USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES FOR TEACHING AND LEARNING AT MZUMBE UNIVERSITY IN TANZANIA

BY

STEPHANO NALAILA
E55/24794/2011

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF EDUCATION (COMPARATIVE AND INTERNATIONAL STUDIES) IN THE SCHOOL OF EDUCATION, KENYATTA UNIVERSITY
DECLARATION

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

[Signature]

STEPHANO NALAILA (E55/24794/2011) DATE

Department of Educational Foundations
Kenyatta University

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

[Signature]

PROF. DANIEL. N. SIFUNA DATE

Department of Educational Foundations
Kenyatta University

November 24TH 2015

PROF. IBRAHIM. O. OANDA DATE

Department of Educational Foundations
Kenyatta University
DEDICATION

This thesis work is dedicated to my son Nevin, and a fountain of my inspiration, my wife Plasida
ACKNOWLEDGEMENTS

I am grateful to my supervisors, Prof. Daniel Namusonge Sifuna and Prof. Ibrahim Ogachi Oanda, for their guidance and support they provided to ensure that the final report was up to standard. I would like also to commend the guidance and support from Dr. Kamere, on behalf of the Department of Educational Foundation at Kenyatta University from the commencement of my scholarship at the University. I too acknowledge the crucial role of my sponsor, on behalf of Mzumbe University, the management team of Faculty of Social Sciences.

Special gratitude to my wife Plasida and son Nevin; words can never convey how much I appreciate your support in bringing out the best in me while away. It was not just easy to say bye when I left for this accomplishment! You became a beacon of hope when things seemed to be falling apart. I express my sincere thanks to my in-laws Mr. and Mrs. Chalamila, who took a delicate responsibility to look after my family when I was away for this task. I am also indebted to my lovely father, Mzee Kilolama and Mother Salome (Naimaeli) and Agnes (Namukoma); brothers, sisters and friends (Msabila and the late William) for their instrumental role in making it a reality.
# TABLE OF CONTENTS

DECLARATION ...................................................................................................................... i
DEDICATION ........................................................................................................................ ii
ACKNOWLEDGEMENTS ....................................................................................................... iii
TABLE OF CONTENTS ....................................................................................................... iv
LIST OF TABLES .................................................................................................................... ix
LIST OF FIGURES ................................................................................................................ x
LIST OF ABBREVIATION AND ACCRONYMS ................................................................ iv
ABSTRACT ........................................................................................................................ xiii

## CHAPTER ONE
INTRODUCTION AND BACKGROUND TO THE STUDY ...................................................... 1

1.1 Introduction ................................................................................................................... 1
1.2 Background to the study ............................................................................................... 1
1.2.1 The use of ICT for teaching and learning in African universities ......................... 4
1.2.2 The use of ICT for teaching and learning in Tanzanian universities ..................... 6
1.2.3 The use of ICT for teaching and learning at Mzumbe University ......................... 11
1.3 Statement of the Problem ......................................................................................... 12
1.4 Purpose of the Study ............................................................................................... 13
1.5 Objectives .............................................................................................................. 13
1.6 Research Questions ............................................................................................... 14
1.7 Significance of the Study ....................................................................................... 15
1.8 Limitations of the Study ....................................................................................... 15
1.9 Delimitations of the Study ...................................................................................... 16
3.4.2 Students' sample

3.4.3 Administrators

3.4.4 Technical support team

3.5 Research Instruments

3.5.1 Questionnaires for lecturers and students

3.5.2 Semi-structured interviews with administrators

3.5.3 Documentary review

3.5.4 Observation checklist

3.5.5 Focus Group Discussions

3.6 Reliability and Validity of the study

3.6.1 Reliability of the study

3.6.2 Validity of the Study

3.7 Data Collection procedures

3.8 Data Analysis Procedures

3.9 Logistical and Ethical Considerations

CHAPTER FOUR

FINDINGS, INTERPRETATION AND DISCUSSIONS

4.0 Introduction

4.1.1 Demographic information of respondents

4.1.2 Lecturers gender, age and ranks

4.1.3 Students' years of study, gender and age

4.1.4 ICT supporting administrators

4.2 Range of ICTs to support teaching and learning at Mzumbe University
LIST OF TABLES

Table 3.1: Sampling techniques and sample size ....................................................... 54

Table 4.1: Lecturers and Students Schools or Faculties ........................................... 67

Table 4.2: Lecturers' gender, age and ranks distribution ........................................... 68

Table 4.3: Student respondents' age distribution ....................................................... 70

Table 4.4: Qualification of the ICT technical team members .................................... 71
LIST OF FIGURES

Figure 1.1: The use of ICTs for learning .................................................. 19
Figure 2.1: The continuum of ICT-based teaching and learning practices .......... 24
Figure 4.1: The Moodle server at Mzumbe University .................................. 73
Figure 4.2: Responses on the range of ICTs at Mzumbe University .................. 74
Figure 4.3: Lecturers' incorporation of on-line into face to face instructional activities .. 86
Figure 4.4: Delivery modes for specific ICT based T/L activities ........................ 87
Figure 4.5: Learning Platforms in use at Mzumbe University ............................ 89
Figure 4.6: Photos of some ICT infrastructure at Mzumbe University ................. 96
Figure 4.7: Adequacy of ICTs for teaching and learning at Mzumbe University ...... 98
Figure 4.8: Basic computer skills among lecturers and students at Mzumbe University 101
Figure 4.9: Lecturers' competence for on -line activities .................................. 103
Figure 4.10: Competency areas deemed necessary from teaching and learning .......... 104
Figure 4.11: Perception of the importance of ICT in teaching and learning .......... 108
LIST OF ABBREVIATION AND ACRONYMS

COSTECH  Commission of Science and Technology

DICT  Directorate of Information Communication and Technology

D & M  DeLone and McLean

EHR  Electronic Health Record

ESDP  Education Sector Development Plan

EMIS  Education Management Information System

GeSCI  Global e-School and Community Initiatives

HEDP  Higher Education Development Plan

ICTs  Information and Communication Technologies

ICT4D  Information and Communication Technology for Development

ICT4E  Information and Communication Technology for Education

IS  Information System

IUCEA  Inter-University Council of East Africa

JICA  Japanese International Cooperation Agency

KENET  Kenya Education Network

LMS  Learning Management System

LCMSs  Learning Course Management Systems
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mbps</td>
<td>Megabytes per second</td>
</tr>
<tr>
<td>MoEVT</td>
<td>Ministry of Education and Vocational Training</td>
</tr>
<tr>
<td>MOOCs</td>
<td>Massive Open Online Courses</td>
</tr>
<tr>
<td>MU-STP</td>
<td>Mzumbe University-Strategic Development Plan (2012-17)</td>
</tr>
<tr>
<td>NREN</td>
<td>National Research Networks</td>
</tr>
<tr>
<td>NICTBB</td>
<td>National Information Communication and Technology Backbone</td>
</tr>
<tr>
<td>NICTP</td>
<td>National ICT Policy</td>
</tr>
<tr>
<td>PHEA</td>
<td>Partnership for Higher Education Africa</td>
</tr>
<tr>
<td>SARUA</td>
<td>Southern African Regional Universities Association</td>
</tr>
<tr>
<td>STHEP</td>
<td>Science and Technology Higher Education Project</td>
</tr>
<tr>
<td>TDV 2025</td>
<td>Tanzania Development Vision 2025</td>
</tr>
<tr>
<td>URT</td>
<td>United Republic of Tanzania</td>
</tr>
<tr>
<td>UNECA</td>
<td>United Nations Economic Commission of Africa</td>
</tr>
<tr>
<td>UNDESA</td>
<td>United Nations Department of Economic and Social Affairs</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
</tr>
<tr>
<td>VSAT</td>
<td>Very Small Aperture Terminal</td>
</tr>
</tbody>
</table>
ABSTRACT

Public Universities in Tanzania are struggling to use Information and Communication Technologies (ICTs) to support different teaching and learning strategies. Although there were indicators for some ICT operations at Mzumbe University, the situation of the ICT use for teaching and learning remained unclear. The objective of this study was therefore to explore the use of ICT and range of infrastructure available to support teaching and learning at Mzumbe University (MU) in Tanzania. Using an exploratory design, the study sought to obtain the more context-specific information on the actual use of the ICTs at Mzumbe University. The selection of Mzumbe University was purposively done with a motivation to capture the use of ICT in teaching and learning in public universities. This study utilised both random and purposive sampling techniques to obtain a total of 752 participants, mainly lecturers, students and administrators who are part and parcel of the planning, designing and implementation of the technology use in teaching and learning. The study used both quantitative and qualitative instruments of data collection in order to elicit both quantifiable and qualitative information on the use of the ICTs. As such, it employed questionnaires (for lecturers and students), interviews (for administrators), Focus Group Discussion (with the technical support team), documentary reviews and an observation checklist in order to draw from diverse perspectives. The data was analyzed mainly qualitatively using descriptive statistics to strengthen the answer to major research questions. Results of qualitative analysis were presented in both narrative and quotes forms while those from descriptive statistics were expressed in terms of frequencies and percentages and presented in tables and graphs. The findings of the study indicate that, despite some efforts by the university to procure a range of infrastructure and facilities to support ICT use for teaching and learning, such use ICT for the prescribed teaching practices (blended learning) remained very low, almost non-existent. The available ICT infrastructure and facilities at the university were still underutilized; only used as a tool for typing notes, PowerPoint presentation, sharing lectures notes and email communication among lecturers and students. Findings also indicate that the prescribed ICT use at the university was fraught with challenges such as lack of awareness about the availability of certain ICTs, limited competency among lectures and students in using the ICTs, uneven distribution and inadequacy of some infrastructure. The study recommends that the university mobilize support from the government and other education stakeholders to resolve these challenges in order to realize the prescribed ICT use targets. Recommendations are made for further research to track the trend of ICT use, quality and usability of the ICTs available and motivational mechanisms to promote sustainable ICT use in universities.
CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Introduction

This chapter presents a background to the study, entailing situations which necessitate the use of ICT in teaching and learning at global, regional, country and case-institutional contexts. The section also shows the situation regarding the available initiatives and ICT use capacity in Africa in general and Tanzania in particular with some lights from the developing regions, which justified the necessity of this study. The chapter further presents the statement of the problem and the research objectives and questions. It also highlights the anticipated significance of the study; experienced limitations and delimitations of the study. The chapter too presents the theoretical and conceptual frameworks which guided this particular study, the operational definition of key terms as well as the way the thesis is organized.

1.2 Background to the study

The Information and Communication Technology for Development of various sectors (ICT4D) constitute an absolute necessity in the socio-economic development strategies in both developed and developing countries. ICTs in the world are now a pillar closely linked with the attainment of the Millennium Development Goals (MDGs) and country-specific Development Visions (United Nations Department of Economic and Social Affairs-UNDESA, 2010). In education context, the use of ICT has been divided into two broad categories: ICT for Education (ICT4E) and ICT in Education. ICTs for education (ICT4E) signifies the development of ICT specifically for teaching and learning
purposes, while the ICTs in Education involve the adoption of various components of ICTs in the teaching learning process (United Nations Educational, Scientific and Cultural Organization-UNESCO, 2012). Globally, the use of ICTs in education is sought to remove learning barriers, expand access to learning opportunities and promote the best learning practices (Garrison and Vaughan, 2008). However, the actual use of ICT to achieve the intended ends remains critical among countries and educational institutions that studies have been called to track and therefore document the situation.

Global interest in the use of ICTs in education has been stimulated both by the potential offered by these technologies and by the complex problems facing education systems worldwide (Bates, 2014; The Inter University Council of East Africa-IUCEA, 2008). In higher education, these include an increased demand for access to education; rising costs, shrinking budgets and an increasing need for flexible education. La Rocque and Latham (2003) cited in IUCEA (2008) estimate that the global demand for higher education is expected to grow from an enrolment of 48 million in 1990 to 159 million in 2025 with an annual growth rate of 3.5 percent. In Africa there is a growing demand for post-secondary education and up to 93% of the college-aged population is not in college due to the high cost and limited access (Mayeku, 2014). In Africa and Asian countries, where student enrolments have more than doubled, the number of full-time teaching staff increased by less than 50% (UNESCO Institute for Statistics, 2014). Studies in Africa also show that there is an ageing cohort of well trained teachers, coupled with heavy workloads in school settings (Southern African Regional Universities Association-SARUA, 2012). All these justify the need for the use of ICT as a tool to mount both access to and quality education for both rural and urban settings.
Despite an increasing emphasis for the ICT use in teaching and learning at regional, National and institutional levels, there is a mixed experiences what ICTs are available and how these are actually being used between the developed and the developing countries and institutions. As higher education institutions in the developed world increasingly automate most applications of ICTs in teaching and learning, most of them in Sub-Saharan Africa lag far much behind (World Bank, 2007). These variations emerge due to the differences in availability and adequacy of the ICT infrastructures and technical capacity to use them (Association of African Universities-AAU, 2009; SARUA, 2012). This suggests that, education institutions in Africa and the rest of the developing world must mobilize more budgets to procure more ICT infrastructures and train teachers and students to use the ICTs for quality teaching. This study sought to establish if universities have managed to put in place adequate ICTs and trained the lecturers and students to use the particular ICTs to mount the teaching strategies they (universities) desire.

This study was triggered by the trends emphasized by the United Nations Education and Cultural Organization (UNESCO) towards a knowledge-based economy which underscores the importance of universities as repositories of valuable human capital to help secure shares in the global market. According to UNESCO (2014), the accelerating shift to high-technology and information technology economies require sustained human resource development and training. Driven by globalization and pressures to teach and train knowledgeable, skilled and competitive professionals, many universities have acknowledged a huge challenge to increase access to higher education and improve the quality of higher education against the stark reality of decreasing resources. Fundamental
to the creation of qualified human resources is an accessible, effective and efficient higher education system, particularly when governments are counting on university graduates to be competitive in creating wealth for their respective countries. Universities are compelled to be innovative and lead by example in using cutting edge technology to meet these expectations. The study therefore focused at university level because of this trust vested to the universities as champions for different innovations in education and economies.

1.2. The use of ICT for teaching and learning in African universities

A review by Hannessy et al (2010) indicates that policies, plans and development projects in countries and universities in Africa increasingly commit to invest and integrate ICT in teaching and learning to deliberately improve the quality of education in formal and informal settings. The policies and plans also provide for procurement, maintenance as well as the use of ICT in education management. Training of lecturers and students in pedagogical application of the ICT and development of relevant curricula for teaching ICT at different levels of the school system are also emphasized. The role of coordinating different ICT investments in education, which were until recently uncoordinated and fragmented, has also been put under respective country ministries. The use of donors (in partnership with the governments) and a phased approach to investment in ICT in education by governments are some of the strategies set out to facilitate the policy objectives. Although the ICT policies are well-articulated statements, the researcher perceived it imperative, however, to explore evidence of what is practically happening in institutions in order to expose gaps that have to be addressed so as to enhance the learning process and outcomes.
Various initiatives and projects have been established in partnership or by individual donors, governments and universities to promote the use of ICT to support various teaching and learning strategies in residential and distance settings. For example, the African Information Society Initiatives (AISI) under the United Nations Economic Commission of Africa in the 1990s (UNECA 2010); the Partnership of Higher Education Africa-PHEA (PHEA, 2010); the UNESCOs ICT for Accessible, Effective and Efficient Higher education projects (UNESCO 2013) and the Inter University Council of East Africa (IUCEA) among others. The aim has been to provide support for ICT use of capacity through facilities such as bandwidth subsidies, administrative and technical support to enable effective ICT-based teaching and learning environments (UNDESA, 2010). The reports by UNESCO (2012) and USAID (2009) indicated that, countries in Africa, including Egypt, South Africa, Kenya, Tanzania, Ethiopia and Ghana, among others, are using ICTs to perform a range of teaching strategies to support campus based, distance and non-formal education. Critics were however noted indicating skepticism on the extent to which various projects have led to the attainment of the intended benefits at the universities and that so much need to be done to effect the ICT use in teaching, learning and the related functions (World Bank, 2007; InfoDev 2013).

Although the general impression may be that African universities still struggle under the constraints of supportive infrastructures, the use of ICT in teaching and learning is relatively recent and that only some of universities already have adequate ICT infrastructures, such hardware like computers, interactive boards and data projectors. Some of them also have installed software systems like Learning Management Systems (LMSs), subject specific program software and websites; and services like high speed
internet connectivity, reliable power and technical support such as software upgrading and installation, virus protection, and performance maintenance to enable a significant portion of on-line alongside face-to-face instructional activities. Despite these investments by donors and governments, the adoption and use of ICT to support teaching and learning remains rudimentary and inconsistent in many universities (the E-learning Africa, 2012). Gaps observed include not only whether or not the ICTs were available in the way universities state; but also on whether lecturers and students had competencies to use the ICTs. These gaps also reflected the observations by Kashorda and Waema (2011) that, many African universities lack evidence for ICT use capacity, which demanded both country and institutional-specific studies to address it.

1.2.2 The use of ICT for teaching and learning in Tanzanian universities

The importance of using ICTS in education was first articulated in Tanzania through the National ICT Policy (NICTP) established in 2003. Its objective in education was replicated from the Tanzania Development Vision (TDV) 2025 of 1999, and later domesticated in the ICT Policy for the Ministry of Education and Vocational Training-MoEVT (2007) among others. The three documents reiterate the necessity of ICT to strengthen capacity of education institutions to carry out their academic functions. In line with a global view, the ICT use in Tanzania was expected to cater for quality and cost-effective instructions and curriculum; reduce tension and expand access on the available resources in educational institutions; and enhance the capacity of education institutions to accommodate more students (United Republic of Tanzania-URT, 2010; MoEVT, 2007; NICTP, 2003). For example, one of the National ICT policy objectives reiterates the desire for ICT as;
To promote the use of ICTs to improve the quality of delivery of education and training in all areas including distance learning, as well as to enhance the learning experience itself (NICTP, 2003; pg. 14).

The ICT Policy for the Ministry of Education and Vocational Training, which is a translation of the National ICT policy of 2003, envisioned the use of ICTs as to strengthen the teaching and learning with improved access, quality and management of education at all levels. It is conceived from this policy that, universities are entrusted with the role of promoting the development and application of science and technology into the national economy and contribute to better shape policies, strategic plans and improve decisions in education system (Msolla, 2007; MoEVT, 2007). Statement No 6.3.8 of the ICT policy for education states that;

Regarding this policy objective, higher education institutions are expected to ensure that the use of ICT is a paramount component of their strategic plans, and that teaching and learning is conducted by using the technologies in order to make education accessible, flexible and a public commodity.

Several changes necessitate the integration of ICT in the teaching and learning in Tanzanian universities to date. Despite an increase of higher education institutions from 4 before 1990s to 54 in 2008, Tanzania still registered the lowest Gross Enrolment Rate (GER of 1%) in East Africa (KENET, 2008; Trust Africa, 2012). The demand for the university education in particular has continued to increase due to the increased graduation rate at the lower levels caused by the Primary and Secondary education Development Programs (PEDP and SEDP) respectively (Mtebe & Raphael, 2013). Just like many other countries in the world, the advocacy for ICT use in teaching and learning in Tanzania dominates the reform agenda in education with hopes to expand access,
improve education quality and increase enrollment in the existing and new university institutions (URT, 2007; MoEVT, 2007; Trust Africa, 2012). While students’ enrollment continue to increase and the outcry of infrastructural constraints threaten the universities, there is evidence that the number of qualified lecturers has not proportionally increased (URT-HEDP, 2010; Trust Africa, 2012). The use of ICT to facilitate teaching and learning and other academic related functions has been agreed upon as intervention mechanism by both government and universities. Several initiatives have been documented in partnership or by individual parties directed to enhancing the use of ICTs in the universities. However, there lacks adequate evidence of what takes place at a classroom setting.

Some commendable initiatives have increasingly been undertaken to promote ICT use in universities. The government of Tanzania established its Education Research Network (TERNET) in 2008 for Higher Education Institutions to link up and exchange information among them, and improve research database and capacity to use ICT in teaching and learning (Trust Africa, 2012; KENET 2008). The recent roll-out of SEACOM marine cable has increased internet speed as well reducing telecommunication costs by 95% (Swarts & Wachira, 2010). The government also decided to remove all value added tax to ICT equipment so that universities and other education institutions could have access to adequate and quality ICTs for use in teaching and learning (Mtebe, 2013; Sife et al., 2007).

The MoEVT through the Science and Technology Higher Education Project (STHEP) has been implementing other intervention programs under the support of the World Bank, with emphasis on science, technology and education by ensuring availability of ICTs for
quality learning environments (Trust Africa, 2012). STHEP is also implementing Education Management Information System (EMIS) and e-Library system to support education and research activities, where the e-Library Management system is also ensuring the availability of digital content for the direct access by the end users. Reviews done for this study posed skepticism on whether the ICT policies and projects had enhanced the ICT use capacity of the universities for the desired teaching and learning, hence contributing to a thrust for this study.

