A FRAMEWORK FOR A STUDENT-CENTRED E-LEARNING SYSTEM IN HIGHER EDUCATION INSTITUTIONS IN ETHIOPIA

by

SIMRET SOLOMON MULUGETA

Submitted in fulfilment of the requirements for the degree

DOCTOR OF PHILOSOPHY IN COMPUTER SCIENCE

in the

COLLEGE OF SCIENCE, ENGINEERING & TECHNOLOGY (CSET)

in the

SCHOOL OF COMPUTING

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: Prof. Sheryl Buckley

February 2021

DECLARATION

I declare that A FRAMEWORK FOR A STUDENT-CENTRED E-LEARNING SYSTEM IN HIGHER EDUCATION INSTITUTIONS IN ETHIOPIA is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

_____ _____

Simret Solomon Mulugeta Date

(44448414)

DEDICATION

I have dedicated this work to my honest and kind beloved late mother, Fasika Yimamu, for all her unreserved support in my academic and throughout my life since my childhood.

ACKNOWLEDGEMENTS

First, I would like to thank my almighty God who has been my provider and helper throughout my life.

I am grateful to my supervisor, Prof. Sheryl Buckley, for her unreserved support throughout the thesis. She has really guided me with her valuable comments starting from the proposal to the completion of this research; encouraging me to participate in the international conferences to present this thesis and inspiring me to publish papers.

My beloved father who always encouraged me to continue my studies. He is a living testimony of the best dad in the world. My late beloved mother who was very strong and never gave up on me, throughout my life sacrificed much for my comfort and success.

My adored family, my best half (Mr. Zena Senay) and my kids (Abigail, Elon, and Marcon), all made a special contribution to the study. They were tolerant of my absence to stay in my study room for long periods. My kids' nanny, Worke Tamiru, for relieving me of many household responsibilities.

I would also like to thank my beloved sisters (Metasbia and Bemnet) for encouraging me and give me moral support to complete my study.

I am grateful to UNISA for providing me financial support to do this research. Colleagues who contributed to my study, especially Dr. Tsige GebreMeskel Aberra (my line manager) and Mr. Meseret Melese Tefera for encouraging me to complete my study and deserve a lot of appreciation.

I always have a special place in my heart for the students, especially those who willingly participated in this study. My appreciation goes to all who supported and encouraged me throughout the process; especially statistician Hennie, UNISA Alumni Dr. Awol, my friend Zelalem (EthERNet), UNISA Alumni Dr.Belew (ECSU), Yared (ECSU), Yoseph (AAit).

ABSTRACT

Different studies have been conducted by researchers on e-learning in both the developed and developing world. However, in developing countries, particularly in Ethiopia, there are insufficient studies on e-learning systems, which provide an e-learning framework that supports the Ethiopian higher educational institutions (HEIs). The aim of this study is to explore students' e-learning experiences and challenges in Ethiopian higher learning institutions and to develop a student-centred e-learning framework.

This study used both qualitative and quantitative research methodology. The qualitative research methodology was used to broadly explore students' experiences regarding the use of e-learning and the challenges Ethiopian HEIs students' experience. The study used an exploratory sequential mixed design approach. As a result of this design, the qualitative data was first collected and analysed using ATLAS.ti. From this process, nine major e-learning themes were identified: 1) Institutional; 2) technological facility; 3) pedagogical/instructional; 4) resources; 5) functionality; 6) feature; 7) policy; 8) student readiness; and 9) system management.

Using these themes, the survey instrument was developed, and the quantitative data was collected and analysed using SPSS. The quantitative result revealed eight validated e-learning framework factors: 1) e-learning management system; 2) technological infrastructure and facility; 3) learner readiness; 4) e-learning resources accessibility; 5) e-learning system features; 6) e-learning services; 7) e-learning communication; and 8) e-learning policy. The descriptive statistics compared factors using frequencies and the correlation between different factors tested using a correlation matrix. Form the finding an e-learning framework was developed, which can be used at HEIs to improve or implement an e-learning system.

Conclusions were drawn from the comparison of variables in the correlation matrix. Both positive and negative linear relationships between the two variables were specified. To find out a relationship between the e-learning management system and e-learning policy, Pearson correlation analysis was conducted. The results revealed a

positive relationship (r =0.73, N = 413, p <0.0001) which showed that the correlation was strong. This means that greater use of e-learning management systems were associated with a more specific e-learning policy. Therefore, the establishment of an e-learning policy is an important factor in the implementation of an e-learning system.

