

**E-LEARNING IN SELECTED PUBLIC MIDDLE LEVEL AND HIGHER LEARNING
INSTITUTIONS IN UASIN GISHU COUNTY, KENYA**

TONUI WELDON KIPKIRUI

**A THESIS SUBMITTED TO THE SCHOOL OF EDUCATION IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF
MASTER OF PHILOSOPHY IN TECHNOLOGY EDUCATION (ELECTRICAL AND
ELECTRONICS TECHNOLOGY), UNIVERSITY OF ELDORET, KENYA**

OCTOBER 2015

DECLARATION**DECLARATION BY THE CANDIDATE**

This Thesis is my original work and has not been presented for any award. No part of this work may be reproduced without prior permission from the author and or University of Eldoret.

WELDON KIPKIRUI TONUI
REG NO: EDU/PGT/03/07

DATE

DECLARATION BY THE SUPERVISORS

This Thesis has been produced and submitted for examination with our approval as University supervisors.

DR. SIMON WANAMI
Senior Lecturer
Department of Technology Education
University of Eldoret

DATE

MR. CHRIS WOSYANJU
Lecturer
Department of Technology Education
University of Eldoret

DATE

DEDICATION

I dedicate this work to my dear wife, Norah, my dear parents David and Esther, my dear brothers Raymond, Wesley, Charles, Fredrick and Vincent and my dear sisters Winnie and Susan. Thank you all for your love and encouragement.

ABSTRACT

With the current technological innovations and the potential to provide high quality education unconstrained by time and space, e-Learning is increasingly becoming a popular and significant mode of delivering instructions in the middle level and higher learning institutions. However, it has not been fully embraced by learning institutions despite its importance. The study investigated institutional constraints hindering e-learning in middle level and higher learning institutions. The study highlighted the barriers that institutions place in the way of e-learning. It shed light on the ways of mitigating such institution based problems limiting faster growth and effective utilization of e-learning in our learning institutions. In literature review, educator attitudes, institutional preparedness, technical support, communication technologies used, status of e-learning, government of Kenya's initiative on e-learning and networks and connectivity were among issues looked at. Stratified and Simple random sampling techniques were employed to select samples of 18 administrators and 164 lecturers from three colleges who gave the relevant information for the study. Data on the above variables were obtained from the sample by use of questionnaires, structured interviews and direct observations. Collected data was analyzed by descriptive statistics, ANOVA, Chi square test and Spearman Correlations. Outputs from the study showed that a significant relationship exists between the e-learning development and lecturer's attitudes. It also revealed that a significant relationship exists between the state of availability of infrastructure and resources and the level of e-learning development. The study concluded that a significant relationship exists between the lecturer's level of ICT skills and e-learning development. It is recommended that an effective e-learning policy and programmes should be a yardstick in ISO certification of public universities to encourage its implementation. All higher learning institutions should have an effective e-learning policy framework to enable the institution to implement the e-learning programs it develops alongside the normal face to face programs.

LIST OF ACRONYMS AND ABBREVIATIONS

ACCA – Association of Chartered Certified Accountants

ANOVA - Analysis Of Variance

AVU - African Virtual University

BLMS- Blackboard Learning Management System

CAI - Computer-Assisted/Aided Instruction

CD – Compact Disc

CD ROM – Compact Disc Read-Only Memory

CFA – Chartered Financial Analyst

COMESA – Common Market for East and Southern Africa

CSCL - Computer-Supported Collaborative Learning

CSCW - Computer-Supported Cooperative Work

DVD – Digital Video/Versatile Disc

ICT - Information Communication Technology

ILS - Integrated Learning Systems

ISO – International Standards Organization

IT – Information Technology

JAB – Joint Admissions Board

KCCT – Kenya College of Communications Technology

KeLC – Kenya e-Learning Centre

KEMRI – Kenya Medical Research Institute

KENET – Kenya Education Network

KIA – Kenya Institute of Administration

KIE – Kenya Institute of Education

KMTC – Kenya Medical Training College

KWS – Kenya Wildlife Service

LAN – Local Area Network

MIT - Massachusetts Institute of Technology

MOEST – Ministry of Education Science and Technology

MOOC - Massive Open Online Courses

NEMA – National Environmental Management Authority

NEPAD – National Partnership for African Development

ODEL – Open Distance Electronic Learning

ODL – Open Distance Learning

OER - Open Educational Resources

SPSS – Statistical Package for the Social Sciences

TUSK – Tufts University Scientific Knowledgebase

TVET – Technical Vocational Education and Training

UNEP – United Nations Environmental Programme

UNESCO – United Nations Educational Scientific and Cultural Organisation

UoE – University of Eldoret

UoN – University of Nairobi

USIU – United States International University

VLE - Virtual Learning Environments

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ABSTRACT	iv
LIST OF ACRONYMS AND ABBREVIATIONS	v
LIST OF TABLES	ix
LIST OF FIGURES	xi
ACKNOWLEDGEMENT	xii
CHAPTER ONE	1
INTRODUCTION.....	1
1.1 Background to the study	1
1.2 Statement of the problem.....	4
1.3 Purpose of the study	4
1.4 Objectives of the study	5
1.4.1 Main objectives	5
1.4.2 Specific objectives.....	5
1.5 Research questions	5
1.6 Hypotheses of the study.....	6
1.7 Assumptions of the study	6
1.8 Significance of the study	6
1.9 Justification of the study.....	7
1.10 Scope of the study	8
1.11 Limitations of the study.....	8
1.12 Theoretical Framework.....	8
1.13 Operational Definitions Of Terms.....	11
1.14 Summary.....	12
CHAPTER TWO	13
LITERATURE REVIEW	13
2.1 Overview.....	13
2.2 E-learning defined	13
2.3 The Drivers for Change	15
2.4 Pedagogical elements and approaches/perspectives	17
2.5 Communication technologies used in e-learning	18
2.6 Networks and Connectivity	19
2.7 Teaching and Learning: Trends in educational theory and practice	20
2.8 Digital divide and Equity issues.....	23
2.9 Institutional Access Barriers	25
2.10 E-Learning Status in Kenyan Universities and Colleges.....	26
2.11 Government of Kenya’s initiative on E-learning	32
2.12 The Future of e-learning	34
2.13 Summary.....	35

CHAPTER THREE	36
RESEARCH DESIGN AND METHODOLOGY	36
3.1 Overview.....	36
3.2 Research Design.....	36
3.3 Area of Study	36
3.4 Population and sample size.....	37
3.5 Research tools and instruments of data collection	38
3.5.1 Questionnaires.....	38
3.5.2 Interviews.....	38
3.5.3 Observations.....	39
3.6 Validity and Reliability of Research Instruments	39
3.6.1 Validity of Data Collection Instrument	39
3.6.2 Reliability of Data Collection Instrument.....	40
3.7 Development of the research instruments	40
3.8 Data Analysis	40
3.9 Summary.....	41
CHAPTER FOUR.....	43
FINDINGS, ANALYSIS AND INTERPRETATION	43
4.1 Introduction.....	43
4.2 E-learning development and lecturer’s attitudes towards e-learning	45
4.3 E-learning development and availability of infrastructure and resources	57
4.4 E-learning development and lecturer’s ICT competence, training and capacity building programs	67
4.5 Summary.....	78
CHAPTER FIVE.....	80
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS	80
5.1 Introduction.....	80
5.2 Summary of the findings	80
5.3 Conclusions.....	82
5.4 Recommendations	82
5.5 Summary.....	84
5.6 Suggestions for Further Research	84
REFERENCES.....	85
APPENDICES	90
APPENDIX I: TIME SCHEDULE.....	90
APPENDIX II: BUDGET FOR THE WHOLE STUDY	91
APPENDIX III: QUESTIONNAIRE FOR ADMINISTRATORS	92
APPENDIX IV: QUESTIONNAIRE FOR LECTURERS	96
APPENDIX V: OBSERVATION CHECK LIST	100

LIST OF TABLES

Table 4.1: Overall analysis on lecturers' attitudes towards e-learning.....	46
Table 4.2: Analysis on lecturers' attitudes towards e-learning by gender.....	47
Table 4.3: Independent sample t-test for lecturers' attitudes towards e-learning	48
Table 4.4: Analysis of lecturers' attitudes towards e-learning by age.....	50
Table 4.5: Further analysis of lecturers' attitudes towards e-learning by age	51
Table 4.6: One way ANOVA of lecturers' attitudes towards e-learning by age	52
Table 4.7: Analysis of Chi-Square tests of relationship between gender of the lecturer and attitude towards e-learning.....	53
Table 4.8: Analysis of Chi-Square tests of relationship between age of the lecturer and attitude towards e-learning	54
Table 4.9: Analysis of Chi-Square tests of relationship between lecturers' academic qualification and attitude towards e-learning	55
Table 4.10: Analysis of Chi-Square tests of relationship between ICT qualification and attitude towards e-learning	56
Table 4.11: Overall analysis of availability of e-learning infrastructure and resources ...	58
Table 4.12: Analysis of availability of infrastructure and resources by institution	59
Table 4.13: One way ANOVA of availability of e-learning infrastructure and resources by institution	61
Table 4.14: Analysis of Chi-Square tests of relationship between institution and availability of infrastructure and resources	63
Table 15: Analysis of Chi-Square tests of the relationship between the orientation of the course and the availability of infrastructure and resources.....	64
Table 4.16: Further analysis of Chi-Square tests of the relationship between level of institutional preparedness and availability of infrastructure and resources	65
Table 4.17: Analysis of availability of infrastructure and resources by institution	66
Table 4.18: Table of internet technology in use by institution	66
Table 4.19: E-learning infrastructure and resources by institution.....	67
Table 4.20: Lecturers' overall analysis on ICT competence, training and capacity building programs	70

Table 4.21: Lecturers' overall analysis on ICT competence, training and capacity building programs by institution	72
Table 4.22: One way ANOVA on lecturers' ICT competence, training and capacity building programs	73
Table 4.23: One way ANOVA of lecturers' ICT competence, training and capacity building programs by gender	74
Table 4.24: Table of challenges to e-learning by institution	76
Table 4.25: Summary of responses from administrators.....	78

LIST OF FIGURES

Figure 1: Drivers of the E-learning Revolution	16
Figure 2: Google Earth map showing the position of Uasin Gishu County relative to the neighbouring counties of Trans Nzoia, Elgeyo Marakwtet and Nandi.	37

ACKNOWLEDGEMENT

I owe much gratitude to the many people who have undoubtedly contributed much to the success of this work. Foremost, I would wish to acknowledge the much support given to me by my supervisors Dr. Simon Wanami and Mr. Chris Wosyanju during my writing of this thesis. I thank them very much for their invaluable guidance and support without which my thesis would not have been a success. Their interest in my work, commitment and constant encouragement gave me the confidence to work harder.

I also thank the principals and management of the colleges and Universities I visited during data collection for their invaluable cooperation that enabled me to obtain the data for my research. I sincerely thank the lecturers and management personnel who gave responses to my questionnaires.

I am heavily indebted to my beloved wife Norah who gave me moral and financial support in the course of my studies. Her inspiration and constant encouragement was the bedrock of my success.

I wouldn't forget to mention my dear parents and siblings including my classmates who gave me the much needed support in the course of this academic work. God bless you all.

CHAPTER ONE

INTRODUCTION

This section presents description of background to the study, statement of the problem and the purpose of the study. Others are objectives of the study, research questions, hypotheses of the study, justification of the study, scope of the study, limitations of the study. Assumptions of the study, theoretical framework and definition of terms used are also presented.

1.1 Background to the study

Over the last decade, Africa has experienced unparalleled economic growth, putting the continent on a pedestal to become the next growth frontier. Development experts predict that most economies in Africa will continue to grow at an average of six per cent even when the rest of the world is currently facing a slump in economic growth. McKinsey Global Institute, a leading economic research institution, predicts that financial services, retail, telecommunications, and construction sectors in Africa will attract more private-investment inflows. Kenya has not been left behind as it has attracted a lot of attention as one of the viable investment destinations in the continent.

While there is so much optimism surrounding Africa's growth potential, the continent appears to be lagging behind in training the necessary human resource to match its rosy economic growth. Although the number of students enrolling for University and tertiary education has been growing, the numbers are still dismally low. However, educationists and economists have observed that if Africa is going to compete in the global economy, at least 12-15 per cent of the continent's workforce should have attained tertiary education. Nevertheless, universities in Africa and in Kenya specifically are currently overwhelmed by increasing numbers of students.

Even with the introduction of parallel and evening programmes, universities still appear to be struggling to deal with the growing student numbers. They have been unable to increase physical infrastructure to meet the growing demand. Manpower and critical support facilities are greatly lacking in most institutions. This demonstrates that the current mode of delivery has been unable to meet either current or projected demand. Therefore, under the traditional classroom teaching, tertiary education for most of school leaving children will remain unattainable.

On the other hand, quality distance education delivery could offer the needed alternative. Distance education employs several methods of learning such as e-Learning and correspondence to extend education to students who are unable to access facilities within the physical classroom due to time and space constraints. It is not restricted by time or space thereby enabling students to learn at their own pace and time through regular guidance from tutors and lecturers. While universities in the past used correspondence as a mode of delivery for distance learning programmes, they have now shifted to e-Learning due to recent developments in technology. Increase in internet connectivity and access to high speed broadband connection have made it possible to increase access to online courses, including Open Educational Resources (OERs) and Massive Open Online Courses (MOOC).

The African Virtual University (AVU) OERs are being accessed in some 193 countries worldwide. The 21st Century is providing increased opportunities for universities to turn to e-Learning as an alternative to traditional classroom-based learning. Africa can therefore, leapfrog barriers to student enrolment by exploiting opportunities e-Learning offers. The 2000 Dakar Framework for Action recognizes use of Information and Communication Technology (ICT) as a key strategy for achieving “Education for All” goals. In 2003, NEPAD prioritized efforts

towards bridging of the digital divide between Africa and the developed world by fast tracking support to ICT initiatives in enhancing access to education. Distance education using information technologies has its own challenges. There is still limited internet connectivity on the continent, the high cost of connectivity as well as intermittent power disruption. Besides these infrastructure issues, there are often lack of national and institutional policies, the scarcity of experienced human resources and the perception that distance education may not offer the same quality as face-to-face education.

However, given the pressure on African countries to face the demand of access to higher education and train human capital who did not attend universities, with the progress made in laying fiber optics and in using alternative source of power, the challenges can be addressed efficiently in order to unlock the potential of ICT in education. Additionally, the emergence of mobile technology is an asset Africans can count on. Between 2005 and 2011, AVU implemented a continent-wide programme, the Multinational Project I covering 12 universities in 10 countries, and the AVU is currently implementing the Multinational Project II (2012-2016) covering 27 universities in 21 African countries, with the main objective of enhancing the capacity of universities to offer ICT integrated programmes in Mathematics and sciences, and to increase access to higher education and training. This is the right time for Africa, especially Sub-Saharan Africa, to consider using e-Learning to address the growing request for quality and affordable education and training.

Development of life-long skills in Kenya is still out of reach for many people due to limited physical and financial capacity in the Kenyan higher education institutions. As a result, the institutions can only admit a fraction of the population willing to pursue advanced training. In a

bid to respond to the high social demand for life-long development of skills, some institutions in Kenya have started open distance and e-Learning programmes meant to increase access. The task is imperative for attainment of human and economic developmental targets. The major concern of this study therefore, was to find out the major barriers to e-Learning at Kenyan Universities and TVET institutions in Uasin Gishu County. Pertinent issues addressed are whether educator attitudes have changed, whether digital divide is being bridged and whether man power is being adequately supplied.

1.2 Statement of the problem

According to Zirkle (2003), the ability to learn at virtually “any time and any place” is a major attraction of e-learning. Time-bound or place-bound students are able to access distance education courses and programs largely on their own schedules, rather than the institutions’ through e-learning. Although seemingly eliminating the access barriers experienced by traditional students, distance education has its own set of constraints, or barriers for students (Zirkle, 2003). Thus e-learning students need help in understanding the potential challenges they may face in trying to utilize e-learning as a mode of receiving instructions. Similarly, institutions require understanding on the underlying challenges facing e-learning in their institutions so that they can eliminate them and take full advantage of the enormous potential of this borderless and timeless mode of delivering education. It is on this basis that the research is being conducted to point out the institutional barriers to e-Learning in Kenya.

1.3 Purpose of the study

The purpose of this study was to find out the institutional barriers hindering growth and development of e-learning in Kenya and the extent to which these barriers have been bridged.

1.4 Objectives of the study

1.4.1 Main objectives

The main objectives of this study were to find out the institutional barriers to e-learning and find out the level of institutional preparedness to e-Learning by the Kenyan middle and higher learning institutions in Uasin Gishu County.

1.4.2 Specific objectives

The specific objectives were:

- 1) To find out the educators' attitudes towards e-learning in Kenyan institutions of middle and higher learning.
- 2) To find out the nature of e-learning infrastructure in Kenyan public middle and higher learning institutions.
- 3) To find out the ICT literacy level of support staff and e-learning educators in public institutions.

1.5 Research questions

The following research questions were used to guide the study:

- 1) What are the educators' attitudes towards e-learning in Kenya?
- 2) What is the nature of e-learning infrastructure in middle and higher learning institutions in Kenya?
- 3) What are the ICT literacy level of lecturers and e-learning technical staff in middle and higher learning institutions?

1.6 Hypotheses of the study

The following are the research hypotheses of this study as were derived from the research questions. They are stated in null form and were tested using the analysis of variance (ANOVA) and Chi-square (χ^2) techniques at alpha level of significance 0.05.

- 1) H_{O1}: Educator attitude has no significant influence on the development of e-learning.
- 2) H_{O2}: E-learning infrastructure has no significant influence on the level of e-learning development in Kenya.
- 3) H_{O3}: ICT skills of e-learning educators have no significant effect on e-learning development.

1.7 Assumptions of the study

In this study, the following assumptions were made:

- 1) All the selected respondents were representative of the total population.
- 2) The responses that the respondents gave constitute a true record of their opinions and views.
- 3) Lecturers in all the colleges selected for the study had an idea about e-learning.
- 4) The respondents were able to give written responses to questionnaires given to them without discussing with their peers.