Some universities in Tanzania, however, assert to possess ICT infrastructure such as connected computer labs, personal computers, digital libraries and various education management systems. These are mainly Learning Management Systems (LMS), such as Moodle, WEBCT, Blackboard, Cloud Computing and Local Area Network (LAN). Universities also reported to have subscribed to different Open Education Resources (OER). Of course, some universities had established ICT use in teaching and learning at varying levels. For example, the University of Dar-es-Salaam had been conducting some blended programs supported by the African Virtual University (AVU) and the Partnership for Higher Education (PHEA) (PHEA, 2009). The World Bank, DANIDA and the Commonwealth of Learning (COL) had been supporting the Open University of Tanzania to create networked regions for various teaching and learning activities (Bhalalusesa et al., 2013; Mtebe & Raphael, 2013). Reviewed studies showed serious challenges in these universities, which attributed to failure for effective ICT use. Some of them include poor connectivity, outdated resources, black outs and persistence of irrelevant trainings (Mtebe, 2013). This study was pressed by a wide range of claims of ICT use in teaching and learning, which however lacked research evidences.
The Tanzania Commission for Universities (TCU) is a quality regulatory organ in universities and other HEIs, in line with the National Qualification Framework (NQF) and the Tanzania Commission for Science and Technology-COSTECH (URT, 2010). Despite efforts coordinated by these organs, mostly procurement of technology resources, Tanzania Commission for Universities is challenged by the capacity to audit the ICT-based teaching and learning in the universities (World Bank, 2007; URT-Higher Education Development Program (HEDP), 2010). This implied that, each institution has to have its own quality control mechanisms in the technologies and use patterns. Unfortunately, both the TCU and the Tanzania Qualification Framework do not clearly articulate on when, at what stage and the nature of ICT-use trainings or competencies ought to be provided to lecturers. This also suggests that each institution has to have some arrangements to provide relevant types of trainings to lecturers and students. In this respect, the study sought to establish if the lecturers and students possess competencies they perceive supportive to mount quality use of the ICTs in the prescribed ICT teaching and learning practices.

Apparently, the use of ICTs in many Tanzanian universities is relatively recent, which suggests that new institutions would be having problems of funding to set up acceptable range of ICTs for teaching and learning. Nevertheless, the available research outputs on the state of ICT use was dominated by only few, namely University of Dar-es-Salaam, the Open University of Tanzania and Sokoine University of Agriculture, which manifests a huge information gap on the ICT use at the university level. It was however apparent that, major constraints which faced the universities were mainly high cost of acquiring, installing, operating, maintaining and replacing ICTs; policies and rules to support the
use, the level of ICT literacy of lecturers, their willingness to teach using ICTs and the readiness of students to use the ICTs for learning (Kashorda & Waema, 2014; 2011). The researcher perceived that, this information gap required more case studies to establish the practicality of the policies and plans of the universities and document what exactly exists; particularly, the actual use, range and adequacy of the ICTs, and the competencies and perception of lecturers and students to use the ICTs. The researcher therefore chose Mzumbe, a public university, which has ICT policy statements and plans, but yet its actual ICT use in teaching and learning remained uninvestigated.

1.2.3 The use of ICT for teaching and learning at Mzumbe University

The deployment of ICT at Mzumbe University was firstly made in 2009 by experts from the directorate of ICT and the support from Agder University (Norway) (Ghasia, 2009). The central aim was to enable a blend of traditional face-to-face and on-line teaching and learning strategies to expand access and improve teaching quality, communication for lecturers and students and information technology (IT) skills among students (MU, 2013; Ghasia, 2009). The university was part of many government and donor projects like EMIS and E-Library System, Last Mile connectivity of the STHEP and Gre@t project by VLIR-OUS from Belgium and Japanese International Cooperation Agency (JICA), which demonstrated commitment to build capacity for ICT use in teaching and learning. Theoretically, the use of ICT features strongly in the University Mission and Strategic Corporate Plan (2012-2017) for both residential and distance education delivery (MU, 2012). Part of one of the strategies in the Strategic Plan is to;

...improving student-computer ratio and access, supporting access to digital knowledge environment, putting requisite computer network infrastructure (Ethernet, wireless) for intranet and internet...,and deploying
In practice, however, the University lacked adequate research evidence on what and how ICTs were being used to support any teaching and learning strategy. The study was thus designed to explore the practical evidence on the range and adequacy of the ICTs to support the teaching practices prescribed at Mzumbe. In line with scholars like Kashorda and Waema (2008; 2014) and Swarts and Wachira (2010), the researcher also recognized the necessity of evidence for other factors like competences and perception of the lecturers and students on the use of such ICTs. This would bring out a clear picture of what and how the (ICTs) were actually being used in teaching and learning at the university.

1.3 Statement of the Problem

Despite the documented initiatives indicating some ICT operations at Mzumbe University, evidence the actual situation of the ICT use in teaching and learning remained unclear. This presented an of information gap on what has been achieved so far regarding the university and National policies, plans and desires for accessible and quality university education. In line with scholars like Kashorda and Waema, (2014), Nzuki (2014) and Mtebe, (2013), the key indicators include the availability of adequate ICT infrastructure, mainly hardware; software systems and ICT support services; and preparedness of both lecturers and students in terms of competencies and perception on the use of the technology. Previous reports by the University appraise an increasing ICT use for teaching and learning (MU, 2013; 2014); however, the reports do not offer adequate evidences for such increase. This study was therefore designed to fill this gap by specifically documenting details which constitute the range, adequacy and actual uses
of ICTs for the teaching and learning at the university. This information constitutes vital evidence for a situation and capacity for ICT use in teaching and learning. The researcher perceived that, the availability of these details would serve for recommendation for both research and policy implications in improving the teaching and learning processes and outcomes and expanding opportunities to access the education at the university.

1.4 Purpose of the Study

The purpose of the study was to explore the use of ICT in teaching and learning and the range of the ICT infrastructure available to support the practices at Mzumbe University. The study sought to establish whether and what gaps existed between what was documented in the policies, plans and reports on the use of ICTs for teaching and learning and what was actually taking place at the university.

1.5 Objectives

The study sought to accomplish the following objectives

i. Establish the range of available Information and Communication Technology infrastructure to support the prescribed teaching and learning at Mzumbe University

ii. Establish how the Information and Communication Technologies were being used in the teaching and learning at Mzumbe University

iii. Estimate the adequacy of the Information and Communication Technologies for the prescribed teaching and learning practices at Mzumbe University
iv. Find out the competencies students and lecturers possess for the use of Information and Communication Technologies for the teaching practices at Mzumbe University

v. Document the perceptions of students and lecturers on the importance of using Information and Communication Technologies in teaching and learning at Mzumbe University

1.6 Research Questions

The study therefore sought to answer the following questions

i. What are the types of Information and Communication Technology infrastructure available to support the prescribed teaching and learning by students and lectures at Mzumbe University?

ii. How are the Information and Communication Technologies being used in teaching and learning at Mzumbe University?

iii. Is the Information and Communication Technology infrastructure adequate to support the prescribed teaching and learning practices prescribed at Mzumbe University?

iv. Do lecturers and students possess supportive competences for using Information and Communication Technologies in the teaching and learning at Mzumbe University?

v. How do lecturers and students at Mzumbe University perceive/experience the importance of using the Information and Communication Technologies for the prescribed teaching and learning?
1.7 Significance of the Study

In the first place, the findings were anticipated to contribute to a body of knowledge on the capacity of Mzumbe University to utilize ICTs to mount teaching and learning. The findings were also meant to provide a basis for appropriate interventions by various stakeholders such as government and institutional administrators, donors and policy makers. In addition, the findings were meant to provide educational planners, implementers and policy makers with awareness on the amount and therefore the deficit on efforts taken to promote ICT accessibility and use in enhancing education reforms. The findings are therefore meant to offer a basis for evaluation on the return of the investments in ICT for teaching and learning in universities by different stakeholders. Lastly, the findings of this study were meant to provide recommendation for areas which needed further research and policy attention regarding the ICT-based teaching and learning practices at the university.

1.8 Limitations of the Study

The study was limited in a number of ways. From the outset, the process of data collection was ill-timed, as the researcher went to the field when both lecturers and students were pre-occupied with mid-semester assessment tests, which debilitated their readiness to participate in the study. It was also at a time when other students (undergraduate 3rd year and masters 2nd year) were out of college for field and research works respectively. Financial constraints posed another challenge in administering the study in all campuses. Moreover, the technical depth of the ICTs and its uses made it difficult (for the researcher) to capture the higher level of details on the ICT use in the teaching and learning.
1.9 Delimitations of the Study

The researcher had to spend longer time (than expected) in order to get adequate responses, as participants were busy with the mid-semester assessments. The variables, objectives questions and tools in this study were structured to explore the ICTs and how they are used to support the instructional strategies prescribed at Mzumbe University. Due to lack of detailed technical know-how in the area of ICT by the researcher, aspects like adequacy and competencies on ICTs were explored from users' perception as opposed to technical examination. Moreover, due to its case nature, the study results were not meant for generalization on the availability and use of the ICTs for teaching and learning in Tanzania. The results therefore provide a basis for more and comprehensive studies at Mzumbe, and only serve as a reference for studies in other educational institutions in Tanzania.

1.10 Theoretical and Conceptual frameworks

1.10.1 Theoretical framework

The study was guided by the *Information Systems (IS) Success Model* by DeLone and McLean-D and M (1992). The authors examined the literature on Information System (IS) success and developed a comprehensive taxonomy of factors contributing to the success of an information system. The IS in this model means a combination of hardware and software infrastructure and trained personnel organised to facilitate planning, control, coordination, and decision making in an organisation. The factors here include the following:
System Quality factor; this factor focuses on usability aspects and performance characteristics of the system under examination. It is commonly measured through perceived ease of use as a result of access, convenience/usability and flexibility.

Information Quality factor; this factor focuses on the quality of the information that the system produces (IS’s output) and its usefulness for the user, for example, the quality of instructions in the teaching. This factor can be measured through availability, adequacy and relevance of the IS.

Service Quality factor; represents the quality of the support that the users receive from the management, IS department and IT support personnel, such as, for example, training, policy guidance, or technical support. It may be measured through competence of the users, assurance, or empathy.

Intention to use or use factor; this represents the degree and manner in which an IS is utilised by its users. This can therefore be measured through the actual use and readiness to use as a measure of system success.

User Satisfaction factor; this is an overall satisfaction and efficiency of the IS by an individual or a group of users. It can be measured through the enjoyment, perception or attitude of the users on the importance of embracing the system.

Net benefits factor for IS success; this constitutes the extent to which IS are contributing to the success of an individual and an organisation. It is generally measured through the level of system efficiency or productivity and return on investment (ROI).

According to the De Loe and McLean (1992), the six factors are not independent indicators for measurement but influential factors whose level determine the success and productivity of any IS business/performance. For the sake of this study, the “Information
"System success" from the Model was borrowed to describe the success of the ICT use in the teaching and learning process and that the taxonomy of the factors in the model are fundamental in the success of the ICT use in teaching and learning (Net benefits). Some of the indicators of factors have been used as variables in this study; they include availability and adequacy of ICT infrastructures, competence and perception of lecturers and students to use the ICTs for teaching and learning. These constituted important aspects to determine the ICT use capacity and level.

The DeLone and McLean’s IS success model has been widely researched and used since its introduction in 1992 (DeLone & McLean, 1992; Petter et al., 2008). The model is multidimensional and widely cited to guide studies in several ICT applications in different contexts. The model was chosen to guide this study because it has been widely associated with positive outcomes of studies exploring and evaluating the ICT applications, mainly justifiable recommendations in the practical situation (cf. DeLone & McLean, 2008).

There is however a consensus that the success of any information system application is dependent on the dimensions of the IS model. For example, the results from the studies by Livari (2005) (on e-learning); Bossen et al. (2013) on electronic health record (EHR) show that perceived system quality (measured through ease of use) and perceived information quality (measured through availability and adequacy) are significant predictors of user satisfaction with the system. Perceived system quality (ease of use) was also a significant predictor of system use (actual use of the system). User satisfaction was found to be a strong predictor of individual impact and institutional net benefit. It is however unfortunate that much of the studies guided by this model were conducted in
contexts other than Tanzania; therefore this study only adopted the model to suit its purpose.

1.11 Conceptual framework

In line with the IS success Model, the current study likened the use of ICT in the teaching and learning to an Information System whose success requires a range and adequacy of ICTs available as independent variables. The competencies and perception of the importance of using the ICTs among lecturers and students constitute intermediate variables to determine success for the actual use of ICT in teaching and learning as a dependent variable.

Figure 1.1: the use of ICTs for and Learning

![Diagram showing the use of ICTs for teaching and learning with categories: Independent Variables, Mediating Variables, and Dependent Variable.]

Source: Researcher's own construct (2015)

From Figure 1.1, the availability and adequate ranges of ICTs constitutes important indicators of the use of ICT for teaching and learning. Nevertheless, for these ICTs to produce the required support in teaching and learning, they must be operated by persons (lecturers, students and technical support teams) with competence and positive perception for using the ICTs.
The De Lone and McLean's (M&D) IS model (1992) helped to derive a conceptual framework and thus determining the direction, process, and outcome of the study. The conceptual framework used in this study is a domestication of the M&D IS model, because it guided the study to explore aspects of the information system (ICT) success in teaching and learning at the study case.

The theoretical and conceptual frameworks provided a useful guidance for this study in several ways. The major six (6) factors in the Information System (IS) success model presented by M & D (1992) helped to define the indicators that are operationalized in the conceptual framework as variable for determining the ICT use for teaching and learning at the study case. These include the range and adequacy of ICTs, the users' competences and perceptions and the actual use pattern.

The Net benefit factor of the M & D IS success model, which describes the desired outcome of any Information System (IS), has been borrowed in this study to characterize the actual use of ICT in teaching and learning as a dependent variable. The Model was therefore helpful on how to gauge the features of an effective ICT use teaching and learning.

Both, the theoretical and conceptual frameworks were useful in defining the nature of the data to be collected (primary and secondary), how to collect and analyze (quantitatively and qualitatively) and thus interpret the data. These were possible mainly through the assessment mechanisms suggested in the model and adopted for the study (physical observation and counting, participants' perception).
1.12 Operational Definition of Terms

For the purpose of this study, the key terms used are defined in this section.

Information and Communication Technologies (ICTs)

These are taken to mean forms of technologies that are used to transmit process, store, create, and display share or exchange information by electronic means.

ICT infrastructure

In this study, the ICT infrastructure denotes a collection of the hardware, software systems and a mix of on-line and face-to-face instructional strategies.

On-line teaching and learning

This is specifically internet and web-based delivered teaching and learning, in and off campus.

Range of ICT infrastructure

In this study, the term range is used to mean varieties of the ICTs available, from where lecturers and students can make choice for use in teaching and learning.

Blended learning strategy

This refers to a teaching and learning approach in which portions of face-to-face activities are complemented with a portion of on-line activities.
1.13 The organization of the thesis

Chapter one presents the introduction, background of the study, statement of the problem, research questions and objectives, significance, limitation and delimitation of the study. It also presents the theoretical and conceptual frameworks, operational definition of terms and organization of the thesis. Chapter two presents the literature review from theoretical and empirical perspectives detailing on the range and use of ICTs for teaching and learning. Chapter three covers the methodologies, covering study design, justification of the study site, population sample and sample size, methods of data collection, validity and reliability, data collection procedures and analysis. Chapter four presents the findings, interpretations and discussion, thematically aligned to the research objectives and questions. Chapter five focuses succinctly on the summary of the main findings and conclusions based on objectives. Recommendations are also presented here based on the findings which call for policy and research attention. Lastly, the chapter ends with recommendations for both policy and research actions regarding the conclusion of the study.
CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction
This chapter presents empirical literature reviewed in line with the themes of the study objectives. These include, the ICT-based teaching and learning practices; the range of ICT infrastructure to support teaching and learning; adequacy of ICT infrastructure for teaching and learning; competences and the existing perception of the lecturers and students on the importance of the ICTs in teaching and learning. The chapter lastly synthesizes literature to illuminate and justify the research gap.

2.1 The ICT-based teaching and learning practices in universities
The reviewed literature indicated that, ICT has been used to enable a continuum of integrated teaching and learning practices. These range from “face-to-face” lead learning, distance learning, both a complete asynchronous or a synchronous time and place learning online mode”, and blended learning which combines instruction lead (face-to-face) learning with online learning activities leading to reduced classroom contact hours (Heinz et al., 2005; Bates, 2013)
After the non-use of any ICT at one end, following are applications like word processing, PowerPoint and other off-line ICTs which have little impact on learning and teaching strategies or the organization. At the other end are on-line (virtual) learning environments (VLEs), and managed learning environments (MLEs), that requires lecturer and students interact in a way that some or all teaching and learning are conducted on line. This can have significant impact upon the way learning and teaching strategies are organized (Sife & Lwoga, 2007). Obviously, the success at one stage may predict the performance status at the subsequent stage; and that the transition from one stage to the upper one in a continuum requires an availability of the relevant technologies and users' competence and positive attitude as critical requisites at any organization (cf. Bates, 2008; Heinz et al., 2005).

Universities and other higher learning institutions are facing challenges in the integration and use of ICTs in face-to-face teaching and learning in developing countries. Sife, et al., (2007) conducted a survey study in Tanzania to analyze challenges which faced the higher learning institutions in implementing e-learning application, with a focal reference to classroom face-to-face instructions. The findings pointed out that majority of
universities in Tanzania still used traditional face-to-face approach of teaching due to lack of awareness and systemic approach; lack of administrative support and mixed perceptions over the compatibility between the ICTs and the traditional approaches among others. The findings also show that, many universities in Tanzania possess basic ICT infrastructure such as Local Area Network (LAN), internet, computers, video, audio, CDs and DVDs, and mobile technology facilities that formed the basis for the ICT use to support teaching. However, the study did not describe the actual classroom situations and therefore, the experiences of individual universities still remained inadequately addressed.

Evidence from studies indicate that, the use of ICT has stimulated a blend of face-to-face and online teaching and learning strategies in many cases, hence an interest for certain studies in the world to explore the way this has been done. The study conducted by Kyalo and Hopkins (2013) at Kenya Medical Training College was meant to explore the acceptance and belief of the lecturers regarding the online learning approaches during time and financial constraints. Through questionnaires and group discussions, it was found that, although participants demonstrated a high degree of acceptance of on-line learning approach, critical issues were the high possibilities of drop-out rates due to difficulty of remaining motivated and self-directed. The study depicted some uncertainties for acceptance of an approach due to the nature of the subjects and the market mindset towards the courses delivered on-line. The findings recommended the use of blended learning because of the way it can trade-off the features of face-to-face and the online approach to create a more effective and flexible learning.
An exploratory study conducted by Azizan (2010) examined the implementation of the blended learning in Malaysian higher learning institutions. The researcher observed that, the requirement for the instructor and students to be in classroom on the day and time that have been designated in class schedule made it difficult to certain instructors and students. In addition, lack of enough instructors, classrooms and equipment in the classroom did not support effective teaching and learning process, hence the need for more flexible and perhaps part-time lessons. It was moreover noted that, the challenge was the amount of resources and support available in relation to what was required to support the prescribed strategy. It was recommended that, as institutions opt for the use of any ICT based teaching and learning strategy, infrastructure and environment support factors must be critically researched upon.

A study conducted at the UNISA by Globler (2013), on the challenges facing the higher education found out that, the shift to purely online teaching and learning platforms required significant investment in ICT infrastructures, re-engineering and capacity development and support for teachers and students which were the major challenges most of African countries are grappling with. A substantial number of scholars agree that blended learning combines the strength of face-to-face and on-line components to create the most efficient learning environment. For example, Garrison and Kanuka (2004) and Mtebe and Raphael (2013) acknowledged that the on-line environment provides opportunities for students to learn and express themselves in the written form while face-to-face discussions cultivates a sense of community and enable them to have enthusiasm that is spontaneous and contagious. A similar recommendation however features in many
studies on the necessity to invest much in ICT infrastructure and the related services and ensure training on how to use the ICTs for the desired teaching and learning strategies.

Empirical evidence shows that, despite the likelihood that the use of ICTs can create a good blend of face-to-face and on-line instructional activities to enhance both quality and access to education, such benefits have not been realized in some African countries. The study by Ssekakubo et al. (2011) which aimed at identifying barriers towards LMS-supported teaching and learning initiatives in developing countries found that, while the majority of these benefits are enjoyed by institutions in the developed countries, most ICT-based teaching and learning initiatives in developing countries have not been successful. The study confirmed high ICT illiteracy rates among the student community; low comfort levels with technology; usability issues of learning management systems; poor marketing strategies; ineffective maintenance strategies and insufficient user/technical support as reasons for the failures (cf. Kashorda and Waema, 2014; Mtebe and Rasimo, 2014).

A mixed methods study by Illomaki (2008) on the effects of ICT on school, teachers and students' perspectives in Finland, aimed at investigating the effects of ICT at school from teachers' and students' perspectives. The focus was on three main subject matters: ICT use and competence, teacher and school community and learning environment and teaching practices. The results indicate that in schools which had special ICT projects (ICT pilot schools) for improving pedagogy, these had led to real changes in teaching practices. Many teachers adopted student-centred and collaborative, inquiry-oriented teaching practices as well as practices that supported students' authentic activities, independent work, knowledge building, and students' responsibility. This was, indeed,
strongly dependent on the ICT-related pedagogical competence of the expert-teacher trainers.

However, the daily practices of some trainees still reflected a rather traditional teacher-centred approach. As a matter of fact, very few trainees ever represented solely, for example, the knowledge building approach; trainers used various approaches or mixed them, based on the situation, teaching and learning goals, and on their pedagogical and technical competence. In general, changes towards pedagogical improvements even in well-organised developmental projects were slow despite the project related expertise and support. This suggested a necessity for investigating the impact of the numerous ICT projects in universities in developing countries, on case basis, to draw insight of their impact, not only on the range of ICT infrastructure they put in place, but essentially if there is compatibility between the pedagogical training and the teaching and learning practices that they (projects) want to build on.

The reviewed literature presents a scenario where more flexibility for various practices of teaching and learning can be provided with a decision to choose between Learning Management System (LMS) and the Social Networks (SN) as tools. Pilli (2014) conducted a qualitative study in Cyprus to explore the extent to which social networking sites that had been used in the learning contexts could provide insights into the patterns of learning activities that were provided in Learning Management systems. The study was an attempt to answer the question: Can social networking sites replace LMSs? The findings indicated that, on one hand, the LMSs had been used to deliver and manage instructional content, identify and asses individual and organisational learning goals,
track the progress towards meeting those goals and collect and present data for monitoring the learning process of the establishment as a whole.

