differ from person to person and place to place. The study intended to provide insights on the applicability of ICT in enriching curriculum implementation to tutors, Academic deans, Heads of ICT departments and Principals of the colleges in teaching and learning activities.

The findings indicate that majority of the respondents (tutors, Heads of ICT departments, Academic deans and Principals) perceive the positively on applicability of ICT in enriching curriculum implementation. A positive applicability about ICT in enriching curriculum implementation in the teaching and learning activities results in

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positive attitude in ICT usage thus makes them to be willing to applying ICT in teaching and learning. This is because positive attitude is an important indicator of willingness and first step in effective applying of technology in teaching and learning (Issa, 2008). However, the ideal integration of ICT in teaching and learning may take effect in schools and colleges, if and only if barriers are minimized. It should also be noted that while barriers to technology application may never be eliminated, successful technology integration empowers educators to successfully manage the barriers they face with the technology that is available to them (Kopcha, 2010).

This study is very potential to fill the gap by providing a detailed guide for developing a new approach to diagnosing and resolving applicability of ICT in enriching curriculum implementation in TCs and eventually encourages MoEVT, Principals of the college and tutors to collaborate in finding the responsible solutions of ICT problems among tutors in TCs for the mutual benefits of the MoEVT, TCs and national at large.

In the light of comprehending applicability of ICT in enriching curriculum implementation in TCs the researcher adopted the path model which is adapted from Brockett and Hiemstra (1991). The model consists three parts, first parts is infrastructure support, multi support and ICT training. The second part of this model is of ICT practice, readiness and ICT competence and the last part consists of enrichment of curriculum implementation. The model was considered suitable for and determining matters on applicability of ICT in enriching curriculum implementation in TCs.

Basing on literature review and findings of the study, it is worth to conclude that, the extent of application of ICT in teaching and learning process in TCs are; to create teaching aid like visual graphics, charts and drawings, to carry out power point presentation, to use scanner or digital camera to import graphics, photos and text for presentation, to use search engines to find educational resources that support teaching and learning in my subject, to use computer to prepare scheme of work and lesson plan, to use of the word processor (writer), database (base), presentation (Impress)

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and spreadsheets (calc) into my subject area curriculum, to use ICT to download resources useful for teaching in my Subject.

Meanwhile, challenges facing tutors when applying ICT in teaching learning process include personal challenges such as lack of technical support, insufficient knowledge of how to use ICT equipment's, lack of knowledge of how to evaluate the use and role-played by ICT in teaching and learning, insufficient knowledge of appropriate software and lack of skill with ICT.

Additionally, college factors/challenges such as inadequate ICT infrastructures, lack of technical support, restrictions in ICT access, frequent electricity interruption, lack of college ICT plan, poor ICT policy/project implementation strategy in TCs, inadequate ICT manpower in the college, limited college budget, poor management on the parts of college administrators and government are mentioned as major impediments to the use of ICT in enriching curriculum implementation in TCs in Tanzania.

Apart from that, strategies for effective use of ICT in teaching learning process in TCs include government should provide more training to tutors, college should organize staff development programs regularly, sharing skills and ideas among staffs, college should have more human resources in ICT and technical support, college should have college level ICT plan, college should provide more training to tutors on pedagogical use of ICT in teaching and learning process, college should provide more teaching materials to tutors, e.g. PowerPoint to replace textbook/ hand notes seminars and discussion on ICTs use could be helpful to them.

6.3 Recommendations

Based on the findings and conclusion of the study the following recommendations are proposed for effective use of ICT in enriching curriculum implementation in TCs:

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6.3.1 To Teachers Colleges

In order to promote effective applicability of ICT in enriching curriculum implementation in TCs there are various initiatives that should be taken by Principals, Academic deans, Heads of ICT department and tutors, some of which include:

- Principals of the TCs should encourage and motivate tutors to use ICT in their daily teaching and learning activities. This can only happen through visiting in the classroom during the normal teaching hours to see the actual behaviors of the tutors because Principals is the heads of the TCs.
- Establishment of college level ICT use plan. Heads of ICT departments should make strong and clear plans on ICT use. TCs need to have college level ICT plan, which will set clear goals and plans on how to motivate ICT use in enriching curriculum implementation in TCs. College plan will be useful in conducting college level meetings, tutors' team works and seminars and organize how to give technical and professional support to tutors.