Keywords: Keywords
E-learning, e-learning experiences, e-learning practice, e-learning challenges, e-learning themes, e-learning factors, e-learning framework, validated e-learning framework factors, student-centred e-learning framework, e-learning management system and e-learning policy.

TABLE OF CONTENTS

ABBREVIATIONS/ACRONYMS

AAiT	Addis Ababa Institute of Technology
AASTU	Addis Ababa Science and Technology University
AAU	Addis Ababa University
ANOVA	Analysis of Variance
AMIT	Arba-Minch Institute of Technology
AMU	Arba-Minch University
AMWT	Arba-Minch Water Technology
ASCUE	Association of Small Computer Users in Education
AU	Actual Use
AVU	African Virtual University
BA	Bachelor of Art
BI	Behavioural Intention
BMC	British Medical Council
CBL	Case-Based Learning
CDs	Compact Discs
CFA	Confirmatory Factor Analysis
CSET	College of Science, Engineering and Technology
DVD	Digital Video Disc
ECSC-DLC	The Ethiopian Civil Service University Development Learning Centre
ECSU	Ethiopia Civil Service University
EFA	Exploratory Factor Analysis
EFL	English as a Foreign Language
EHEI	Ethiopia Higher Education Institutions
EHL	Ethiopia Higher Learning
ELIP	E-Learning Instructional Programme
ESC	Education Strategy Centre
ESCU	English Speaking Canadian Universities
ESDP	Education Sector Development Programme
ESDPRP	Ethiopian Sustainable Development and Poverty Reduction Programme

EthERNet	Ethiopian Education and Research Network
ETQAA	Education and Training Quality Assurance Agency
FA	Factor Analysis
GDP	Growth Domestic Product
GTP	Growth and Transformation Plan
GTZ	German Agency of Technical Cooperation
H.S.I.U	Haile I Selassie University
HE	Higher Education
HEIs	Higher Educational Institutions
HERQA	Higher Education Relevance and Quality Assurance Agency
HESC	Higher Education Strategy Centre
HEI	Higher Learning Institutions
HRM	Human Resource Management
ICDE	International Council for Distance Education
ICDE	International Council for Distance Education
ICT	Information and Communication Technologies
ICTC	Information and Communication Technology Centre
IDIA	Development Informatics Association
INC	Incentives
IO	Industrial Organisation
IP	Internet Protocol
IT	Information Technology
IRT	Item Response Theory (IRT)
ITD	Information Technology Directorate
IWS	Internet World Stats
KMO	Kaiser-Meyer-Olkin
LAN	Local Area Network
LIS	Library and Information Science
LMS	Learning Management System
MCIT	Ministry of Communication and Information Technology
MoE	Ministry of Education
Moodle	Modular Object Oriented Dynamic Learning Environment

MS	Management Support
MUHAS	Muhimbili University of Health and Allied Science
NACTA	National Association of College Teachers in Agriculture
ODEL	Open Distance electronic Learning
OF	Organisational Factor
OLSS	Online Learning Strategies Scale
PA	Public Administration
PAF	Principal Axis Factoring
PCA	Principal Component Analysis
PCS	Personal Computers
PDAs	Personal Digital Assistants
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
RBV	Resource-Based View
ROI	Return on investment
SDG	Sustainable Development Goals
SEM	Structural Equation Modelling
SIS	Student information systems
SMS	Short Message Service
SN	Social Networks
SPSS	Statistical Package for the Social Sciences
TAM	Technology Acceptance Model
TAR	Training
TRA	Theory of Reasoned Action
TV	Television
TVET	Technical and Vocational Education and Training
UNCTAD	UN Conference on Trade and Development
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNISA	University of South Africa
US	United States
UTAUT	Unified Technology of Acceptance and use of Technology
VL	Virtual Learning

VLEs	Virtual Learning Environments
VSAT	Very Small Aperture Terminals
WAN	Wide Area Network
Wi-Fi	Wireless Fidelity
WSIS	World Summit on the Information Society
WWW	World Wide Web

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1:

INTRODUCTION

1.1 INTRODUCTION

The integration of the teaching-learning process with the twenty-first century Information and Communication Technologies (ICT) technologies is undeniable to achieve high results in the educational sector. Tesfalidet and Nirmala (2015) explained that an e-learning system is a system for facilitating and advancing education, especially to improve knowledge among students all over the world.