On the other hand, the role of social networking sites in higher education was much diversified; online social networks enabled learners and instructors to present themselves socially in an online environment and connect with one another while enabling individuals to engage in recurring meaningful experiences with others. Beside some issues against educational networking such as privacy, intellectual property, student desire, managing learning, the author dismissed claims that the LMS does not provide for interactions, and that the two can be used together. The way to do this was, however, left to be a matter of institutional arrangements; thus the current study was structured to explore if there was any teaching and learning activities, patterned along the two platforms.

Apparently, the situation of ICT-enabled teaching and learning practices in Tanzania and Africa in general constituted mixed experiences. It seems generally underdeveloped. Much of such studies have, however, been too general, failing to present the context-specific use of the ICT and the range of available supportive infrastructure. As a result, the actual picture of ICT use in individual institutions, particularly universities, remained too unclear and difficult to address. In response to this gap, this study was designed to document the ICT-use related teaching and learning practices taking place, as a way of justifying the availability and use of ICT at Mzumbe University. The findings of this study were also meant to help to reflect on the different initiatives by the universities, governments and donors to realize the institutional and the wider global visions of improving education provision.
2.2 The range of ICT infrastructure for teaching and learning

Substantial literature indicates that the range and adequacy of ICT infrastructure an institution can possess is a good measure of its readiness to use ICTs in teaching and learning (Kasorda and Waema, 2011; KENET, 2008). While Mishra and Koehler (2007) classified the ICT infrastructure into old and new, and analog and digital, this study like many other studies focused on the new and digital ICTs for a more flexible and quality delivery system. Such infrastructures include, but not limited to, Hardware and Software (both proprietary and open source) (computer labs, networked computers, Personal computers, data projectors, interactive boards, Learning Management Platform/Systems (LMSs), subject specific software, Websites for subjects, e-contents) and Support services (Bandwidth and internet connectivity, power sources (electricity and standby generators) and technical support (Sife et al., 2007; InfoDev, 2013).

The current study is in line with Kyalo and Mulwa’s (2013) study on the influence of ICT infrastructure on readiness to adopt E-learning in secondary schools in Kitui district in Kenya. The researchers came up with a view that, the availability of ICT infrastructure may be a sufficient measure of schools’ readiness to adopt e-learning only if reliable sources of energy are available. However, the scholars cautioned that, the question of a range of ICT infrastructure for teaching and learning need to be dealt with from institutional context as well as the prescribed teaching and learning practices in order to give a true picture of the specific operational environment. The implication stands that, the range of prescribed teaching and learning activities at a particular institution will determine the range and amount ICT tools to be made available, and consequently the types of users’ trainings. Thus, the current study drew a recommendation necessitating
case studies to be carried out to explore not only the actual teaching and learning practices, but also ICT infrastructure to cater for such practices at individual institutions.

A study by Nzuki (2014), which used secondary data to explore the theoretical and practical disparities towards *E-Learning Pedagogy Model in Africa* observed that, a significant number of ICT tools is made for optimal use in African higher education settings; however others were either lying idle, inappropriately used or had vanished into oblivion. Although some of the tools wasted away due to a mismatch between their design and the users’ particular needs, others never realized a significant use due to poor perceptive concerning the pedagogical strategies employed in training the user about optimal usage. For instance, recently, publicly available web-based social networking tools such as Facebook, WhatsApp, Google Docs, Delicious and Flickr had also been adopted in teaching and learning, with a lot of misconceptions from among teachers, students and administrators. Since this scenario might precipitate a major impediment to the realization of effective usage of the particular ICTs, it therefore required that, studies document the range of ICTs available and those considered relevant and useful to the prescribed needs.

**2.3 The adequacy of ICT infrastructure for teaching and learning**

Studies show that majority of African universities have limited access to adequate and up to date ICT infrastructure because of financial constraints, lack of awareness about the quality and lack of technical capacity to evaluate their worthy (Mtebe, 2013; IUCEA, 2008). This also suggests that only few universities have access to adequate ICTs for teaching and learning. The survey study by InfoDev (2013) aimed at establishing "Knowledge Maps" in the developing countries observed that; electricity grid was limited
to commercially viable areas missing out most of the schools in the rural areas. Furthermore, access to the internet was rare and expensive in Africa due to dependence on expensive satellite (Very Small Aperture Terminals-VSAT) connections.

The study conducted by Mitchel (2009) to evaluate donor ICT projects drew experience from Nigeria that, educational development projects and donors were not well informed of the quality and quantity details of the infrastructures they established in the developing countries because much of the publically available information about the quality of particular ICTs was generated by the companies who marketed such products and the related services. This suggested the importance to explore from individual cases, to find out the arrangements put to enable them to procure the ICTs and train their staff and students on the use of the particular technologies, which laid a basis for this study.

The survey study by Mtebe (2013) was designed to explore the potential of *Clouds computing* in facilitating the adoption of blended learning in Africa. It found that with the existing financial constraints, the procurement of quality ICT facilities is the most expensive. The author observed that, while some companies such as Google and Microsoft are available to offer quality ICT infrastructure at a low cost (for example Cloud computing), majority of HEIs lacked information to access such facilities. As a result, these facilities continued to be used in the developed countries and only few institutions in Africa. Mzumbe University which is a public funded university had been part in many government and donor funded project, for instance, the EMIS, Last Mile Connection, and E-library by government and World Bank), Great project (funded by the Belgium government). The motives of these projects had been to offer access to ICT infrastructure for teaching and learning (Trust Africa, 2012). The lack of follow ups on
different ICT projects in Africa (InfoDev, 2013) also meant an information gap on how much ICTs these projects delivered to the institutions. The findings of this study contributes to the understanding of what ICTs were exactly available, hence offering a more realistic picture to the donors and the governments on gaps which need much policy and research attention.

The survey studies by KENET in 2008 and 2013 aimed to establish the e-readiness in among the universities in East Africa and Kenya respectively. The authors observed that, East African HEIs still experienced inadequacy of ICT infrastructure for teaching and learning. The studies found that, university enrollment had increased to the point of forcing the budgetary increase by 100% in order to procure enough ICT infrastructure that majority of institutions could not afford. Generally, all the East African surveyed Higher Education Institutions had less than the recommended level of ICT infrastructure in relation to the demand. For example, majority of the HEIs in East Africa had not attained the recommended 10 Personal computers per 100 students and 4Mbps bandwidth per 1000 students in the campus, thus on-line interaction has been limited to emails and that students’ internet source still depended on cafés. In Kenya for instance, the internet budget dropped down from stage 1.9 in 2008 to 1.4 in 2013 due to increased enrolment. In addition, the network stability remained inadequately unimproved at 2.5, while the telephony infrastructure dropping from stage 2.1 in 2008 to 1.1 in 2013, which means that institutions were not ready for the Internet Protocol or IP-based video and web conferencing, a necessary component of on-line instructional delivery (Kashorda & Waema, 2008; 2014).
A study in Singapore by Teo (2006), on the observations of ICT-mediated lessons identified several barriers to teacher ICT-integration in the classroom. These barriers involve inadequate appointment of technical support staff, inadequate appointment and training of student ICT helpers, lack of sufficient time for teachers to prepare for ICT-mediated lessons, insufficient collaboration among teachers in preparing ICT-mediated lessons, lack of support provided by school leaders in addressing teachers' ICT concerns, and insufficient training and demonstrations or advice for teachers on how to incorporate ICT into classroom instruction. The study, however, did not show the realities of what was happening in classrooms as a result of such inadequacies in the identified infrastructure, which manifested a gap for further studies.

Theoretically, many institutions had made claims to use ICT for substantial on-line teaching and learning activities in Tanzania and Africa at large, which really required institutions to possess diverse and adequate ICT infrastructure (Mtebe, 2013; Sifeet al., 2007). However, up to date studies intended to quantify the available ICT infrastructure were still limited to few areas and institutions; for example Kenya in the East African countries (Kashorda & Waema, 2014). In Tanzania, studies focused only on some few universities such as University of Dar-es-Salaam, Sokoine University of Agriculture and the Open University of Tanzania, thus failing to be exhaustive. This study was meant to explore and quantify the range of available ICTs and justify the adequacy of these ICTs to support the available teaching practices at Mzumbe University.
2.4 Lecturer and students’ competences for ICT-use in teaching and learning

Effective use of ICT in teaching and learning requires lecturers and students to be able to integrate the use of ICT into teaching and learning; thus a vast array of competences needs to be developed, such as: creativity, flexibility, collaborating skills, and computer competence (Zhu & Angels, 2014). The availability of specific training related to the curricular and didactic usage of ICT tools and to the design and creation of teaching and learning practices more adapted to particular educational needs featured as one of the challenging issues in ICT use literature. These cover the relevance of training to the available ICTs; the relevance of ICT use training to prescribed teaching and learning practices and the compatibility between the training on ICT use for teaching and learning and the nature of the subjects to be taught; and what trainers believe to be a necessity versus what lecturers/teachers perceive to be.

Empirical studies indicate that, it is not uncommon that ICT infrastructure, such as a learning management system, automated assessment tools, wireless networks, computer laboratories and other devices are available, but lecturers and students choose not to take advantage of them. In this view, Ocak (2011) presented the findings of an exploratory qualitative case study which examined impediments that lecturers encountered in blended learning environments in the Turkish higher education system. The author noted that using ICTs in teaching could be highly complex and involve different teaching patterns, which, in turn, affect the effectiveness of ICT-based teaching and learning practices. An evaluative study on the paradigm shift in teachers’ professional development in Gambia by Mathew et al. (2010) found that, the World Bank’s World pilot project placed enough computers and internet connectivity but it never worked because teachers lacked
appropriate training and supportive environments to design and implement the learning approach. These experiences contributed insights to this study on the necessity to explore the nature of trainings offered to the ICT users, and if these were relevant to prescribed teaching and learning practices.

The study conducted by Amare (2010) which aimed at exploring the extent of ICTs in supporting pedagogical practices in developing countries observed that, many traditionally trained teachers were not trained to utilize the technologies in their daily teaching tasks. This is similar to the situation in Tanzania, where the recruitment of university lecturers and tutors was not taking into consideration the use of ICT as a pedagogical tool; leave alone the lack of pedagogical trainings which were not part in their academic qualifications. Anangisye (2011) and UNESCO (2012) further observed that, different professional development programmes were not addressing the key competencies in ways that empower the lecturers to accommodate the new educational innovations. For example, the study conducted at the Open University of Tanzania by Nihuka and Voogt (2012) revealed that trainings, workshops and many seminars had not led to improvements in the use of ICTs in teaching and learning.

Eid (2013) conducted a research to examine how ICT was applied in the classroom of Kuwait schools from the perspective of students, teachers and decision-makers. Based on four fundamental research questions, the aim was to analyze the level and impact of ICT on teachers’ pedagogy, the students’ perception of ICT use in the classroom and to seek out any fundamental differences in public and private education, as well as across genders. The researcher observed that ICT pedagogical skills are important for teaching with ICT, across all topic areas. Particular features of teacher actions linked to the
planning of ICT enhanced lessons across topics were recognized. Hence, features of good planning include: (a) Content-centric goals for lessons, (b) Choice of technology-enhanced activity, (c) Differentiation strategies, and (d) Sequencing of activities. While implementation features include: (a) The fact that teachers need to become confident in using ICT in their daily teaching, (b) Knowledge of specific classroom management techniques for teaching with technology, and (c) Modeling strategies. However useful these features are, there remained a significant gap as all these features are unique in how they are expressed by the teacher and students’ actions in different contexts and classroom experiences.

The study about the designing and implementation of an on-line instructional model for English language teachers at Rovira University (Spain), Del Maria (2007) cited Cabero (1998) who observed that most training have been developed according to technical and instrumental criteria, whereas aspects such as reference on the utilisation, organisation and didactic design have not been given adequate attention. According to Majó and Marqués, (2002) as cited by Del Maria (2007), the preparation and the competencies of teacher as a result of their training have to change due to the following facts:

i. The teacher has to cope with more complex situations in which students are more heterogeneous but more familiar with the different communication means.

ii. The changes in the contents to be taught and the instruments to be used, bearing in mind ICT, the increase in the functions to be developed by the teacher and the evolvement of didactic methodologies
iii. The need of a permanent lifelong learning and a constant updating of knowledge.

The existing literature related to teacher training in ICT is widespread: Miguel, et al. (2012), Moeller and Reitzes (2011) and Amare (2010), coincide on the necessity of developing training actions as a basic condition for a successful implementation of ICT in schools, but also bearing in mind a basic factor, (of interest to this study) key to reach success: the combination of technological knowledge together with the didactic use of the same, which would include aspects such as the creation of on-line activities, the integration of IT in the teaching and learning process and the evaluation of the student’s progress. In this sense, Del Maria (2007) noted that, without training in the field of ICT, the school will not be able to meet the challenge that Information Society is calling for. This required therefore studies be undertaken to explore if the training offered had primarily responded to the needs of what available ICT functions were asking for, and the pedagogical practices which would be enabled through the integration of the ICT infrastructure.

In Tanzanian higher education institution context, where professional development programs among lecturers had not been effective (UNESCO, 2012; Anangisye, 2011), the researcher was skeptical whether or not the ICTs integration in teaching and learning aligned with the available competencies among lecturers and students. A study by Mfaume et al (2014) explored the opportunities and challenges of instituting E-Learning at Mzumbe University from their practical experience. The study reported different trainings and workshops provided to lecturers and students on the e-learning usage. It is worth noting that, the use of technology in teaching and learning require teacher and
students to understand the technology and how it suits the particular subject contents (Mishra & Koehler, 2007). Studies focus much on challenging the effectiveness teacher training curriculum and professional development programs with inadequate attention paid to relevance of the skills acquired from the training and the available ICTs in the working contexts. It also remained unclear on whether the types of skills the trainers have relate to the competencies trainees were expected to develop. This study was an attempt to fill the gap on whether, the skills lecturers and students possess were helpful to the use of the ICTs for the prescribed teaching and learning practices. And since it had been documented that in-house trainings were being regularly conducted at Mzumbe University (Mfaume et al., 2014; MU, 2013; 14), this study was also structured to explore the qualification and the nature of skills the in-house trainers possessed.

2.5 Perceptions on the importance of using ICTs in teaching and learning

“Innovation is not necessarily perceived as useful or beneficial by all parties involved” (Zhu & Engels, 2014; pg. 139). While it is widely acknowledged that ICTs can enhance delivery quality, enhance collaboration and expand access, the immediacy with which it seems that ICT have to be introduced causes them profound despair and uneasiness. The survey study to investigate the perceptions on ICT usage in Turkey was conducted by Gulbahar and Guven (2008). Findings from this study indicate that social studies teachers understood the benefits of ICT usage in education. These teachers considered ICTs as viable educational tools with potential to bring about improvements to their schools and classrooms. The findings indicated a significantly positive correlation between teachers’ attitudes toward ICT in education and their perceptions of the advantages of the use of computers. However, teachers’ perception of the compatibility of ICT with their current
teaching practices was not as positive. Teachers pointed out that the allocated class time was too limited for ICT usage (Ocak, 2011).

In the study by Eid (2013) to examine how ICT was applied in the classroom of Kuwait schools from the perspective of students, teachers and decision-makers, its fundamental research questions, meant to analyse the level and impact of ICT on teachers’ pedagogy, the students’ perception of ICT use in the classroom. The author drew an experience with regards to the contradictions in teachers’ perspectives towards ICT from Handal (2011), who examined the usage of ICT with secondary mathematics teachers in Australia. The author found out that there were contradictions on the way different teachers perceived the suitability of using ICTs; some of them believed that ICT was beneficial in learning and teaching in the General Mathematics course but not suitable in the other Mathematics courses (Mathematics “2-Unit”, Extension 1 and Extension 2). Consequently, two reasons were presented for this contradiction: the first one being that the teachers found ICT detrimental to learning and the second reason was that there was misalignment between assessment and classroom practice. This observation provided a starting point in the current study in an attempt to explore the perception by the lecturers and students as to justify the use of ICT for teaching and learning at Mzumbe University.

A survey study conducted by Voogt and Douglas (2010) which was meant to explore the ICT use for professional development of the pre-service teachers in Ghana observed a negative perception toward ICT use in mathematics teaching. The study further noted that the negative attitude was associated with lack of Mathematics software (such as geometer, sketchpad and graphic calculus) used to teach maths; and lack of other facilities like networked computer laboratories. Also similar findings were obtained by
Ondigi et al (2013) on Kiswahili teachers in Kakamega County (Kenya) and the survey study by Waweru et al (2013) which explored the viewpoints of English language teachers in Kenya. Contradicting findings were obtained from a mixed survey study conducted by Drapper (2010) in high schools science teachers and students with limited skills and access to ICT infrastructure in South Africa. Although teachers and students had limited access to the ICTs, the use was highly motivated because both of these considered ICT as empowerment tool which made them better learning participants. Moreover, those who used the ICTs, though over a limited time, reported high impact on enquiry minds. The later findings confirm the observation by Kashorda and Waema (2010) that, an institution could succeed within infrastructural constraints if it had assessed its capacity level, hence heightening the need for this study to investigate if lecturers and students perceived the importance of using the ICT in the teaching and learning activities.

The study by Palak and Walls (2009) investigated whether teachers who frequently integrate technology and work in technology-rich schools shift their beliefs and practices towards a student-centred paradigm. The results showed that teachers’ attitudes towards technology significantly predict teachers’ ability to use technology and a variety of instructional strategies. In line with the requirement of the present study, it was found that teachers had positive attitudes towards the use of ICT as a pedagogical tool but they did not integrate it in their teaching. The author noted that, having positive attitudes did not guarantee that a teacher would use ICT in teaching, and that, it depended on the level of understanding, willingness, confidence, motivation and the perceived usefulness of ICT as a pedagogical tool. Such relationship was borrowed in the current study, in order to
explore if there was any relationship between the competences, infrastructure, attitude and the actual use of the ICTs in teaching and learning at Mzumbe University.

Drawing from social cognitive theory, Wu et al., (2010)’s study on students’ satisfaction in blended learning proposed a research model that examined the determinants of student learning satisfaction in a blended learning environment. Findings indicated that computer self-efficacy, performance expectations, system functionality, content features, interaction, and learning climate were the primary determinants of student learning satisfaction. The results also show that learning climate and performance expectations significantly affected learning satisfaction, while computer self-efficacy, system functionality, content feature and interaction significantly affected performance expectations.

Substantial number of studies have drawn students’ concern for the importance of using ICTs to blend teaching and learning just like the teachers/lecturers as adding value to learning, providing opportunity for more effective, efficient and interesting learning even when resources are limited (Mtebe and Raphael, 2013; Drapper, 2010; Wu et al., 2010; and Vaughan, 2007). The reviewed literature in this section addresses pertinent aspects influencing the perception of the importance of using ICTs in teaching and learning mainly, skills, adequacy and quality of the ICTs, time, (workloads), motivation and self-efficacy. Unfortunately, much of studies reviewed under this study reflected situation outside Tanzanian contexts, which suggest inadequacy of such studies in the Country. This study sought to contribute to the pool of literature by documenting the perception of students on the importance of using ICTs from the context of Mzumbe University.
2.6 Research Gaps

The general impression indicates that, the use of the ICT in universities had been addressed in a way that the information available could not suffice to explain the situation at individual institutions, which required more contextualized studies (mainly case studies). While some institutions would claim to possess ICT infrastructure, they lacked evidence on the range of the ICTs and adequacy regarding the users' populations. There is also evidence that, some institutions purport to possess ICT infrastructure but their nature do not support the prescribed teaching and learning activities. While studies challenged the curriculum and professional development programs as not addressing the requirement of technology use among teachers at various levels, there had been no adequate attention to the link of such skills and the characteristics of the available ICTs, which could also be a reason for failures in its application. Lastly, while number of studies focused on the same issues by using one or few types of participants and data collection methods, this study engaged lecturers, student, administrators and technical support teams to obtain the richer information. This study also used a range of both quantitative and qualitative methods. In the light of these gaps, the current study was therefore meant to provide an actual situation of ICT use for teaching and learning at Mzumbe University.
CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the methodology of the study. The main sections in this chapter are; research design, variables, study sites, the target population and the sample selection, research instruments, data collection procedures and analysis and finally, logistical and ethical considerations.

3.1 Research Design

This study used an exploratory design to elicit information on the use of ICTs and the available ICT infrastructure for the teaching and learning practices at Mzumbe University. The relevance of the design is on the purpose and methodologies suitable to accomplish the study. In line with the purpose of this study, Yin (2003) describes exploratory design as a qualitative design uses inductive approach to develop new understanding of the phenomena within its real life context where nothing or only little is known about the study problem at the study locale. This design was thus opted for in this study in order to establish about range and how the ICTs were being used for teaching and learning at Mzumbe University as a study case. From methodological perspective, the design allowed for use of a single case in which a deeper, more grounded and focussed detail of the use of ICT for teaching and learning was possible at the study case (cf. Creswell, 2007). The design was useful in providing insight of what was actually the status of ICT use in teaching and learning at the Mzumbe University, hence contributing
information which provides a good basis for further studies as well as policy attention (Qur'an, 2010).