- Academic deans as the head of academic issues in TCs should emphasize good utilization of the few resources available in enriching curriculum implementation is very important as a start. Though resources are not enough compared to number of user, both tutors and student teachers, cannot wait any longer if we desire progress in ICT use, there is a need for plans and clear objectives to use even the few infrastructure in the meantime.

- Tutors should be ready to use the available few ICT facilities in teaching and learning activities because tutors are well prepared in universities and are equipped with Technological Pedagogical Content Knowledge (TPCK), on how to use ICTs in enriching curriculum implementation.

6.3.2 To Ministry of Education and Vocational Training

- Teachers department at the MoEVT as the responsible for controlling TCs should make sure that enough fund allocation on ICT matters in TCs as other important matters in education, there is need for more investment in

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infrastructure, seminars and courses for tutors and students teachers on ICT use. Financial assistance should be done on different types of ICT so as to make proper investments on ICT in TCs to replace the old infrastructure system. We cannot continue to depend on donors. Government and particularly associate ministry MoEVT should think on allocating budget enough fund in TCs.

- ICT unit under the teacher department at the MoEVT should make sure that proper implementation, monitoring and evaluation of the ICT project in TCs. The available ICT facilities in TCs should be effectively monitored and evaluated so as to support applicability of ICT in enriching curriculum implementation in TCs. This monitoring and evaluation should be conducted at the end of each years in which could enable to understand ICT facilities required in the TCs.

- Teachers departments under the MoEVT should emphasis on pre-service training and preparation only equip tutors with basic computer knowledge; it's high time to figure out how pre-service training can be equipped with pedagogical knowledge to be able to teach their subject with ICTs. Ongoing professional development for in-services tutors is also crucial in empowering teachers not only for ICT matters but also for other innovation and improvement in teaching and learning process. This could be enable tutors to acquire knowledge and basic skills on the application of ICT in the teaching and learning activities.

6.3.3 To Policy Makers

There is a need to review Education and Training Policy (ETP) of 1995 in order for to accommodate changes in time that are occurring everywhere in the world. ETP must reflect currently issues taking place. For instance, issues like Public Private Partnership (PPP), Privatization, the role of NGOs and many others of this kind are some of the key issues which should be reflected in

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ETP. ETP should be clearly monitored and evaluated systematically by MoEVT. Therefore, the government should put proper ICT policy in education in order to make effective applicability of ICT in TCs.

6.3.4 Direction for Further Study

The study was conducted in Bunda and Tarime district in Mara Region, focusing on one Diploma TC and one Grade "A" TC. The findings of this study were limited to the researched area and theme. Considering the importance of applicability of ICT in enriching curriculum implementation in TCs for improvement of education in Tanzania as a whole, the researcher calls upon further research in the subject matter to examine other TCs on applicability of ICT in enriching curriculum implementation to see similarities and differences of the problems.

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APPENDICES

Appendix A: Questionnaire for Principals, Academic deans, Heads of ICT departments and Tutors

Dear Sir/ Madam

I am Said Noyi, a postgraduate student at Mzumbe University. Currently, I am conducting a study on, The ***Applicability of Information and Communication Technology in Enriching Curriculum Implementation in Selected Teachers College in Tanzania.*** The aim of this questionnaire is to get views about the issue understudy. In this study, ICT is used to include Computers, Internet, and Television, LCDs, DVD and other related technologies. It is expected that your views will help to improve the teaching by using ICT and consequently lead to applicability of ICT in enriching curriculum implementation in the TCs. Be informed that the views collected from you will be used for the purpose of this study only and not otherwise.