1.8 Significance of the study

It is hoped that the findings of this study will be useful in the following ways:

- 1) The study will be of benefit to the management of higher learning institutions (universities and middle level colleges) in knowing the institutional barriers that constraint effective takeoff and utilization of e-learning in their institutions.
- 2) The findings of this study will hopefully be used to improve the e-learning programs in institutions of higher learning in Kenya.
- 3) The findings of this study will contribute to new knowledge which will aid the ministry of education, science and technology (MoEST) in accreditation and management of e-learning programs in middle level colleges.
- 4) The findings of this study will contribute new knowledge which will aid the Ministry of Education and management in accreditation and management of e-learning programs in middle level colleges.
- 5) The findings will hopefully improve management and coordination of e-learning programs offered by higher learning institutions in Uasin Gishu County so as to be more effective and productive.

1.9 Justification of the study

This study is important for decision and policy makers on the specific challenges facing e-learning in Kenya so they could be able to take appropriate actions in addressing the challenges especially through important legislations and policies. The students, lecturers, organizations need to be informed of the challenges that hinder the effective use of e-learning as an alternative way of providing education to the large masses of students who would otherwise miss out on traditional face-to-face methods of delivery. Thus they can be better prepared to deal with those challenges.

1.10 Scope of the study

The scope of this study was only limited to finding out the challenges facing the e-learning in the institutions of higher learning in Uasin Gishu county, Kenya and especially barriers imposed by the institutions themselves. It was also limited to the ICT aspect of e-learning and excluding mobile learning (learning using the mobile phone). Geographically it was only looking at higher learning institutions in Uasin Gishu County, Kenya.

1.11 Limitations of the study

The study encountered the following challenges:

- 1) Some selected respondents could not be easily reached hence it took a lot of time for the researcher to find them.
- 2) The study was only limited to challenges facing e-learning in institutions of middle and higher learning in Uasin Gishu County and the findings can be generalized to other counties.

1.12 Theoretical Framework

This research has its understanding grounded in the constructivist theories. According to Jean Piaget's constructivist learning theory, learners construct knowledge by being active participants in the learning process, by collaborating with their peers and facilitators, by being autonomous and self-directed, and by using critical thinking and problem solving skills (Moallem, 2001). Formalization of the theory of constructivism is generally attributed to Jean Piaget, who articulated mechanisms by which knowledge is internalized by learners. He suggested that through processes of accommodation and assimilation, individuals construct new knowledge from their experiences. When individuals assimilate, they incorporate the new experience into an

already existing framework without changing that framework. This may occur when individuals' experiences are aligned with their internal representations of the world, but may also occur as a failure to change a faulty understanding; for example, they may not notice events, may misunderstand input from others, or may decide that an event is a fluke and is therefore unimportant as information about the world. In contrast, when individuals' experiences contradict their internal representations, they may change their perceptions of the experiences to fit their internal representations. According to the theory, accommodation is the process of reframing one's mental representation of the external world to fit new experiences. Accommodation can be understood as the mechanism by which failure leads to learning: when we act on the expectation that the world operates in one way and it violates our expectations, we often fail, but by accommodating this new experience and reframing our model of the way the world works, we learn from the experience of failure, or others' failure.

Jonassen, Carr, & Yueh (1998) argue that “technologies should not support learning by attempting to instruct the learners, but rather should be used as knowledge construction tools that students learn with, not from.” The design of web based learning, from a constructivist viewpoint, must incorporate features that create scholarly partnerships between the learners, the facilitator, and the content. Jonassen et al (1998) feel that a constructivist environment is most effective for those in an advanced stage of knowledge acquisition, which makes university education an ideal place for the implementation of constructivist learning principles. We all have existing stores of knowledge that we can both add to and use to build new learning. Case based, problem solving agendas that require the learner to solve real world problems are an effective method of requiring thought, participation, and critical reflection on the part of the learner. Web based conferencing tools such as WebCT require the learner to participate in a text based

conversational setting where learners can interact, strategize, problem solve, and confer with their peers. Thus, there should be an effective e-learning technologies and processes to help stimulate learning. This theoretical framework will well inform this study and form good ground for it to be done.

1.13 OPERATIONAL DEFINITIONS OF TERMS

E-learning- The delivery of learning, training or education program by electronic means- the computers.

Attitude – is taken to mean an acquired internal state or feeling influencing one’s choice of actions.

Impact – is taken to mean any result, be it positive or negative, due to exposure to certain change or exposure to different conditions.

Blended Learning – Incorporating different learning styles for teaching and learning.

Middle level institution – means a post secondary institution ranked below a university.

Higher learning institution – refers to university as an institution offering degree level programs and beyond.

1.14 Summary

This chapter has outlined the background to the study, statement of the problem, objectives of the study, research questions, research hypotheses, significance, assumptions, scope and limitations of the study including theoretical framework and operational definitions of terms used in the study. The chapter has presented the need for this study to have been conducted otherwise the Kenyan institutions risks of not meeting its mandate to the Kenyan people of providing education for all. Clear problem existed as there are many youths yearning for higher education in Kenya and beyond, therefore there is need to eliminate any barriers that can curtail this noble objective of meeting this demand. Objectives which were to be realized were stated clearly to direct the study to its logical conclusion. The nature of e-learning to be looked at was limited to the computers and excluded mobile learning and other forms.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter deals with reviewing the relevant literature under the variables as the headings. The literature reviewed concerns the literature that has been written about the same variables or closely related to the topic that is being studied.

2.2 E-learning defined

E-learning has yet to be widely accepted as the term to describe ‘technologised’ learning in all its forms. Authors agree that a single definition for eLearning has yet to be found (Selinger & Pearson, 1999; Sloman, 2001; Rosenburg, 2001). A range of terms such as tele-learning (Collis, 1996), telematics (Selinger & Pearson, 1999), online learning (Salmon, 2000), distributed learning (Bates, 2000), flexible learning (Collis & Moonen, 2001), may all point to a similarly conceived educational experience. For Sloman (2001), it is the idea of connectivity that best describes eLearning: eLearning is emerging as the term referring to the learning technology that takes advantage of connectivity... learning delivered or received mainly through the internet, intranets, extranets or the web.

Rosenberg (2001), writing about corporate e-learning, forms a definition based on three fundamental criteria: eLearning is networked, capable of instant updating, storage/retrieval, distribution and sharing of instruction and information. It is delivered to the end user via a computer – using standard internet technology. It focuses on the broadest view of learning – learning solutions that go beyond the traditional paradigm of training. Collis & Moonen (2001) prefer the term ‘flexible learning’ and uses it to describe a shift away from ‘situated learning’, to

one which offers ‘the learner a range of options’ in their studies. ‘Flexibility is applied with regard to ‘time, content, entry requirements, instructional approach and resources, and delivery and logistics’ (Collis & Moonen, 2001).

While this does not specifically mention the role of eLearning, implicit in opening up these options to students is the role of technology. Morris & Rippin (2002) recognize the range of meanings inherent in the term eLearning and base their concept of eLearning in terms of hardware, software, users and location. The definition of eLearning that is proposed for this study is a hybrid, taking into account the connectivity with information and people described by Sloman (2001), with an emphasis on social aspects of learning (Salmon, 2000). The underpinning technologies are important, in that end-user computing and use of the internet are so ubiquitous that there can be little argument that eLearning be delivered via them (Rosenberg, 2001). For this study, eLearning is learning facilitated by internet and www technologies, delivered via end-user computing, that creates connectivity between people and information and creates opportunities for social learning approaches.

In this study e-learning is discussed with particular emphasis and relevance to online learning and web-based technologies, as these represent the area where most of the effort and data is available. This includes the use of ICT to support face to face delivery, blended learning, and fully online implementations, and covers a variety of technologies from e-mail to Integrated Learning Systems (ILS), stand-alone or networked. The study does not focus in detail on emerging technologies for instruction, such as mobile technologies, as the aim is to provide a broad view of issues as they relate to the universities and TVET sector.

There may be other definitions, but it is widely accepted to define e-learning as the delivery of a learning, training or education program by electronic means. E-learning involves the use of a computer or electronic device (for example, a mobile phone) in some way to provide training, educational or learning material (Derek, 2003). E-learning can involve a greater variety of equipment than online training or education, for as the name implies, "online" involves using the Internet or an Intranet. CD-ROM and DVD can be used to provide learning materials. Distance education provided the base for e-learning's development. E-learning is an on demand learning program as it overcomes timing, attendance and travel difficulties.

2.3 The Drivers for Change

Rosenberg (2001) points out that 'the history of using technology for learning is replete with promise and disappointment'. He discusses various media that others have predicted would replace textbooks and classroom teaching: film, radio, television, and videotapes. This poses the question of what the difference is between these tried technologies and the eLearning revolution (Sloman, 2001). Castells (1996) answers this question in a very definite way. A technological revolution, of which e-learning is a part, is seen by Castells to be an event of historical significance which has 'transformed the social landscape of human life'. Centred on information technologies and the power that they increasingly wield within the global economy, it can be asserted that eLearning has drivers that previous learning technologies lacked. A review of literature reveals a multiplicity of factors that drive the revolution. E-Learning can be seen as both a result of rapid technological change and a response to the changes happening in culture and society. The shifts towards an information society (Castells, 1996), e-governance (Holzer, 2001), learning organizations and knowledge workers (Senge1990) are facilitated by the use of technology.

E-Learning in itself is viewed as an enabler of a shift from discrete units of training to continuous learning (Sloman, 2001). Education, through the use of technologies in learning, is helping prepare members of society for this new information age (Gartner Report, 2001). Part of the promise of e-Learning is the connection of dispersed groups of learners and individualized curricula that can deliver ‘just in-time’ learning on a global basis and this enables corporations to create development structures that reflect the global nature of their businesses.

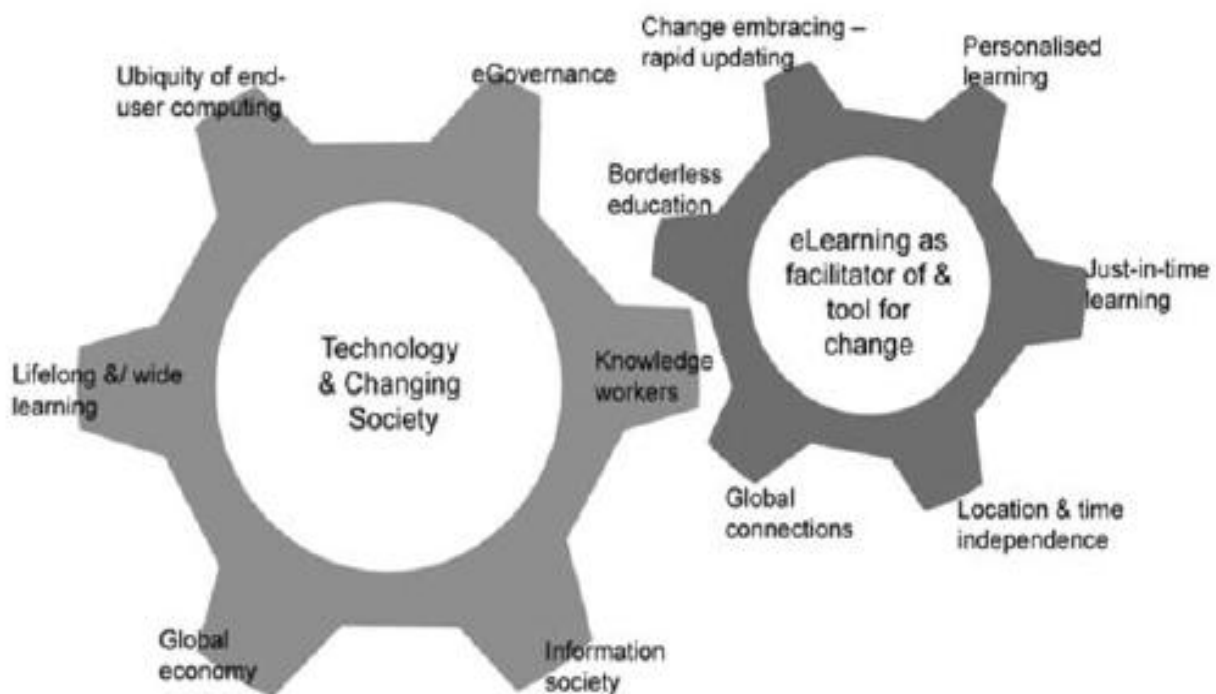


Figure 1: Drivers of the E-learning Revolution
(Adapted from Models of e-learning. The international Journal of Management Education).

2.4 Pedagogical elements and approaches/perspectives

Pedagogical elements are an attempt to define structures or units of educational material. For example, this could be a lesson, an assignment, a multiple choice question, a quiz, a discussion group or a case study. These units should be format independent, so although it may be implemented in any of the following methods, pedagogical structures would not include a textbook, a web page, a video conference or an iPod video.

When beginning to create e-Learning content, the pedagogical approaches need to be evaluated. Simple pedagogical approaches make it easy to create content, but lack flexibility, richness and downstream functionality. On the other hand, complex pedagogical approaches can be difficult to set up and slow to develop, though they have the potential to provide more engaging learning experiences for students. Somewhere between these extremes is an ideal pedagogy that allows a particular educator to effectively create educational materials while simultaneously providing the most engaging educational experiences for students.

It is possible to use various pedagogical approaches for eLearning which include: **Instructional design** - the traditional pedagogy of instruction which is curriculum focused, and is developed by a centralized educating group or a single teacher. **Social-constructivist** - this pedagogy is particularly well afforded by the use of discussion forums, blogs and on-line collaborative activities. It is a collaborative approach that opens educational content creation to a wider group including the students themselves. **Laurillard's Conversational Model** is also particularly relevant to eLearning, and Gilly Salmon's Five-Stage Model is a pedagogical approach to the use of discussion boards. **Cognitive perspective** focuses on the cognitive processes involved in learning as well as how the brain works. **Emotional perspective** focuses on the emotional

aspects of learning, like motivation, engagement, fun, etc. **Behavioural perspective** focuses on the skills and behavioural outcomes of the learning process; role-playing and application to on-the-job settings. **Contextual perspective** focuses on the environmental and social aspects, which can stimulate learning; interaction with other people, collaborative discovery and the importance of peer support as well as pressure.

The eEurope2002 and eEurope2005 Action Plans adopted by Lisbon and Stockholm Councils identify e-learning as a top priority, and set goals for the development of infrastructure, equipment and basic training, which are viewed preconditions for its integration. The e-learning initiative further develops these objectives educationally, emphasizing the need for innovative pedagogical approaches and objectives for learning quality and easier access to e-learning resources and services. It also stresses the need for removing other structural obstacles to innovation, such as organizational and legal barriers, and the way knowledge and competencies are evaluated and certified (Commission of the European Communities, 2002).

2.5 Communication technologies used in e-learning

Communication technologies are generally categorized as asynchronous or synchronous. Asynchronous activities use technologies such as blogs and discussion boards. The idea here is that participants may engage in the exchange of ideas or information without the dependency of other participants' involvement at the same time. Electronic mail (Email) is also asynchronous in that mail can be sent or received without having both the participants' involvement at the same time. Synchronous activities involve the exchange of ideas and information with one or more participants during the same period of time. A face to face discussion is an example of

synchronous communications. Synchronous activities occur with all participants joining in at once, as with an online chat session or a virtual classroom or meeting.

Virtual classrooms and meetings can often use a mix of communication technologies. In many models, the writing community and the communication channels relate with the E-learning and the M-learning communities. Both the communities provide a general overview of the basic learning models and the activities required for the participants to join the learning sessions across the virtual classroom or even across standard classrooms enabled by technology. Many activities, essential for the learners in these environments, require frequent chat sessions in the form of virtual classrooms and/or blog meetings.

2.6 Networks and Connectivity

Networks and connectivity are almost universally assumed to be critical to the development of successful infrastructure. It should be noted that connectivity is not just an enabler of networks and access to content but it is an organizing principle in its own right. Connections enable relationships (involving people and services) and relationships enable networks. The ‘connected’ word (as in ‘connected learning’) is being currently adopted within policy frameworks around the world (e.g., UK and Australia) – perhaps as the next distinguishing label that follows ‘networked learning’ and ‘blended learning’.

In the Kenyan situation, rural areas are increasingly getting connected to broadband internet through private and public initiatives. This is an effort to bridge the already wide digital divide that had long been skewed in favor of the urban areas. Majority of Kenyans in rural areas have no access to an internet connection of any kind and the rest have to travel long distances to access the services through a cyber café. According to the communications commission of

Kenya (CCK), less than three per cent of the population is connected to broadband with over ninety per cent of the 14 million internet users accessing the internet through their mobile phones. More recent data compiled by the CCK indicates that 72 per cent of all Kenyans do not have access to internet services, 11 per cent do not have access to voice services. The commission indicated that this yawning digital divide needs at least 74 billion shillings to bridge.

Lack of reliable broadband connection hinders development especially in higher education. It curtails e-learning which is highly dependent on broadband connection to succeed. There exists a huge gap as majority of the Kenyan population are unable to access internet connection. The Kenyan government had undertaken to provide internet to colleges for e-learning. This is to be done by enhancing application of ICT in TVET institutions to provide e-learning and teaching resources to provide curriculum delivery and ensure the professional development of lecturers and students. The government of Kenya recognizes that to attain industrialized status in line with development blue print Vision 2030, the country must optimize the use of technicians and technologists in various spheres of the economy. The government can leverage on e-learning to enhance training of this critical skilled workforce needed to drive the economy. The access and connectivity barriers must be eliminated to leverage on this.

2.7 Teaching and Learning: Trends in educational theory and practice

Educational Theory has also had an impact on using ICT, as content creators search for a theoretical basis to justify their designs, and as technology is seen increasingly as an enabler of learning. The rise of cognitivism as the dominant ‘post-modern/post behaviourist’ learning theory and the recognition of the importance of the social context for learning is changing curricula and teaching practice. Significant trends in linking pedagogy and educational

technology are emerging worldwide as learners; trainers and teachers evaluate the capacity of e-learning to improve learning for different types of skills and competencies (Reding, 2003; Straub, 2003). Effort is being directed at determining the factors that create effective electronic learning environments (Khan, 2002), and the broader factors that create successful e-learning programs (Frydenberg, 2002). This includes establishing a basic framework for Web-based or electronic learning covering dimensions as diverse as the pedagogical; technological; interface design; evaluation; management; resource support; and ethical considerations and establishing standards to cover domains such as executive commitment, student services and instruction and instructor services that support the delivery of e-learning programs by institutions.