One of the significant aspects of technology advancement is to be able to narrow the gaps in the teaching-learning process. There is a common understanding between scholars that the twenty-first century will be a more globalised and knowledge-based era than that of the twentieth century which was based on the physical trading of commodities. Navani and Ansari (2016) explained that advancements in ICT have changed the dynamics of teaching and learning and are providing new ways of interacting and learning.

E-learning is named both online learning and electronic learning and is based on the exchange of knowledge which takes place via electronic technologies and media. Typically, e-learning is conducted through the internet, where students can access their learning resources online at any time and place. E-learning most often takes place in the form of online courses, online degrees or online programmes (Tamm, 2019). Many studies have shown that IT is becoming a feasible resolution for all HEIs in terms of advancing the qualities of education (teaching-learning) and reduction to the budget expenditure in executing education (Alenezi, Tarhini & Sharma, 2015; Almajali & Tarhini, 2016; Aparicio, Bacao & Oliveira, 2016; Darawsheh, ALshaar & AL-Lozi, 2016; Hajir, Obeidat & Al-dalahmeh, 2015; Masa'deh, Tarhini, Bany & Maqableh, 2016; Maqableh, Rajab, Quteshat, Masa'deh, Khatib & Karajeh, 2015; Tarhini et al., 2016).

As mentioned above, the main purpose of e-learning is to make education accessible for a wider range of society and reduce costs in the teaching-learning process. It also increases productivity while enhancing independent learning (Doculan, 2016).

As per Obeidat, Al-Suradi and Tarhini (2016), there are many advantages that e-learning provides both for teachers and learners because it provides access to learning, personalised learning, used as a proficient way to standardise and deliver content, on-demand content availability, interactivity and self-pacing. E-learning also offers a flexible, appropriate and diverse e-learning environment that can meet all learners' needs from anywhere and at any time (Hajir et al., 2015; Salter, Karia, Sanfilippo & Clifford, 2014). Moreover, e-learning can potentially reduce the costs of providing large numbers of classrooms, instructors and other related educational facilities (Moravec, Stepanek & Valenta, 2015).

Since the development of electronic technology in the mid-twentieth century, ICTs have been used in a variety of fields all over the world. For example, in education, ICTs have opened up the prospects for learners and HEIs to participate in teaching and learning electronically. Nearly all HEIs in developed countries and developing countries like Ethiopia use Learning Management Systems (LMSs), which facilitate teaching and learning through the internet with tools to allow the learners to interact with each other and share electronic learning resources (Zhong, 2015).

In reviewing the current use of e-learning in Ethiopian HEIs, the studies reveal that the full features and functions of e-learning are not used (Bass, 2011; Beyene, 2010; Hagos, Anteneh & Garfield, 2018; Hare, 2007; Ketema &Nirmala, 2015; Tibebu, Bandyopadhyay & Negash, 2009; Unwin, 2007, 2008; Webometrics, 2016). This reviles that HEIs are not capable enough to use e-learning systems in full capacity to utilise the opportunities they provide.

1.2 BACKGROUND OF THE STUDY

This research is mainly focused on the importance and hence the development of an e-learning framework with a core focus of students that will help to facilitate the learning process in developing countries like Ethiopia. The empirical data used for the study was taken from different higher education institutions in Ethiopia like the Ethiopian civil service university (ECSU), Arba-Minch Institute of Technology, and Addis Ababa Institute of Technology as a case for the study.

The Addis Ababa Institute of Technology (AAiT) is one of the leading institutes of technology in Ethiopia, which was established some 60 years ago. AAiT is one faculty under Addis Ababa University (AAU) that is enrolling undergraduate and graduate students in different programmes in the technology field. AAiT has an e-learning web portal LMS called Modular Object Oriented Dynamic Learning Environment (Moodle) which is designed to help students and instructors to engage in an online classroom for better interaction and collaboration. Students use Moodle LMS to upload their assignments and download assignment questions and they use it to download links to e-Books and additional reading materials. Moreover, they use it to have discussions with other students on a discussion forum and to watch some lectures which have video links attached to them among other online services (AAiT, 2013).