A. Biographic data

1. Sex: Male [ ], Female [ ]
2. College_____ District_____
3. Teaching Experience_____
4. Highest education qualifications: Diploma in Education ( )
   Bachelor of Education ( ) Masters of Education ( )

B General Information

4. Do you have knowledge of ICT: Yes ( ), No ( )
5. Do you attend short course of ICT: Yes ( ), No ( )

.

6. Use the scale provided below to show the extent to which ICT facilities are applied in teaching and learning process. Choose only one response and tick (√) in the respective column where applicability means. 1: Large Extent (51% - 100% of lessons taught in academic year) 2: Small Extent (10% - 50% of lessons taught in academic year) 3: None (0% - 9% of lessons taught in academic year)

Application of ICT	**Responses**		
	1	**2**	**3**
To create teaching aid like visual graphics, charts and drawings.			
To carry out power point presentation			
To use scanner or digital camera to import graphics, photos and text for presentation			
To use search engines to find educational resources that support teaching and learning in my subject.			
To use computer to prepare scheme of work, lesson plan and lesson notes			
To use the word processor (writer), database (base), presentation (impress) and spreadsheets (calc) into my subject area curriculum			
To use ICT to download resources useful for teaching in my subject			

7. Other application _____

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8. What are personal challenges towards effective applicability of ICT in teaching and learning activities? Tick (√) under the appropriate 1 stand for Yes or 2 stand for No response against each problem statement as you deem appropriate.

Problems	**Response**	
	1	**2**
Lack of skill with ICTs		
Lack of confidence in using ICT		
Insufficient knowledge of appropriate software		
Insufficient knowledge of how to use ICT equipment		
Lack of knowledge of how to evaluate the use and role-played by ICT in teaching and learning		
Lack of technical support		

9. Others personal challenges if any? _____

10. What are college and other factors/challenges towards effective use of ICT in enriching curriculum implementation in Teachers Colleges? Tick (√) under the appropriate 1 stand for Yes or 2 stands for No response against each problem statement as you deem appropriate.

Problems	**Responses**	
	1	**2**
Inadequate ICT infrastructures		
Lack of technical support		
Restrictions in ICT access		
Frequent electricity interruption		
Absence of college ICT plan		
Non integration into the college curriculum		
Poor ICT policy/project implementation strategy		
Inadequate ICT manpower in the college		
Limited college budget		
Poor management on the parts of college administrators and government		

11. Others college challenges (not specified above) _____

.

12. Use scale provided to show what should be done to improve effective use of ICT in enriching curriculum implementation in TCs and tick (√) in the respective column.

1: Strongly Agree (SA) 2: Agree (A) 3: Not Sure (NS) 4: Disagree (D)

5: Strongly Disagree (SD)

Recommendations	**Responses**				
	1	**2**	**3**	**4**	**5**
Classrooms well-equipped with ICT facilities					
Organize more courses and seminars to help to change the mindset of the tutors by exposing them to current development in the ICT field					
Provide more teaching materials to tutors, e.g. PowerPoint to replace/complement textbook/ hand notes					
More training to tutors on pedagogical use of ICT					
Wireless Internet access at college					
College should have college level ICT plan					
More human resources in ICT and technical support					
College should organize staff development programs regularly, sharing skills and ideas among staffs					
Conduct monthly meetings on discussions regarding ICT use					

13. Other recommendations _____

Thank you for your participation

.

Appendix B: Observation checklist

Availability										Condition					
ICT facility	**Bunda TC**			**Tarime TC**			**Total**			**Bunda TC**			**Tarime TC**		
	R	A	S	R	A	S	R	A	S	G/ O	P/ N	N A	G/ O	P/N	NA
Computers laboratories															
Computers															
Projectors															
Televisions															
White boards															
Scanners															
Printers															
Photocopies															

KEY: R = Required

A = Available

S = Shortage

NA= Not Applicable

G = Good

O = Operating

P = Poor

N= Not

N = Not Applicable

.