Further, studies are being made of how students use ICT to support learning delivered by conventional methods (Rourke, 2002), and to create a social climate equivalent to that found in the classroom (Oren et al, 2002). There is also a great interest in the literature in cognitive and other forms of learner profiling to ensure the fit between students' learning needs and skills and the product offered via educational technology. Discussion of cognitivism and constructivism in learning focuses on achieving higher-level learning (Hung & Nichani, 2001) in engendering independent, self reliant learners who can employ a range of strategies to construct their own knowledge. ICT is seen as an enabler, a means of acquiring knowledge, a metacognitive tool. The attainment of higher-order knowledge, attitudes and approaches embedded in a social context and made all the more possible through technology is an aim of education in the post-modern society.

Early education is undertaken in preparation for further, lifelong learning and multiple careers through an ability to undertake training and professional development that furthers both

individual and organizational growth. In terms of the impact of learning theory on instructional design practices, a significant literature demonstrates how theory informs design. For example, cognitivism is based on a cognitive model of the human mind and the premise of a limited working memory, and the importance of relating new knowledge to existing knowledge structures within the brain. The instructional design approaches that are derived from this imply a scaffolded sequencing of material, limiting the number of concepts and interacting threads on a page, and providing a recognizable context for learning. Many of these design heuristics are, however, derived from grounded theory, that is, the practice of building on experience using online materials. The cognitivist/constructivist debate has impacted and informed learning designs, favoring strategies and an emphasis on processes rather than content, and initiatives that enable e-learning such as the use of templates and the notion of the learner as designer.

Collaborative activities, sites where students can use e-mail, forums, bulletin boards and share and edit documents online arise as alternatives to the more rigid Learner Management Systems, like WebCT. Jasinski (2001) argues that collaboration with students renews the teacher/learner relationship, while maintaining immediacy and minimizing the need for technical expertise. Blended learning allows for a range of teaching and learning practices to be combined into a custom made learning experience for each individual learner. The term has come to describe a well thought-out combination of e-learning and other training methods - the future trend will use the concept of blended learning more effectively - proactive blending, which means 'taking into consideration the strengths and weaknesses of technology-mediated learning' (Brodsky, 2003).

2.8 Digital divide and Equity issues

Access to and the ability to effectively use information and communications technologies (ICTs) to obtain information and services are becoming increasingly important skills necessary to fully participate in contemporary Kenyan economic, political and social life. The term digital divide is common in the literature, with many writers agreeing that without careful management of the learning process, application of best principles and practices in e-learning design strategies, effective attention to staff development, provision of extensive learner support services, and careful focus on a range of socio-educational issues, the promise may lead to a widening gap in access between rich and poor, young and old, employed and unemployed, and computer literate and illiterate persons. Access to e-learning may actually be made more difficult by the wider use of technology claimed to be able to improve it (Fathaigh, 2002).

A level of ICT confidence and competence needs to exist before the benefits of e-learning can be reaped. Social inequities exist irrespective of the technology or innovation, and policy and practice is put in place underneath the appropriate legislation to address it. In the past few years there have been significant advances in accessibility compliance for digital assets through the World Wide Web Consortium and subgroups such as the Web Accessibility Initiative. There is a growing understanding of accessibility in the development community. As the definition of accessibility is expanded to include technical and social aspects of disadvantage, educational technology must become better able to meet the needs of specific target groups such as indigenous learners, learners with literacy needs, learners with a disability, women, rural and remote rural learners and isolated metropolitan learners. Europe and the US have implemented legislative frameworks for facilitating access for disadvantaged students. On a much more detailed level, the Access and Equity provisions of the Framework aim to ensure all aspects of

online delivery including policy making, infrastructure, program development and support services address access and equity issues. The embedding of these principles has nurtured a system that provides e-learning opportunities for all (Daniells, 2001).

The continuation of this thrust should ensure that the digital divide would become less marked as the adoption of e-learning increases. As home computers and networking capabilities grow, the rise of blended learning as a preferred approach allows for students to find a learning experience that meets their budgets and level of skill. With the increased possibility of cross-accreditation of courses between organizations with courses offered in different delivery modes, the opportunities for access to e-learning will expand and equity considerations more easily addressed. The Access and Equity in Online Learning Project recommended that the provision of suitable material for equity groups be regarded as integral to best practice in teaching and learning, rather than as extra work for facilitators or managers (Daniells, 2001). The higher learning education sector must aspire to a culture of universal design and access that will create a climate where attention to access and equity is an accepted part of the development of online education and training.

There is another approach to addressing the digital divide that focuses less on the gaps and more on positive actions for social inclusion. This kind of integration can only be achieved by attention to the wide range of physical, digital, human, and social resources that meaningful access to ICT entails. It is now time to deepen public understanding of this issue through a more thorough appraisal of what access to ICT entails and of the ends that such access serves (Warschauer, 2002).

2.9 Institutional Access Barriers

With respect to institutional barriers, Garland (1993) and Yap (1996) listed several barriers impeding distance education efforts, including: Program costs, lack of equipment & support, scheduling, resource availability, instructional concerns and technical assistance. These institutional barriers have been highlighted in selected career and technical education studies. Program costs have been identified as a barrier to implementation of distance education in agricultural education (Miller & Miller, 2000; Murphy & Terry, 1998) and cited in efforts to implement distance education programs in adult and vocational education (McClelland & Fouza, 1986). Equipment availability and support are also related to program costs, and were identified by Ndahi (1999) as a factor in the unwillingness by trade and industrial education faculty to teach at a distance. Simply offering courses can be a significant barrier.

Zirkle (2002) described trade and industrial education majors who were able to access courses in their major, but were unable to schedule university general education courses they needed to graduate to offering courses at a distance. Scheduling courses at specific times can be a difficulty as well. Classes taught with satellite technology may have limited channels availability on which to broadcast. Finding faculty to teach at “off” times can also be a challenge (Zirkle, 2001). Institutions offering courses and programs at a distance must make certain resources such as advising; library services, and scheduling/registration are available for distance learners. Having information available about programs and courses and competent advising are particularly critical. Flowers (2001), in a study of technology education teachers, described the need for institutions to better advertise course offerings to facilitate awareness. Trade and industrial education majors, taking courses at a distance, perceived themselves as not as important as on-campus students (Zirkle, 2002). Instructional issues permeate distance education. Faculty,

accustomed to traditional, on-campus, can be resistant to offering distance courses (Dillon & Walsh, 1992). This resistance may be a result of the significant time constraints associated with offering career and technical education courses and programs at a distance (Miller & Miller, 2000; Murphy & Terry, 1998b; Ndahi, 1999; Ragothaman & Hoadley, 1997; Zirkle, 2002c). Many faculties need training in order to move an on-campus class to a distance environment and this training may be scarce (Ko & Rossen, 2001; Murphy & Terry, 1998). Some course content—such as the specific psychomotor “hands-on” skills found in many trade and industrial (Zirkle, 2000) and agriculture programs (Miller, 1997) may not be easily taught through distance education. The “soft skills” associated with many business education programs (Fann & Lewis, 2001) may also be difficult to teach at a distance. Distance education programming relies heavily on technical assistance. The lack of an effective institutional network of technical assistance is a significant barrier. Capable technical support to students when problems arise, assistance for faculty to deliver course material via distance methodologies, and issues of copyright and intellectual property were identified in a study by Zirkle (2002b) that examined both institutional and student barriers to distance education.

2.10 E-Learning Status in Kenyan Universities and Colleges

In a speech by the then minister for education during the **2nd International Conference on ICT for Development, Education and Training**, popularly known as e-Learning Africa held between 28th-30th May 2007 at the Safari Park Hotel, Nairobi, The Minister gave the status of e-learning in Kenyan universities. The theme of the conference was “**Accelerating the Building of ICT Infrastructure and capacities for African Educational Systems**”. At the University of Nairobi, the oldest University in Kenya, for instance, the minister noted that a well tested e-learning platform - **Wedusoft** is in use to provide e-learning courses within and off campus has

been set up. Other software products that support the e-content development and automation process are also there. Other environments that are available include TUSK (Tufts University Sciences Knowledgebase) which is available for staff. In the same university, many of the staff who has been trained on e-learning have now embarked on e-content development projects and by then, over 62 complete electronic courses were on interactive learning CDs, some of which had been made available on custom-developed e-learning platform. Students use the Interactive CDs to supplement study materials, beside being able to have independent learning on their own at home and their places of work. This is a flexible and convenient way of studying without limitations of pace, time and space. Indeed, a check on its website <http://www.uonbi.ac.ke> revealed the same.

At Moi University established in 1984, the minister noted that implementation of an Open and Distance Learning (ODL) initiative to support Government efforts in expanding access to university education had been launched. The university had set up the necessary ICT infrastructure in its satellite campuses in different parts of the country that would operationalise ODL. In addition, the university was an active member of Kenya Education Network (KENET) whose mission is to improve connectivity among the institutions of higher learning in Kenya. Further, as was indicated in its Ten-Year Strategic Plan, the University was scheduled to start Open and Distance Learning Programmes during the 2007/2008 financial year and all arrangements for implementation were on course. The same was confirmed from <http://www.mu.ac.ke>.

In the Lakeside city of Kisumu, Kenya, Maseno University had assembled requisite ICT infrastructure worth Ksh 14 million in readiness for e-learning programmes particularly video conferencing equipment. The university was in take-off stage of adoption of e-learning

programmes. In order to offer access to university education to a larger number of students who qualify but fail to join public universities through Joint Admissions Board (JAB), Maseno University had identified nine Learning Centres countrywide, which can be used as pilot centres for the Open, Distance and Electronic Learning (ODEL) programmes. Secondary schools and tertiary institutions under the NEPAD e-school initiative are also potential areas Maseno looked forward to include in her initiative. The same report can be retrieved at <http://www.maseno.ac.ke>.

At Egerton University (<http://www.egerton.ac.ke>) near Nakuru, Kenya, the university planned to launch an e-learning programme in Nursing at its Nakuru Town Campus during the 2007/2008 academic year. The university fully understood that learners play a major role in constructing their own knowledge and developing their skills and hence to enhance their learning base. Kenyatta University (<http://www.ku.ac.ke>) has been offering Open Learning and School-Based programmes since 2002. The University currently has eight Open Learning Centers countrywide, namely; Parklands Campus, Mombasa, Nakuru, Kakamega, Kisumu, Garissa, Embu and Nyeri. The programmes range from diploma to postgraduate levels hence the University has been receiving overwhelming students' enrolments in the Open programmes. The university posts the reading materials to Open Learning students in form of module booklets and CDs. The University has also been availing some materials through its e- Blackboard Learning Management System (BLMS). In order to reach out to the non-residential students, Kenyatta University launched the e- Learning mode of teaching in 2005. Selected lecturers have been trained on how to write and upload the teaching materials on the e-Blackboard Learning Management System (BLMS). At the same time, some of the students have been sensitized on how to interact through the e-platforms. The content posted on the on the BLMS is only accessible to the staff and students who are issued with passwords. Since inception, some

students in Open Learning and regular programmes have partially been interacting through the (BLMS) from any point of internet access. Some of the University's Open Learning Centres are connected to the Internet for this purpose.

E-learning programmes have also been in operation at Jomo Kenyatta University of Agriculture and Technology (<http://www.jkuat.ac.ke>) with the establishment of The School of e-Learning in 2006. Among the objectives of the School is to improve the quality education offered by the university and increase the access to education by students who wish to join university courses. Initial sensitization of administration and staff was conducted before inception in 2004 while further training of technical staff was conducted in 2005 with the assistance of the Commonwealth of Learning. In Masinde Muliro University of Science and Technology (<http://www.wust.ac.ke>), Kenya, ICT technologies have impacted on data/information collection, storage and dissemination, contributing to enhance university growth.

In middle level colleges, e-learning programmes had been launched at Kenya College of Communications Technology (KCCT). The college has been on e-learning mode of delivery in some courses since 2001 when it opened its first e-Learning Centre at the City Centre Campus at, Telposta Towers and later in the year at Mbagathi Campus. The College is currently in the process of hosting its own e-learning platform to launch its unique telecommunication engineering courses online. In addition, KCCT is setting up an online Testing Centre, and introducing a variety of IT certifications so as to make it a one-stop ICT training and certification centre. E-learning activities are alive in several Kenyan institutions, such as Strathmore University, The Catholic University of Eastern Africa, USIU, Kenyatta University, Kenya Polytechnic and Kenya College of Communication Technology.

Kenyan Universities are increasingly turning to e-learning as a tool to facilitate improved education. They also want to rope in more students through better access to facilities, hoping to reach a wider base in a cost-effective way. The efficiency accruing from e-learning is among the advantages gained by local universities that have adopted the use of technology. Using different platforms, students are able follow lectures online, interact with lecturers, submit assignments and check on their grades. Lecturers are also able to upload course materials, post assignments and generate discussions online using blogs. However, these institutions have to train both students and lecturers on how to use the platforms.

At Strathmore University, United States International University (USIU) and University of Nairobi (UoN), all students are enrolled in e-learning courses when they first join. Strathmore University has adopted the use of e-learning in many of its courses via the Moodle platform. The university uses this as a way of facilitating lectures. The Director of Strategy and Performance Improvement said that the university applies a blend of direct lectures and e-learning techniques in many courses as technology gains acceptability among lecturers and students. One area in which the university has utilized e-learning is by the use of video conferencing for visiting professors; this is done especially in partnership with other business schools. Strathmore had teamed up with the IESE Business School which is under the University of Navarra in Barcelona Spain. The Vice Chancellor of the university said the platform is already in use, but it takes time for lecturers and students to be fully comfortable with the approach. He said that the Moodle program allows university professors to give lectures remotely, on top of enabling access to more students.

The Director of IT at USIU said e-learning is just another way of delivering services which works together with face-to-face teaching. The director added that gives you the ability to manage work more effectively. It is not replacing the contact hours but it is being more responsive to the modern student. The director further says that USIU had recently adopted a new platform, Blackboard 9.1. She added that formerly the University has been using Webcity which had over 400 courses and half of the faculty using it in interacting with students. Daystar University has also adopted a blended version of e-learning. Deputy Vice-chancellor says that this enables a fully electronic relationship between lecturers and students. The Vice Chancellor added that in distance-learning, students work and does assignments online. The university been working in that direction and probably next year they will have a whole degree taught on that kind of platform. The Vice Chancellor however noted that there are various challenges being faced. The technical infrastructure relies completely on local networks and the internet which may be may be slow. Public universities such as Moi, Maseno, Jomo Kenyatta University of Agriculture and Technology and Kenyatta all have e-learning portals where students can log and perform various tasks while interacting with lecturers.

The Director of ICT at UoN says the institution uses technology to enhance distant learning education and has the necessary facilities to do this in all its campuses. Lecturers have flexible access and student hostels have a wireless network. There is curriculum training for staff on how to facilitate content online and the student's information systems network has been integrated into the e-learning system to enhance and allow fast uptake of e-learning. There is also an awareness campaign using brochures, flyers and open days to increase interest among students and staff. Kenyatta University has an institute of Open Distance and e-learning using the Moodle platform. According to its website, over 100 courses are fully offered using the platform. In the

US and Britain, e-learning has been in use for a long time. Universities like the University of Phoenix, University of Illinois and Ashford University offer on campus and online degrees. On the other hand, Institutions like The London School of Business and Kaplan University offer degrees and professional certifications like the Association of Chartered Certified Accountants (ACCA) and Chartered Financial Analyst (CFA) online. These two status updates, nevertheless revealed little information on e-Learning components applied, features associated with e-learning, benefits experienced and constraints encountered in the implementation of e-Learning. Hence this study will majorly focus on the institutional barriers to e-learning in Kenyan institutions.

2.11 Government of Kenya's initiative on E-learning

Kenya is gearing towards deepening the provision of technology-backed learning in both its public and private institutions, as well as playing a more prominent role in increasing the uptake of Information and Communication Technology (ICT) in the region. The process of integrating ICT into its education system through e-learning is expected to entrench the country's position as an ICT hub in the region, with a planned replication of what is happening in Kenya in close to 20 other countries in the region. The region is expected to start implementation of a regional strategy on e-learning, which is to be spearheaded by Kenya. This follows a recent nomination of Kenya as the COMESA e-Learning hub. The country is expected to coordinate development and implementation of a COMESA-Wide e-Learning program targeting the 19 African countries.

UNEP has also nominated Kenya as a sub-regional e-Learning Center of excellence for the East and central Africa region. The African Ministerial Conference on the Environment held in South Africa in 2010 saw the ministers adopt a decision on environmental education and

technology-supported learning in the continent. Already a reference point for many countries on the continent due to inroads made in ICT infrastructure development, Kenya has also made milestones in e-Learning development and implementation, in part due to the commitment by the Government to ICTs as an engine for growth. Through e-Learning, Kenya will consolidate its position as the ICT hub in Africa, opening opportunities for the growth of the knowledge process outsourcing industry through development of animations labs and other value added e-services. There is no reason why young Kenyan professionals cannot coach or tutor learners and business people in other parts of Africa and the world online. Kenya is known for its deep pool of specialized knowledge and skills, and these can be made available to those in need through Knowledge process outsourcing.

The Kenya e-Learning Centre (KeLC), an initiative under e-Government to adopt e-learning in the training of civil servants, has been key in growth of e-learning. It was established in a bid to harmonise and consolidate all Government training programmes under one umbrella. It is also expected to provide e-Learning infrastructure and training expertise for the Government online training programmes. One of the biggest beneficiaries so far of the KeLC programmes has been the National Environment Management Authority (NEMA), which has established its own environmental e-Learning centre in an initiative to implement the African ministers' plans for dissemination of environmental education and technology-supported learning. Nema's e-Learning centre offers online environmental education for the provincial and district environmental committees and others, with an aim of advancing the state of the country's environment. The centre also offers education and skills to bolster the stakeholders' capacity to conserve ecosystems, with emphasis on environmental policies and laws in Kenya. It is supposed

to offer a platform for different organisation expected to incorporate e-learning in their training programmes.