The exploratory study design was also used in order to provide for the use of both quantitative and qualitative approaches to data collection and analysis. Thus, quantitative data on the range and adequacy of ICT infrastructure like hardware and connectivity was captured through approaches like physical counting (observation), questionnaire and documentary review. On the other hand, qualitative data about perception on competences and the importance of ICTs was gathered through approaches, mainly interviews and focus group discussion. Thematic and statistical forms of analysis were used, regarding the requirements of objectives and as a basis for interpretation and discussion of findings. The use of both quantitative and qualitative approaches under this study, as supported by Kothari (2010) and Creswell (2007) was crucial for strengthening the claims of the findings. The design, however, helped to retain the holistic and meaningful characteristics of the actual practices of ICT use and available infrastructure at Mzumbe University (cf. Yin, 2003)

3.1.1 Research Variables

The study aimed at establishing the actual use of ICT and the available infrastructure to support the teaching and learning at MU. This was achieved by operationalizing the following variables

**Independent Variable**

An independent (predictor) variable is a variable that influences the outcomes (Creswell, 2009). The independent variable in this study entails the availability of ICT
infrastructure (range and adequacy), which constitutes a key requirement for any Information System (IS) success. The proposed checklist of the ICT infrastructure includes hardware and software and support services. The hardware and software infrastructure entail connected computers, personal computers, data projectors, interactive boards, Learning Management System (software platform), sound system, subject specific software and e-contents. The range of ICT support service infrastructure included sources of internet connectivity, sources of power and technical support. This checklist was developed from various sources of literature and that, their availability and adequacy could provide a basis for status of ICT based teaching and learning. These were assessed through physical counting/observation, survey questionnaires administered to lecturers and students and the secondary sources, particularly reports and training manuals, as suggested from Kashorda and Waema (2011) and DeLone and McLean (1992).

Mediating Variables

These are variables which help to explain the relationship between the independent and dependent variables (Creswell, 2009). Although the availability of ICTs is an essential component to ICT based teaching and learning, these ICTs must, however, be operated by people with competences and positive attitude on the particular technologies. In this study, the competences and perception on the importance of using the ICTs by lecturers and students constituted the mediating variables of this study. These were assessed by drawing from the opinions or perspectives of the particular users (lecturers and students), through questionnaires and informal discussions.
Dependent Variable

This is an outcome variable that depends on the independent variables (Creswell, 2009). In this study, the dependent variable is the actual ICT use in teaching and learning at Mzumbe University. In line with DeLone and McLean (1992), these were assessed through the users’ intention to use the ICTs, expressed through the roles associated with and willingness to use the particular ICTs for teaching and learning. In addition, the actual use of the ICTs defines the level of ICT integration into the various teaching and learning practices. In this study, the actual use of ICT in teaching and learning was assessed by exploring the range of teaching and learning activities performed by using the ICTs which could be mentioned or observed from among the lecturers and students (through questionnaires) and the e-contents observed from the Learning Management System. The activities range from the use of offline ICT to support face-to-face teaching activities to the purely on-line activities performed to complement certain face-to-face teaching and learning activities. The extent of ICT use therefore is determined by the range of ICT based activities that are in place and the level of satisfaction perceived by lecturers and students on the capacity the available ICT can support these activities.

Generally, the study was designed to cover the ICT use situation in teaching and learning at Mzumbe University. This includes the type of ICTs available and the actual use in teaching and learning practices at the university. The study was thus set to depict the relationship between independent variables (the ICTs available) on one hand, and the dependent (outcome) variable (the actual use in teaching and learning by lecturers and students) on the other hand, in the light of the mediating variables (competences and
attitude). These were purposively operationalized to present a reflection of the status of the ICT use for the prescribed teaching and learning practices at Mzumbe University.

3.2 Study Site

The study was conducted at Mzumbe University, one of 11 public universities in Tanzania. Geographically, the university operates three (3) campuses in three regions; the University's main campus in Mvomero district, located 25 Kilometres (Kms) South West of Morogoro Municipal centre, about 3.5 Kms off Dar-es-Salaam on Zambia Highway. Other campuses include the Dar-es-Salaam Business College campus in Dar-es-Salaam commercial city and the Mbeya Campus College in Mbeya city in the Southern Highlands zone of the country. The university also runs three (3) satellite centres in Morogoro, Mwanza and Tanga Municipalities respectively. The university currently offers over 200 courses of degree and non-degree programs in management, business, social sciences, humanities, laws and science and technology areas (MU, 2012).

Mzumbe University was purposively selected for the study because it manifested the problem that a researcher sought to investigate (cf. Patton, 1990; Qur'an, 2010). The university has been in a noticeable expansion position. Total enrolment for the past five years (2009/10-2013/14) increased by 73%, while much of its resources still remained the same. The number of lecturers, for instance, for the past three years had dropped from 299 2011/12 to 274 in 2013/14 thus creating a mismatch which required ICT use interventions (MU facts and figures, 2014). Mzumbe University had well documented ICT policies, plans, initiatives for the use of ICTs in teaching and learning, but the actual ICTs and how they were being used still remained unconfirmed by studies. This study was therefore an attempt to provide evidence that can be useful in providing evidence for
practical translation of the policies, plans through the status of the ICT use and thus the ICT capacity of the university to mount the ICT-based teaching and learning as a way of addressing challenges of overwhelming expansion of students' enrolment.

Mzumbe is among the public universities with many campuses/centers in Tanzania. By 2014, the university had three (3) campuses and three (3) satellite centers dispersed in different regions of the country (MU, 2014). Some of the campuses/centers are in remote areas, with possibility for lecturers and students to face difficulties for conventional class sessions. Exploring the ICT use at the university therefore was meant to bring insight on how the University has located and used ICTs as a tool for teaching and learning.

Mzumbe University was selected for the study because of the ICT projects which are documented to have been taking place and thus indicating ICT operations at the university. Some of these projects include the EMIS and E-Library System, Last Mile connectivity of the Science and Technology Higher Education Project (STHEP) (by the government and the World Bank) and Gre@t project by VLIR-OUS from Belgium and Japanese International Cooperation Agency (JICA), which demonstrated commitment to build capacity for ICT use in teaching and learning among other areas. The study was therefore a necessary enquiry tool for what had been practical indicators of the ICT use in the teaching and learning, as a result of these projects.

The unit of analysis was the university’s main campus. Besides focusing on an in-depth analysis on how ICT was used at this campus, the choice of this unit was informed by the fact that it controlled all ICT technical, financial and administrative matters of the entire university, including teaching and learning. Others reasons for the choice of the unit were
based on logistical considerations; mainly resources, competence and familiarity of the researcher in the study site and the participants, so that the study could be feasibly convenient

3.3 Target Population of the Study

The target population comprised 7,193 students, 274 teaching staff (203 males and 71 females) and 271 non-teaching staff, which by then constituted the community of Mzumbe University. The researcher perceived that, using a sample would help to get the workable population than using the whole population which would require having research assistants and a lot of time which are all costly. However, as a matter of fact, in exploratory studies, the sample sizes may not be fixed before data collection. Consequently, the sample size is therefore that population which agreed to participate in the study (Lincoln and Guba, 1985). At the proposal stage of this study, the population samples and sizes were only tentative because the study also sought to confirm the availability of the same.

3.4 Sampling techniques and Sample size

3.4.1 Lecturers sample

The study used stratified sampling to divide the population of 274 lecturers into two homogeneous groups/strata. Stratum one constituted lecturers who had been using the university ICTs managed by the available Learning Management System (LMS), while stratum two constituted those lecturers who were not using ICTs and those who were using ICTs under unmanaged platforms, like social media. The researcher categorized those using unmanaged platforms into the non-users group. The categorization was done so as to provide a diverse perspective from both lecturers who were using the university's
managed ICTs and platform and those who had either opted not to use the ICTs or were using the non-managed ICTs and platforms. The researcher opted for stratified sampling because it is a more convenient than aggregating data across groups (cf. Cohen et al., 2007).

A convenient sample of thirty percent (30%) of lecturers who were available at work, which translates to 81 lecturers in total, was selected from the two strata by using simple random sampling to participate in the study. This formed a proportion of 51 and 30 for users and non-users respectively. This is a sample of respondents who were easily available and willing to participate in the study (cf. Patton, 2002; Creswell, 2009). The selected sample size is supported by Kilemi and Wamahiu (1995) who proposed at least 10% of the population to form a good sample for a study. Random sampling technique was used to allow the researcher to obtain the basic data and trends, by including both users and non-users (male and female) and draw bias free perspectives of ICT uses. Survey questionnaire was used to ask the participant lecturers on the range, adequacy and perception of the importance of ICT use and their competences to utilize them for the teaching practices prescribed at the university. In line with the nature of the study design, the researcher believed that, this sample size sufficed to portray a true lecturers’ perspective on the status of the ICT use for teaching and learning at Mzumbe University.

3.4.2 Students’ sample

Stratified sampling technique was used to divide the total population of 7190 students into homogeneous sub-groups according to years of study, so that each year of study was represented in the sample. Keen on respondents’ gender and year of study, the researcher
used random sampling approach to get 719 (10%) of all students to complete a baseline questionnaire on the use of the ICTs for teaching and learning. This reasonable sample size is also backed up by Kilemi and Wamahiu (1995). Under random sampling, an individual was chosen entirely by chance, such that each one from the group had the same probability of being chosen (Lincoln and Guba, 1985). The use of the two sampling techniques together enabled the researcher to get the most representative population from classes which were potentially available to participate in the study.

After confirming their availability, the researcher used purposive sampling to include the entire 10 (100%) students from the students’ helpdesk team to participate in an unstructured Focus Group Discussion (FDG). This was meant to elicit the opinions and experiences of this group of technically trusted students on the ICT use. The researcher aimed to elicit more opinions and detailed clarification of issues that are given in the questionnaire (cf. Oanda, 2002), mainly on the range and adequacy of ICT infrastructure at their disposal, and their competences to utilize them for the prescribed learning activities at the university. This sample size is in line with Orodho’s (2008) standpoint that a small population may all be taken as a sample size.

3.4.3 Administrators

Two (2) administrators, the director for quality assurance and the director for the E-learning unit were purposively selected due to their roles on the use of ICT in teaching and learning (cf. Creswell, 2009; 2003). While the director for quality assurance oversees matters related to quality delivery of teaching and learning, the director for E-learning is in charge of all matters related to the use of ICTs at the university, including teaching and learning activities. The researcher used semi-structured interviews to seek from these
administrators information on the arrangements such as trainings, workshops, research, motivation and quality assurance support services available to support the use of ICT in the teaching and learning at the university. The researcher needed to document if there was adequate support accorded to lecturers and students in the use of ICT at the university. The two administrators were selected because of the key roles vested in them in the planning, designing implementing and evaluating the ICT roles in the teaching and learning (MU-STP, 2012).

3.4.4 Technical support team

After confirming their availability, the researcher used purposive sampling to include the entire 10 (100%) technical support team members (from the directorate of ICT) in the study. This is a group from the non-teaching staff from the directorate of ICT who deal with technical support in ICT use at the university (Ghasia, 2009). These were called for an unstructured Focus Group Discussion (FGD) to elicit issues of their view on range and adequacy of ICTs and competence to provide the technical support to both lecturers and students. The researcher saw that, the number was small that it was just convenient to investigate in its entirety (cf. Orodho, 2008). This selection was mainly due to the role and involvement of these people in technical support matters in the use of the ICTs (cf. Creswell, 2009; 2003).
Table 3.1: Sampling techniques and sample size

<table>
<thead>
<tr>
<th>Population Unit</th>
<th>Sampling Technique</th>
<th>Population</th>
<th>Sample size</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrators</td>
<td>Purposive</td>
<td>02</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Technical support team</td>
<td>Purposive</td>
<td>10</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Random</td>
<td>274</td>
<td>81</td>
<td>30</td>
</tr>
<tr>
<td>Students</td>
<td>Random</td>
<td>7190</td>
<td>719</td>
<td>10</td>
</tr>
<tr>
<td>Students' helpdesk</td>
<td>Purposive</td>
<td>10</td>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Researcher's own construct 2015.

3.5 Research Instruments

The study used both primary (original information collected for the first time) and secondary data (information that has been collected and documented from previous studies). The necessity for the two forms of data was driven by the nature and requirement of the study objectives. While the primary data was sought to present what was actually the available perspectives of the status of ICT use, the secondary data was meant to provide light of what had been documented as a trend and initiatives regarding the use of the ICTs at the university. Primary data was thus gathered by using interview (from administrators), questionnaires (from lecturer and students), FGD (technical team and helpdesk team) and observation checklist. Secondary data was gathered through review of different documents, mainly LMS log-in records, E-learning use reports, lecturers and students’ training manual and reports among others. The researcher opted to use multiple instruments in order to compensate for the deficiencies of individual tools and strengthen the reliability of the findings as suggested by Creswell (1998; 2003).
3.5.1 Questionnaires for lecturers and students

A questionnaire is a purposeful, structured set of questions that was used in this study to obtain the opinions of a large number lecturer and student respondents (81 lecturers and 720 students) in writing, without necessarily making contact with the particular groups (cf. Kothari, 2010). The researcher chose to use questionnaires so that the opinions of respondents could be obtained in a structured manner. The tool also allowed for both quantifiable and qualitative information about the ICT use that the study sought to elicit. The tool was also preferred in the study due to its capacity to elicit information which is direct and factual in nature (cf. Oanda, 2002).

Two versions of the questionnaire were administered to respective lecturers and students to elicit information on the ICT hardware, software and supporting services and the actual use at Mzumbe University (appendices 1 A.1 and 1 A.2). The questionnaires were structured in such away containing both closed and open-ended questions in order to provide for flexibility and convenience for respondents to express their extensive opinions. Each of the questionnaires has a total of five (5) questions, which are also further subdivided in smaller parts. The closed-ended types of items are in ‘Yes or No’ format and likert scales type of questions. These helped to elicit information about things that are direct, mainly objective nature. Open-ended questions helped to elicit information that a respondent had to critically think before answering (cf. Creswell, 2003). Responses for both lecturers and students’ questionnaires were collected in two ways; on-line (through a Google doc electronic way) and as hard copy, manually distributed and collected. The electronically filled questionnaire gave room for the respondent to submit it electronically while the hard copies allowed for one to complete
off-line for them to be entered manually in the computer program for an analysis. In order to ensure that questionnaires were filled with precision, besides providing freedom to respondents, the researcher guaranteed a presence for clarification of any ambiguities from the tools.

3.5.2 Semi-structured interviews with administrators

In this study, semi-structured qualitative interview was used as one of the main data collection methods. Semi-structured interviews entail open and flexible conversations between the interviewer and interviewee that allow new ideas to be brought up through some guiding agenda (Gall et al., 2005). Semi-structured face-to-face interview was administered to the directors for Quality assurance and the E-learning units to cover broad concerns of the study through constant probing (cf. Oanda, 2002). This interview was suitable for the study because it covered a wide range of aspects (about the problem) and provided an understanding of the participants’ own interpretation and standpoints (cf. Yin, 2003). The method was also used because of its flexibility in giving the interviewer a lot of freedom in what questions to ask, when to ask and the freedom to follow up on what the interviewee says that was not in the interview guide but useful to the research.

An interview with the director of E-learning (appendix 1 B.1) was guided by questions which are open-ended in nature. On the other hand, the interview with the director of quality assurance (appendix 1 B.2) was guided by questions, which could actually generate several other questions through a constant probing. The interviews were administered in such a way that both the researcher and the interviewee(s) freely participated, which according to Creswell (2007) and Gall et al. (2005), is an important requirement for exploratory studies like this. For example, although it was not easy to
find a completely quiet room for the interviews, effort was made to keep the outside noise at the lowest possible under the circumstances. During the interviews, an interview guide was used to give direction to the sessions and to avoid deviations. The interview sessions were scheduled around 45 minutes to one hour. The respondents were informed in advance about the need to record the interviews and their consent was sought before doing so. In the course of the interviews, notes were taken in addition to tape recordings.

3.5.3 Documentary review

This is a way of collecting secondary data by reviewing documents (both electronic and text) related to the study (Krippendorff, 2004). Documents constituted a potential source of both qualitative and quantitative data in this study. The study reviewed university ICT policy, staff e-learning log-in records and e-learning training manuals to contribute information on the range of ICTs and the usage. This information was also useful because the researcher was able to estimate the trend of different initiatives to the implementation of ICT in teaching. Other important reviewed documents include ICT use training reports that highlighted the type of skills both lecturers and students were taught and log-in records which showed the type of ICT use teaching and learning activities. Besides saving a lot of time that would have been spent in the field, documents were information rich and helped to validate and even reconcile data from other sources especially on the teaching and learning practices which were taking place at the university.

3.5.4 Observation checklist

The study employed an observation technique or schedule to elicit first-hand information on various ICT use aspects in their natural setting to supplement other data sources (cf. Kothari, 2010). Participant observation formed an important tool in obtaining factual
information on the actual ICT use and the ICT infrastructure available. The aim was to strengthen the findings on what had been theoretically claimed and what was actually happening at the university. A checklist (appendix I.D) was prepared in order to gauge both quantitative and qualitative features of the observable aspects of ICTs and their use patterns. The researcher was observing facilities like covering ICT hardware, software and other supporting services. The researcher also happened to participate in some ICT use related trainings and workshops, those conducted by experts from within the university and those from other partner universities in Europe, where the nature and details of training contents were explored and reviewed. The method further helped the researcher to count and establish a ratio between some of the observable facilities to the number of lecturers and students (users). Observed aspects were recorded by note taking and by using camera to take photographs.

3.5.5 Focus Group Discussions

Focus group discussion (FGD) is a form of group interview in which a number of people participate in a discussion that is guided by a researcher (Gall et al., 2005). The researcher held a total of four unstructured group discussions (Appendix IC.1 and IC.2), which took 45 minutes to one hour for each. Two with the technical support team, (five (5) members for each group) from the directorate of ICT at the university, and the other two with students help desk team (five (5) members for each group). The method was useful in order to elicit a collective perspective lying behind participants' view of the status of the ICT use at Mzumbe University.

FGDs were helpful in gathering a rich understanding of participants' experience and opinions on the ICT use and the required support for an effective ICT use in teaching and
learning. The FGDs also provided a good platform to engage participants in a discussion that shed light on differences in opinions, attitudes on ICT use and the common thread in the participants' views on what they considered to be the importance of using ICT in instruction. The researcher created a free discussion atmosphere so that participants were able to freely express themselves. The role of the researcher was to probe on the responses about feelings and beliefs on the ICT use for teaching and learning at the university. It is in line with Kothari (2010) that FGDs generated a good deal of information to complement, extend, confirm or challenge data collected through other methods.

3.6 Reliability and Validity of the study

3.6.1 Reliability of the study

Reliability refers to the extent that research instruments can be replicated (Brown, 2009). Research tools were given to different scholars, including the supervisors to rate and comment on the contents and structure, in the light of the study objectives, as suggested by Guba and Lincoln (1981). The comments shed light on how to improve and enhance reliability and suitability of the tools and study objectives before the field work.

The study also employed both primary and secondary sources of data (questionnaires, interviews, focused group discussions, observation and documentary review). The use of both primary and secondary source was meant to bring the two in complement, so that specific aspects were widely and accurately assessed. In addition, the study also ensured that, different types of respondents constituting the key users of ICT as a teaching and learning tool were sampled to provide views and experience on the ICT use situation at
Mzumbe University (Triangulation method). This ensured that, the information gathered was rich and adequate in responding to the associated objectives. Thus by using respective instruments, lecturers, students, administrators and technical team provided different perspectives to portray the actual use of ICTs in teaching and learning and the available infrastructure to support it. The approach was meant to compensate for limitations of the individual sources and instruments of data and respondents by generating a rich experience that at the end enhanced the objectivity of the results and hence increase some reliability.

It is also in line with Merriam (1998) that the administration of each instrument and data analysis and interpretation was done with high precision to allow for an audit trail that was necessary to ensure reliability of the instruments. Although the study was administered during a busy semester schedule time, the researcher managed to administer the research instruments in a time frame which allowed both the researcher and respondents to perform their roles precisely. Moreover, the tools are written in a simple, friendly and context specific language, reflecting the understanding level of the participants, in order to enable participants to understand what was required out of them. At the same time, the researcher arranged for electronic communication (phone calls and e-mails) for those participants who could not make it for face to face or paper responses. To some respondents such as lecturers, for instance, the data collection process was done on-line when they were not physically accessible. This helped to present flexibility that participants had a room to choose the modality of convenience to them which also increased some reliability.
3.6.2 Validity of the Study

According to Cohen et al. (2000), validity refers to the degree to which an instrument measures exactly what is supposed to measure and nothing else. The following ways were used to ensure the validity of this study:

The study used more than one sources and methods for data collection, with central themes about the ICT use and the available infrastructure. Different methods and sources of data were harmonized to provide inputs to confirm the emerging findings on similar themes, that is, triangulation as supported by Merriam (1998). By doing this, the information required from each instrument was kept reflective of the other instruments, in order to establish outcomes that are agreed upon by all instruments and respondents. The weight of evidence suggested that, if every data source, which looked at the issue from different points of view, saw an outcome then it was more than likely to be a true outcome. To gain the true outcome therefore, the sources of data and instruments were structured with precision to provide the right inputs to heighten the validity of the findings.

The researcher was aware that, having multiple sources of data and diverse instruments to data collection is one important factor for enhancing both validity and reliability. However, if these are not well administered during the field work, they may not help much in terms of gathering the most accurate information. To maximize validity in this study, the researcher ensured a well-structured fieldwork and that all informants had an opportunity to disclose their experiences; by analyzing the evidence and supporting interpretations with evidences from a balanced perspective (cf. Cohen et al., 2000). This
also ensured that personal bias or incompetence by a researcher was avoided to compromise the research process and findings. This was also achieved through careful attention to advice from the supervisors on how to create the most focused instruments and administration procedures.