Appendix C: Interview Guide for Principal of the Colleges

Dear Sir/ Madam

I am Said Noyi, a postgraduate student at the Mzumbe University. Currently, I am conducting a study on the ***Applicability of Information and Communication Technology in Enriching Curriculum Implementation in Selected Teachers Colleges in Tanzania.*** The aim of this interview is to get views about the issue under study. In this study, ICT is used to include Computers, Internet, Television, LCDs, DVD and other related technologies. It is expected that your views will help to improve the teaching by using ICT and consequently lead to applicability of ICT in enriching curriculum implementation in the colleges. Be informed that the views collected from you will be used for the purpose of this study only and not otherwise.

A. Biographic data

1. Sex: Male [ ], Female [ ]
2. Teaching experiences_____
4. Highest academic qualification_____

B. Interview questions

1. Do you have the ICT facilities in the college?
2. How do you empower and encourage tutors to use ICT in their daily teaching and learning activities in the classroom?
3. What do you think are the major challenges towards effective use of ICT in enriching curriculum implementation?
4. Which strategies do you employ to improve the use of ICT in enriching curriculum implementation in your college?
5. What do you think should be done to support effective use of ICT in enriching curriculum implementation in your college?

Thank you for your participation

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Appendix D: Interview Guide for ICT Heads of Department

Dear Sir/ Madam

I am Said Noyi, a postgraduate student at the Mzumbe University. Currently, I am conducting a study on ***Applicability of Information and Communication Technology in Enriching Curriculum Implementation in Selected Teachers College in Tanzania.*** The aim of this interview is to get views about the issue under the study. In this study, ICT are used to mean Computers, Internet, Television, LCDs, DVD and other related technologies. It is expected that your views will help to improve the teaching by using ICT and consequently lead to applicability of ICT in enriching curriculum implementation in the colleges. Be informed that the views collected from you will be used for purpose of this study only and not otherwise

A. Biographic data

1. Sex: male [ ], female [ ]
2. Teaching Experiences _____
3. Highest academic qualification_____

B. Interview questions

1. What kind of technical support do tutors need in their daily use of ICT in enriching curriculum implementation?
2. What kind of technical support is available in the college to help tutors use ICT in enriching curriculum implementation in their everyday teaching activities?
3. What do you think are the major challenges towards effective use of ICT in enriching curriculum implementation in Teachers Colleges?
4. What do you think tutors need for effective pedagogical use of ICT in enriching curriculum implementation?
5. What should be done to improve the use of ICT in enriching curriculum implementation?

Thank you for your participation

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Appendix E: Interview Guide for Academic Dean

Dear Sir/ Madam

I am Said Noyi, a postgraduate student at the Mzumbe University. Currently, I am conducting a study on, ***Applicability of Information and Communication Technology in Enriching Curriculum Implementation in Selected Teachers College in Tanzania.*** The aim of this interview is to get views about that issue under study, ICT is used to include Computers, Internet and Television, LCDs, DVD and other related technologies. It is expected that your views will help to improve the teaching by using ICT and consequently lead to applicability of ICT in enriching curriculum implementation in the colleges. Be informed that the views collected from you will used for purpose of this study and not otherwise.

A. Biographic data

1. Sex: Male [ ], Female [ ]

3. Teaching experiences _____

4. Highest academic qualification_____

B. Interview questions

1. Do tutors use the available ICT during their lessons?

2. In which ways are the available ICT facilities currently being used in enriching curriculum implementation in the college?

3. What do you think are the major challenges towards effective use of ICT in enriching curriculum implementation in TCs?