Some of the Government's institutions that have moved towards adoption of e-Learning in their training programs include KWS, KIE, KMTC, KEMRI, University of Nairobi and KIA. Already, the e-learning centre is actively involved in developing e-learning initiatives in the environment sector. The Centre has a cooperation agreement with InWEnt, German Capacity Building international to offer InWEnt's e-Learning programs in Africa through a blended approach. Since 2007, a total of 600 technical staff from over 10 African countries has been trained in e-Learning didactics and technology. The same model will be used to roll out the proposed COMESA e-Learning program coordinated by KeLC and partners. It was however noted that lack of a national policy on e-learning might stand in the way of further developments in embedding ICT in education sector. It was noted that without a national policy and strategy, it would be impossible to have a working e-Learning program in the Kenya. Thus this study is meant to look into other challenges that can hinder implementation of e-learning programs in institutions of middle and higher learning. Mitigation of such barriers will enable a quicker take off of e-learning with immense benefits to the Kenyan society.

2.12 The Future of e-learning

Forces that are aligning to shape the future for e-learning may be categorized as technical, teaching and development practices or organizational initiatives. Dramatic changes in hardware and software and the continued mainstreaming of technologies into people's lives through e-commerce and entertainment are providing a powerful and unstoppable force for the growth of e-learning. A new generation of learners is growing up with technology and will increasingly

expect it to be deployed in undertaking training. Organizations, including schools and higher learning institutions, are developing better IT infrastructure and systems for efficient business and will be seeking to leverage off those efficiencies for the delivery of training. Institutions are seeking more skilled and flexible workers who can adopt and already possess some of those attributes thought once only achieved through experience. The only certainty is change, and the only way to effectively accommodate change is through having sound processes. These are processes for identifying the needs of the learner, for designing experiences that efficiently meet learning objectives, for choosing appropriate technologies and creating motivating learning designs, and for measuring learning outcomes.

2.13 Summary

This chapter has reviewed the critical literature and identified the existing gap. There is still a huge gap in ICT, infrastructure, digital divide and equity issues as well as connectivity and technical support. From the literature reviewed in this chapter, lack of ICT infrastructure, e-learning resources, digital divide and lack of broadband access are among issues that have come out clear. Kenyan universities and colleges need to invest in the ICT infrastructure, e-learning resources, digital and broadband access in order to cut a competitive edge among its African peers in the provision of e-learning programs. Often, the university and colleges ranking is based on adoption and usage of ICT and no wonder our Kenyan institutions are often ranked distant behind its African peers. Massive resources would be required to bridge the huge digital divide and lack of infrastructure. Under Vision 2030, the government of Kenya aspires to make a technology workforce and population the foundation to build a knowledge economy.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Overview

This chapter discusses the research design, study area, population size and sample and research methodology. It focuses on sampling design and procedures, data collection, data analysis, pilot study and the summary of the chapter.

3.2 Research Design

Survey design was used to conduct this study. Surveys are normally used to systematically gather factual quantifiable information necessary for decision-making (Kothari, 2004). According to Kothari, surveys are efficient methods of collecting descriptive data regarding the characteristics of populations, present practices and conditions or needs. Creswell (2011) noted that survey design is also helpful in gathering information from large cases by use of samples to reduce the costs. Therefore, survey research design was adopted in this study in order to capture descriptive data from selected samples and generalize the findings to the populations from which the sample was selected.

3.3 Area of Study

This study was conducted in selected middle and higher learning institutions in Uasin Gishu County. As shown in fig.2, Uasin Gishu borders Kericho County to the South, Nandi to the South West, Bungoma to the West and Trans Nzoia to the North. Other counties sharing borders with Uasin Gishu are Elgeyo Marakwet to the East and Baringo to the South East. The area was chosen because it is rich in a good number of middle and higher learning institutions. The area was also more accessible by the researcher.

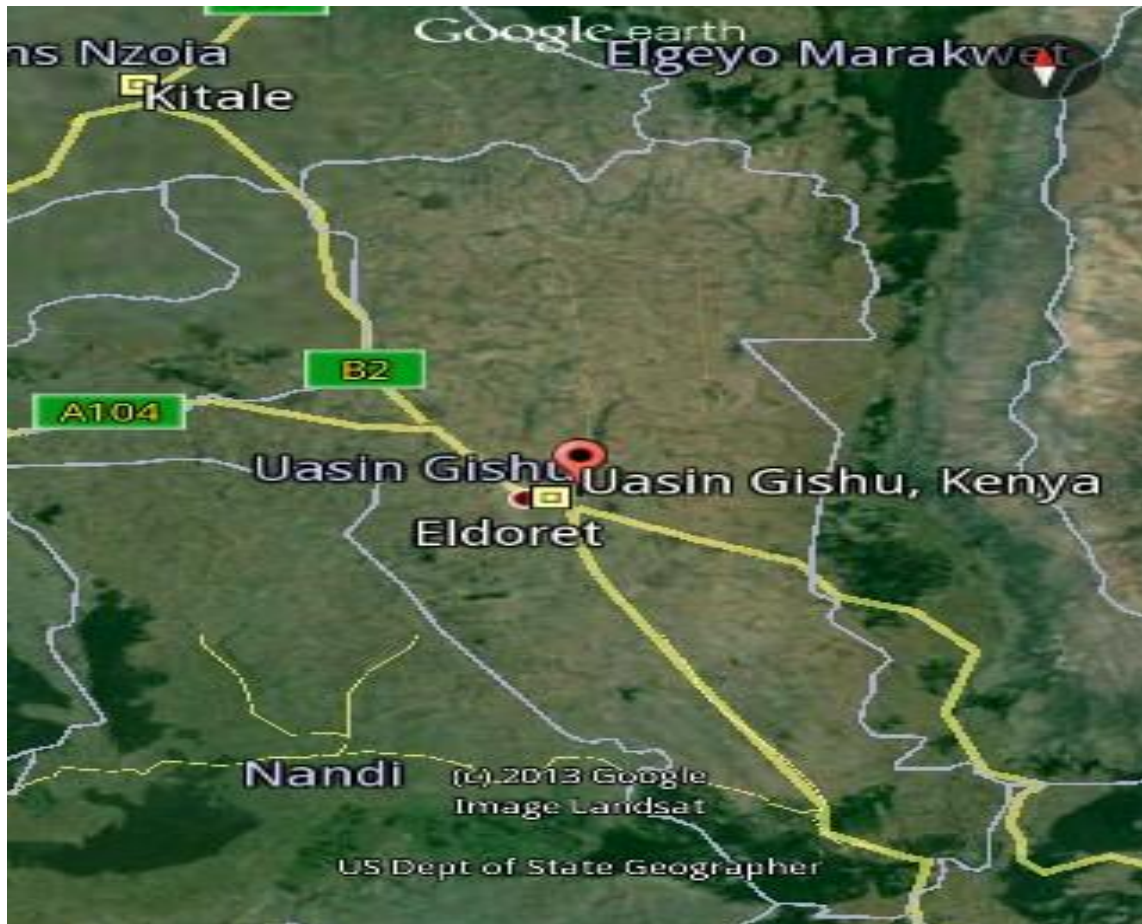


Figure 2: Google Earth map showing the position of Uasin Gishu County relative to the neighbouring counties of Trans Nzoia, Elgeyo Marakwtet and Nandi.

3.4 Population and sample size

The target population for this study comprised of the administrators and lecturers in institutions of middle and higher learning in Uasin Gishu County, Kenya. It was estimated that the three institutions chosen for the study had 545 lecturers and 45 in the administrators' category. The population size was all lecturers and administrators in all these institutions of higher learning. Stratified proportional random sampling technique was used to select samples of 18 administrators and 166 lecturers in the 3 institutions chosen for the study.

3.5 Research tools and instruments of data collection

The research tools that were used are observations, interviews, questionnaires and document analysis since the data was both qualitative and quantitative. The selection of these tools was dependent on the nature of the data to be collected, the time available as well as the objectives of the study.

3.5.1 Questionnaires

Questionnaires were appropriate for this study because they enable the coverage of wide area and extensive contents within a short period of time (Orodho, 2004). This is mainly due to the fact that question targeted different groups with varied responses. The researcher with the help of a research assistant distributed the questionnaires to the sampled lecturers and administrators. The respondents were requested to give responses to the questions that were collected later. Some questionnaires were collected immediately because some respondents were willing to give responses there and then.

3.5.2 Interviews

The researcher employed interview method on areas where questionnaires did not capture the responses to a satisfactory level. Interviews were also used to supplement the information from the questionnaires (Kothari, 2005). The researcher randomly chose 5 respondents from the research sample who were to be interviewed. The people interviewed were mostly administrators. Most of the questions captured in the questionnaires were also used in the interview schedule.

3.5.3 Observations

Observation focused on the environment of the middle and higher learning institutions and the e-learning facilities in those institutions. It also focused on the type of facilities and resources available. The number of e-learning students affiliated to those higher learning institutions was also observed. The observations were done to complement the information that was captured by the questionnaires (Koul, 1992).

3.6 Validity and Reliability of Research Instruments

3.6.1 Validity of Data Collection Instrument

Validity of an instrument is the success of a scale in measuring what it sets out to measure so that differences in individual scores can be taken as representing true differences on the characteristics under study (Koul, 1992). Content validity refers to the subjective agreement among professionals that a scale logically appears to reflect accurately what it purports to measure (Uysal et al., 2000).

To determine the content validity of the questionnaire items, three experts in the department of Technology Education, University of Eldoret examined them and provided valuable suggestions and comments, which were used as basis to modify the research items to make them adaptable to the study. Based on the feedback offered by those experts who examined the questionnaires, the terminologies, questions, objectives and content of the questionnaires were modified to either include or exclude some items. This was due to the fact that some items could have been included that captured irrelevant data or some items had been excluded that would have helped the researcher to capture some important information regarding the study.

3.6.2 Reliability of Data Collection Instrument

The reliability is consistency in measurement (Kothari, 2005). To verify on reliability of the instrument, the questionnaires were pre-tested through a pilot study so as to ascertain their effectiveness in capturing the required and intended information. Pilot study was carried out at Maseno University in order to determine the questionnaires' internal consistency and to highlight any difficulties that the respondents will likely face when responding to the questions. Split half technique was used to obtain X and Y scores. X distribution took odd numbered items, while Y distribution will take even numbered items. Pearson product moment correlation (r) was used to calculate the reliability coefficient. The coefficient obtained was then converted into an appropriate correlation for the entire test using Spearman formula. The reliability coefficient of 0.5 and above was accepted as a good measure of reliability.

3.7 Development of the research instruments

Since the research design adopted was a survey, the researcher used questionnaires presented in the Likert Scale method for the lecturers and administrators. Orodho (2004) says that in social sciences research, the most commonly used instruments are questionnaires, interview schedules and observation forms. Thus questionnaires were used to collect important information about the population. Simple Yes or No responses were also used in the questions to provide direct answers. Questions that required detailed opinion were left open ended to elicit more explanations that enabled the respondents to provide their detailed opinions.

3.8 Data Analysis

After the data collection was done, the data obtained was not used in raw form. Responses from all the open ended and closed ended questions was checked to enable coding, processing and

entry into the computer program in preparation for analysis. Data processing commenced with the coding of all the responses in all the questionnaires to enable easy analysis using computer Statistical Packages for Social Sciences (SPSS version 10.0). A master code was developed to ensure that all the questionnaires are coded uniformly. Descriptive statistics was used to analyze the collected data. Descriptive statistics gave a summary of the characteristics of the populations from which the samples were drawn. Chi-square (χ^2) test and Spearman Correlation (bivariate) was used to analyze the data. The formula used for calculating the chi-square test was

$$\chi^2 = \sum \frac{(O - E)^2}{E} \text{ where: O is the observed and E the expected values in the sample. Chi-square}$$

test is a statistical technique that is used to compare the differences between categorical frequencies when data is categorical and drawn from a population with uniform distribution in which all alternative responses are equally likely. Chi-square test was used because the data the researcher collected was of the type one-variable-many-levels and were basically categorical frequencies of the descriptions of views, opinions, attitudes and feelings of the respondents towards the challenges facing e-learning in the institutions of higher learning. Spearman Bivariate Correlations was used to analyze strengths of tabulated significant relationships. Apart from Chi-square test, the researcher also used percentage rank score as a means of comparing the response to variables under study based on the Likert Scale scoring. All data was analyzed at a level of 95% or $p = 0.05$ confidence interval for all the cases. The value $\alpha=0.05$ was chosen because the sample size was adopted from figures calculated based on 0.95 level of confidence.

3.9 Summary

This chapter has discussed the procedures that were employed in carrying out the study. It has outlined the research design, the study area, the study population, sample and sampling

procedures, research instruments, piloting, data collection and analysis. Survey research design was employed in the study to gather large amounts of information from a vast area within a short time. Within a population of lecturers and administrators in 3 colleges, 166 samples of lecturers were used though 2 of them did not give their responses. 18 administrators participated in the study. Study area of Uasin Gishu County was appropriate and ideal for the researcher. Piloting revealed that the tools used, procedures and analysis techniques to be used were appropriate after corrections were carried out. The design of the instruments and analysis techniques were such as to capture the main objectives of this study from which hypothesis testing was carried out and results/findings will be presented in the next chapter. Coding of data and entry into SPSS was promptly done to enable analysis to be carried out. The next chapter will focus on data analysis, presentation and discussion of results.

CHAPTER FOUR

FINDINGS, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter discusses the organization, analysis and presentation of data. The term data organization in research refers to orderliness in research data. This is putting the data into some useful systematic form. The raw data collected, particularly in surveys, needs to be processed before it can be subjected to any useful analysis. This organization includes identifying and correcting errors in the data, coding the data, storing it in appropriate form. On the other hand, analysis refers to examining the coded data critically and making inferences (Kombo & Tromp, 2006). The presentation of data refers to ways of arranging data to make it clearly understood.

First, the study investigated lecturer's and management's attitudes towards e-learning. Data was collected and analyzed to obtain the overall picture of the lecturers' and managements' attitudes towards e-learning as a mode of study. Specifically, data was analyzed to determine whether:

- 1) E-learning as a mode of study will drive the lecturers out of their jobs
- 2) Lecturers are positive about e-learning
- 3) E-learning as a mode of study is more effective than the traditional face to face method

Secondly, the study investigated the availability of e-learning infrastructure and resources in Kenyan public institutions of higher learning. It sought the opinion and views of lecturers and management on whether the e-learning infrastructure and resources as currently exists is adequate to support e-learning programs in the institutions. Data was collected and analyzed to show the overall picture of the opinion of lecturers and management towards the adequacy of the

infrastructure and resources in their institutions. In particular, data was analyzed to show whether:

- 1) E-learning resources are adequate
- 2) Infrastructure is sufficient to support e-learning
- 3) E-learning resources, equipments and ICT tools can be easily accessed

Lastly, the study investigated the level of organizational preparedness. It sought the opinion and views of the lecturers and management on the level of organizational preparedness to launch e-learning programs. In particular, data was collected and analyzed to determine whether:

- 1) There is adequate number of lecturers participating in e-learning programs in the institutions of higher learning
- 2) There is adequate training offered to the lecturers on e-learning
- 3) There are adequate technical assistance offered to the lecturers
- 4) There are adequate capacity building programs to support e-learning in institutions of higher learning

As stated in the previous chapter, the main research instruments were lecturer's questionnaire, administrator's questionnaire, observation schedules and interview schedules. Data was analysed and hypotheses that were previously stated were tested and were either rejected or accepted depending on the outcome of the analysed data. The independent variable, E-LEARNING DEVELOPMENT was considered against lecturers and administrator's attitudes, infrastructure and resources and organizational preparedness. In all the cases, inferential and descriptive statistics were used to analyse the data. For descriptive statistics, frequencies, means, standard

deviations and percentages were used while for the inferential statistics, the analysis of variance (ANOVA) and chi-square (χ^2) were used to test the hypothesis at $\alpha = 0.05$ level of significance and appropriate degrees of freedom.

4.2 E-learning development and lecturer's attitudes towards e-learning

The data collected in lecturer's attitude towards e-learning was analysed to obtain an overall picture of the lecturer's attitudes towards e-learning and e-learning development in Kenya. In the lecturer's questionnaire, there were four items that were testing the lecturer's attitudes towards e-learning. The results of the attitudes are captured in table 4.1. The grand mean of all items is 2.686. This is an average value on the Likert scale. This shows more lecturers who are positive towards e-learning than are those of the contrary opinion. This can be attributed to the low level of awareness and training carried by the respective institutions. The level of ICT skills possessed by the lecturers is also a pointer to the negative opinion held by approximately 50% of the respondents.

Despite the average value of the opinion of the lecturers towards e-learning, there is still quite low number of lecturers participating in provision of e-learning activities. The value of 2.01 in table 4.1 is a very low value in the Likert scale showing that the majority of the lecturers do not engage in e-learning which is be a pointer to the negative opinion towards e-learning. However, items 2, 3, 4 & 5 of table 4.1 show that the lecturers were positive about. Lecturers were of the opinion that e-learning cannot drive them out of their jobs which shows that the lecturers do not fear the advancement of e-learning though quite a number of them are yet to embrace it. This opinion was reinforced by the lecturer's response on the effectiveness of e-learning as a mode of teaching and learning as compared to the traditional face to face. The response of an average of

2.74 on the Likert scale in table 4.1 is high enough to conclude that quite a number of lecturers hold a positive view about e-learning.

Table 4.1: Overall analysis on lecturers' attitudes towards e-learning

Item	Statement	N	Sum	Mean
1.	Lecturers participating in e-learning are inadequate	164	330	2.01
2.	E-learning lecturers are overburdened	164	439	2.68
3.	E-learning will drive the lecturers out of their jobs	164	583	3.55
4.	Lecturers are positive about e-learning	164	402	2.45
5.	E-learning as a mode of study is more effective than other modes	164	449	2.74
	Valid N (list wise)	164	2203	2.686

$$\bar{X} = 2.686 \text{ (grand mean)}$$

Table 4.2 shows the comparison of lecturers' attitudes towards e-learning by gender. The results show that generally, there is positive attitude towards e-learning by lecturers. This is indicated by an average value of 2.68 and 2.704 for males and females respectively. However, there were items which the lecturers showed to be highly negative about. Both male and female lecturers showed less enthusiasm in participation on e-learning as in item number one. This is shown by weak values on the Likert scale of mean of 2.07 for males and 1.88 for females. This is attributed to the low level of ICT skills and awareness about e-learning. These means indicates that though both male and female lecturers are less enthusiastic in participation in e-learning, the female lecturers displayed less willingness as compared to their male counterparts. More female lecturers felt overburdened to engage in e-learning than the male lecturers. This is shown by their respective means of 2.62 and 2.82 for males and females respectively. This showed that more

male lecturers are willing and ready to engage in teaching through e-learning than the female lecturers who majority showed are not ready.