3.7 Data Collection procedures

Having obtained proposal approval from the Department of Educational Foundation of Kenyatta University, the researcher sought a research clearance from Kenyatta University, with a researcher's introduction letter explaining the purpose of the study be granted before field visit. At the study university, the researcher requested permission from the relevant department (Department of Research, Publication and graduate Studies-DRPS) to undertake the study. Appointments were made with respondents through physical visits, mobile phone calls and e-mails before data collection process. Upon their readiness, the researcher administered the tools to the respective participants. Questionnaires prepared through Google docs computer program were sent to lecturers and students through their emails (those who opted for the electronic ones). Hard copy versions of the same were also physically circulated to respondents who opted for that. During the same prior arrangement, the researcher and the interview respondents agreed on the days and time for the data collection process. It was deemed necessary to make the transcription process an on-going and integral activity so as to avoid a huge backlog, as advised by some writers in qualitative research like Bryman (2012). This approach helped in not only avoiding the accumulation of too much work but also ensured that the data collected was transcribed soon after its collection when the context of interaction was still fresh in the memory of the researcher.
3.8 Data Analysis Procedures

This study was designed to explore the use of ICT in teaching and learning at Mzumbe University and the ICT infrastructure available to support it. Beside its qualitative nature, the study sought to capture both qualitative and quantitative data on ICT infrastructure under investigation. Consequently, the analysis employed some features of quantitative methods to complement the dominant qualitative methods. After the data had been collected, they were cleaned to identify the incomplete or inaccurate responses so that they were filtered for improvements as suggested by Strauss and Corbin (1990). Qualitative data from interviews, FGDs, questionnaires and observation mainly on perception on the importance and competences on using ICT were transcribed, coded and categorized into thematic texts and images. Quantitative data on number and adequacy of the ICT infrastructure were coded and descriptively analyzed using excel computer program resulting into tables, graphs and charts. A critical content analysis was also done to corroborate both quantitative and the qualitative data on both use of ICT as observed from the Learning Management Platform and different ICT use reports.

Subsequently, findings from the interviews, observations, focus group discussion, documents and questionnaires were harmonized basing on themes under the objectives of the study. These include the actual use situation of ICTs in teaching and learning; the range of ICTs available; the adequacy of ICTs in teaching and learning; the competence for ICT use in teaching and learning among lecturers and students; and the perception of the importance for using ICTs for teaching and learning. The reporting of the findings employed narrative forms and quotes and descriptive statistics in form of frequencies, percentages presented in tables and charts. The complementation of thematic and
descriptive information together helped to provide a clear situation of ICT use in teaching and learning at Mzumbe University.

3.9 Logistical and Ethical Considerations

The researcher requested permission from the Directorate of Research, Publications and Postgraduate Studies (DRPS) at the study university to undertake the study. To clear any misconceptions about the intentions of the study, a synopsis of what the research entails and how the findings could be utilized, was given to the university administration and respondents before the field work. During the field work, the researcher obtained participants’ consent and ensured confidentiality so that they would speak freely without the fear of being identified as having provided information. The assurance for the adherence to these aspects was also made part in the tools administered to the participants. Moreover, respondents were informed about the freedom to withdraw from the study once they felt to do so. Neither photos nor recordings were made without respondent’s willingness.
CHAPTER FOUR

FINDINGS, INTERPRETATION AND DISCUSSIONS

4.0 Introduction

This chapter presents findings of the study, interpretations and discussion, as guided by research questions under the following study objectives:

i. To establish the range of available Information and Communication Technology infrastructure to support the prescribed teaching and learning at Mzumbe University;

ii. To establish how the Information and Communication Technologies were being used in the teaching and learning at the university;

iii. To estimate the adequacy of the ICTs used in the prescribed teaching and learning at the university;

iv. To find out the competences students and lecturers possess for the use of Information and Communication Technologies for the teaching practices at the university;

v. Document the perceptions of students and lecturers on the importance of using Information and Communication Technologies in teaching and learning at Mzumbe University.

The chapter is presented in the following order. Firstly, the demographic information of the respondents who participated in the study is provided. Secondly, the findings for each objective are given, followed by interpretation and discussion under each. Lastly, a chapter conclusion which presents a brief reflection of the chapter contents is given.
4.1.1 Demographic information of respondents

The demographic information of the study respondents was analyzed along the groups of lecturers, students and the ICT use supporting administrators. Generally, a sample size of 822 respondents was targeted; from which, 752 respondents were reached during the study. This included 51 out of 81, translating to (65%) lecturer participants, 691 out of 719 (96.1%) students, and nine (9) ICT technicians and two (2) administrators (100%). The average response rate was thus 92%, which enabled the researcher get necessary information for the study. The details of the participants are given in sub-sections 4.1.2 to 4.1.3.

Lecturers and students who were sampled as respondents for this study were drawn from all five (5) faculties and schools which offer degree programmes at the university. The number of respondents however varied from the faculties/schools mainly due to the size of the particular school or faculty and the readiness of the members to participate as it was stated in chapter three. Table 4.1 presents the actual number of participants and their respective faculties or schools. The study drew participants from all faculties to participate in this study in order to ensure a more representative population of the academic units.
Table 4.1: Lecturers and Students Schools or Faculties

<table>
<thead>
<tr>
<th>School/Faculty</th>
<th>No. of Lecturers</th>
<th>Percent (%)</th>
<th>No. of students</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Law</td>
<td>8</td>
<td>15</td>
<td>124</td>
<td>18</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>11</td>
<td>22</td>
<td>152</td>
<td>22</td>
</tr>
<tr>
<td>Business</td>
<td>11</td>
<td>22</td>
<td>166</td>
<td>24</td>
</tr>
<tr>
<td>Public Administration and Management</td>
<td>10</td>
<td>21.5</td>
<td>145</td>
<td>21</td>
</tr>
<tr>
<td>Science and Technology</td>
<td>10</td>
<td>21.5</td>
<td>104</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
<td><strong>100</strong></td>
<td><strong>691</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Field study, 2015.

Table 4.1 indicates that, all the five faculties/schools were significantly represented in the study population. There is however an impression that Faculty of science and technology was the least represented by both lecturers (21.5%) and students (15%), while the schools of Business and the Faculty of Social Sciences were the most represented by lecturers (22%) each, and that the School of Business was the most represented by the students (24%). The variations in the representativeness of schools/faculties in this study was viewed from two scenarios; the fully represented units (school of Business, School of public Administration and Faculty of Social Sciences) had a larger population of the target population compared to the least represented (faculty of Law); on the other instance, a good representation of some units manifested higher interest of the particular populations to participate in the study, and thus a higher return rate (for example the Faculty of Science and technology). Nevertheless, despite this variation, the exploratory nature of the study guaranteed that, such slight variation in terms of representativeness have no impact to the nature of the required findings.
4.1.2 Lecturers gender, age and ranks

The lecturer's background information taken on board includes gender, age and rank. The information is summarized in Table 4.2.

Table 4.2: Lecturers' gender, age and ranks distribution

<table>
<thead>
<tr>
<th>Measure</th>
<th>Number (N)</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>40</td>
<td>78</td>
</tr>
<tr>
<td>Female</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Age distribution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-35</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>36-45</td>
<td>23</td>
<td>45</td>
</tr>
<tr>
<td>46-55</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>55+</td>
<td>07</td>
<td>13</td>
</tr>
<tr>
<td>Rank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professors</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Doctors</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Other (Lecturers, assistant lecturers, tutorial assistants)</td>
<td>38</td>
<td>74</td>
</tr>
</tbody>
</table>

Source: Field study, 2015

The summarized information of the lecturers’ participants in Table 4.2 shows an exhaustive coverage of the important segments of the participants, in terms of gender, age and ranks. A total of 11 (22%) lecturers who responded to the survey were females and 40 (78%) of the participants were males. This gender difference is however a reflection of the mismatch between male against female employees at the university, which constitutes 76% against only 24% male and female lecturer employees respectively. It therefore presents an impression that, variations in the way ICT is used at Mzumbe University is not a function of gender.
The age range included lecturers under 25 (0%) and over 55 (13%). The largest age group was 36-45 years (45%), followed by 46-55 (22%) and 25-35 years (20%). The lecturers’ teaching experience indicates that, 16% had an experience below 5 years; 40% lecturers had experience of 5-10 years; 22% had experience of 11-15 years; while up to 12% of them had an experience of over 20 years. The researcher decided to collect information across such groups in order to obtain diverse information to establish if there was any ICT use pattern which might have been influenced by such characteristics.

4.1.3 Students’ years of study, gender and age

The demographic characteristics of students’ participants are presented basing on the year of study, gender and age distribution. Responses indicate that, out of 690 students, majority (75%) participants were in their 2nd year of studies, while only 25% were 3rd year. This variation was a result of the fact that, the data collection process took place during the first semester of the study in which majority of the third year students had gone for their field attachment. The researcher was however able to meet the third year students from the faculty of law and the department of education in the faculty of social sciences only whose field attachment calendar differs from that of others. Moreover, the responses indicate that, 51% and 49% were male and female student respondents respectively. This percentage ratio depicts the actual situation of the achievement that the university attained in addressing the access to education by all genders, currently at 51% and 49% for male and female students respectively (MU fact and figures, 2014). The age distribution of the students is presented in Table 4.3.
### Table 4.3: Student respondents' age distribution

<table>
<thead>
<tr>
<th>Age range</th>
<th>Number (N)</th>
<th>Percentage %</th>
<th>Cum. percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 20 years</td>
<td>21</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>20-25</td>
<td>476</td>
<td>69</td>
<td>72</td>
</tr>
<tr>
<td>26-30</td>
<td>166</td>
<td>24</td>
<td>96</td>
</tr>
<tr>
<td>31-35</td>
<td>21</td>
<td>3</td>
<td>99</td>
</tr>
<tr>
<td>Above 35 years</td>
<td>06</td>
<td>1</td>
<td>100</td>
</tr>
</tbody>
</table>

**Source: Field study, 2015**

Table 4.3 indicates that, 476 (69%), of the student respondents were between ages of 20-25, followed by ages of 26-30 (24%), below 20 years (3%) while the least (6) was the age above 35 years (1%). This suggests that, majority of the participant students were within the age range of general student body that joins the public universities in Tanzania which actually constitute the ICT use sensitive group.

#### 4.1.4 ICT supporting administrators

The study also engaged administrators and the ICT technical team as important supporting groups in the use of ICT in teaching and learning. Two administrators who are part in the university management team were involved, including the director for e-learning, who was responsible to oversee the ICT use in teaching and learning and the director for Quality Assurance as a quality manager of the teaching and learning process and outcomes. The study also involved all (10) technicians from the ICT directorate; these are people responsible for both technical and pedagogical ICT use support solutions to lecturers and students. The academic specialization/qualification of the members as presented in Table 4.4 determines the suitability of these personnel to support right practices of ICT use in teaching and learning.
Table 4.4: Qualification of the ICT technical team members

<table>
<thead>
<tr>
<th>Qualification/Specialization</th>
<th>Number</th>
<th>ICT in T/L Qualification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>MSc. Database Systems</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>BSc. Computer Science</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>MSc. Software engineering</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>BSc. ICT Management</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>BSc. Information &amp; Technology Systems</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Diploma in ICT-Management</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Certificate in Electronic Sciences</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>

Source: Field study, 2015

Table 4.4 presents the description of the academic qualification of the technical team members. As it may be seen that two (2) of the members possessed some attributes of teaching profession to support the ICT use in teaching and learning which they obtained from some short courses. This rises a doubt whether by merely attending short courses the staff could provide adequate support on matters related to designing and implementation of ICT based teaching and learning activities at the university.

4.2 Range of ICTs to support teaching and learning At Mzumbe University

The study sought to explore the range of ICTs available to mount teaching and learning at MU. This section aimed, specifically, at finding out whether or not there is ICT infrastructure or facilities which can support teaching and learning. The section also
sought to document the gaps that must be addressed regarding the range of ICTs to support teaching and learning at the university.

By using questionnaires, lecturers and students were asked to list infrastructure/facilities they were aware of and their availability to support teaching and learning at the university. This understanding was required in order to determine the possibility that certain ICT-based teaching and learning practices could be possible and effective. The responses revealed that, Mzumbe University has ICT infrastructure and facilities for teaching and learning. Responses to indicate the available range of the ICTs are presented in parts; the Learning Management System (LMS) and other ICTs.

4.2.1 Learning Management System (LMS) at Mzumbe University

It emerged through observation, interview with the director of e-learning and the Focus Group Discussion with the ICT technicians that, Mzumbe University had an Open Source Moodle system to manage its academic, administrative and research activities. Moodle is software with features that can facilitate various on-line teaching and learning activities; such as sharing asynchronous video and other academic materials, creating contents online, online discussion, chats, and students peer review, online assignment/quizzes and self-assessment of submissions among others.

The interview with the director of e-Learning and the focus group discussion with the ICT technician demonstrated that, the university management had confidence that, Moodle was a perfect platform to support teaching and learning at the university despite an increasing call to procure some advanced learning management systems like Blackboard and Cloud Computing among others. For example, in the interview with the director of e-Learning, the respondent asserted that, “...technology is there, we don’t have an excuse by
saying that it will be costly to procure platforms like Blackboard and others that are expensive for the developing countries; but we have the Open Source Software (Moodle) which is both easy to access and use”.

This statement aligns with response from one technician, who posited that, “the platform is capable of all that we may decide to do here”.

The researcher observed the availability of this software and some demonstration of different features of teaching and learning activities, such as sharing of different files between lecturers and students; on-line discussions, chats and content creation. The findings indicate that Mzumbe University could make use of the system/software to mount various on-line activities either as complement for face-to-face activities or purely distance education.

Despite the evidence on availability of the platform as a key requirement for ICT based teaching and learning, the researcher was cognizant of the fact that the platform alone could not enable the accomplishment of desired teaching and learning activities. On this basis, the researcher chose to explore other resources that must tie to support teaching and learning.

4.1 Other ICT infrastructure for teaching and learning at Mzumbe University

The researcher sought to find out the other types of ICT infrastructure available to support teaching and learning. Findings indicated that, a range of ICTs is available at Mzumbe University. However, there is no uniformity in terms of the types of ICTs and the frequency at which lecturers and students reported them. These are described on a comparative basis from lecturer and students’ responses given in figure 4.2.
The summary of findings presented in Figure 4.2 show the ICT infrastructure whose availability was acknowledged by lecturer and students respondents. It emerged that; majority (above 50%) of lecturer participants listed a broader range of ICTs and associated facilities than the student respondents. Lecturers acknowledged: networked computer laboratories by 84%; personal computers and internet sources by 82% and 67% respectively, on campus internet connectivity (51%), sources of power (electricity) (51%), ICT use trainings (63%), technical support (73%) and data projectors (60%). The response pattern also presents a picture for ICTs whose availability was acknowledged by only few lecturer participants; these include subject-specific software (10%), digital contents (27%), motivation for ICT use (43%), subject website (8%) and off campus internet connectivity (11%). This shows that, although lecturers were aware of the availability of certain ICT infrastructure for teaching and learning, some ICTs were not
adequately made available to other lecturers which reduce the confidence that ICT-based teaching and learning might be effectively done by all lecturers. This suggests the need for proper arrangements to be made at the university so that both lecturers and students are aware of the available ICTs.

Findings indicated that, over 50% of the student respondents listed a limited range of ICTs; these include: networked computer laboratories (90%), personal computers and internet sources (83% and 82% respectively), on-campus network connectivity (77%) and power sources at (64%). On the other hand, responses have indicated that, many students did not confirm a broad range of ICTs, which are vital for ICT-based teaching and learning activities. Many types of ICTs which are vital for ICT-based teaching and learning activities were acknowledged by only small percent of student respondents as follows; ICT use trainings (34%), technical support (27%), data projectors (18%), subject specific software (14%); digital contents (13%); motivation for ICT use (13%), subject websites (7%) and off-campus internet connectivity (7%). This pattern suggests that, majority of student respondents are unaware of the availability of certain ICTs, and thus predicts inability to carry out the related ICT based teaching and teaching activities.

The researcher also wanted to find out if the available ICTs were equally accessible to lecturers and students. Responses indicated a variation in accessibility on some ICTs between the lecturers and students. While networked computer laboratories, personal computers, subject specific software, subject websites and off campus connectivity are relatively equally mentioned by both lecturer and student participants, there is however a noticeable variation for some ICTs. This is evident as for example, while 82% of students listed the availability of personal internet sources, 67% of the lectures did. Whereas only
34% of students acknowledged the availability of the ICT use trainings, 63% of the lecturers did. Similarly, 73% of lecturers listed the technical support whereas only 27% of students did. This suggests a lack of balanced provision of the ICT facilities for teaching and learning between the different groups of users.

The responses of lecturers and students in Figure 4.2 also indicate a variation in confirmation over certain ICTs. Some ICTs were acknowledged by a larger number of students and lecturers while others were acknowledged a smaller number. For example, on-campus internet connectivity was acknowledged by 77% and 51% of students and lecturers respectively and reliable power supply was acknowledged by 64% and 51% of students and lecturers respectively. The ICTs that were hardly acknowledged included: off-campus internet connectivity at 7% and 11% of students and lecturers respectively and digital contents at 13% and 27% of students and lecturers respectively. This suggests uneven distribution and accessibility of the available ICTs by lecturers and students. It also suggests that, while some attention has been put on some ICTs, some ICTs have not received much attention. This pattern may contribute to the low use of the ICTs for teaching and learning.

The study also sought to elicit the perspectives of ICT administrators on the confidence that the available ICT could support teaching and learning. The findings indicate that, the technical support experts and the director for e-learning had confidence that the available ICTs could support on-line activities for complementing face-to-face instruction as well as distance education (purely on-line), but they were skeptical that lecturers and students were not ready to use the ICTs in the desired teaching practices During the interview with the director for e-learning, the respondent said the following words; "...the lack or
unfriendly infrastructure doesn’t have to be mentioned here... because there is wireless connection everywhere, and enough computer laboratories; so there is no way one can pile blame about infrastructure”. The claim from the IT personnel indicates a perception that the ICT infrastructure is not a problem at the university; however, this view contradicts the perspectives of the lecturers and students, who seemed to lack confidence for the supportiveness of the available ICTs.

One technical support team member reiterated during the Focused Group discussion that, “...some people may think this is the Mzumbe of old days; things are not the same here; the available facilities can support activities that are not evident in any other university in Tanzania”

The researcher sought to confirm, through direct observation, the availability of certain ICT infrastructure and facilities mentioned by respondents. The researcher observed a total of six (6) computer laboratories which together had a total of 250 computers. All of these computer laboratories were supplied with sound speakers systems, Uninterrupted Power Systems (UPS) and lights. In lecture rooms, the researcher observed smart boards, projector screens and Liquid Crystal Display (LCD) projector stands, although in some classes, the stands did not have the projectors. The researcher also visited the offices for the directorate of ICT, where he observed some movements of students, some of them registering for e-learning subscription at the students’ helpdesk, while others were seeking for technical support. In many offices for lecturers, internet cables were seen and some sockets to support computer uses. This observation helped to confirm some of the ICTs and observe some gaps regarding the adequacy of the same, which is presented in section 4.5 under the adequacy of ICTs.
The study further sought to interrogate the ICT use training, workshops and public speeches at the university in order to establish the likelihood that they had an impact on the ICT-based teaching and learning. When asked if there had been any trainings or workshops to foster ICT use among lecturers and students, the director for e-learning asserted that:

We have conducted a good number of workshops and trainings in collaboration with people from the North under the VRIL-OUS project. Recently, we invited a Professor from Belgium, who is expert in the learning technology and teaching, which is the best combination of what we are doing....It is very unfortunate that, many people were not even aware that these opportunities are here!

The responses indicated that, despite the availability of trainings and workshops geared to enhancing ICT use for teaching and learning at the university, these programmes have not been inclusive, continuous and of high impact in transforming traditional teaching. In a workshop on how to design and implement blended learning for the MBA programmes at the university, where the researcher attended as participant observer, evidence for these features were noted. The workshop was facilitated by two (2) external Professors (from Europe) and two co-facilitators from within Mzumbe University. The training engaged only few lecturers (20) who received invitation, basically those teaching MBA courses.

The workshop was intended to attain the following outcomes among lecturers; 1) design online course activities for blended MBA-programmes at Mzumbe University; 2) understand and apply Bloom's (revised) taxonomy of cognitive operations to the programme and course outcomes; 3) design a learning trajectory of activities and resources aimed at reaching the learning outcomes and 4) to know how to implement the programme and use appropriate assessment scales, internal and external activities and resources in MOODLE.
Besides this focused workshop and other trainings whose contents were critically analyzed, it was found that, the contents of these training were relevant to the strategy being advocated at the university but hardly linked to current practices. The study further observed that, the lecturers gained some knowledge from the workshop because they were able to demonstrate some activities they were trained about. However, the study observed that, the workshops and trainings had certain features which limited their practicality. They were not inclusive as majority of lecturers were not attending. Such workshops did not have any follow-up arrangement as a mechanism of ensuring that things were done beyond the workshop rooms. This too applies to the ICT trainings provided to students. The researcher observed a queue of students waiting for training service of two internal trainers, which also implied a mismatch between the number of trainers and that of students.

Discussion

The exploratory nature of this study was meant to provide a picture on the range of ICT facilities available to support teaching and learning activities at MU. The aim was to provide insights into the range of hardware, software and other supporting facilities available to support teaching practices at the university. Findings of this study confirmed presence of various ICT infrastructure and facilities to support a broad spectrum of teaching and learning practices at the university. These include public and personal computers, mobile devices like smart phones, data projectors and screens, sound systems and stand-by generators. It was also possible to observe learning management software (Moodle) which has the capacity to facilitate activities to complement the traditionally offered face-to-face instructions as well as purely distance education (cf. MU, 2012).
The study also found that, the university had been able to put in place internet connectivity in the campus (Local Area Network (LAN) and Wide Area Network (WAN)), and establish technical support team and students' help desk teams which were available to provide support forms like guidance, maintenance and installation. Elsewhere in literature, this range of ICTs would provide basic requirements for ICT-based teaching and learning activities, including blended learning (Sife et al., 2007; Mtebe and Raphael, 2013). DeLone and McLean (1992) regard the availability of such ICTs as an important Information Quality factor in any Information Success context. The situation regarding use of these ICTs at Mzumbe University is well discussed in section 4.4.