4. What should be done to improve the use of ICT in enriching curriculum implementation in TCs?

5. What do you think should be done to help tutors apply ICT in enriching curriculum implementation in TCs?

Thank you for your participation

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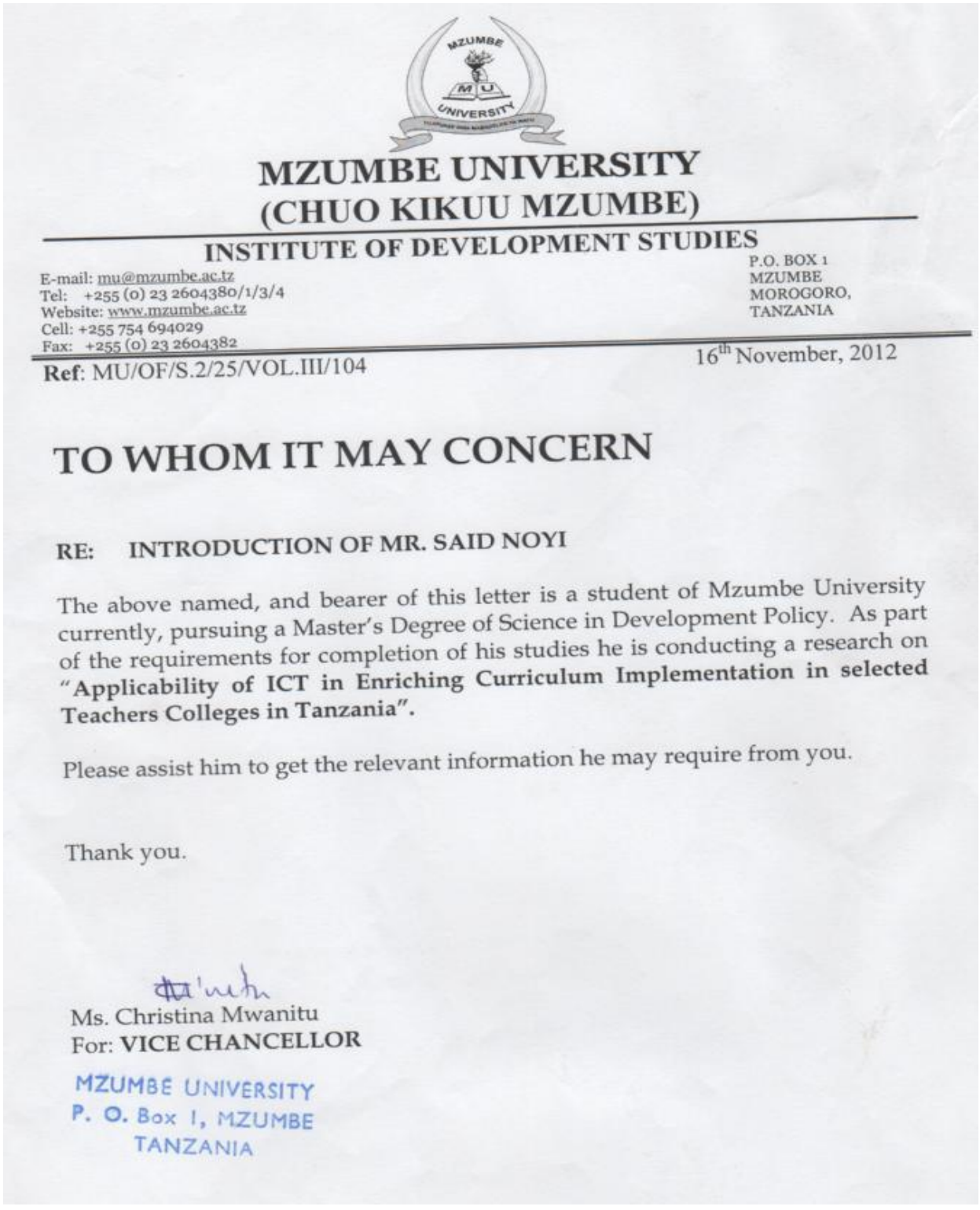
Appendix F Introduction letter



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16th November, 2012

TO WHOM IT MAY CONCERN

RE: INTRODUCTION OF MR. SAID NOYI

The above named, and bearer of this letter is a student of Mzumbe University currently, pursuing a Master's Degree of Science in Development Policy. As part of the requirements for completion of his studies he is conducting a research on **"Applicability of ICT in Enriching Curriculum Implementation in selected Teachers Colleges in Tanzania".**

Please assist him to get the relevant information he may require from you.

Thank you.

Ms. Christina Mwanitu
For: **VICE CHANCELLOR**

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