Means of 3.66 for males and 3.31 for females implied that more female lecturers feel that their jobs are not secured with advancement of e-learning than their male counterparts who majority did not show fear for e-learning. Though on average lecturers accept e-learning and would embrace it, quite a number of them feel that e-learning will drive them out of their jobs and would therefore not embrace it. There are quite a number of lecturers who do not accept e-learning as a mode of study. More females showed positive attitude towards e-learning with a mean of 2.57 as compared to males who had an average of 2.40. As for males, their mean is below average in the Likert scale hence it implies that more males are less positive about e-learning. As for whether e-learning as a mode of study is more effective in comparison to other modes, both male and female lecturers showed a higher mean of 2.65 and 2.94 respectively. This showed that more female lecturers feel that e-learning as a mode of study is more effective than other modes as was compared with the responses of their male counterparts.

Table 4.2: Analysis on lecturers' attitudes towards e-learning by gender

Item	Statement	Gender	N	Sum	Mean
1.	Lecturers participating in e-learning are inadequate	Male	115	238	2.07
		Female	49	92	1.88
2.	E-learning lecturers are overburdened	Male	115	301	2.62
		Female	49	138	2.82
3.	E-learning will drive the lecturers out of their jobs	Male	115	421	3.66
		Female	49	162	3.31
4.	Lecturers are positive about e-learning	Male	115	276	2.40
		Female	49	126	2.57
5.	E-learning as a mode of study is more effective than other modes	Male	115	305	2.65
		Female	49	144	2.94
	Valid N (list wise)	Male	115		X = 2.68
		Female	49		X = 2.704

The results of table 4.2 were subjected to the t-test to determine whether the differences in the means were statistically significant. The results are shown in table 4.3. The t-test gave values of $p > 0.05$ for all items showing that the differences in means for males and females are not statistically significant. This implies that gender has no significant influence on attitudes towards e-learning and by extension e-learning development. Thus male and female lecturers are equally positive about e-learning and would participate in it.

Table 4.3: Independent sample t-test for lecturers' attitudes towards e-learning

Item		T-test for Equality of Means				
		Sig.	t	df	Sig. (2-tailed)	
1.	Lecturers participating in e-learning are inadequate	Equal variances assumed	0.285	0.969	162	0.334
		Equal variances not assumed		0.984	94.046	0.328
2.	E-learning lecturers are overburdened	Equal variances assumed	0.872	-0.840	162	0.402
		Equal variances not assumed		-0.838	90.214	0.404
3.	E-learning will drive the lecturers out of their jobs	Equal variances assumed	0.803	1.622	162	0.107
		Equal variances not assumed		1.649	94.174	0.102
4.	Lecturers are positive about e-learning	Equal variances assumed	0.366	-0.896	162	0.371
		Equal variances not assumed		-0.873	85.581	0.385
5.	E-learning as a mode of study is more effective than other modes	Equal variances assumed	0.369	-1.413	162	0.159
		Equal variances not assumed		-1.432	93.391	0.156

Table 4.4 shows an analysis of the lecturer's attitudes toward e-learning by age. Generally the attitudes towards e-learning are positive for all ages. The mean for lecturers participating in e-learning activities for age below 30 years is 1.68 which is a low value in the Likert scale indicating that more young lecturers are not engaging in e-learning. This can be attributed to the small number of lecturers below the age of 30 years who gave responses for the study. It indicates that majority of the lecturers are above age 30. Again, since majority of lecturers are in middle level colleges, it's an indication of the low level of development of e-learning in those institutions. As for other ages, mean values are low except for lecturers above age 60 whose mean show a more than average participation in e-learning with a mean of 3.67. This can be attributed to their experience and training they might have undergone since joining the profession. Majority of lecturers in the age category of above 60 felt that they are positive about e-learning. This is shown by the small mean value of 1.33 in the Likert scale which tends towards the value of 1 (strongly agree) as per the Likert scale. Other age categories returned average values on the Likert scale indicating that equal numbers of lecturers are as positive about e-learning as there are those who are negative. There is an exception of age category of 51-60 which show a very small mean of 2.07 indicating majority of lecturers are positive about e-learning.

All age categories disagree that lecturers are overburdened to engage in e-learning. The mean values for all categories are above 2.5 except for age category of 41-50 whose mean is 2.47. This shows that more than half of the lecturers felt that they can still engage in e-learning activities despite their other engagements. This showed a positive attitude. As for the fear that e-learning will drive them out of their jobs, the mean value for all age categories is more than 3.5 which is a very high value in the Likert scale. This indicates that majority of the lecturers are of the view

that e-learning will not drive them out of their jobs and would therefore embrace it. This is a high positive indicator. The highest mean in this item is for age category of above 60 with a mean value of 4.67. This indicates that more experienced lecturers have come to learn overtime that technology is not meant to replace the lecturers. However, this same group of lecturers felt that e-learning is not a more effective mode of teaching and learning as compared to the traditional face to face mode. This is shown by the mean value of 1.00 which is the least as compared to other age categories. Other age categories returned average mean values.

Table 4.5 shows the grand mean for all age categories. The grand mean for age category of below 30 is 2.88, for age category of 30 - 40 the grand mean is 2.614, for age category of 41-50, the grand mean is 2.742, for age category of 51-60, the grand mean is 2.508 while the age category of above 61 has a grand mean of 2.734. This indicates that more young lecturers in the age category of below 30 are more positive about e-learning as compared to lecturers in other age categories. This is because this age category has the highest grand mean of 2.88.

Table 4.4: Analysis of lecturers' attitudes towards e-learning by age

Item	Statement	Mean (x ₁)	Mean (x ₂)	Mean (x ₃)	Mean (x ₄)	Mean (x ₅)
1.	Age of the respondent	Below 30	30 - 40	41 - 50	51 - 60	61 and above
2.	Lecturers participating in e-learning are inadequate	1.68	2.04	2.16	1.60	3.67
3.	E-learning lecturers are overburdened	3.16	2.53	2.47	3.20	3.00
4.	Lecturers are positive about e-learning	2.60	2.40	2.63	2.07	1.33
5.	E-learning will drive the lecturers out of their jobs	3.72	3.43	3.67	3.27	4.67
6.	E-learning as a mode of study is more effective than other modes	3.24	2.67	2.78	2.40	1.00
	Valid N (list wise)	25	70	51	15	3

Table 4.5: Further analysis of lecturers' attitudes towards e-learning by age

Item	Statement	Mean (x ₁)	Mean (x ₂)	Mean (x ₃)	Mean (x ₄)	Mean (x ₅)
1.	Age of the respondent	Below 30	30 - 40	41 – 50	51 – 60	61 and above
2.	Lecturers participating in e-learning are inadequate	1.68	2.04	2.16	1.60	3.67
3.	E-learning lecturers are overburdened	3.16	2.53	2.47	3.20	3.00
4.	Lecturers are positive about e-learning	2.60	2.40	2.63	2.07	1.33
5.	E-learning will drive the lecturers out of their jobs	3.72	3.43	3.67	3.27	4.67
6.	E-learning as a mode of study is more effective than other modes	3.24	2.67	2.78	2.40	1.00
	Valid N (list wise)	25	70	51	15	3
	GRAND MEAN (X)	2.88	2.614	2.742	2.508	2.734

Table 4.6 shows results of One-way ANOVA performed on the results on table 4.5. This was done to determine whether there is a statistical mean difference in attitudes towards e-learning by lecturers of different age categories. As for lecturers' participation in e-learning and e-learning as a mode of study, the ANOVA gave p values of 0.026 and 0.014 respectively. Since these p values are less than 0.05, it suggests that the means for all age groups in those particular items are statistically significant. This implies that there is a significant difference in the number of lecturers participating in e-learning for the different age categories. Young lecturers participate more in e-learning as compared to older lecturers. It also suggests that there is a significant difference in the number of lecturers who are of the view that e-learning is more effective than other modes across age groups. Older lecturers are of the view that e-learning isn't more effective as compared to traditional face to face method. This is contrary to the responses from the younger lecturers who view e-learning to be more effective.

Table 4.6: One way ANOVA of lecturers' attitudes towards e-learning by age

Item	Statement		Sum of Squares	df	Mean Square	F	Sig.	S or NS
1.	Lecturers participating in e-learning are inadequate	Between Groups	14.652	4	3.663	2.837	0.026	S
		Within Groups	205.323	159	1.291			
		Total	219.976	163				
2.	E-learning lecturers are overburdened	Between Groups	13.963	4	3.491	1.851	0.122	NS
		Within Groups	299.909	159	1.886			
		Total	313.872	163				
3.	E-learning will drive the lecturers out of their jobs	Between Groups	7.390	4	1.847	1.116	0.351	NS
		Within Groups	263.116	159	1.655			
		Total	270.506	163				
4.	Lecturers are positive about e-learning	Between Groups	8.288	4	2.072	1.678	0.158	NS
		Within Groups	196.322	159	1.235			
		Total	204.610	163				
5.	E-learning as a mode of study is more effective than other modes	Between Groups	17.495	4	4.374	3.246	0.014	S
		Within Groups	214.230	159	1.347			
		Total	231.726	163				

All the variables on attitudes were subjected to Chi-Square test of relationship between:

- 1) Gender of the lecturer and attitudes towards e-learning
- 2) Age of the lecturer and attitudes towards e-learning
- 3) Academic qualification of the lecturer and attitudes towards e-learning
- 4) ICT qualification of the lecturer and attitudes towards e-learning

In table 4.7, the findings show that the attitudes of the lecturers are not statistically different when their gender is taken into consideration. The p value for all the items is greater than 0.05 showing there is no statistically significant difference in the attitudes towards e-learning by lecturers by gender. Both male and female lecturers will hold the same opinion about e-learning as a mode of teaching and learning. Gender has no significant influence on the lecturer's opinion.

Similarly, in table 4.8, findings show that only one item returned a statistically significant value of $p < 0.05$. The p value of 0.023 shows that the age factor has a significant influence on the lecturer's view of e-learning. Younger lecturers have a more positive view of e-learning as compared to their older counterparts who majority tends to be more negative. This shows that age has a significant influence on the lecturer's opinion of e-learning.

Overall, when all items are considered in the table, the overall results shows that age has no statistical significant difference on the lecturer's opinion towards e-learning. The opinions towards e-learning would tend to be the same across all age categories.

Table 4.7: Analysis of Chi-Square tests of relationship between gender of the lecturer and attitude towards e-learning

Item	Statement	Chi-Square Tests				
		Chi-Square Value	df	Sig. (2-sided)	Remarks	S or NS
1.	Lecturers participating in e-learning are inadequate	22.774	24	0.533	$p > 0.05$	NS
2.	E-learning lecturers are overburdened	22.73	24	0.563	$p > 0.05$	NS
3.	E-learning will drive the lecturers out of their jobs	20.948	24	0.642	$p > 0.05$	NS
4.	Lecturers are positive about e-learning	22.338	24	0.559	$p > 0.05$	NS
5.	E-learning as a mode of study is more effective than other modes	24.148	24	0.453	$p > 0.05$	NS

Table 4.8: Analysis of Chi-Square tests of relationship between age of the lecturer and attitude towards e-learning

Item	Statement	Chi-Square Tests				
		Chi-Square Value	df	Sig. (2-sided)	Remarks	S or NS
1.	Lecturers participating in e-learning are inadequate	24.917	16	0.071	p>0.05	NS
2.	E-learning lecturers are overburdened	20.501	16	0.199	p>0.05	NS
3.	E-learning will drive the lecturers out of their jobs	14.057	16	0.594	p>0.05	NS
4.	Lecturers are positive about e-learning	29.105	16	0.023	p<0.05	S
5.	E-learning as a mode of study is more effective than other modes	33.375	16	0.07	p>0.05	NS

Table 4.9 shows the results of Chi-Square tests of the relationship between academic qualification of the lecturers and attitudes towards e-learning. Item number one shows a p value of 0.533 which is >0.05 and therefore implies that the academic qualification of the lecturer doesn't influence his or her participation in e-learning. Lecturers of different academic qualification are equally likely to participate in e-learning. Similarly, all other items have p>0.05 and therefore has no significant influence on attitudes towards e-learning by the lecturers of different levels of academic qualifications. Overall results of table 4.9 show that academic qualification of the lecturer has no significant influence on attitudes towards e-learning.

Table 4.10 shows the results of Chi-Square tests of the relationship between computer/ICT qualification of the lecturer and attitudes towards e-learning. The p value of 0.348 which is greater than 0.05 indicates insignificant difference. This implies that the computer/ICT qualification of the lecturer doesn't influence his or her attitude towards e-learning. P values of 0.502 and 0.173 shows that the computer/ICT qualification of the lecturer have no significant

influence on the choice to participate in e-learning and consequently attitudes towards e-learning. The attitude of the lecturer towards e-learning is independent of his or her computer/ICT qualification. Lecturers with different levels of computer/ICT qualification would equally view e-learning as more or less effective mode of teaching and learning.

However, p values of 0.642 and 0.559 are greater than 0.05, showing that computer/ICT qualification has no significant influence. As for item two, it implies that lecturers are more likely to feel that e-learning will likely drive them out of their jobs despite their qualification. Similarly, lecturers of different computer/ICT qualification will have different opinions on e-learning i.e. the more qualified lecturers shows positive attitude towards e-learning whereas lecturers with minimal computer/ICT qualification shows negative opinion on e-learning. This can be attributed to the fact that knowledge of computers and ICT usage are key areas in terms engaging in e-learning as a lecturer. Overall, computer/ICT qualification of the lecturer has a significant influence on the attitudes of the lecturer towards e-learning.

Table 4.9: Analysis of Chi-Square tests of relationship between lecturers' academic qualification and attitude towards e-learning

Item	Statement	Chi-Square Tests				
		Chi-Square Value	df	Sig. (2-sided)	Remarks	S or NS
1.	Lecturers participating in e-learning are inadequate	22.774	24	0.533	p>0.05	NS
2.	E-learning lecturers are overburdened	22.73	24	0.563	p>0.05	NS
3.	E-learning will drive the lecturers out of their jobs	20.948	24	0.642	p>0.05	NS
4.	Lecturers are positive about e-learning	22.338	24	0.559	p>0.05	NS
5.	E-learning as a mode of study is more effective than other modes	24.148	24	0.453	p>0.05	NS

Table 4.10: Analysis of Chi-Square tests of relationship between ICT qualification and attitude towards e-learning

		Chi-Square Tests				
Item	Statement	Chi-Square Value	df	Sig. (2-sided)	Remarks	S or NS
1.	Lecturers participating in e-learning are inadequate	30.315	28	0.348	p>0.05	NS
2.	E-learning lecturers are overburdened	27.296	28	0.502	p>0.05	NS
3.	E-learning will drive the lecturers out of their jobs	46.380	28	0.016	p<0.05	S
4.	Lecturers are positive about e-learning	46.288	28	0.016	p<0.05	S
5.	E-learning as a mode of study is more effective than other modes	34.893	28	0.173	p>0.05	NS

From the above research findings, it can be concluded that the attitudes of the lecturers have an impact on the e-learning development. Positive attitude of the lecturers have a positive impact on e-learning. The first hypothesis of the study was **H₀₁: There is no significant difference between the lecturer's attitudes and e-learning development.** It can be concluded from the findings that a significant relationship exists between the e-learning development and lecturer's attitudes towards e-learning. The null hypothesis was therefore rejected. E-learning will greatly develop and advance with positive change in lecturer's attitudes. Improvement of compute/ICT qualifications of the lecturers greatly improves their attitudes towards e-learning and consequently its development. It is hoped that the administration will gear their efforts and strategies towards training the lecturers and other staff particularly on computer and ICT skills which forms the bedrock of e-learning development.

4.3 E-learning development and availability of infrastructure and resources

The data collected on availability of e-learning infrastructure and resources was analyzed to depict a general picture of the impact of the availability infrastructure and resources on e-learning development. There were 7 items that were testing on the availability of infrastructure and resources and its impact on e-learning development in Kenya. Table 4.11 gives a summary of those results. The grand mean of all the items is 3.1314. This mean depicts an acute shortage of infrastructure and resources in the learning institutions. This can be attributed to the inadequate level of organizational preparedness to offer e-learning programs in the institutions. Item number one had a mean of 3.73 indicating that the lecturers are of the opinion that the infrastructure and resources are inadequate at their respective learning institutions. Similarly, item two with a mean of 1.93 indicates that lecturers are in agreement that the infrastructure and resources are insufficient. As for item three with a mean of 3.41, the results indicate that there are no new e-learning infrastructure and equipments in their respective institutions. Item four with a mean of 3.71 indicates that the e-learning infrastructure and resources cannot be easily accessed in the various learning institutions. This was reinforced by results of item number five with a mean of 3.54 suggesting that lecturers do not have access to internet all the time at their respective institutions. Item six with a mean of 3.42 points to lack of e-learning platform in the respective learning institutions. In summary, item 7 with a mean of 2.18 shows that the results suggest institutions lack adequate organizational preparedness to offer e-learning at the institutions. This is majorly due to lack of adequate infrastructure and resources necessary to launch the e-learning programs.

Table 4.11: Overall analysis of availability of e-learning infrastructure and resources

Item	Statement	N	Sum	Mean
1.	E-learning resources are adequate	164	611	3.73
2.	E-learning infrastructure are insufficient	164	317	1.93
3.	E-learning equipments/technologies are new and effective	164	560	3.41
4.	E-learning resources/equipments/technologies are easily available	164	608	3.71
5.	Lecturers have access to internet all the time	164	580	3.54
6.	Quality of e-learning platforms is good	164	561	3.42
7.	Inadequate organizational preparedness to offer e-learning	164	358	2.18
	Valid N (list wise)	164	$\bar{X} = 3.1313$	

Table 4.12 gives a summary of an analysis of availability of infrastructure and resources per institution. As can be observed from the results of the table, generally there is a shortage of infrastructure and resources across all institutions. For item one, the means at RVTTI and at Eldoret Polytechnic are the highest at 4.00 and 3.95 respectively. As for University of Eldoret (UoE), the mean is 3.40. All these means indicates that the e-learning resources are inadequate but respectively according to the institutions, UoE is better placed in terms of availability of infrastructure and resources and is therefore better in organizational preparedness.