This study also found that, the ICT infrastructure were unevenly distributed, mainly because of uncoordinated planning, that would pose some difficulties in their use for teaching and learning activities. The study for example proved that, certain ICT facilities were not easily accessible by either lecturers or students, mainly due to lack of awareness over their availability. Other facilities were however unevenly provided among students and lecturers; for example, the study found that students had less clinical support than the lecturers, which suggests some difficulties for students to engage in the use of particular ICTs. This observation resembles findings made by Zaki (2014) that a significant number of ICT tools may be available in the university settings, but either lie idle, inappropriately used or just vanish into oblivion. The situation at Mzumbe University therefore suggests that, the university has to make arrangements of ensuring that the ICTs available are accessible and evenly distributed among lecturers and students.
The findings of this study indicated that, the university had placed much emphasis to ensure availability of only some ICTs and less emphasis on others. The tone of this study is in line with Kyalo and Mulwa (2013) who cautions that, the question of the range of ICT infrastructure for teaching and learning need to be dealt with from institutional context and the prescribed teaching and learning practices in order to give a true picture of the specific operational environment. Drawing from this perspective, this may be interpreted as the need to put in place ICTs that can accomplish the desired practices. From this perspective, the decision to put in place ICTs must ensure a balance on the type of ICTs required. Findings of the current study indicate that, the availability of certain ICTs was by far less rated over others, which implies lack of balanced procurement. Studies in developing countries have documented much about lack of financial muscles for the universities to procure adequate ICTs for their teaching and learning activities (Mtebe, 2013; Sifeet et al., 2007; and InfoDev, 2013). Mzumbe University is a typical of the financially challenged institutions; the situation suggests a high need to mobilize more budget sources so that necessary ICTs can be made available to support broader range of teaching and learning activities.

Findings at Mzumbe University also indicate a mismatch between the available ICT services and the desired outcomes. While some useful training has been provided, specially those conducted by trainers from European partner universities; these have never lacked continuity and sustainability. The study confirmed that, the technical support team members had much of technological expertise instead of the teacher-skills related competences, which reduces the likelihood that they could help lecturers design effective teaching and learning activities, as suggested by Kohler and Mishra (2006).
This was also proved correct when some lecturer respondents argued that the trainings offered by internal trainers had not been effective. It further indicates that, there is lack of right teacher-related skills (pedagogies) among the technical support members, who are in this case trainer for ICT-use teaching practices, which might lead to application failures. This observation is similar to findings at the Open University of Tanzania by Nihuka and Voogt (2012). It is in light of this observation that, the researcher perceives the necessity for the Mzumbe University to ensure that the trainings are conducted by trainers who can link between technology and the pedagogy in order to ensure sustainability of ICT use for teaching and learning.

The study identified some efforts that the university had been making to ensure availability of relevant expertise for the areas related to ICT use in teaching and learning. Through its collaboration with some universities in Europe under the VRIL-OU project, Mzumbe University had sent its staff for short term and PhD training in the area of eLearning, distance learning or virtual learning. The aim has been to have experts in the areas such as curriculum development, course design, quality assurance controls as well as content generation that will improve the university profile. The above collaborations coupled with training of staff signify the efforts by the university to sustain the use of the ICTs in teaching and learning.

4.3.0 The ICT usage for teaching and learning at Mzumbe University

Another task of this study was to establish the actual situation of ICT use in teaching and learning, with a close focus on the prescribed practices at the University. Questions under this section were set to interrogate the following aspects; whether there was any ICT use
in teaching and learning or not; types of ICT based activities; motivation of ICT use for teaching and learning and the platforms for on-line based activities.

4.3.1 The prescribed ICT use for teaching and learning at Mzumbe University

A critical review of documents revealed that, Mzumbe University embraced the use of Blended learning, whose necessity in instructions is mandated by the university mission and the Strategic Plan (MU-STP 2012-17), as a tool of producing graduates with relevant market competencies for employability. Objective 1.A3 of the strategic plan envisages the use of ICT as;

_To strengthen digital environment for teaching and learning; with among other relevant targets, to adopt and operationalize digital communication within the University community and ensure teaching and learning related documents for all courses available online to foster blended learning strategies by 2013_, pg 29.

The strategic plan’s articulations were also echoed in the interview response from the director of E-learning, who reiterated that;

...we have wanted to see blended learning as an icon at the university and a key strategy that we can use even for marketing the evolution of this institution from being a local government’s Institute of Development Management-IDM into the current university.

The documentary review also indicated that, the use of ICTs for teaching and learning was introduced in 2009 by university ICT experts under the support from Agder University, among other partners (Ghasia, 2009). Since then, the idea of having some on-line activities complement the face-to-face instructions was introduced for the purpose of increasing interactivity between lecturers and students who may be separated by time and space (MU, 2012). In principle, blended learning mode requires a mix of proportions of on-line and face-to-face teaching and learning activities to offer a flexible
teaching and learning to lecturers and students.

A thorough documentary review further indicated that, from its inception (2009), the ICT capacity was expected to offer various online activities to support face-to-face lecturer-students interaction; such as sharing asynchronous video and other academic materials and creating and sharing contents online. Other activities targeted include online discussion, chats, students’ peer interaction, online assignment/quizzes and self-assessment of submissions among others, managed through the Moodle Learning Management System or Software (cf. Ghasia, 2009; MU, 2010). Regarding what the university anticipated to attain on the ICT use in teaching and learning, the major gap was on the nature of ICT use in practice, which could be used to estimate the developments between what was anticipated and what is actually taking place. The study observed that, the anticipated strategy had not been achieved, because of the weaknesses, some of which resulted from the available ICT infrastructure and lack of right skills to use the ICTs to perform the anticipated teaching and learning activities, as presented in section 4.4.3

4.3.2 The usage of ICT for teaching and learning at Mzumbe University

The study sought to document actual uses of ICT in teaching and learning. Lecturer and students were firstly asked whether or not there were any ICT uses in their daily teaching and learning. Findings indicated that, the use of ICT was highly acknowledged by respondents of the study. A total of 51 (100%) lecturers and 691 (100%) student respondents who completed the questionnaires agreed that they had been using ICTs in their teaching and learning activities. This presented a picture that, the use of ICT, regardless of its level of use in teaching and learning is no longer an abstract endeavor.
among lecturers and students at Mzumbe University, as majority of the respondents acknowledged its prevalence. This also implies that, regardless of the maturity level of the ICT use at the university, the awareness about its potentials had permeated to a certain extent at the university, which suggests that some transformations have taken place. The detail of the types of activities conducted by using ICTs is presented in the sub-section 4.4.3.

4.3.3 Types of ICT based teaching and learning activities at Mzumbe University

The study interrogated the respondents on the actual activities they performed by using the ICTs available at university. The researcher categorized the activities in three levels, which indicate the depth of ICT use; off-line face-to-face mode, the online mode, and the combined/blended (face-to-face and online) mode. These modes define a progressively wider spectrum of ICT use in teaching and learning, ranging from the use of ICTs like computers, projectors and software programs to enhance classroom face-to-face instructions to purely on-line (web-based) distance instructions.

Thus, both lecturers and students were asked to indicate the modes for certain teaching and learning activities. Responses from lecturers indicated that, 33 translating to 61% of respondents acknowledged to employ some on-line activities along the face-to-face activities (blended learning); 14 respondents (of which 10 are males and 4 females) translating to 30% disagreed that they had employed any on-line types of teaching and learning activities; while least 4 (8%) lecturer participants did not respond. These responses are summarized in Figure 4.3
Similarly, students’ responses indicated that, 421 (61%) of respondents acknowledged the prevalence of teaching and learning conducted through a face-to-face mode alone. This number includes all (124) student respondents from the faculty of Law. A total of 269 (39%) of the same agreed to have some teaching and learning activities conducted by incorporating some on-line activities into face-to-face activities; and none (0%) of the respondents declared the prevalence of a purely on-line taught subjects. The findings present some evidence that, while majority of participants acknowledged the dominance of face-to-face teaching and learning mode, there, are, however some bits of on-line activities conducted to complement the face-to-face activities, which also suggests some changes in the ICT use for teaching and learning.

The study further interrogated about specific activities regarding the dominant delivery mode for each. Responses shown in Figure 4.4 summarize the findings on the modes for
the different activities according to student participants’ responses.

Figure 4.4: Delivery modes for specific ICT based T/L activities

![Bar chart showing delivery modes for specific ICT based T/L activities]

Source: Study findings, 2015

The findings summarized in Figure 4.4 indicate that, major teaching and learning activities are dominantly conducted through face-to-face mode; these include lectures, tutorials, discussions/charts and assignments/tests/examination administration at 96%, 95%, 88% and 96% respectively. However, students acknowledged using the ICT in on-line mode to get access to materials, such as lecture handouts, notes and assignments at a proportion of 41% besides the face-to-face mode. A marginal portion of on-line activities (i.e. discussion 2% and material sharing 3%) were however observed from the faculty of science and technology, mainly among students and lecturers taking ICT related subjects. The dominance of face-to-face mode of teaching and learning activities is also reflected in the lecturers whose responses were sought to complement the description of the
teaching and learning activities supported by the available ICTs. The lecturers echoed the use of ICTs, mainly the managed Moodle platform as to facilitate provision of handouts, notes and assignments to students at above 60%.

The dominance of face-to-face delivery mode over other ICT based teaching and learning modes is also backed up by the interview response from the director in charge of e-learning, who asserted that:

*"I would not say that we have adopted blended learning by now; maybe I would say we still have remnants of ICT use in traditional teaching and learning; because blending is more than what we have by now. If we go to the platform, there is every feature which allows for a continuous on-line interaction: .... In blended learning, we want to see portions of presentations, assignments and students feedback carried out on-line. Even for the few lecturers who are able to upload their lecture notes, they do that exactly the same slides or teaching notes in Microsoft word which is brought to the face-to-face lecture, which does not provide an impression of what has to transpire in blended learning environments.*

The study findings therefore provide evidence that, the use of ICT for teaching and learning has not reached the level (target) desired by the university. ICT uses are still offline, mainly the use of computers for typing notes, PowerPoint slides, handouts for face-to-face instruction only with some limited on-line interactions between lecturers and students, mainly for sharing the lecture notes, handouts and assignments which to not qualify a blended learning strategy as anticipated by the university. Of course, evidences from the faculty of Law also suggest that, some lecturers still conduct all activities in purely traditional face-to-face mode.

The study sought to find out the influence of social networks on the use of managed learning platform. Both lecturers and students were asked to indicate the platform they used in teaching and learning. Study findings indicated that, 30 of 34 lecturers who
responded to the question (90%) used the learning platform managed by the university (Moodle) only; while the rest, 4 (10%) indicated that they used Moodle and the social networks in teaching and learning. A total of 400 students responded to this item; of which, 78% used the university Moodle only, while 22% used Moodle and social networks. This information is summarized in Figure 4.5

Figure 4.5: Learning Platforms in use at MU

![Learning platforms in use](image)

Source: Study findings, 2015

The summary findings presented in Figure 4.5 show that, while all respondents (lecturers and students) indicated to use the learning platform managed by the university (Moodle), it was also found out that, the use of social networks featured in the ICT use for teaching and learning among lecturers and students and thus threatening the use of managed learning platforms (Moodle). The emerging use of social networks at the university was also raised by one student in the students helpdesk team who was asked on the extent to which students are using the learning platform managed by the university; he claimed that; 

"there is an increased use of social networks (whatsapp, instagram and facebook) but these are minimally used for academic purpose" During the Focused Group Discussion, another student asserted that;
While some lecturers have tended to post some activities for students online mode, these activities are not individualized to students, and therefore, it is not uncommon that, some students would download the activities and share with other students off-line.

Findings further indicated that, students are more active in the use of the social media over the lecturers. The study does, however, not present the comparative details of how the two platforms have been used, and how they can be better used, hence calling for another study.

4.3.4 Motives for ICT use among lecturers and students at Mzumbe University

The study further aimed to find out the reasons that frequently motivated both lecturers and students to use the ICTs in their teaching and learning activities. Respondents were asked to give reasons for their choice to use ICT, specifically to develop and implement on-line activities. It emerged from the study that a range of motivational factors made lecturers and students opt for ICT use. These are summarized in Figure 4.5.

![Figure 4.5: Motive factors for ICT use among lecturers and students](chart)

Source: Study findings, 2015
Basing on summary presented in Figure 4.5, the most frequently mentioned reasons by both lectures and students are; personal interests at 81%, improving presentation of materials (78%), flexibility of interaction between lecturers and students (77%), making the teaching and learning more enjoyable (73%), enriching the content of the lessons (63%), making the lessons more interesting (58%), and the nature of the subjects (51%).

It was also found that, 28% of respondents objectively asserted to perform some on-line activities enabled by the Learning Management software (Moodle) just because of the prescription by the university management. This observation presents a picture that, the decision to use ICTs offered by the University for teaching and learning is associated with the convenience associated with it. It also presents an impression that, the use of ICT is not given much emphasis in practice as how it is reported in the policy and strategic plans. This therefore calls for more efforts by the university to motivate both lecturers and students who are still not using ICT as anticipated by the university.

**Discussion**

The study sought to establish the situation of ICT use in teaching and learning at the university, in the light of the available infrastructure and facilities. Answers to questions on the desirable and the actual ICT use practices and the motives for the available uses emerged in the findings of this study. The study found that, theoretically, the university embraced the incorporation of some on-line and face-to-face modes of instructions (blended learning), but in practice, it has not been the case, and that, the intended usage is almost non-existent contrary to what had been reported earlier. The study proved that, the university strongly advocated the blended learning strategy through its Corporate Strategic Development Plan as well as the ICT policy. The confidence for the strategy is
also linked to the available ICTs, such as the Moodle software, networked environments and university support, among other factors. Of course, some scholars demonstrate that the availability of the aforementioned factors constitute significant enablers of blended learning (Mtebe, 2013 and Sife et al., 2007).

It emerged from the study that, the use of ICTs as blended learning enabler remains very low despite the confirmed infrastructure. The Moodle platform which has diverse features to support teaching and learning interaction is underutilized, as only few lecturers were documented to have been using it as a result of lack of technical capacity to design and implement the desired practices. The study found that the dominant ICT activities involved the use of computers as tools for preparing notes and through PowerPoint presentation. The types of activities performed on-line remained predominantly sharing of lecture notes and provision and submission of assignments, which do not have impact as expected in blended learning strategy. The situation at Mzumbe is similar to many other universities in the developing world. The study conducted at the University of Dar-Es-Salaam (Mtebe & Raphael, 2013) also revealed unavailability of instructors during live online sessions, and under-utilization of Learning Centers as factors that affected students' use of the technology.

The findings of this study are also consistent with what Bhalalusesa et al. (2013) observed at the Open University of Tanzania in blended learning programmes offered via Moodle system. The findings for the study revealed that, there were no adequate learning contents uploaded in the software for students' access. Generally, there is lack of expertise and experience among the instructors in universities in developing countries to design and implement quality ICT enabled learning activities, and that many institutions continue to
rely on traditional teaching practices and printed resources which manifest high cost and limited flexibility and efficiency.

It also emerged from the study that, there was a co-use of the learning management platform (Moodle) managed by the university and the unmanaged Social Networks (Whatsapp, Instagram and Facebook). It was evident that, these social networks are increasingly paving its way at the university at least as peer platforms for students, although there is no evidence if they are used for academic purpose. Fortunately, they seem to offer a more flexible and individualized participation in interaction, which may be advantageous over a managed platform. Based on secondary data, Nzuki (2014) observed that, these social networks are used in teaching and learning in some other places with a lot of misconception from among teachers. The different perceptive concerning the pedagogical strategies which may be enabled by these social networks call for more researches to ascertain their optimal benefits in teaching and learning.

4.4 Adequacy of ICT infrastructure to support teaching at Mzumbe University

The study interrogated about sets of different ICTs available by using questionnaire (lecturers and students), interviews, observation and documentary analysis. Respondents were asked to rate the adequacy of the supportiveness of the ICTs for the blended learning activities prescribed at the university. The review of various both hard and soft copy contents and physical observation were however used to qualify the responses from respondents.

4.4.1 ICT hardware infrastructure

This consisted of all the publicly accessible computers, sound systems, data projectors
and space in lecture rooms and laboratories within the institution for the sample population. Lecturers and student participants were asked to rank the level of adequacy at the Likert scale of 0 to 4; whereas 0=Not supportive, 1=Less supportive, 2=Average 3=Supportive and 4=Very supportive. Findings summarized in Figure 4.7 show that majority (35%) of the respondents ranked this particular resource's adequacy as average; this was followed by less supportive (28%), supportive (15.4%), very supportive (14%) and not supportive at all, which were represented by (14%) of the population. The responses show that, majority of respondents indicated adequacy as average, supportive and very supportive at 35%, 15.4% and 14% respectively, which show a relative confidence in the adequacy of the particular ICTs.

The researcher visited to observe 6 (six) computer laboratories (Figure 4.6), with a total of over 250 networked computers. This roughly translates to a computer and students' ratio of 1:28, which is below the recommended 10 computers per 100 students (cf. Kashorda & Waema, 2011). The researcher however observed that both students and lecturers were not making use of the computer laboratories during the time an observation was made; the laboratories were idle with no users. This observation is consistent with the e-learning report generated by the university, in which almost 80% of users never practiced the skills acquired from the trainings. Moreover, of the remaining 20%, none would have a 100% of the training content in a week time. In the same lane, even the training manual and demo were never used for actual teaching and learning practices, rather being stored in shelves (Ghasia, 2015)

It emerged from the study that, majority of both lecturers (82%) and students (83%) possessed and made use of their personal computers and other handled devices like
tablets and smart phones. It was further revealed during one of the Focused Group Discussions with the students helpdesk team that, findings of one project (Zone-IT project) in which they took part as research assistant found that, 65% of students at Mzumbe University owned smartphones with capacity to execute various on-line learning activities, including chats, discussions, and submission of assignments. This suggests an increased use of personal devices over the computer laboratories offered by the university, which reduces tensions over infrastructure to be offered by the university.

Figure 4.6 is a photo indicating some ICT use activities in two computer laboratories at the university with 150 of the 250 total university computers. The study did not, however, undertake any technical examination to identify the number of working and the non-working computers as this would require some technical IT competence that the researcher was not able to accomplish. Despite the mismatch between the numbers of students and certain hardware facilities, the findings suggest a relative confidence on the adequacy of available computer laboratories to support on-line activities because of the option to use personal devices.
1. Computer laboratories at Mzumbe University

2. Students in ICT use (e-learning) training

Source: Study findings, 2015

4.4.2 Software facilities

This entails different software and subject specific programs to facilitate the application of ICT hardware infrastructure for the teaching and learning activities at the university. This would be expected to support both lecturers and students’ subject-specific teaching
and learning activities. Figure 4.7 shows that 10% of the respondents rated this particular resource's adequacy as "average"; this was followed by "less supportive" which was rated by 70% of the respondents, "not supportive at all" which were rated by 18% of the respondents; and "supportive" which was rated by only 2% of the respondents. Having the majority of respondents (80%) rate the software facilities below average shows lack of confidence in the adequacy software facilities to support teaching and learning.

4.4.3 Internet connectivity

This consists of all the respondents' sources of internet offered by the institution that include all Wireless Networks (WAN) and the Local Area Network (LAN). The responses summarized in Figure 4.6 show that most (40.6%) of the respondents rated this particular facility adequacy as "average"; followed by "less supportive", "poorly supportive" and "not supportive at all" which were all individually represented by (18.7%) and "highly supportive" which was rated by only (3.2%) of the respondents, which is slightly above average but does not show confidence in its adequacy. This response pattern contradicts other responses, such as the director for e-learning and the technical support team, who revealed that, the university has a supply of a total of 40 Megabytes, which puts in place a recommendable bandwidth of 4mbs per 1000 students in campus (cf. Kashorda & Waema, 2013; 2011). This may suggest that, there is un-even pattern of bandwidth provision at the university so that others cannot access the connectivity.

4.4.5 Technical and support Services

This consisted of different services to enable the use of the ICTs for the prescribed
teaching and learning. These include power (electricity) supply, technical support services like maintenance and repair, antivirus protection among others. Findings summarized in Figure 4.7 show that most (48%) of the respondents rated this particular resource's adequacy as "average"; followed by "less supportive" which was rated by 30.5% of the respondents; "poorly supportive" and "not supportive at all" which were both individually rated by 7.9% of the respondents and "supportive" which was ranked by only 5.6% of the respondents, which is slightly below average but shows lack of confidence in its adequacy. The responses on adequacy of the investigated ICTs are summarized in Figure 4.7

**Figure 4.7: Adequacy of ICTs for teaching and learning at MU**

![Adequacy estimate graph](image)

Source: Study findings, 2015

**Discussion**

The study sought to establish the adequacy of the ICT infrastructure and facilities at Mzumbe University as an important condition for any Information Success (DeLone & McLean, 1992). The overall impression from the responses indicates that, the ICT
infrastructure and facilities at Mzumbe University, just like in many other universities in developing world are still inadequate. Evidence from other literature indicates that, the mismatch between number of ICTs and users is partly due to increased enrolment and shrinking budgets in higher learning institutions (Kashorda & Waema, 2008, 2014; Mayeku, 2014; UNESCO-IS, 2014; SARUA, 2012). Findings indicate that, Mzumbe University has installed software systems like Learning Management Systems (Moodle), subject specific programme software; and services like internet connectivity, power sources and technical support services such as software upgrading and installation, virus protection, and performance maintenance to enable a significant portion of on-line alongside face-to-face instructional activities. However, the use of ICTs is still challenged by inadequacy of certain ICT facilities, such as computer labs, internet connectivity, technical support and competence to operate the ICTs.