The Arba-Minch Institute of Technology (AMIT) which was formerly known as Arba-Minch Water Technology(AMWT) is based in South-West of Ethiopia, was founded in 1986. It offers education both to undergraduates and graduate-level students and operates in five campuses located in different parts of the town. The institute focuses on the implementation of ICT systems and services to the whole campuses (Arba-Minch University, 2014). Moodle is used as one learning platform for students' online classroom teaching and for other course-related interaction in the institute (AMIT, 2014).

The other university included in the study is the ECSU. It started its operations in 1995 and after a year, namely, in 1996, it was formally established as an independent institution with a legitimate status by the Council of Ministers' Regulation No. 3/1996. Its purpose is to train civil servants so that they can keep up with the country's development policies and strategies of the government. The university played a significant role in contributing to the training of civil servants through education at a university standard. The main objective of the Ethiopian government to establish this university arose from the dire need for well-trained civil servants. As the government structure has changed to a federal government system, the newly established regional governments need well-trained manpower. The university started training in the fields of law and economics. The university provides short-term training programmes along with formal university-level education. In addition, it provides a consultancy service, seminars and workshops. The university uses delivery modalities ranging from

residential training and educational programmes to on-the-job, evening and distance education, comprising a Global Development Learning Network.

1.3 PROBLEM STATEMENT

Different studies have been done on e-learning in the developed and developing countries HEIs. Nonetheless, few studies have been conducted in Ethiopia or the developing world at large. As per the Ethiopian Ministry of Education study done under the title Education Sector Development Programme (ESDP) report, the limitation of the conventional face-to-face type of education system stipulated and the report stated that due to the nature of the country, geographical settlement of the population among which majority of the population lives in rural areas, spreading education to the public and the equitable access to education is a big challenge for the government (MoE, 2010:9). The same report conversely, reports that the need for the country to become a middle-income country and to make an economic transformation to the nation is impossible without the application of science, technology and innovation.

This research fills the gap by examining in depth the students' experience regarding e-learning usage and the challenges they experienced in an Ethiopian HEI. It also attempts to develop a student-centred e-learning framework to support the facilitation of e-learning in the Ethiopian HEIs.

Educational institutions are investing in e-learning technologies to be on par with other world-class institutions. However, the use of e-learning systems in educational institutions of Ethiopia is only beginning. One of the best universities of Ethiopia is AAiT, but even in this institution, there are very few stakeholders involved in implementing an e-learning system (Sangheethaa, Korath, Metsihe and Kefayalew, 2016).

Research by Islam (2013) summarises the opportunities, challenges and possible solutions in using an e-learning framework. He also further pinpointed that there is a gap in the area concerning the challenges and corresponding solutions specifically in the developing countries.

A study was done at the UNESCO level and was cited in Unwin (2008) on the African e-learning status. A questionnaire was distributed a year before the study to 316 respondents and found that it was difficult to generalise the responses into some

categories due to the wide variety of the responses gained and the evidence provided to the researchers. However, the following three main conclusions could be drawn:

- Africa's e-learning practices are widespread in nature.
- Africa's e-learning practices are at their early stage.
- The eagerness to use e-learning among the respondents in the African countries is huge.

Different studies reveal that e-learning application in the developing world and, in our case, in Ethiopia is at its infancy to come up with the solution, that helps the education system, based on the performances of the past experiences (Adyinika & Mutula, 2010; Bass, 2011, Beyene, 2010; Eke, 2011; Hagos & Negash, 2014; Hare, 2007; Ketema & Nirmala, 2015; Lwoga, 2014; Nagunwa & Lwoga, 2013; Rhema & Miliszewska, 2010; Tibebu et al., 2009). These studies suggested the need for in-depth studies on e-learning practice and challenges in Ethiopian HEIs. These factors motivated me to explore the possibilities for designing an e-learning framework based on students' e-learning practice and challenges which takes into consideration the technical, operational, institutional, economical, and motivational traits of Ethiopian learners.

Alkharang (2014) mentioned that when we talk about the implementation of e-learning the developing world is a follower as in other technological sectors. This can be credited to the deferral in the acceptance of the internet by the governments of many developing countries. Consequently, there are few studies on the benefits, limitations, obstacles, and acceptability of e-learning in these countries.

According to Mulugeta (2015), implementing e-learning in Africa will increase education access and quality, and decrease the education cost. She further explained that some instances show that there is an increasing number of accomplishment stories with the application of e-learning throughout Africa. Even though all African educational problems cannot be solved by the application of e-learning, it is a tool that must be taken into serious consideration by government policymakers and donors. Introducing e-learning technologies in African primary, secondary, and higher education has its challenges. E-learning has been known to be fundamental in the improvement of the teaching-learning process at HEIs in Africa.