Similarly, items 3,4,5 and 6 indicates that though generally there is lack of infrastructure and resources across all the institutions, results indicates UoE as being better equipped in infrastructure though insufficient. Results from these items indicate Eldoret Polytechnic as facing acute shortage of infrastructure and resources as compared to the other two institutions. This is due to its low level of organizational preparedness to offer e-learning as depicted by item 7 in which Eldoret Polytechnic had the least mean of 1.83 indicating a very low level agreement,

while UoE had the highest mean of 2.44 indicating a high level of agreement. The grand mean of all the items per institution indicates that Eldoret Polytechnic had the highest grand mean of 3.27; RVTTI had a grand mean of 3.20 while UoE had a grand mean of 2.69. This indicates that Eldoret Polytechnic had the least mean and therefore the most lacking in e-learning infrastructure and resources and is therefore the least in organizational preparedness. UoE had the highest grand mean indicating it is the better equipped in terms of infrastructure and resources and is therefore the highest in organizational preparedness.

Table 4.12: Analysis of availability of infrastructure and resources by institution

Item	Statement	Institution	N	Sum	Mean
1.	E-learning resources are adequate	Eldoret Poly	58	229	3.95
		RVTTI	36	144	4.00
		UoE	70	238	3.40
2.	E-learning infrastructure are insufficient	Eldoret Poly	58	109	1.88
		RVTTI	36	60	1.67
		UoE	70	148	2.11
3.	E-learning equipments/technologies are new and effective	Eldoret Poly	58	203	3.50
		RVTTI	36	124	3.44
		UoE	70	233	3.33
4.	E-learning resources/equipments/technologies are easily available	Eldoret Poly	58	233	4.02
		RVTTI	36	142	3.94
		UoE	70	233	3.33
5.	Lecturers have access to internet all the time	Eldoret Poly	58	240	4.14
		RVTTI	36	134	3.72
		UoE	70	206	2.94
6.	Quality of e-learning platforms is good	Eldoret Poly	58	208	3.59
		RVTTI	36	122	3.39
		UoE	70	231	3.30
7.	Inadequate organizational preparedness to offer e-learning	Eldoret Poly	58	106	1.83
		RVTTI	36	81	2.25
		UoE	70	171	2.44
	Total Valid N (listwise)	Eldoret Poly	58		X=3.27
		RVTTI	36		X=3.20
		UoE	70		X=2.69

The results of the table 4.12 were subjected to a one way ANOVA to determine whether there is any significant difference among the three institutions. The results are as shown in table 4.13. One way ANOVA was performed on all the items that were testing on the availability of infrastructure and resources by different institutions. This was done to determine whether there is a statistical mean difference in availability of infrastructure and resources and organizational preparedness.

Item one shows a p value of less than 0.05 hence it determines that there is a significant statistical mean difference between availability of infrastructure and resources and the organizational preparedness of the institution. Similarly, item two had a p value greater than 0.05 meaning there is no statistical mean difference between organizational preparedness and the insufficiency of infrastructure. For all the items, the p values suggest that there is a relationship between organizational preparedness and the availability of e-learning infrastructure and resources. Thus, organizational preparedness has an impact on e-learning development. The better organized institutions show a reasonable availability of e-learning infrastructure and resources.

Table 4.13: One way ANOVA of availability of e-learning infrastructure and resources by institution

Item	Statement		Sum of Squares	df	Mean Square	F	Sig.	S or NS
1.	E-learning resources are adequate	Between Groups	13.008	2	6.504	3.799	0.024	S
		Within Groups	275.645	161	1.712			
		Total	288.652	163				
2.	E-learning infrastructure are insufficient	Between Groups	5.021	2	2.511	2.571	0.080	NS
		Within Groups	157.241	161	0.977			
		Total	162.262	163				
3.	E-learning equipments/technologies are new and effective	Between Groups	0.973	2	0.487	0.382	0.683	NS
		Within Groups	204.832	161	1.272			
		Total	205.805	163				
4.	E-learning resources/equipments/ technologies are easily available	Between Groups	17.637	2	8.818	7.382	0.001	S
		Within Groups	192.315	161	1.195			
		Total	209.951	163				
5.	Lecturers have access to internet all the time	Between Groups	46.890	2	23.445	16.710	0.000	S
		Within Groups	225.890	161	1.403			
		Total	272.780	163				
6.	Inadequate institutional preparedness to offer e-learning	Between Groups	12.215	2	6.107	5.113	0.007	S
		Within Groups	192.297	161	1.194			
		Total	204.512	163				
7.	Quality of e-learning platforms is good	Between Groups	2.645	2	1.322	1.149	0.320	NS
		Within Groups	185.325	161	1.151			
		Total	187.970	163				

All the variables on availability of e-learning infrastructure and resources were subjected to Chi-Square test of relationship between:

- 1) The institution and the availability of e-learning infrastructure and resources
- 2) The nature of the course and the availability of e-learning infrastructure and resources
- 3) Organizational preparedness and the availability of e-learning infrastructure and resources

The results of the first relationship are shown in table 4.14. The p values for the first, second and third items are greater than 0.05, showing that the relationship between the institutions and availability of e-learning infrastructure and resources is not significant. The availability of e-learning infrastructure and resources doesn't depend on a particular institution. According to the results, the e-learning infrastructure and resources are equally unavailable and inadequate across the three institutions. The results are similar to item six with the p value greater than 0.05. However, items 4, 5 and 7 have p values less than 0.05 hence shows that they have a significant difference. As for item 4, it shows that the availability of e-learning infrastructure and resources would greatly depend on a particular institution. This clearly shows a lack of adequate e-learning infrastructure and resources in our higher learning institutions. Different institutions would have a significant difference in availability of these infrastructure and resources. This is reinforced by items 5 and 7. Internet availability depends on a particular institution, meaning for the selected institutions, some would not have internet available all the time for the teaching staff. Not all institutions have established an e-learning platform.

Generally, the Chi-Square results show an insignificant relationship between the institution and the state of availability of infrastructure and resources. The insignificant relationship means that

there is a dire of lack of infrastructure and resources equally across the middle and higher learning institutions.

Table 4.14: Analysis of Chi-Square tests of relationship between institution and availability of infrastructure and resources

Item	Statement	Chi-Square Tests				
		Chi-Square Value	df	Sig. (2-sided)	Remarks	S or NS
1.	E-learning resources are adequate	12.711	8	0.122	p>0.05	NS
2.	E-learning infrastructure is insufficient	15.473	8	0.051	p>0.05	NS
3.	E-learning technologies are new and effective	13.175	8	0.106	p>0.05	NS
4.	E-learning technologies/equipments and resources easily available	34.339	8	0.000	p<0.05	S
5.	Lecturers have access to internet all the time	35.084	8	0.000	p<0.05	S
6.	Quality of e-learning platform is good	12.057	8	0.149	p>0.05	NS
7.	There is inadequate organizational preparedness of offer e-learning	21.556	8	0.006	p<0.05	S

Table 4.15 shows the results of Chi-Square tests of the relationship between the orientation of the course and availability of the e-learning infrastructure and resources. As for item one, the p value is less than 0.05 indicating a significant relationship between the course and availability of infrastructure and resources. Similarly, items 5 and 7 have p values less than 0.05. This further strengthens the fact that the orientation/nature of the course has some significant influence on the availability of infrastructure and resources. Item 5 shows a significant impact/influence of the course orientation on the ease of access of the internet. Similarly, item 7 shows a significant impact of the level of organizational preparedness on the availability of the infrastructure and resources. However, items 2, 3, 4 and 6 shows that there is no significant impact of the orientation of the course on the availability of infrastructure and resources in higher learning

institutions. Item 2 show that there is no significant difference between the orientation of the course and the availability of infrastructure and resources. This is similar to item 3. Item 4 reinforces the fact that the ease of availability of e-learning infrastructure and resources doesn't depend on the orientation of the course. Generally, the results of these Chi-Square tests show an overall result that tells that there isn't any significant relationship between the orientation of the courses and the availability of e-learning infrastructure and resources.

Table 15: Analysis of Chi-Square tests of the relationship between the orientation of the course and the availability of infrastructure and resources

		Chi-Square Tests				
Item	Statement	Chi-Square Value	df	Sig. (2-sided)	Remarks	S or NS
1.	E-learning resources are adequate	30.992	12	0.002	p<0.05	S
2.	E-learning infrastructure is insufficient	20.156	12	0.064	p>0.05	NS
3.	E-learning technologies are new and effective	7.687	12	0.809	p>0.05	NS
4.	E-learning technologies/equipments and resources easily available	20.936	12	0.051	p>0.05	NS
5.	Lecturers have access to internet all the time	21.128	12	0.049	p<0.05	S
6.	Quality of e-learning platform is good	14.072	12	0.296	p>0.05	NS
7.	There is inadequate organizational preparedness of offer e-learning	21.639	12	0.042	p<0.05	S

Table 4.16 shows the summary of the Chi-Square tests of the relationship between the level of institutional preparedness and availability of e-learning infrastructure and resources per institution. Generally, the level of organizational preparedness determines the degree of availability of e-learning infrastructure and resources.

Table 4.16: Further analysis of Chi-Square tests of the relationship between level of institutional preparedness and availability of infrastructure and resources

Item	Statement	Institution	Chi-Square Tests				
			Chi-Square Value	df	Sig. (2-sided)	Remarks	S or NS
1.	E-learning resources are adequate	Eldoret Poly	20.930	9	0.013	p<0.05	S
		RVTTI	13.529	16	0.634	p>0.05	NS
		UoE	37.740	16	0.02	p<0.05	S
2.	E-learning infrastructure is insufficient	Eldoret Poly	43.094	12	0.000	p<0.05	S
		RVTTI	7.529	12	0.821	p>0.05	NS
		UoE	41.966	12	0.000	p<0.05	S
3.	E-learning technologies are new and effective	Eldoret Poly	11.094	12	0.521	p>0.05	NS
		RVTTI	11.541	16	0.775	p>0.05	NS
		UoE	26.306	16	0.050	p>0.05	NS
4.	E-learning technologies/equipments and resources easily available	Eldoret Poly	30.218	9	0.000	p<0.05	S
		RVTTI	14.905	12	0.247	p>0.05	NS
		UoE	58.300	16	0.000	p<0.05	S
5.	Lecturers have access to internet all the time	Eldoret Poly	37.023	9	0.000	p<0.05	S
		RVTTI	13.271	16	0.653	p>0.05	NS
		UoE	30.332	16	0.016	p<0.05	S
6.	Quality of e-learning platform is good	Eldoret Poly	14.668	9	0.100	p>0.05	NS
		RVTTI	12.518	16	0.708	p>0.05	NS
		UoE	23.533	16	0.100	p>0.05	NS

Tables 4.17, 4.18 and 4.19 give a summary of the availability of internet technology and e-learning infrastructure and resources by institution. The main means of accessing internet by institutions is mainly copper cables and fiber optic as depicted by the grand means. There is also the existence of wireless internet technology in the institutions though it indicates it's not the widely used. This also points to the fact that internet in the institutions is not readily available since it is the wireless internet technology that can be accessed conveniently anywhere, anytime within the institution. The mean values of the infrastructure shows that the entire institutions still lacks the basic infrastructure to launch e-learning programs. The available resources aren't

adequate to launch e-learning programs in the institutions. This depicts a lack of organizational preparedness by the institutions.

Table 4.17: Analysis of availability of infrastructure and resources by institution

Item	Institution of the respondent		Internet technology in use	E-learning infrastructure/technologies/resources available
1.	Eldoret Poly	Mean	2.84	1.14
		N	58	58
2.	RVTTI	Mean	3.19	1.22
		N	36	36
3.	UoE	Mean	2.36	1.24
		N	70	70
	Total	Mean	2.71	1.20
		N	164	164

Table 4.18: Table of internet technology in use by institution

Item	Internet technology in use	Frequency	Percent	Valid Percent	Cumulative Percent
1.	Wireless	49	29.9	29.9	29.9
2.	Copper	48	29.3	29.3	59.1
3.	Fiber optic	21	12.8	12.8	72.0
4.	Wireless and Copper	34	20.7	20.7	92.7
5.	Wireless and Fiber Optic	5	3.0	3.0	95.7
6.	Modem	1	0.6	0.6	96.3
7.	wireless and Modem	1	0.6	0.6	97.0
8.	None	5	3.0	3.0	100.0
	Total	164	100.0	100.0	

Table 4.19: E-learning infrastructure and resources by institution

Item	Infrastructure and Resources	Frequency	Percent	Valid Percent	Cumulative Percent
1.	Internet/ICT lab/LAN/CD ROM/video tapes/audio tapes/e-journals/e-books	157	95.7	95.7	95.7
2.	Category 1 and 2	4	2.4	2.4	98.2
3.	Category 2 and 3	2	1.2	1.2	99.4
4.	None in all categories	1	0.6	0.6	100.0
	Total	164	100.0	100.0	

From the above findings, it can be concluded that the state of availability of e-learning infrastructure and resources have an impact on the e-learning development in Kenya. It is apparent that lack of e-learning infrastructure and resources has a negative impact on e-learning development. The second hypothesis of the study was; **H₀₂: The state of availability of infrastructure has no significant impact on e-learning development.** It can be concluded from the findings that a significant relationship exists between the state of availability of e-learning infrastructure and resources and the level of e-learning development. The null hypothesis was therefore rejected. With provision of adequate infrastructure and resources, this could positively impact the development of e-learning in the higher learning institutions.

4.4 E-learning development and lecturer's ICT competence, training and capacity building programs

The data collected on lecturer's ICT competence, training and capacity building programs was analyzed to paint a general picture of the lecturer's ICT competence, training and capacity building programs conducted by the higher learning institutions in support of e-learning in Kenya. As depicted in the literature in the previous chapter, the lecturer's ICT competence and confidence is a main factor affecting e-learning takeoff in higher learning institutions in Kenya. Training on ICT integration and utilization as well as capacity building programs on e-learning

are integral in support to e-learning. In lecturer's competence, training and capacity building programs, there were 6 items that were testing the same. The results are captured in table 4.20. In the first item, the mean is 2.95, which is a more than average value in the Likert scale. This then implies that lecturers are of the view that majority has competence and confidence in the use of ICT tools for teaching and learning. This can be attributed to the fact that lecturers are positive towards integration of ICT in teaching and learning process. However, as per the mean, quite a number of lecturers are of the opinion that some of them lack the competence and confidence in the use of ICT tools in teaching and learning. This can be attributed to the lack of adequate training in the same.

Item two has a mean of 3.27 which is a high value in the Likert scale. This indicates that majority of the lecturers are in agreement that they lack the critical ICT training necessary for teaching and learning. The results show a lack of adequate ICT skills training as critical component of delivering e-learning. Item three has a mean of 2.32, which is a low value in the Likert scale. This shows that lecturers are in agreement that the institutions lack the critical staff in e-content developers and ICT technical staff. In the literature review in the previous chapter, it was pointed out that for successful implementation of e-learning programs; the critical support staff plays a key role in the institutions in offering critical technical assistance to the teaching fraternity. However, there is an acute lack of ICT technical staff and e-content developers in the institutions.

Item four has a mean of 2.10 which is still a very low value in the Likert scale. This point to an agreement that training on e-content development skills to lecturers is inadequate. E-content development is a very vital skill to lecturers as was pointed out in the previous chapter. This is

reinforced by the results of item 5 which has a mean of 3.82 which is high value in the Likert scale. Lecturers are of the view that capacity building programs on e-learning are lacking in institutions of higher learning. One of the vital capacity building programs that should be offered by the institutions is e-content development programs. These should be enhanced to provide the training needed for the lecturers to be able to meaningfully engage and participate in provision of e-learning. Lastly, item 6 have a mean value of 2.24 which is a low value in the Likert scale. This shows that lecturers disagree to the idea that there is adequate technical assistance given to lecturers in offering e-learning programs. This reinforces results of item three which showed a lack of e-learning support staff in e-content development and ICT technical staff.

The grand mean of all the items is 2.7833. This is a more than average value in the Likert scale indicating that there is a general consensus that there is lack of capacity building programs and technical assistance on e-learning at the higher learning institutions. This can be attributed to the lack of adequate organizational preparedness to offer e-learning programs. On ICT competence and confidence, equal number of lecturers is of contrary opinions. Despite a general agreement that lecturers are competent and confident in the use of ICT tools, quite a number are of the opinion that they lack competence and confidence in the use of ICT tools which is a necessary skill in offering e-learning.

Table 4.20: Lecturers' overall analysis on ICT competence, training and capacity building programs

Statement	N	Sum	Mean	Std. Deviation
Lecturers lack competence and confidence in use of ICT equipments	164	483	2.95	1.070
ICT training to lecturers is adequate	164	536	3.27	1.183
ICT skills of technical staff/e-content developers is inadequate	164	380	2.32	1.160
Training on e-content development skills is inadequate	164	345	2.10	1.060
Capacity building programs on e-learning are sufficient	164	627	3.82	1.027
Inadequate technical assistance given to lecturers	164	368	2.24	1.146
Valid N (listwise)	164			

Table 4.21 shows the lecturers overall analysis on ICT competence, training and capacity building programs per institution. The mean for Eldoret polytechnic in all the items is 2.7833 while the mean for RVTTI is 2.7600. The mean for UoE is 2.7163. As can be seen from all these results, all the institutions have similar means of average values. The interpretation is that overall; these institutions still lack use of ICT, training and capacity building programs.

In the first item, the lowest mean of 2.81 belongs to UoE. The second lowest mean of 3.03 is for Eldoret polytechnic while RVTTI has a mean of 3.06. This means generally that lecturers are in agreement that they have competence and confidence in use of ICT tools. RVTTI has the highest number of lecturers who still lack ICT competence and confidence as compared to other institutions. UoE has the highest number of lecturers with ICT competence and confidence. For

item two, Eldoret polytechnic has the highest mean of 3.33, followed by UoE with a mean of 3.24 while RVTTI has mean of 3.22. This generally means that lecturers are in agreement that there is little ICT training done at these institutions geared towards e-learning. Of these institutions, RVTTI has the least mean indicating a concerted effort in ICT training and capacity building programs. Eldoret polytechnic showed results that indicate little is being done in ICT training and capacity building programs in other institutions.