When viewed in a broader lens, the central factor at Mzumbe University is financial capability; that, much of infrastructure have waited for support from donors’ projects. Evidences from the Mzumbe also suggest that, perception of the inadequacy of some ICTs may be self-imposed, to mean, a result of lack of proper management and usage patterns and attitude. It emerged from the study that, some lecturers were reluctant adopt the prescribed teaching (blended) strategy because of negative attitudes and lack expertise, autonomy and knowledge to execute the functions of technology. It also emerged from the study that, certain ICTs were unevenly distributed among lecturers and students; for example, more trainings were provided to lecturers than students. Literature provided evidence that, an institution can succeed within infrastructural constraints if it had assessed its capacity level (Kashorda & Waema (2010). This implies that, the
institutional understanding of the capacity level will encourage the members to appreciate and productively make use of the same level of ICTs. This is proved correct by the study by Drapper (2010) in high schools science teachers and students with limited skills and access to ICT infrastructure in South Africa. Drapper (ibid) observed that, the schools had few ICTs with limited access, but led to high impact due to the motivated usage among the teacher and students. The situation at Mzumbe University needs therefore to be investigated further; although the ICTs may seem generally inadequate, the current rate of ICT use suggests more than just procuring more ICTs.

4.5 Competences in ICT use for teaching and learning at Mzumbe University

The study aimed to find out the competences students and lecturers possess for the use of ICTs for the teaching strategies at Mzumbe University. The study sought to elicit information on basic computer skills among lecturers and students and the extent to which they could design and implement ICT-based teaching and learning activities. Such information was meant not only to serve as a basis for determining the actual use of ICTs, but also elicit the perceptions on the skills deemed necessary to enhance ICT-based teaching and learning strategies desired at the university.

4.5.1 Basic computer skills among lecturers and students at MU

The study interrogated basic computer skills, such as typing, editing, and formatting and internet browsing among lecturers and students, as determining capabilities for ICT use or the prescribed strategy at the university. The summary of findings based on the responses from students and lectures are presented along with average percentage in the
The summary presented in Figure 4.8 indicates that majority of the respondents rated their ICT skills at a "highly skilled and very highly skilled" levels, at a cumulative percentage of 76.1 compared to respondents who rated their skills at moderately skilled (18.4%) and below average at a cumulative percentage of 5.75% respectively. This demonstrated that the lecturers and students estimated their basic computer skills as above average at most, which predict confidence in the possession of basic competences as a factor for effective ICT use in the teaching and learning. However, findings also indicate minority relatively small of respondents, both lecturers and students, who have low basic computer skills and thus may be limited to participate in the ICT-based teaching and learning activities.

4.5.2 Competence to design and implement on-line activities

The researcher was cognizant that, basic computer skills do not guarantee competence
(knowledge and skills required) to use ICTs for the all teaching and learning practices. The study investigated the competences (from respondents' own perception) related to designing and implementing the on-line part of blended learning among lecturers, students and the technical support team. Lecturers, students and the technical support team were asked to indicate if they had received any training on how to implement a blend of face-to-face and on-line strategies. Responses indicated that, not all respondents, particularly lecturers and students had access to the trainings provided at the university. Responses further indicated that, 78.4% and 62% of lecturers and students had received some training. In contrast, 21.6% lecturers and 38% students had never received such training, which also suggest the likelihood for inability for them to participate well in the prescribed teaching and learning practices.

Both lecturers and students were also asked to rate the effectiveness of the training they had received. A total of 468 respondents (40 lecturers and 428 students), which translate to 78.4% and 62% respondents answered this question. Findings indicate that, majority of lecturers (62%) rated the trainings as average, followed by ineffective (15%), effective (13%) and very effective (10%). Similarly, the students' responses indicated that, 70% students rated the training as average; followed by 15% rating it as effective; 10% effective and only 5% very effective. This response pattern indicates that, although some training has featured at Mzumbe University, the nature in which it was conducted is not yielded the desired changes in the way lecturers and students perform the prescribed teaching strategy.

The study sought to probe on the current competence level of the lecturers in designing and implementing blended instruction by using the Moodle Learning System available at
the university using the Likert item scale of 0=Illiterate, 1=Beginner, 2=Moderate competence, 3=High competence and 4=Very high competence. The responses are summarized in Figure 4.9.

Figure 4.9: Lecturers’ competence for on-line activities

<table>
<thead>
<tr>
<th>Lecturers’ competences for on-line activities</th>
<th>Response %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very high competence</td>
<td>2%</td>
</tr>
<tr>
<td>High competence</td>
<td>6%</td>
</tr>
<tr>
<td>Moderate competence</td>
<td>18%</td>
</tr>
<tr>
<td>Beginner</td>
<td>54%</td>
</tr>
<tr>
<td>Illiterate</td>
<td>20%</td>
</tr>
</tbody>
</table>

Source: Study Findings, 2015

Findings from responses summarized in Figure 4.9 indicate that the majority of lecturers are at the stages of a beginner and illiterate (cumulative percent of 74%) having below moderate competence to design and implement the on-line teaching and learning activities using the Moodle. This is followed by 18% of lecturers who indicated an average competence and a cumulative percentage of 8% who are qualified and experts in competence respectively. This tells that, although majority of the lecturers indicated to have basic computer skills above average, they cannot execute a significant number of on-line activities due to lack of relevant competence.

In attempt to elicit the competency areas which lecturers deemed most essential, the researcher asked the respondents to identify aspects they thought important to enable
them mount an effective blended-learning strategy. Figure 4.10 presents the areas that lecturers called for more competency training.

**Figure 4.10: Competency areas deemed necessary from teaching and learning**

<table>
<thead>
<tr>
<th>Competency Area</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0%</td>
</tr>
<tr>
<td>Assessing and evaluating online activities</td>
<td>57%</td>
</tr>
<tr>
<td>Participating in on-line activities</td>
<td>59%</td>
</tr>
<tr>
<td>Designing on-line activities</td>
<td>77%</td>
</tr>
<tr>
<td>Logging-in into the LMS</td>
<td>27%</td>
</tr>
<tr>
<td>Using computers for typing notes</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Source: Study findings, 2015**

Findings from the response summary in Figure 4.10 show that, majority of respondent lecturers reported the necessity for comprehensive trainings on how to design on-line type of blended strategy (77%); participating in the different on-line activities (59%) and assessing and evaluating the on-line portion of teaching and learning activities (57%). Another 27% of respondents called for training on how to log-in in the Moodle system; whereas 6% needed none of the trainings as they believed to be competent in all these areas. This summary indicates that, certain ICT use related competencies, critical to blended learning strategy, are lacking among lecturers and that any plans to introduce training in the area have to prioritize them.

All 9 (nine) technical support team members were called for FGD. Their responses about competence to support the designing and implementation of the blended strategy revealed
that, members possess ICT competency, but not the ICT competency necessary for designing, implementing and evaluating the teaching and learning activities. It emerged from the study that, none of the members had had any comprehensive training on how to use ICT to design and implement actual teaching and learning (pedagogy). Two members reported to have attended some e-learning short courses, where, training about how Moodle works was provided. The technical team respondents were however hesitant to state their confidence level to guide lecturers in designing and implementing the on-line teaching and learning activities. One member stated that:

*I don’t know these things of teacher-related skills you are bringing out here!......most of us can tell what activities can be enabled by the Moodle Learning Management System; but honestly can’t tell how much of each of the activities should be performed on-line...; as a result, we cannot effectively advice the lecturers to design and implement the most expected blend of the teaching and learning activities”.

The study further interrogated the trainings, workshops and open lectures about the use of ICT in teaching and learning at MU. The study revealed that several trainings, workshops and public lectures were being organized for lecturers, students and even the ICT technical team at the university. Most of these programmes were conducted by members from within the Directorate of ICT, with only few conducted by out-sourced personnel especially from European partner universities. The study observed that, trainings organized by the ICT technical team for students and lecturers on semester or yearly basis have not had much impact on the way teaching and learning ought to be conducted. This is an observation from majority of both lecturers and student respondents who appealed for more hands-on training.
Discussion

The study sought to collect information on basic computer skills among lecturers and students and the extent to which they can design and implement ICT-based teaching and learning activities. The study findings showed lecturers and students having basic computer skills such as typing, editing, PowerPoint presentation, excel and internet browsing, which presents a good condition for ICT use for teaching and learning activities. However, the study indicates that, majority (over cumulative 70%) of lecturers lack a significant number of competences to design and implement on-line types of blended learning activities, as the training and workshop carried out for lecturers and students have not been effective to transform teaching into a desirable strategy. This observation is consistent with the study conducted at the Open University of Tanzania by Nihuka and Voogt (2012) and University of Dar es Salaam by Mtebe and Raphael (2013), all of which observed that, lecturers lacked technical competencies to use the ICTs to operate the teaching and learning activities.

The problem of technology use competence may be more complicated at Mzumbe University, like any other Tanzanian universities also because majority of lecturers in universities do not have a good basis of teacher-related competences. It has to be noted that, ICT use training or workshop must embrace two major branches of knowledge; technology and pedagogy (Kohler and Mishra, 2007). It emerged from the current study, there is no sustainable orientation to enhance ICT use at Mzumbe and that the most active trainings and workshops are donor-oriented and lack continuity. The lack of active orientation and continuity of the ICT use training offered to lecturers and students universities pose a likelihood that, the low utilization of technologies will continue to ail, which also has an impact on the way education is delivered.
The study observed that, Mzumbe University had taken good initiatives to build the competency base of its internal staff with expertise in the area of e-learning, distance learning or virtual learning. It emerged from the interview with the director for e-learning that, several university staff were doing their studies in particular skills in collaboration with partner universities in Belgium. The aim has been to have experts in ICT-based curriculum development, course design; quality assurance controls as well as content generation for quality ICT use in teaching and learning. While these efforts can enhance the ICT use capacity of the university, it must, however, be noted that, the experts will need much support if they are to effect the desired ICT use culture. Evidence from literature indicates that, university administrators have a critical role to ensure continuity of the internal knowledge base development. Administrators can provide the conditions that are needed, such as ICT policy, incentives and resources (Sife et al., 2007). The commitment and interest of the top management and other leaders at every level is the most critical supporting factor for successful implementation of ICT use. This also means that, for the integration of ICTs to be effective and sustainable, administrators themselves must be competent in the use of the technology, and they must have a broad understanding of the technical, pedagogy, administrative, financial, and social dimensions of ICTs in education.

4.6.1 Perceptions on the importance of ICT use for teaching at Mzumbe University

The study explored to document the perceptions or experiences of students and lecturers on the importance of using ICTs in teaching and learning at Mzumbe University. This criterion was used to assess what was the populations’ greatest motivator or rather what they considered the most relevant reason for the use ICTs to accomplish the prescribed teaching and learning practices. Responses indicated that, both lecturers and students attached some
importance to using ICT although at varying degrees. These are summarized in Figure 4.11.

Figure 4.11: Perception of the importance of ICT in teaching and learning

The response summary presented in Figure 4.11 shows that; majority (92%) of the respondents indicated the need to access more academic resources relevant to their studies and work. This was considered to be the major reason for one to use ICT in the teaching and learning process. Another aspect was time saving as the second most selected reason with a cumulative response rate of (85%), followed by the need to keep up with current technologies as the third with a cumulative response rate of 70% while cost effectiveness and flexibility tied at the fifth most dominant reasons each with a cumulative response rate of 69%. Convenience, quality of work and essential for record keeping followed last with response rates of 68%, 64% and 62% respectively.

4.6.2 Requirements for effective ICT-based teaching at Mzumbe University

The study further sought to identify the requirements, in terms of infrastructure, for effective ICT use at the university. Respondents were asked to suggest the requirements that can
make ICT use to realize the importance it is associated with. Findings indicate that, there are challenges related to the ICT use that must be addressed; these relate to the following issues besides the response percentage rates; procurement of more ICT facilities, mainly subject-specific software, digital contents, video conference facilities, better sound devices and a more efficient Learning Management System (88%). About 79% of respondents also reiterated the need for trainings and workshops relevant to the general practices at the university, and that must be conducted in convenient time schedules so that lecturers are open to participate. It emerged also from 79% of respondents that the university has to arrange for motivation mechanisms because much of the digital contents and interactive online activities require both time and resources to design and implement.

Discussion

The study was meant to establish whether lecturers and students perceived any importance of using ICTs as one of the important condition for any Information Success as emphasized by DeLone and McLean (1992). Findings from the study indicated that, both lecturers and students at Mzumbe University associate the use of ICTs with some benefits it offers in teaching and learning; these benefits range from personal, institutional and National in scope. At Mzumbe, the major motivators have been the need for access to better resources, capacity to budget time and resources, quality work, flexibility and convenience in teaching/learning performance. The findings of the current study relates to many other studies which had similar or same objectives. The findings in the study by Gulbahar and Guven (2008) in Turkey indicated a significantly positive correlation between teachers’ attitudes toward ICT in education and their perceptions of the advantages of the use of computers. At the same line, the study conducted by Opati (2013) at Makerere University,
observed that, both students and lecturers attached their positive perception to the ability of ICT to cut down on the time that would have otherwise been spent looking for educational materials. Thus, the argument in this study is therefore similar to Zhu and Engels (2014) that, if students and lecturers perceive a certain importance toward the use of the ICTs then they can innovatively participate in the adoption and use of such technologies in the teaching and learning processes.

The findings in this study revealed that, the use of ICT in teaching and learning at Mzumbe remains low despite the positive attitude on what ICT can serve. It was noted that, lecturers and students indicated that the realization of the importance of the technologies does not just result cheaply. It is therefore important that different conditions be available to influence the rate of ICT use. Commonly mentioned factors relate to infrastructure, mainly hardware, such as enough computer labs; software such as subject-specific software; and other supporting services like efficient electricity, internet connectivity and technical support. It is strongly evident in literature, the several studies document factors that have been found to be critical in influencing perception and therefore the use of the ICT among lecturers and students. These include the studies by Ocak (2011); Voogt and Douglas (2010); Ondigi, et al (2013) among others. The general view in this regard is that, the placement of sufficient ICT facilities is important as a factor for building a community of ICT users with positive attitude to use the technologies.

4.7 Chapter summary

The chapter has presented findings, interpretation and discussions based on the objectives of the study. The aim of the study was to answer the major questions on the range of ICTs and
how these had been used in teaching and learning at Mzumbe University. Other associated themes include the adequacy of the ICT infrastructure and facilities, lecturers and students competences and perception on the importance of ICT use to support the teaching and learning practices at the university. An appreciable respondents’ return rate (92%) helped to present a real situation of ICT use for teaching and learning at the university. The interpretation and discussion were done with a maximum precision, as researcher’s incompetence and personal biasness were all controlled.

Findings from research instruments indicated that, although the university had some ICT infrastructure and facilities, their application were hampered by inadequacy of the same and limited technical capacity among lecturers, students and administrators. Although there seemed a growing motivation among lecturers and students to use ICTs to mount some higher levels of teaching and learning strategies (blended learning), majority of teaching and learning activities continued to be done traditionally, with face-to-face instruction as a dominant mode. However, in line with the rest of the universities in developing countries especially in Africa, Mzumbe University deserves some appreciation for financial and administrative support, which includes procurement of ICTs like computers, internet bandwidth and putting in place partnerships to develop its ICT use capacity. However, the general impression at Mzumbe University is therefore that, although the university has initiatives to promoting the use of ICT in teaching and learning, there seemed a long way to go for its success.
CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction
This chapter presents the summary of the main findings, conclusions and recommendations of the current study on the basis of the study objectives. The recommendations are mainly meant to direct some further researchers and locate the emerging gaps into policy attention.

5.2 Summary of the findings
This study was carried out at Mzumbe University, a public university in Tanzania, with a focus to exploring the use of ICT and the available ICTs to support teaching and learning. The study drew participants from among lecturers, students and administrators who were closely linked to the use of ICT for teaching and learning with attention to age, sex and experience of the respondents. By using both primary and secondary sources of information, the study was able to answer questions designed on the basis of the following components of specific objectives: The range of ICT infrastructure and/or facilities for teaching and learning; the actual situation of ICT use for teaching and learning; the adequacy of the ICTs available to support teaching and learning; the lecturers and students’ competence to use ICT for the prescribed teaching and learning; and the lecturers and students’ perception on the use of ICT for the prescribed teaching and learning at the university. The summary of findings related to observations from these objectives is presented below.
5.2.1. On the range of ICT infrastructure for teaching and learning at Mzumbe University

The study revealed that, Mzumbe University has demonstrated some achievements in terms of putting in place ICT infrastructure for teaching and learning. The availability of the Moodle Learning Management System, hardware and software and other ICT service facilities proved that certain teaching and learning activities could be carried out. The study observed that, the University had managed to procure computers which ensured a computer and student ratio of 1:28 respectively, plus an internet connectivity of 40 Mbps, which ensured the supply of recommendable bandwidth of 4mbs per 1000 students in campus. These computers are placed in six computer laboratories; equipped with data projectors, sound system, light, sockets and uninterrupted power supply (UPSs). Mzumbe University had a power (electricity) generated from the National grid as well as three (3) standby generators. Moreover, the study proved an availability of technical support and students’ helpdesk teams to provide support to lecturers and students in the use of ICT in the teaching and learning.

The study however found some challenges which face the use of the available ICTs at the study case. It emerged from the study that, the distribution of such infrastructure and facilities were not evenly patterned to offer an equal users’ convenience. While some ICTs could be accessible by over 80% of the respondents (such as networked computer laboratories personal computers and internet sources), a portion of other ICTs were accessible by less than 50% respondents (for example, subject-specific software, digital contents, motivation for ICT use and subject website). The study also revealed that, some ICT facilities were available, but both lecturers and students chose not to take advantage
of them; such as the ICT use training and workshops, all of which signified some difficulties to scale up the use of ICTs.

5.2.2. On the situation of ICT use for teaching and learning at Mzumbe University

The study revealed that, Mzumbe University emphasized on the use of blended learning strategy in teaching and learning. This strategy was associated with a possibility to enhancing access to, quality and flexible instruction at the university. Despite the availability of many ICTs which had been confirmed to have supported the blended learning strategy in other contexts, its use at Mzumbe were observed to remain very low; mainly the use of computers for typing notes and PowerPoint presentation. The Moodle platform was too underutilized, only as tool for sharing lecture notes and email communication because of limited technical capacity of the lecturers and students to navigate the teaching and activities the system was meant to serve. The study also observed that, computer laboratories were used mainly for training and workshops on ICT use, but not for individualized lecturers and students’ routine academic activities. The current use of the available ICTs could not serve the targets by university to ensure flexibility, quality delivery and efficient instructions. Moreover, the emerging use of Social Networks (SNs) such as facebook, whatsapp and instagram is regarded in this study as a threat to the Learning Management Systems, since the former is more flexible and individualized, hence calling for an attention to harmonize the two platforms.
5.2.3. On adequacy of the ICT infrastructure to support teaching and learning

Findings indicated a lack of confidence on the adequacy of some ICT infrastructure to support the blended learning strategy. Since the study predominantly drew from users' perspectives, with little quantitative measures (mainly observation and physical counting), the aspect of adequacy remains a subject for further research, with more mathematical treatment of the variables. However, in the context of Mzumbe University, findings indicated that, the users' feeling for the inadequacy of the ICT infrastructure/facilities, it was observed to be stretched by lack of awareness over the availability and uneven distribution and use pattern of the particular ICTs. At a wider context however, the inadequacy of ICTs at Mzumbe was viewed from a broader financial constraints facing most of the developing countries. The approach to address this therefore requires that, both lecturers and students must be motivated to make the possible use of the little ICT resources available. More important, what seems to be critical is an integrated budgetary effort from within and outside university, in order to cater for the costs for procurement of more ICTs and carrying out effective human resource development initiatives to mount the effective ICT use.

5.2.4. On the competences in ICT use for teaching and learning at Mzumbe University

The focus of the study in this aspect was to find out the competences students and lecturers possessed for the use of ICTs for the prescribed teaching and learning practices. However, the current study relied of the perspectives of the respondents, which may suggest a need for a technical based study to assess the ICT use competences. Findings from the study indicated that, majority of respondents at a cumulative 76.1% had basic
computer skills which formed the basis for some levels of ICT use for teaching and learning. In contrast, at most 74% of the respondents indicated a below average competence to design and participate in the on-line portion of the blended learning practices. The study further revealed that, the major limiting factor was lack of effectiveness and continuity of the training carried out at the university. On this basis, lecturers suggested that, more training, with follow-ups carried out on how to design, participate, assess and evaluate the online portion of the blended learning practices. It was however noted that, Mzumbe University had sent some of its staff for short and long term training in the area of blended learning in order to strengthen the university ICT use capacity.

5.2.5. The perceptions on the importance of using ICTs in teaching and learning

The study explored lecturers and students’ perception/experience of the importance of using ICTs in teaching and learning, as one of the important motivators to mount sustainable ICT-based teaching practices. The findings indicated that, majority of both lecturers and students had attached positive image that ICT would enhance teaching and learning. However, findings presented a controversy between the value that respondents attached to the use of ICT for teaching and learning on one hand and the actual situation of the ICT use in teaching and learning on the other hand. Evidence from administrative perspective indicated that, lectures were still reluctant to integrate their traditional and the ICT-based practices due to fear and lack of confidence. This study does not offer a justifiable stand on this controversy, unless some further studies carried out to justify it. Respondents were asked to suggest the requirements for the available ICT infrastructure to realize the importance associated with. Findings indicate challenges that must be
addressed to ensure effective ICT use. These relate to the need for more ICT infrastructure, such as subject-specific software, digital contents, video conference facilities, better sound devices; the need for trainings and workshops relevant to the general practices at the university. Other challenges relate to motivational mechanisms; as much of the digital contents and interactive on-line activities require both time and resources to design and implement.