In Ethiopian HEIs, the teaching-learning processes are largely conducted in a conventional way, namely, face-to-face teaching. However, this is prone to many drawbacks. Firstly, there is a scarcity of manpower that could satisfy the demands of the education system. Secondly, the students are ordinarily to be present in the classroom at the time of teaching. This means that the teaching-learning process is limited to a designated place, at a particular time and by a known tutor. Thirdly, the traditional mode of teaching is costly regarding time and money. Fourthly, there is a shortage of resources. The last problem of a traditional teaching-learning process is that it takes more time than electronic learning (Hirut, 2011).

As Beyene (2010) put it, the Ethiopian government's interest to integrate e-learning into the Ethiopian HEI system is growing. Conversely, the problem is considered only from the technological infrastructure perspective. On the other hand, Hagos and Negash (2014) argued that there is a positive increment in the use of e-learning systems in Ethiopian HEIs so that the teaching-learning system can be supported by modern technology and the process can be migrated to an online delivery system.

According to Aguti, Walters and Wills (2014), some HEIs have not used e-learning to its full potential to foster student-centred learning. Student-centred learning emphasises the development of communicative and collaborative skills amongst the students and their teachers making the students more engaged rather than passive in their learning process. E-learning technologies can support social interactions between students and teachers and amongst students. It is therefore vital that learning technologists understand the factors and approaches that influence effective blended learning.

As different studies revealed many African and in our case, Ethiopian HEIs are investing in order to implement the e-learning system into those institutions (Beyene, 2010; Gunga & Ricketts, 2007; Lwoga, 2014; Matti, Ngumbuke, & Kemppainen, 2010; Nagunwa & Lwoga, 2013; Rhema and Miliszewska, 2010). Despite the investments in these institutions, the e-learning system is not working successfully. It is thus essential that doing a comprehensive study towards the contextual problem which hindered to achieve and on the possible solutions. Accordingly, I explored major e-learning themes based on the practice and challenges that students experience in Ethiopian HEIs in order to develop an efficacious student-centred e-learning framework.

Thus, after a thorough study in the area from various studies done previously, the researcher concluded that there is no empirically developed e-learning framework for Ethiopian HEIs. An exploratory research method was adopted to fill the gap of identifying the problems and to find the possible solution by designing a student-centred e-learning framework for Ethiopian HEI learners.

1.4 RESEARCH QUESTIONS

The research questions for this study are:

1. What are students' experiences regarding the use of e-learning in Ethiopian higher learning institutions?
2. What are the challenges that Ethiopian higher learning institution students experience when using e-learning?
3. What are the major factors impacting e-learning in Ethiopia higher learning institutions?
4. What possible e-learning framework can be developed in the context of Ethiopian higher learning institutions?

1.5 AIM AND OBJECTIVES OF THE STUDY

The main objective of the study is to explore students' experience regarding the use of e-learning and the challenges Ethiopian HEI students experience when they use e-learning to develop a student-centred e-learning framework. The specific objectives are to: -

1. To find out students' experiences of the use of e-learning.
2. To determine the challenges of e-learning based on the experiences of students.
3. To identify major e-learning factors in the Ethiopian higher learning context.
4. To develop an e-learning framework in the context of Ethiopian higher learning Institutions.

1.6 SIGNIFICANCE OF THE STUDY

The study has provided a suitable framework for student-centred e-learning in HEIs in developing countries including Ethiopia, which will help to enhance their education systems.

Furthermore, the research assisted as a bridge that connects e-learning in the teaching and learning process of HEIs in Ethiopia by identifying facts on the current challenges and facilitating the implementation of e-learning technology in HEIs in Ethiopia. The lessons learned from Ethiopian HEIs' experiences with e-learning could be used in other countries.

The findings of the study helped to establish the status and challenges of e-learning practices in Ethiopia to determine how to implement technologically enhanced learning facilities. The research's baseline data will be used by other researchers for the researches to be done for the developing countries.

Moreover, the research contributes to individuals, learning institutions and governments by providing exploratory concepts, frameworks and theories concerning e-learning. The study also builds the knowledge of the challenges of practical e-learning and an e-learning framework to use as a solution in the educational system of developing countries.