Similarly, items three, four, five and six shows similar trend where there is inadequate technical assistance, little training on e-content development, insufficient capacity building programs and inadequate technical staff on e-learning in the sampled institutions. The means of some institutions indicates an effort has been made to provide technical assistance, training on ICT and e-content development and capacity building programs. The overall means of all the items in these institutions still showed a lack of ICT competence, training and capacity building programs geared towards e-learning.

Table 4.21: Lecturers' overall analysis on ICT competence, training and capacity building programs by institution

Institution of the respondent	Statement	N	Sum	Mean	Std. Deviation
Eldoret Poly	Lecturers lack competence and confidence in use of ICT equipments	58	176	3.03	1.042
	ICT training to lecturers is adequate	58	193	3.33	1.082
	ICT skills of technical staff/e-content developers is inadequate	58	130	2.24	1.081
	Training on e-content development skills is inadequate	58	121	2.09	0.923
	Capacity building programs on e-learning are sufficient	58	231	3.98	0.783
	Inadequate technical assistance given to lecturers	58	118	2.03	0.973
	Valid N (listwise)	58		2.7833	
RVTI	Lecturers lack competence and confidence in use of ICT equipments	36	110	3.06	1.170
	ICT training to lecturers is adequate	36	116	3.22	1.124
	ICT skills of technical staff/e-content developers is inadequate	36	78	2.17	1.134
	Training on e-content development skills is inadequate	36	77	2.14	1.246
	Capacity building programs on e-learning are sufficient	36	142	3.94	0.955
	Inadequate technical assistance given to lecturers	36	78	2.17	1.207
	Valid N (listwise)	36		2.7600	
UoE	Lecturers lack competence and confidence in use of ICT equipments	70	197	2.81	1.040
	ICT training to lecturers is adequate	70	227	3.24	1.301
	ICT skills of technical staff/e-content developers is inadequate	70	172	2.46	1.236
	Training on e-content development skills is inadequate	70	147	2.10	1.079
	Capacity building programs on e-learning are sufficient	70	254	3.63	1.206
	Inadequate technical assistance given to lecturers	70	172	2.46	1.224
	Valid N (listwise)	70		2.7163	

Table 4.22 and table 4.23 shows a one-way ANOVA on lecturer's ICT competence, training and capacity building programs in the institutions. All the items returned a result with an F greater than 0.05 indicating that they are significant. These results indicates that lack of ICT competence, lack of ICT training on lecturers, lack of ICT skills on technical staff and e-content developers, training on e-content development skills and lack of capacity building programs have a significant impact on e-learning development in Kenya.

Table 4.22: One way ANOVA on lecturers' ICT competence, training and capacity building programs

Item	Statement		Sum of Squares	df	Mean Square	F	Sig.
1.	Lecturers lack competence and confidence in use of ICT equipments	Between Groups	2.100	2	1.050	0.917	0.402
		Within Groups	184.406	161	1.145		
		Total	186.506	163			
2.	ICT training to lecturers is adequate	Between Groups	0.326	2	0.163	0.115	0.891
		Within Groups	227.870	161	1.415		
		Total	228.195	163			
3.	ICT skills of technical staff/e-content developers is inadequate	Between Groups	2.520	2	1.260	0.935	0.395
		Within Groups	216.992	161	1.348		
		Total	219.512	163			
4.	Training on e-content development skills is inadequate	Between Groups	0.063	2	0.032	0.028	0.973
		Within Groups	183.175	161	1.138		
		Total	183.238	163			
5.	Capacity building programs on e-learning are sufficient	Between Groups	4.657	2	2.329	2.242	0.110
		Within Groups	167.215	161	1.039		
		Total	171.872	163			
6.	Inadequate technical assistance given to lecturers	Between Groups	5.941	2	2.971	2.296	0.104
		Within Groups	208.302	161	1.294		
		Total	214.244	163			

Table 4.23: One way ANOVA of lecturers' ICT competence, training and capacity building programs by gender

Item	Statement		Sum of Squares	df	Mean Square	F	Sig.
1.	Lecturers lack competence and confidence in use of ICT equipments	Between Groups	1.159	1	1.159	1.013	0.316
		Within Groups	185.347	162	1.144		
		Total	186.506	163			
2.	ICT training to lecturers is adequate	Between Groups	1.099	1	1.099	0.784	0.377
		Within Groups	227.096	162	1.402		
		Total	228.195	163			
3.	ICT skills of technical staff/ e-content developers is inadequate	Between Groups	0.599	1	0.599	0.443	0.507
		Within Groups	218.913	162	1.351		
		Total	219.512	163			
4.	Training on e-content development skills is inadequate	Between Groups	5.769	1	5.769	5.266	0.023
		Within Groups	177.469	162	1.095		
		Total	183.238	163			
5.	Capacity building programs on e-learning are sufficient	Between Groups	0.052	1	0.052	0.049	0.825
		Within Groups	171.820	162	1.061		
		Total	171.872	163			
6.	Inadequate technical assistance given to lecturers	Between Groups	4.157	1	4.157	3.205	0.075
		Within Groups	210.087	162	1.297		
		Total	214.244	163			

Table 4.24 shows the general view of the respondent's challenges and shortcomings facing e-learning. The responses show that a greater percentage of the respondents (64.6%) agree that the major institutional barrier to e-learning is lack of funding, infrastructure, facilities and resources. Indeed the results found that the lack of appropriate infrastructure and necessary resources greatly hinders the development of e-learning in the middle and higher learning institutions.

The second major barrier identified by the respondents was the lack of trained personnel in terms of trainers and the technical assistance. Poor motivation and negative attitude is another major barrier to e-learning in institutions. This was given a percentage of 2.4%. The next major barrier to e-learning identified is lack of commitment, institutional policy framework and fear of loss of jobs. This result shows a percentage of 4.3%. The last major barrier identified was the nature of the course that discourages e-learning. This was given a percentage of 1.2%. All these institutional barriers were identified in the results analyses above. It is hoped that it will give an insight on the major hindrances to e-learning.

Table 4.24: Table of challenges to e-learning by institution

Challenges/Shortcomings to e-learning					
Category	Statement	Frequency	Percent	Valid Percent	Cumulative Percent
1.	Lack of funding/infrastructure/equipments/facilities/resources	106	64.6	64.6	64.6
2.	Lack of trained personnel/time/poor motivation/negative attitude	4	2.4	2.4	67.1
3.	Lack of commitment/policy/fear of loss of jobs	7	4.3	4.3	71.3
4.	Nature of the course discourages e-learning	2	1.2	1.2	72.6
5.	No comment	7	4.3	4.3	76.8
6.	At least 1 in category 1 and 2	34	20.7	20.7	97.6
7.	At least 1 in category 3, 4 and 5	4	2.4	2.4	100.0
	Total	164	100.0	100.0	

From the above findings, it can be concluded that the lecturer's ICT competence, training and capacity building programs have an impact on e-learning development. It is apparent that low level of ICT competence, lack of training and capacity building programs has a negative impact on the development of e-learning in Kenya. The third hypothesis of the study was: **H₀₃: Lecturer's level of ICT competence, training and capacity building programs has no significant influence on e-learning development in Kenya.** It can be concluded from the above findings that a significant relationship exists between the level of ICT competence, training and capacity building programs and the level of e-learning development. With improvement on the ICT competence of lecturers and frequency of ICT training as well as other capacity building programs geared towards e-learning, it is apparent that the level of e-learning development will greatly improve for the good. It is hoped that the institutions and the management will lay down programs geared towards improving the level ICT competence of both the teaching staff and the

e-learning support staff in their institutions. This will greatly leap the state of the e-learning in the country.

Table 4.25 gives the overall summary of the responses from the administrators. In most cases the administrators concurs with the lecturers in that the means of responses of specific items put to the administrators reflects those of the lecturers. The mean of item one is 2.33 indicating that administrators agrees that training on e-content development skills to lecturers is not adequate.

Analysis on other items with their means shown in the table below points to:

- Lack of capacity building programs on e-learning
- Inadequate technical assistance on e-learning
- Lack of organizational preparedness to e-learning programs
- Lack of e-learning platforms
- Negligible number of lecturers participating in e-learning
- Inexistence of e-learning programs
- Inadequate infrastructure and resources to support e-learning

Observation of the learning environment and interviews from a selected number of administrators points to a similar scenario with no e-learning platforms present in the three institutions. Internet availability was present in the three institutions of study though they were of limited bandwidth. Administrators reported to ongoing works on installation of fiber optic cables so as to upgrade the technology being used to improve on reliability and increase bandwidth. There were no e-learning courses reported or observed and consequently there were no students reportedly enrolled in the courses. LAN and ICT laboratories were present in the three institutions of study. VoIP was reported not being in use in the three institutions despite being a

low cost e-learning technology. Observations and interviews generally were consistent with the analysis of responses from questionnaires which generally shows e-learning activities are absent or are being initiated.

Table 4.25: Summary of responses from administrators

Item	Statement	N	Mean
1.	Training on e-content development skills to lecturers	18	2.33
2.	Capacity building programs on e-learning	18	3.89
3.	Technical assistance given to lecturers	18	2.56
4.	Institutional preparedness to offer e-learning	18	2.28
5.	Quality of e-learning platforms	18	3.61
6.	Enrolment on e-learning programs compared to others	18	2.17
7.	Number of lecturers participating in e-learning	18	1.17
8.	Number of e-learning support staff in the department	18	1.11
9.	Number of full e-learning courses in the department	18	1.00
10.	Number of blended e-learning courses in the department	18	1.00
11.	E-learning infrastructure/technologies/resources available	18	1.00
12.	Capacity building programs carried out by institution	18	3.11
13.	Capacity building programs attended by lecturers	18	4.11
	Valid N (list wise)	18	

4.5 Summary

This chapter has analysed the relationship between the independent variables and the dependent variables. The results show a significant relationship between the variables indicated in the study. The findings showed that a significant relationship exists between the e-learning development and lecturer's attitudes. It also revealed that a significant relationship between the state of availability of infrastructure and resources and the level of e-learning development. Research findings also showed a significant relationship exists between the lecturer's level of

ICT skills and e-learning development. Next chapter will discuss the findings, relate the dependent and independent variables draw conclusions from the findings and make recommendations.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter revisits the research objectives and hypotheses as was outlined in chapter one so as to discuss each one of them and draw conclusions and recommendations.

5.2 Summary of the findings

The main objective of this study was to investigate the institutional barriers to e-learning development in Uasin Gishu County, Kenya. The independent variable was E-LEARNING DEVELOPMENT whereas dependent variables were lecturer's attitudes, availability of e-learning resources and infrastructure, and organizational preparedness. The sources of data for this study were lecturer's questionnaire, administrator's questionnaire, observation schedules and document analysis.

The first research question was: Do lecturer's attitudes have any impact on e-learning development? For this research question, the hypothesis that was tested was: There is no significant difference between the lecturer's attitudes and e-learning development. From the research findings, it was concluded that a significant relationship exists between the e-learning development and lecturer's attitudes. The null hypothesis was therefore rejected. The findings generally revealed lecturers have a positive attitude towards e-learning though some areas indicate a dire need for improvement. There is need to improve the number of lecturers participating in e-learning. The mean of the lecturers who the findings showed were participating in e-learning was very low. There is need for institutions of higher learning to assure the lecturers that adoption of e-learning will not drive them out of their employment. There is need

to carry out awareness campaign for more adoption of e-learning by institutions and lecturers at personal level. There is need to improve the ICT competence of lecturers by carrying out regular ICT skills training so as to properly equip the lecturers with the vital e-learning skills and improve their attitudes towards e-learning hence participate meaningfully in the same. This is because the findings revealed a direct relationship between the ICT qualifications of lecturers and the lecturer's involvement in e-learning. Lecturers with high ICT qualification had better involvement in e-learning than lecturers with low ICT qualification.

The second question of the research study was: Do the state of availability of infrastructure and resources have any impact on e-learning development? For this research question, the hypothesis that was tested was: The state of availability of infrastructure and resources has no significant impact on e-learning development. From the research findings, it can be concluded that a significant relationship exists between the state of availability of infrastructure/resources and the level of e-learning development. The null hypothesis was therefore rejected.

The findings revealed that generally across the institutions, there is a dire lack of the critical infrastructure and resources necessary for e-learning. There is need to improve the availability of the critical infrastructure and resources to kick off e-learning. The mean for the availability of this critical infrastructure and resources was very low, hence there is need for the higher learning institutions and line ministry to roll out the this critical component of the e-learning.

The third question of the research study was: Do the lecturer's level of ICT have any influence on the development of e-learning? For this research question, the hypothesis that was tested was: H₀₃: ICT skills of educators have no significant effect on e-learning development. From the research findings, it was concluded that a significant relationship exists between the lecturer's

level of ICT skills and e-learning development. The null hypothesis was therefore rejected. The findings revealed that generally, lecturers have good ICT skills. However, the results also showed that some lecturers have low level of ICT skills and therefore hindering the personal development and delivery of e-learning. There is need for institutions to focus on more training of the lecturers especially to upgrade their level of ICT skills so as to increase their efficiency in terms of engaging in e-learning delivery. The training and capacity building programs will also bring the lecturers up to date with the latest ICT developments necessary for e-learning.

5.3 Conclusions

This study found that there is a significant relationship between the lecturer's attitudes and e-learning development. Though lectures are positive about e-learning, there are still a significant number of lecturers who are yet to embrace e-learning as an alternative mode of delivering instruction in middle and higher learning institutions. The study also found out that the state of availability of e-learning infrastructure and resources largely determine the success of e-learning. Lack of basic infrastructure and resources significantly hinders the development of e-learning. Lastly, the results of the study also found that there is need to improve the ICT skills of lecturers through training and capacity building programs geared towards e-learning. In conclusion, lecturers' attitudes, e-learning infrastructure and resources and the level of ICT skills of lecturers have a significant relationship with e-learning development.

5.4 Recommendations

From the research findings, the following recommendations were made:

- 1) All higher learning institutions should have an effective e-learning policy framework to enable the institution to implement the e-learning programs it develops alongside the normal face to face academic programs.
- 2) Higher learning institutions should assure the lecturers that with adoption of e-learning in the academic programs, none of them would be rendered jobless.
- 3) Higher learning institutions should invest massively on acquisition of e-learning infrastructure and resources.
- 4) The leadership/administration of higher learning institutions should annually avail adequate funds towards establishment and facilitation of e-learning programs.
- 5) The government through the ministry of higher education, science and technology should ensure that higher learning institutions are given sufficient funds through the national budget to adequately cater for their programs.
- 6) The higher learning institutions should regularly train lecturers on use of e-learning technologies, equipments and resources available in the institutions.
- 7) Higher learning institutions should establish e-learning support, coordination and resource centers in their institutions so as to effectively coordinate and monitor the implementation of e-learning programs as well as offer support to lecturers by availing vital resources.

- 8) The extent of implementation of e-learning programs in the higher learning institutions should be a basis of quality accreditation (ISO certification) by the standards body.

5.5 Summary

This chapter has recapped the specific objectives of the study and the corresponding hypotheses. The chapter has briefly shown the results found and whether the hypothesis has been accepted or rejected. All the null hypotheses of the study were rejected showing that the results of the study show a significant relationship between E-LEARNING DEVELOPMENT and:

- 1) Attitudes of the lecturers
- 2) State of availability of infrastructure and resources
- 3) ICT skills of lecturers, training and capacity building programs

5.6 Suggestions for Further Research

Since this study could not exhaust all about barriers to e-learning development in Kenya, it recommended more research to supplement its findings. The following are possible areas suggested for further research:

- 1) Since the study was only limited to higher learning institutions in Uasin Gishu County, similar studies could be carried out in other counties. This study will form a basis for such a study to be conducted and similar results would be expected.
- 2) Since the study was only limited to institutional barriers to e-learning development, a similar study could be conducted to assess the barriers to e-learning from the students and stakeholders point of view.

REFERENCES

- Bates, A. W. (1990). *Media and Technology in European Distance Education*: Walton Hall.
- Bates, T. (2000). *Managing Technological Change: Strategies for College and University Leaders*, Jossey Bass, California, USA.
- Beetham, H. and Conole, G. (2001). *Modelling aspects of institutional developments: Culture, Infrastructure, Expertise. Improving Student Learning Using Learning Technologies Conference*, Heriott Watt University; Edinburgh.
- Beetham, H., Jones, S. and Gornall, L. (2001), *Career Development of Learning Technology Staff*: University of Bristol.
- Biskman, L. & Rogs D. J. (1998). *Handbook of Applied Social Research Methods*. Thousand Oaks: Sage.
- Blinco et al. (2004). *Trends and Issues in E-learning Infrastructure Development*. Australia and UK.
- Borg & Gall, (1989). *Research Design and Methodology*. London: New Holland Publishers (UK) Ltd.
- Borg, W. R, Gall J. & Gall M. D. (1993). *Applying Educational Research: A Practical Guide*. New York: Longman.
- Brodsky, M. (2003). *E-Learning Trends, Today and Beyond. Learning and Training Innovations Magazine*, <http://www.elearningmag.com/ltimagazine/article/articleDetail.jsp?id=56219>, (Date accessed June 2003).
- Burkle, M. & Sayed, Y. (2001). 'Integrating ICT in Higher Education: The Case of ITESM', Mexico, International Journal of Education.
- Castells, M. (1996). *The Rise of the Network Society, Volume 1*, Blackwell, Oxford and Malden, MA.
- Cohen, L. Manion, L. and Morrison, K. (2007). *Research methods in education (6th ed.)*. London: Routledge.
- Cohen, V. L. (1997). *Learning styles in a technology-rich environment. Journal of Research on Collis, B. (1996). Tele-learning in a digital world: The future of distance learning*, International Thomson, London.
- Collis, B. & Moonen, J. (2001). *Flexible learning in a digital world: experiences and expectations*, Kogan Page, London.