5.3 Conclusion

This study was conducted to gain insights of the use of ICT and the available ICTs to support teaching and learning at Mzumbe University. The study was conducted within the framework of the “Information Systems (IS) Success Model” by DeLone and McLean (1992); whereas the proposed “Higher Education E-readiness Assessment Model” by Kenya Education Network-KENET (Kashoda & Waema, 2008; 2011) provided a useful framework for the literature review. In the light of the two models, several factors are fundamental for the success of ICT use in teaching and learning; these include the availability of ICT infrastructure, technical capacity of the lecturers and students to navigate the technology in teaching and learning and the positive attitude and motivation to use the technologies, among others. The body of literature reviewed in this study presented a mixed experience of ICT use in teaching and learning in universities under which specific contexts have not been well addressed, forcing up a study like this at Mzumbe University. The findings under this study, led to the following concluding statements about the situation of ICT use for teaching and learning at Mzumbe University.
Regarding the range of ICT infrastructure and facilities, the study established that, there are various ICTs at the university, including hardware, software and support services to support teaching and learning. These could have offered a relatively good starting point for blended learning strategy embraced by the university. These ICTs, however, remained underutilized by lecturers and students because of uncoordinated planning and use. Major issues include lack of competence to use them, unawareness over the availability and inaccessibility of certain ICTs.

Regarding the actual ICT use situation at the university, findings indicated that, despite clear statements for the ICT-based teaching and learning strategy (blended learning) prescribed at the university, such strategy had not been practically reached. This also implies that, the broader National ICT in education policy and the broader MDG targets also remained un-met. The common uses ICT was still too traditional to enhance flexibility and quality teaching and learning anticipated. In this study, the challenge was lack of competences to make the best of the target blended learning. It was also noted that various training on ICT use to lecturers and students had not had much impact because of lacking inclusion, continuity and incompetence of trainers which altogether limited both the designing and implementation of the target strategy.

The estimation of adequacy of the ICT available was blurred by some factors; such as, underutilization of the available infrastructure, as a result of inaccessibility of some ICTs and lack of competences. Although claims by respondents indicated inadequacy of some ICTs, this could not be justified since majority of the lecturers and students were not using the available ICTs. However, there still seemed a necessity for more budgets to procure more ICT infrastructure regarding the increasing adoption and uses of the same.
The study also aimed to establish perception lecturers and students had on their own competences to mount the prescribed teaching and learning practices. Findings indicated that, both lecturers and students expressed the need for right competences to navigate the teaching and learning practices prescribed at university. This is also the case with the technical support team members, who expressed the lack pedagogy skills to complement the IT-skills. The study also observed that, the trainings which had been carried out still had negligible impact on transforming the traditional practices, which suggested for more focused trainings that would transform the traditional practices.

The study further aimed to confirm the perception lecturers and students had on the necessity for ICT use, mainly for the teaching and learning practices the university embraced. Findings show that, both lecturers and students had a positive perception to what ICT use would bring. Respondents expressed some opinions on the requirements which have to be addressed as to ensure effective ICT use at the university. These emanate from challenges of skills and competence to use the ICTs and motivation.

5.4 Recommendations

This section presents study recommendations from the findings. These are directed to policy and research attention, as mechanisms for soliciting viable interventions to improve the use of ICT in teaching and learning at Mzumbe University.

5.4.1 Policy Recommendations

i. The technology integration in educational planning must be carefully addressed to ensure that it does not dominate to compromise what (contents) to be learned.

Evidences from other settings indicate that, the poorly planned ICT integration
may compromise the quality of knowledge obtained through ICT-based teaching and learning strategies. It is therefore recommended from this study that, Mzumbe University and the government of Tanzania strengthen the capacity of quality regulatory organs (such as Tanzania Commission for Universities-TCU) to enhance the tracking of relevant and quality uses of the technologies in line with the National Qualification Framework so that it does not compromise the quality of the knowledge taught.

ii. Although the government had made some initiatives by removing the value added tax to the ICT infrastructure; evidences in Tanzania showed that, the successful universities in Tanzania benefited from donors and partner universities from developed countries. This study recommends that, the government of Tanzania must partner with universities to mobilize more funds to strengthen the ICT capacity at the university level.

iii. Evidence indicates that, pedagogical competences do not constitute a necessary condition for recruitment of the lecturers in Tanzania. This means that, upon their recruitment as lecturers, they are supposed to undertake some pedagogical training in their respective universities. It must be noted that, the integration of ICT in teaching must also be done in the light of theories of teaching and learning that most of the lecturers were not trained on. The study therefore recommends that, Mzumbe University must mobilise funds to ensure that all lecturers undergo comprehensive trainings, specifically on how to design and implement ICT-based teaching and learning practices.
iv. The Tanzania ICT policy (2003) declares the necessity for ICT use as to ensure accessibility of education to a diverse, including rural population. The existing infrastructural constraint in rural areas poses scepticism whether this target can be attained. The study recommends that the government to establish ICT resource centres in rural areas so that university students can be able to undertake lesson activities in their remote residences.

v. The Mzumbe University workload policy presents the size of workload lecturers of different ranks have to be accountable at. It must however noted that, Blended learning requires a continuous interactions between the lecturers and students most of the time beyond classroom and formal work hours, which has an implication to an increased workload. This study therefore recommends that Mzumbe University must re-think the workload policy, so that lectures are motivated for the responsibilities resulting from ICT uses, which are not taken care of in the formally structured timetable.

5.4.2 Areas for further research

This study contributes to the understanding of the range and adequacy of ICTs for teaching and learning at Mzumbe University. It also reveals the actual use of the available ICTs in relation with the strategy prescribed at the University. These aspects constitute knowledge on the capacity of Mzumbe University regarding the use of ICT for teaching and learning. The exploratory nature of this study has however not been exhaustive regarding the situation of ICT use at Mzumbe. Thus the following areas call for further researches.
i. Due to its case nature, the necessity to understand the institutional context situation on ICT use for teaching and learning in Tanzanian universities requires a study like this also carried out in other universities in Tanzania and other East African countries in order to develop a comparative perspective of the situation of ICT use in teaching and learning.

ii. There is a need to carry out studies to describe the quality of the ICT infrastructure available to support teaching and learning at the university. This should focus, for example on the relevance, suitability and friendliness among other features of quality ICTs.

iii. The study noted a low usage of ICTs among the academic staff at Mzumbe University. It is recommended therefore that a comprehensive research be done to explore the motivational mechanisms to enhance ICT use in teaching and learning among academic staff at Mzumbe University.

iv. Studies should also be carried out to document on the nature of academic activities that the Social Networks can serve in blended learning. There should also be a study directed to developing a model on how the Social Networks can be integrated with the Managed Learning Management Systems like Moodle in order to provide a more flexible and meaningful interaction among students and with lecturers.

v. Lastly, findings from this study indicated some reluctance by lecturers to adopt the prescribed teaching and learning practices as majority of them still embraced the traditional practices. Studies have to be carried out to investigate if there are types of ICT-use practices relevant to contexts of the developing
countries as opposed to those borrowed from the developed countries. This will help to develop models for ICT use practices relevant to local needs.
REFERENCES


Del Maria. (2007). Teacher Training in ICT-Based Learning Settings: Design and Implementation of an On-line Instructional Model for English Language Teachers. *PhD thesis, University of Rovira*


Miguel, Angélica & Guzman. (2012). Teaching Competencies for Technology Integration in the Classroom; Pontificia Universidad Católica de Chile


APPENDICES

APPENDIX I: Research instruments

1A.1 Lecturer’s Questionnaire

I, Stephano Nalaila, kindly request you to participate in this study set to explore ‘The use of ICT for teaching and learning at Mzumbe University’, as a requirement for the degree of Master of Education in Comparative and International Studies of Kenyatta University. The study interrogates ICT hardware, software and the supporting services that support teaching and learning practices at the university. Please, note that, any information you can provide will be treated with utmost anonymity.

Part A: Personal information: Please fill or tick the most appropriate details

Title:  
- Prof  
- Dr  
- Mr  
- Ms.

Educational level: Faculty/School: Department: 

Your age range:  
- Below 26  
- 26-35  
- 36-45  
- 46-55  
- above 55

Gender:  
- Male  
- Female

Years in the teaching job:  
- Above 20  
- 16-20  
- 11-15  
- 6-10  
- Below 5

Part B: Please, answer the questions in this part as required under each item

1. The situation of ICT use for teaching and learning activities at the Mzumbe University

i. Do you use ICT in your teaching activities at the university?  
- Yes  
- No

ii. If No (for item i.) please provide reasons: 

............................................................................................................................
............................................................................................................................
............................................................................................................................
............................................................................................................................
............................................................................................................................
............................................................................................................................
............................................................................................................................
............................................................................................................................
............................................................................................................................
............................................................................................................................
............................................................................................................................
............................................................................................................................
iii. If Yes, Which activities do you perform through the following delivery modes?

<table>
<thead>
<tr>
<th>Learning activity</th>
<th>Face-to-face only</th>
<th>On-line only</th>
<th>Mixed modes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eg: Field work</strong></td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lectures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tutorials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussion/chats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examinations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Providing course materials to students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circulation of lecture notes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Providing assignments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students consultation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others (name)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

iv. What reasons made you opt for the use of ICTs in teaching and learning?

- Personal interests
- Prescribed by university management
- the nature of the subject(s) I teach
- differently located students
- other reasons (Please indicate)

v. Which Learning platform do you use to perform the on-line portions of teaching activities (indicated in the table above)?

- Platform managed by university
- unmanaged platforms, like Social Networks
- Both

vi. How do you rate students' participation in the ICT based learning activities you incorporate?

- Very poor
- Poor
- Average
- Good
- Very Good

vii. Range of ICT hardware, software and supporting service infrastructure to support teaching and learning activities

i. Which of the following ICT facilities are available to support teaching and learning at the university

132
i. Which ICTs do you consider important for teaching and learning but are not available at your disposal?

3. Adequacy of ICT infrastructure/facilities to support teaching and learning

Rate the adequacy of the following sets of ICT infrastructure/facilities to support teaching and learning at the scale of 0=Very poor, 1=Poor, 2=Fair, 3=Good, 4=Very supportive.

i. Hardware facilities, like computers, mobile devices, sound systems and data projectors to support ICT based teaching and learning activities

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ii. Digital (electronic) subject contents and subject specific software and programs for teaching and learning

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

iii. The internet connectivity to support teaching and learning activities at the university

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

v. Sources of power (electricity) for effective use of ICTs in teaching activities

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
v. Technical support services, such as installation and maintenance to help lecturers’ use of ICT for teaching

0 1 2 3 4

Very poor ☐ ☐ ☐ ☐ ☐ Very supportive

vi. Administrative support in terms of policies, motivation, grants and training to stimulate ICT use for teaching and learning

0 1 2 3 4

Very poor ☐ ☐ ☐ ☐ ☐ Very supportive

4. Perception on the competences to use ICTs for teaching activities

i. Rate your basic computer skills, mainly typing, editing, lay out and search engines at the scale of 0=Novice, 1=Very low, 3= Average, 4=Qualified, 5=Expert

0 1 2 3 4 5

Novice ☐ ☐ ☐ ☐ ☐ Expert

ii. Rate your competence to design and implement ICT based teaching and learning activities at the university, at the scale of 0=Novice, 1=Very low, 3= Average, 4=Qualified, 5=Expert.

0 1 2 3 4

Novice ☐ ☐ ☐ ☐ ☐ Expert

iii. Have you received any training for designing and implementing the ICT based teaching and learning currently in use at university?

☐ Yes ☐ No

iv. If yes (in iii above), how effective have the training helped you in the use of ICTs to perform the prescribed teaching and learning activities at the university, at the scale of 0=Very ineffective 1=Ineffective 2=Average 3=Effective 4=Very effective

0 1 2 3 4
Very ineffective ☐ ☐ ☐ ☐ ☐ Very effective

v. In which ways has the use of ICTs changed the way you do your teaching activities?

vi. In which of the following aspects of ICT use do you need much help in terms of training for improvements? (You may tick in more than one)

- Typing by using computers
- Logging into the learning platform
- Interacting with students in the on-line type of activities
- Designing the on-line activities
- Assessing and evaluating the on-line type activities
- Others (please list)

5. Perception on the importance of using ICTs in teaching and learning

Basing on your own experience/perception at Mzumbe University, what importance (if any) does the current use of ICT in teaching and learning offer?

Are there hindrances preventing the realization of importance the ICTs use in teaching and learning activities as per your expectations? ☐ No ☐ Yes

If Yes, (from the item ii), list the hindrances:

Given a chance, what major facilities would you suggest to be made available in order to improve the use of ICTs for teaching and learning at Mzumbe University?

A kind note: One may use the back page or attach another sheet to write on. However, make sure you indicate the number of the question(s).
Appendix I A. 2: Students' Questionnaire

I, Stephano Nalaila, kindly request you to participate in this study set to explore 'The use of ICT for teaching and learning at Mzumbe University', as a requirement for the degree of Master of Education in Comparative and International Studies of Kenyatta University. The ICTs under investigation covers hardware, software and the supporting services. Please, note that, any information you can provide will be treated with utmost anonymity.

Personal Information: Please fill in or tick the most appropriate details

Year of study  
- First Year
- Second Year
- Third Year
- Masters

Gender  
- Male
- Female

Age Group  
- below 21
- 21 to 25
- 26 to 30
- 31 to 35
- Above 35

Part one. Please, answer the questions in this part as required under each item

1. The situation of ICT use for teaching and learning activities at the Mzumbe University
   
i. Do you use ICT in your learning activities at the university?  
   - Yes
   - No
   
   ii. If Yes, Which activities do you perform through the following delivery modes?

<table>
<thead>
<tr>
<th>Mode of delivery</th>
<th>Face-to-face only</th>
<th>On-line only</th>
<th>Mixed modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For example: Field work</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lectures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tutorials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examinations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessing course materials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collection of notes from the lecturer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assignments to and from the lecturer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultation with lecturers</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
iii. Is there any factor forcing you to engage in on-line activities in teaching and learning?

If the answer is Yes; indicate the relevant factor in the light of the following:

- Personal interests
- Prescribed by university management
- Forces from the lecturers
- Difficulty to physically access the lecturers
- Other reasons (Please indicate)

Which Learning platform do you use to perform the on-line learning activities?

- Managed by the university
- Unmanaged platforms, like Social Networks

How do you rate lecturers’ guidance for the ICT based teaching and learning activities you participate?

- Very poor
- Poor
- Average
- Good
- Very Good

Range of ICT infrastructure/facilities to support teaching and learning activities

Which ICT facilities/infrastructure are available at the university to support teaching and learning (tick the relevant)

- Computer laboratories
- Personal computer
- Internet connectivity in campus
- Subject-specific software
- Subject websites
- Digital contents
- Lectures’ online guidance
- Technical support
- Sources of power/electricity
- Internet connectivity off campus
- Sound systems in computer labs
- Others

What ICT facilities/infrastructure do you think are important but are not available to support the current teaching and learning activities? (Please list)

Rate the adequacy of the following sets of ICT infrastructure/facilities to support teaching and learning at the scale of 0=Very poor, 1=Poor, 2=Fair, 3=Good, 4=Very supportive.

Hardware facilities, like computers, mobile devices, sound systems and data projectors to support ICT based teaching and learning activities

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Very supportive
viii. Digital (electronic) subject contents and subject specific software and programs for
teaching and learning

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very poor</td>
<td>Very supportive</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ix. The internet connectivity to support teaching and learning activities at the university

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very poor</td>
<td>Very supportive</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

x. Sources of power (electricity) for effective use of ICTs in teaching activities

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very poor</td>
<td>Very supportive</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

xi. Technical support services, such as installation and maintenance to help lecturers’
use of ICT for teaching

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very poor</td>
<td>Very supportive</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

xii. Administrative support in terms of policies, motivation, grants and training to
stimulate ICT use for teaching and learning.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very poor</td>
<td>Very supportive</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Perception on ICT competences to participate in the prescribed learning activities
i. Rate your basic computer skills, mainly typing, editing, lay out and search engines at
the scale of 0=Novice, 1=Very low, 3=Average, 4=Qualified, 5=Expert

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Novice</td>
<td>Expert</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ii. Have you received any training for participating in any ICT based teaching and
learning activities at university? Yes No
iii. If yes (in iii above), rate your competence to participate in the ICT based teaching and learning activities at the university, at the scale of 0=Novice, 1=Very low, 3= Average, 4=Qualified, 5=Expert.

0 1 2 3 4
Novice ☐ ☐ ☐ ☐ ☐ Expert

iv. In which ways has the use of ICTs changed the way you do your learning activities?


v. In which aspects of ICT use do you need much help in terms of training for improvements? (You may tick in more than one)

- Typing and formatting assignments
- Login-into the e-learning account
- Interacting with peers in the on-line type of activities
- Online submission of assignments
- Reviewing on-line discussions
- Others (please list)

5. Perception on the importance of using ICTs in teaching and learning

i. Basing on your own experience/perception at Mzumbe University, what importance (if any) does the current use of ICT in teaching and learning offer?


i. Are there hindrances preventing the realization of importance the ICTs use in teaching and learning activities as per your expectations? ✓ No ✓ Yes

ii. If Yes, (from item ii), list the hindrances;
iv. Given a chance, what major ICT facilities would you suggest to be made available in order to improve the use of ICTs for teaching and learning at Mzumbe University?

A kind note: One may use the back page or attach another sheet to write on. However, make sure you indicate the number of the question(s).

Thank you for your time
Appendix I B.1: Interview Schedule for the Director of E-learning

1. Does the university have a policy/plan requiring ICT use in teaching and learning?

2. What are the policy/plan expectations?

3. What is the role of the directorate on the requirements of the policy?

4. Is ICT used in teaching and learning at the university?

5. If yes, what are the teaching and learning activities or practices accomplished through the ICT use?

6. How far is this use regarding the requirement of the university policy?

7. Which roles are the lecturers and students expected to perform regarding the particular ICT based activities? (Probing for success indicators expected)

8. Are they prepared for such roles? (Probing for the nature of training and competence)

9. How are they performing? (Probing for the actual use of the ICTs)

10. Which ICT infrastructure (hardware, software and support facilities) are available to support the teaching and learning activities at the university?

11. How well accessible by lecturers and students are the ICTs?

12. How adequate are the infrastructure?

Thank you for your time
Appendix I B. 2- Director for Quality Assurance

1. Are you aware of any teaching and learning activities carried out by using ICTs at the university? (What are these activities?)

2. Is there any role that ICT is perceived to play for quality delivery of education provided at the university? (What quality role is ICT expected to play?)

3. Are there mechanisms by the directorate to ensure quality use of the ICTs in teaching and learning? (What are the mechanisms?)

4. Is there a way the directorate participates to ensure quality ICTs are procured for use? (Which role does the directorate play during the procurement of the ICTs?)

5. Are there any quality changes in delivery of teaching and learning which may be associated with the use of ICT? (What are the changes?)

Thank you for your time
Appendix 1C.1: Focused Group Discussion guides for ICT technical support team

1. Are there roles you play regarding the use of ICT in teaching and learning at this university? (Probing for support roles of the team members to ICT use in teaching and learning)

2. If Yes, What support services are you expected to provide to lecturers and students regarding the ICT use in teaching and learning? (What are you actually doing?)

3. What ICT infrastructure are available to support the teaching and learning at the university? (The aim was to probe for both the available ICTs (if any) and the required ones)

4. What capabilities do you possess to facilitate the designing and implementation of various teaching and learning activities? (Probing on the competences and motivation of the team to support ICT use in teaching and learning)

5. What are the common ICT based teaching and learning activities which are currently supported by the team? (To probe on the range of activities performed by using ICT use)

6. What challenges are you facing when helping the lecturers and students to participate in the ICT based teaching and learning activities? (The aim was to capture infrastructure constraints in the use of ICT for teaching and learning)
Appendix 1 C. 2 FGD guide for Students’ Helpdesk team

1. What are the roles of the team regarding the use of ICT in teaching and learning at the university?

2. What are the teaching and learning activities are you currently engaged to support at the university? And how?

3. What available ICTs are you aware of that the lecturers and students are using for teaching and learning?

4. Do you have competences regarding the use of ICT in teaching and learning?

5. Did you receive any training on these activities? (also probing on the nature of the trainings)

6. How useful are the trainings (if any) in fulfilling your roles as helpdesk team members?

7. Are there any (what are they) complaints from lecturers and students over the use of ICT infrastructure to support teaching and learning activities?

8. What do you suggest to be available in order to strengthen the use of ICTs in teaching and learning
Appendix 1 D: Observation Checklist

The researcher also observed the following ICT aspects:

- Networked computer laboratories
- Wireless network
- Telephony infrastructure
- Number of computers in offices and labs
- The Uninterrupted Power Systems (UPSs)
- Standby generators
- Log-in history for lecturers and students in the LMS
- Students in the different ICT use activities
- Library computer sections
- Space and lightening in the computer labs
- Class size and number of students in classroom sessions.
## Appendix II: WORK PLAN

<table>
<thead>
<tr>
<th>Activity</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposal writing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submission to graduate school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data collection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis and report writing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Editing &amp; submission of final copy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix III: Budget

<table>
<thead>
<tr>
<th>No.</th>
<th>Particulars</th>
<th>Cost (KSH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stationeries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Note books &amp; ream papers</td>
<td>1500</td>
</tr>
<tr>
<td></td>
<td>Internet sources (modem and air time)</td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td>Proposal and thesis printing, binding and photocopying &amp; Editing</td>
<td>25,000</td>
</tr>
<tr>
<td>2</td>
<td>Consultation and data collection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Travelling</td>
<td>100,000</td>
</tr>
<tr>
<td></td>
<td>Accommodation</td>
<td>100,000</td>
</tr>
<tr>
<td>3</td>
<td>Contingencies</td>
<td>20000</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>250,500</td>
</tr>
</tbody>
</table>