1.7 THE SCOPE OF THE STUDY

The study was conducted on AAiT, ECSU and **AMIT** students as a case study since these universities have e-learning portals (LMS) and online classrooms. In the case of AAiT and AMIT, the study considers the experience of undergraduate and master's students since they use the Moodle LMS e-learning portal. In the case of ECSU, the study considers the experiences of master's students who are using the Drupal LMS e-learning portal for online blended courses.

1.8 LIMITATIONS OF THE STUDY

This study was scheduled to complete in 36 months. However, as the study used an exploratory sequential mixed research method, it took a lot of time before the research questions could bean answered. Among other things, the potential constraints of this study were finance and time. This study collected data only from students although it would have been good to collect data from the management of the institutions and the lecturers. Moreover, the shortage of the budget limited data collection to three main technology universities as it would have required more time and money to get additional input from additional local universities.

1.9 RESEARCH DESIGN AND METHODS

The study explored students' experiences regarding the use of e-learning in Ethiopian HEIs and identified major themes of e-learning to develop an e-learning framework. The study used empirical data taking a case study of students in AAiT, ECSU and AMIT, which used e-learning portals for the purpose of online classrooms, examinations, assignment submission, electronic delivery, a discussion forum and additional e-learning services.

This research used two research methods: quantitative and qualitative. Initially, quantitative research methods were developed in the natural science fields to study natural social and cultural phenomena and it implicates the use of statistical tools and packages to examine data (Myers, 2013:7-8).

On the other hand, Myers (2013:9) states that the qualitative research method is appropriate for an in-depth study of a specific subject and is primarily suggested for exploratory research. Consequently, this method can help to explore students e-learning challenges and to develop a framework for addressing them. However, generalising the findings that come from a larger population is difficult when using the qualitative method.

This research used a research method called mixed-methods. This method is defined by Creswell and Plano Clark (2018) and Plano Clark and Ivankova (2016) as research that accommodates different viewpoints, ways of doing things and forms of data which helps to develop common understanding.

1.10 TYPE OF RESEARCH – EXPLORATORY RESEARCH DESIGN

For this study, an exploratory sequential research design is used by the researcher. As described by Babbie (2010), exploratory studies are typically done for three purposes:

1. To fulfil the researcher's inquisitiveness and wish for better understanding.
2. To test the feasibility of a more extensive study.
3. To develop methods that can be used in any succeeding study.

Mostly, social studies are done by an exploratory research method due to the reason that this type of research design inspires researchers to have more understandings of

the case undertaken by the researcher, rather than for the mere reason of confirming or disconfirming a hypothesis. In addition, such studies are crucial to break new ground and to yield new perceptions of the research topic (Babbie 2010).

1.11 RESEARCH PROCEDURES, DIAGRAMMATIC REPRESENTATION, VALIDITY AND RELIABILITY

Figure 1.1 shows the sequence of procedures followed in the research.

Phase 1: Research contextualisation	Phase 2: Data collection	Phase 3: Evaluation & results
Literature Review Concepts→	Qualitative semi-structured interview ↓ Quantitative data survey	Meaningful results / Findings

Figure 1.1: Data collection (AAiT, AMIU and ECSU undergraduate and masters' students).

In Phase 1, the literature review was done on particular e-learning theories and concepts interrelated to this study.

In Phase 2, of the empirical study, the researcher used semi-structured, in-depth interviews, explored the use of e-learning and challenges that students experience in Ethiopian HEIs, and identified the major themes of e-learning in the context of Ethiopian higher learning institutions. According to Oates (2006:188), in semi-structured interviews:

> "You have a list of themes to be covered and questions you want to ask, but you are willing to change the order of questions depending on the flow of the conversation and you might ask additional questions if your interviewee brings up issues you had not prepared for and for the conformation the obtained data through questioner. The interviewees can speak with more detail on the issues you raise and introduce issues of their own that they think relevant to your themes."

In Phase 2, the quantitative survey instrument was developed using the major themes of e-learning identified in the qualitative data analysis. At this level, the survey was evaluated using Exploratory Factor Analysis.

ATLAS.ti 7.5 software was used for the qualitative analysis and the analysis of the quantitative survey was done using SPSS 25.

In Phase 3, out of the results, a framework for student-centred e-learning system in the context of Ethiopia HEIs was developed.