- Conole, G. and Dyke, M. (2003). 'What are the affordances of Information and Communication Technologies?' BERA conference proceedings, 11-13th September, Edinburgh.
- Creswell, J.W (2011). *Research Design. Qualitative, Quantitative & Mixed Methods Approaches 3rd ed*. India, Sage.
- Cross, P. (1981). *Adults As Learners*. San Francisco: Jossey-Bass.
- Crotty, M. (1998). *The foundations of Social Research*. London: Sage Publications.
- CVCP/HEFCE. (2000). *The Business of Borderless Education*: UK.
- Daniells, R. (2001). *Everyone Online? A project of Strategy 2000 and 2001, under the Australian National Flexible Learning Framework 2000 to 2004*. http://www.flexiblelearning.net.au/nw2001/01_attending/papers/7_3Daniell.doc, Date accessed June 2013.
- Dillenbourg, P. (1999a), "Introduction: what do you mean by 'collaborative learning'", in Dillenbourg, P. (Eds), *Collaborative Learning and Computational Approaches*, Pergamon, Elsevier Science, Amsterdam, pp.1-19.
- Dourish, P. (1999), "Software infrastructures", in Beaudouin-Lafon, M. (Eds), *Computer-Supported Cooperative Work*, Wiley, Chichester, pp.195-220.
- Ernest, P. (1994). *An introduction to research methodology and paradigms*. Exeter, Devon: RSU, University of Exeter.
- Fathaigh, M. (2002). *E-Learning and Access: Some Issues and Implications*. UACE Conference Paper, University of Bath, March 2002.
- Forman, E.A., Cazden, C.B. (1985), "Exploring Vygotskian perspectives in education: the cognitive value of peer interaction", in Wetsch, J. (Eds), *Culture, Communication, and Cognition: Vygotskian Perspectives*, Cambridge University Press, Cambridge, pp.323-47.
- Frydenberg, J. (2002). *Quality Standards in eLearning: A Matrix of Analysis*. *International Review of Research in Open and Distance Learning*, <http://www.irrodl.org/content/v3.2/frydenberg>. Html, Date accessed June 2003.
- Gartner Report (2001), 'Advisor Radar, Where Is ELearning Headed?'
- Gay, L.R. (1992). *Educational Research: Competencies for Analysis and Application*. New York: Macmillan Publishing Company.
- Gay, L.R., Mills, G.E. & Airasian, P.W. (2009). *Educational Research: Competencies for Analysis and Application*. New Jersey: Kevin M. Davis.

- Government of Kenya & UNESCO (2004). *Challenges of Implementing Free primary Education in Kenya, Assessment Report*. Nairobi: UNESCO.
- Government of Kenya, (2007). *Public Universities Inspection Board Report*. Nairobi: Government Printer.
- Government of Kenya, (2005). *Kenya Education Sector Support Programme*. Nairobi: Ministry of Education.
- Häkkinen, P. (2002), "*Challenges for design of computer-based learning environments*", British Journal of Educational Technology, Vol. 33 No.4, pp.465-74.
- Holzer, M. (2001). *Benchmarking E-government: A Global Perspective, Report for United Nations Division for Public Economics and Public Administration and American Society for Public Administration*. UN.
- Hung, D., & Nichani, M. (2001). *Constructivism and E-Learning: Balancing between the Individual and Social Levels of Cognition*. Educational Technology, 41, 2, 40-44 Mar-Apr 2001.
- Jasinski, M. (2001) *E-Games: Improvisation through Open Platform Design*. Paper presented at the Moving Online II conference, 2-4 September, Gold Coast, Australia, <http://www.scu.edu.au/schools/sawd/moconf/papers2001/jasinski.pdf>, Date accessed June 2003.
- Jonassen, D. H., Carr, C., & Yeuh, H., (1998). Computers as mindtools for engaging learners in critical thinking. TechTrends. (43), 2. P24-32. Retrieved November 25, 2004 from http://elearning.uccb.ca:8080/SCRIPT/Edu533_75/scripts/serve_home.
- Kinyanjui, L. (2002). *Preparing A Workforce For The Evolving Economy: A Survey of ICT Access And Use in Kenyan Secondary Schools*. Nairobi, School Net Kenya.
- Kombo, D.K & Tromp, D.L. (2006). *Proposal and Thesis Writing. An Introduction*. Paulines Publications Africa, Nairobi.
- Kothari C.R. (2004). *Research Methodology (Methods and Techniques), 2nd revised Edition*. New Delhi: New Age International (P) Ltd. Publishers.
- Koul, L. (1992). *Methodology in Educational Research*. New Delhi: Vikas Press.
- Laurillard, D. (1993). *Rethinking University Teaching*, Routledge, London.
- Laurillard, D. (2002). *Rethinking University Teaching, 2nd Edition*, Routledge/Falmer, London.
- Littlejohn, A. (2003), '*Supporting sustainable e-learning*', ALT-J 11(3), 88-102.

- McBain, R. (2001), 'E-learning: Towards a Blended Approach', *Manager Update*, 13, 1, Autumn 2001.
- Moallem, Mahnaz. (2001). Applying constructivist and objectivist learning theories in the design of a web-based course: implications for practice. *Educational Technology & Society*, 4 (3), 2001.
- Morris, H. & Rippin, A. (2002), *E-Learning in Business and Management: The Current State of Play*, Presented at BEST 2002 Conference, Supporting the Teacher, Challenging the Learner, Edinburgh, <http://www.business.ltsn.ac.uk/events/BEST%202002/Papers/MorrisRippin.PDF> <http://ausweb.scu.edu.au/aw99/papers/reid/paper.html>
- Mugenda, O. & Mugenda, A. (1999). *Research Methods: Qualitative and Quantitative Approaches*. Nairobi: African Centre for Technology Studies (ACTS) Press.
- Nicol, D. and Coen, M. (2003), 'A model for evaluating the institutional costs and benefits of ICT initiatives in teaching and learning in higher education', *ALT-J*, 11(2), 46-60.
- Ogula, P. (2005). *Research Methods*. Nairobi: CUEA Publications.
- Ogula, P.A. (2009). *A handbook on Educational Research. Port Victoria; New Kemit*.
- Oren, A., Mioduser, D., Nachmias, R. (2002). *The Development of Social Climate in Virtual Learning Discussion Groups*. *International Review of Research in Open and Distance Learning*, 3, 1, April, 2002.
- Orodho, A.J. (2004). *Techniques of writing research proposals and Reports in Educational and Social Sciences*. Nairobi: Reata Printers.
- Orodho, J.A. (2003). *Essentials of Educational and Social Research Methods*. Nairobi: Masola
- Phipps, R. & Merisotis (1999). *What's the Difference? A review of contemporary research in the effectiveness of Distance Learning in higher education*, *The Institute for Higher Education Policy*, Washington, DC, USA, April 1999. Publishers.
- Reding, Viviane. (2003). Is e-learning Going Mainstream? Speech given at the Opening of the Learntec Forum Karlsruhe, 4 February 2003, <http://europa.eu.int/rapid/start/cgi/>, Date accessed May 2003.
- Rosenberg, M. (2001). *E-Learning: strategies for delivering knowledge in the digital age*, McGraw-Hill, New York.

- Rourke, Liam. (2002). *Using Web-Based, Group Communication Systems to Support Case Study Learning at a Distance*. International Review of Research in Open and Distance Learning, October – 2002.
- Salmon, G. (2000). *E-moderating: the key to teaching and learning online*, Kogan-Page, London.
- Salmon, G. (2002). *Pedagogic requirements of VLEs: Pets and Planets*, UCISA TLIG-SDG User Support Conference, Leeds, 2002, <http://sstweb.open.ac.uk:8282/oubs/gilly>.
- Salmon, G. (2006). *E-Learning: Key to Training Online*. New Delhi: Taylor and Francis Ltd.
- Selinger, M. & Pearson, J. (1999), *Telematics in Education: Trends & Issues*, Pergamon (Elsevier Science Ltd), Oxford.
- Senge, Peter M. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*, Doubleday, New York.
- Sloman, M. (2001). *The E-learning Revolution*, CIPD, London.
- Stockley, D (2003). *Implementing e-learning - an "how to" guide*. Derek Stockley Pty Ltd, Melbourne, Australia.
- Straub, Richard. (2003). *Why Isn't e-Learning Taking off in a Big Way in our Daily Lives?* <http://www.elearningeuropa.info/doc.php?lng=1&id=1097&doclng=1>, Date accessed May 2003.
- Zirkle, C. (2003). *Distance education: The state of the art in career and technical Education*. Columbus, OH: National Council for Workforce Education.

APPENDIX II: BUDGET FOR THE WHOLE STUDY

Components	Descriptions	Item description	No.	Unit rates (Kshs)	Costs (Kshs)
Proposal writing	Literature search in libraries, literature review, Internet research.	Transport, internet costs, printing and binding costs subsistence	100 days	100/day plus 50/hour; 2hours/day (internet)	10,000 10,000
Subtotal					20,000
Field work	Reconnaissance & pre-testing questionnaires	Investigator (self) (Transport, subsistence & accommodation)	10 days	1000/day	10,000
	Data collection	1 research assistant (transport, accommodation & subsistence). Self (transport accommodation & subsistence).	10 days	1000/day	10,000
		Research assistant (transport, subsistence & accommodation)	30 days	1000/day	30,000
			30 days	800/day	24,000
Subtotal					74,000
Stationary	Questionnaires	Writing, printing & photocopying documents.	@ 5 pgs* 400 questionnaires		2,000
	7 draft reports copies.	Printing papers	4 reams		2,000
	5 final copies of thesis & binding	Printing report drafts & binding.	Estimated drafts 7		16,000
					20,000
Subtotal					40,000
Grand total					134,000

APPENDIX III: QUESTIONNAIRE FOR ADMINISTRATORS

Dear respondent,

I am conducting a survey to gather information on institutional barriers to e-learning development in Kenya. I have selected you because you are in a position of authority on this topic. I would greatly appreciate your effort in filling this questionnaire. Your responses will be strictly treated as very confidential. Thank you in advance for your time and effort.

NB: DO NOT WRITE YOUR NAME, PHONE NUMBER OR OTHER PERSONAL DETAILS ANYWHERE IN THIS QUESTIONNAIRE.

SECTION A

Please tick where appropriate and fill where necessary

1. Gender: (a) Male (b) Female
2. Age: (a) Below 30 (b) 30 to 40 (c) 41 to 50 (d) 51 to 60 (e) 61 and above
3. (a) Name of your institution:
- (b) School (if applicable):
- (c) Department:
4. Highest academic qualification: (a) Professor (b) Doctorate (c) Masters
(d) Degree (e) Post Graduate Diploma (f) Higher National Diploma
(g) Diploma (h) Certificate (i) None (j) Other (specify)
5. Administrative experience: (a) Below 5 years (b) 5 to 10 years
(c) 11 to 15 years (d) 16 to 20 (e) 21 and above
6. Highest ICT qualification: (a) Professor (b) Doctorate (c) Masters
(d) Degree (e) Post Graduate Diploma (f) Higher National Diploma
(g) Diploma (h) Certificate (i) None (j) Other (specify)

SECTION B

Please indicate your level of agreement as it relates to the following statements:

No	Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
7	E-learning program costs (start-up and running costs) are higher as compared to costs of other programs					
8	Funds allocated to e-learning programs are inadequate in this institution					
9	The e-learning policies in place at public universities are old and ineffective					
10	The institutional policies on e-learning at public universities are new and progressive					

No	Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
11	There is regular publicity of e-learning programs offered in institutions of higher learning					
12	Funds allocated to publicity of e-learning programs in institutions of higher learning are inadequate					
13	The number of e-learning lecturers in public higher learning institutions is adequate					
14	E-learning educators are positive about e-learning and e-learning programs					
15	The e-learning resources in higher learning institutions are inadequate					
16	New e-learning technologies and infrastructure are expensive and unaffordable					
17	The e-learning technologies and equipments in use in public institutions of higher learning are old and ineffective					
18	ICT training for e-learning lecturers is adequate					
19	The level of ICT skills of e-learning lecturers is inadequate					
20	The level of ICT skills of e-learning technical staff and e-content developers is inadequate					
21	Training on e-content development to lecturers and technical support staff is sufficient					
22	There is adequate technical assistance (support staff) offered to the e-learning lecturers in our public institutions					
23	There is adequate organizational preparedness to offer e-learning programs in public institutions					
24	There is low enrolment levels in e-learning programs at public institutions compared to other programs					
25	E-learning as a mode of study is less effective as compared to other modes					

SECTION C

26. Please fill the table below to indicate how many of the listed items are in your institution.

Item	Quantity
e-Learning lecturers in your department	
e-Learning support staff in your department	
Full e-Learning courses in your department	
Number of blended e-learning courses in your department	

27. Please indicate which of the following e-learning technologies/resources are available at your institution. Tick the available ones and indicate others which could be present.

E-learning platform.....
 Internet.....
 ICT laboratories.....
 Computers in a local network (LAN).....
 E-journals.....
 Technical support staff.....
 E-content developers.....
 Others (specify).....

28. Which capacity building programs on e-learning are provided by your institution? Please tick the available ones and indicate others which could be also available.

Training on e-content development.....
 Training on e-learning pedagogy.....
 ICT skills training.....
 Other (specify).....

29. Please indicate the modes of publicity used to publicize e-learning programs in institutions of higher learning. Tick the ones normally used.

Print media (newspapers, magazines, etc).....
 Radio advertisements.....
 Television advertisements.....
 Internet (institution's website).....
 Internet (social networking sites like facebook, etc).....
 Others (specify).....

30. What is the main source of funds for the e-learning programs at your institution? Please tick appropriately.

- (a) Donors
- (b) College/University revenue
- (c) Ministry of higher education
- (d) Others (specify).....

31. What do you think are the challenges/shortcomings faced by higher learning institutions in offering e-learning programs?.....

.....

.....

.....

32. How do you think can these challenges be overcome?

.....

.....

.....

Thank you very much for your time filling this questionnaire. God bless you very much.

APPENDIX IV: QUESTIONNAIRE FOR LECTURERS

Dear respondent,

I am conducting a survey to gather information on institutional barriers to e-learning development in Kenya. I have selected you because you are in a position to give me the necessary responses on this topic. Please take a few minutes of your time to answer the questions in this questionnaire. Your responses will be strictly treated as very confidential. Thank you in advance for your time and effort.

NB: DO NOT WRITE YOUR NAME, PHONE NUMBER OR ANY OTHER PERSONAL DETAILS ANYWHERE IN THIS QUESTIONNAIRE.

SECTION A.

Please tick where appropriate and fill where necessary

1. Gender: (a) Male (b) Female
2. Age: (a) Below 30 (b) 30 to 40 (c) 41 to 50 (d) 51 to 60
(e) 61 and above
3. (a) Name of your institution:
(b) School (if applicable):
(c) Department:
4. Orientation of the courses you teach? (i) Science (ii) Arts (iii) ICT
(iv) Engineering/Technical (v) Other (please specify).....
5. Number of years in service: (a) Below 5 years (b) 5 to 10 years
(c) 11 to 20 years (d) 21 to 30 (e) 31 and above
6. Highest academic qualification: (a) Professor (b) Doctorate (c) Masters
(d) Degree (e) Post Graduate Diploma (f) HND (g) Diploma
(h) Certificate (i) Other (please specify).....
7. Highest ICT qualification: (a) Professor (b) Doctorate (c) Masters
(d) Degree (e) Post Graduate Diploma (f) Higher National Diploma
(g) Diploma (h) Certificate (i) None (j) Other (specify)

SECTION B.

Please indicate your level of agreement as it relates to the following statements:

No	Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
8	The number of lecturers in your institution participating in e-learning is inadequate					
9	Lecturers are overburdened to engage in provision of e-learning programs					

No	Statement	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
10	E-learning as a mode of study will drive the lecturers out of their jobs					
11	Lecturers at your institution are positive about e-learning and e-learning programs					
12	The e-learning resources in your higher learning institution are adequate					
13	E-learning infrastructure in your institution is insufficient					
14	The e-learning technologies and equipments in use in your institution of higher learning are new and effective					
15	The e-learning resources, technologies and equipments can be easily accessed in your institution					
16	Lecturers in your institution are competent and confident in use ICT equipments					
17	ICT training for lecturers and educators in your institution is adequate					
18	The level of ICT skills of technical staff and e-content developers in your institution is inadequate					
19	Training on e-content development skills to lecturers and technical support staff at your institution is inadequate					
20	Capacity building programs on e-learning offered to lecturers at your institution are sufficient					
21	There is inadequate e-learning technical assistance (support staff) offered to lecturers at your institution					
22	All lecturers at your institution have access to the internet all the time					
23	There is inadequate organizational preparedness to offer e-learning programs in your institution					
24	The quality of e-learning platform in your institution is good					
25	There is low enrolment levels in e-learning programs in your institution compared to other programs					
26	E-learning as a mode of study is more effective than to other modes					

SECTION C.

27. Please fill the table below to indicate how many of the listed items are in your institution.

Item	Quantity
e-Learning lecturers in your department (trained on e-learning)	
e-Learning support staff in your department	
Full e-Learning courses in your department	
Blended e-learning courses in your department	

28. What is the nature of internet technology used in your institution?

(a) Wireless internet (b) Use of copper cables (c) Use of fiber optic cables

(d) Other (specify)

29. Please indicate which of the following e-learning infrastructure/technologies/resources are available at your institution. Tick the available ones and indicate others which could be present.

(a) E-learning platform (b) Internet (c) Intranet (d) ICT laboratories

(e) Digitized syllabus content (f) Computers in a network (e.g. LAN)

(g) Video teleconferencing facilities (h) Satellite Television (i) CD-ROM

(j) Video tapes (k) Audio tapes (l) E-journals (m) E-books

(n) e-Learning resource center (o) e-Learning coordination/support center

(p) Other (specify).....
.....

30. Which capacity building programs on e-learning are conducted by your institution? Please tick the available ones and indicate others which could be also available.

(a) Training on e-content development (b) Training on course development

(c) Training on e-learning pedagogy (d) ICT skills training (e) Internet/e-mail skills (f)

e-Learning administration (g) Other (specify)

.....

31. Which capacity building programs on e-learning have you attended within the last one year?

(a) Training on e-content development (b) Training on course development

(c) Training on e-learning pedagogy (d) ICT skills training (e) Internet/e-mail skills (f)

e-Learning administration (g) Other (specify)

.....

32. What challenges/shortcomings do institutions have in trying to offer effective and efficient e-learning programs?

.....

.....
.....
.....
.....
.....

33. In your view, how can these challenges be overcome?

.....
.....
.....

Thank you very much for your time filling this questionnaire. God bless you very much.

APPENDIX V: OBSERVATION CHECK LIST

ITEM	PRESENT/ ABSENT	STATUS/COMMENTS
E-learning platform		
Internet		
ICT laboratories		
Networks e.g. LAN		
Video conferencing facilities		
Video tapes		
e-journals		
Capacity building programs		
Enrolment		
Institutional Policy document		
Publicity		
Others		