1.12 ETHICAL CONSIDERATIONS

The University of South Africa (UNISA) Ethics Committee gave their written consent for the research to be undertaken. (Appendix I). The written permission to conduct the study was acquired from AAiT, ECSU and AMIT (Appendix II). In the process of this study, the following ethical issues were considered. The consent of respondents was obtained and the study purpose was explained to them (Appendix III). These respondents (students) consent was collected orally before they fill out the questionnaire. An assurance was given to the respondents on the information they were about to give to be kept confidentially.

Reasonable care was given to the respondents (interviewees) in the interview session and the usage of the information in the research process. Respondents also were informed about the objective of the research beforehand. Demographical data that could identify respondents personally handled in possession of the researcher privately and assurance on this matter was given to use pseudonyms rather than their real names. Case study analysis did not associate personal information with the data obtained from the respondent.

1.13 RESEARCH ORGANISATIONS

This research was organised into seven chapters.

Chapter 1 consists of an introduction, the background to the study, statement of the problem, research questions, aim and objectives of the study, significance of the study, the scope of the study, limitation of the study, research design and methods and ethical considerations.

In Chapter 2, a review of literature on the theoretical framework on important e-learning concepts and aspects such as e-learning approaches, e-learning technology, e-learning practice, e-learning challenges, benefits of e-learning, e-learning framework dimensions, and a theoretical framework, namely, Khan's framework is included.

Chapter 3 focuses on Ethiopian higher education which includes a literature review of the e-learning in Ethiopia HEIs, the status of e-learning in developing countries, factors affecting e-learning implementation in Africa, the future e-learning needs in Ethiopia, e-learning in the Ethiopian context, challenges related to ICT in Ethiopia higher education, e-learning initiatives in Ethiopia, learning theories and online theories and student-centred learning.

Chapter 4 presents the research design, research paradigms, research strategies, sampling, interview, instrumentation, reliability and validity, data collection procedure and data analysis procedure.

Chapter 5 deals with the analysis and results of the qualitative study; it presents qualitative data analysis and qualitative results.

Chapter 6 presents the analysis and result of the quantitative study which includes the development of survey instrument, pilot study, the validity of factors of e-learning framework, testing the reliability of the items of valid factors of e-learning framework, descriptive statistics of factors, comparing factors, testing the correlation between different factors using a correlation matrix.

Chapter 7 includes the overview of the study, discussion, conclusions and recommendations and presents the proposed e-learning framework.

1.14 CHAPTER SUMMARY

This chapter started with a brief introduction to this study on e-learning development and higher education. Moreover, the backgrounds of the universities, which are part of the study at hand, were described. This chapter included the problem statement of the study, research questions, the aims and objectives of the study, the significance of the study, the scope of the study, limitations of the study and research design and methods, and ethical considerations.

In the next chapter, relevant literature on the concept of e-learning and its approaches, e-learning technologies, its status in developing countries and particularly in Ethiopia, challenges of e-learning, and its benefits, e-learning factors and dimensions is discussed.

CHAPTER 2:

LITERATURE REVIEW

2.1 INTRODUCTION

According to Creswell (2009), the literature review is an important part of a study that achieves several purposes through reviewing related studies that have a close relationship with the current study.

This chapter reviews different concepts and theoretical frameworks that are related to e-learning concepts and approaches, e-learning technologies and the practice of using e-learning, challenges of e-learning, benefits of e-learning and e-learning framework dimensions are discussed. This chapter addresses the objective of the study by exploring the practice and challenges of e-learning and covers the theory of major e-learning framework dimensions to create a foundation for the development of an e-learning framework.

2.2 E-LEARNING CONCEPTS

According to Rodrigues, Almeida, Figueiredo and Lopes, (2019) e-learning was defined as a learning system that is based on digital technologies and other forms of educational resources with the main goal of providing students with a tailored, learner-centred which also is interactive in its nature to support and enhance the teaching-learning process, while Garrison (2017) argued that this platform for the teaching-learning process is quite disruptive when we compare it to the conventional learning approach.

Khan (2003) defines e-learning as:

> an innovative way to deliver a well-designed, learner-centred, interactive and facilitated learning environment to anyone, anyplace, anytime, by utilising the attributes and resources of various digital technologies along with other forms for learning materials suited for open and distributed learning environment.

Due to its complexity e-learning encompasses virtual learning, distributed learning and web-based or networked learning rather than seeing it simply as online learning. Oketch and Achieng (2013) explained that the word electronic is the prefix in the term

e-learning. This drives all educational events that are carried out by individuals or groups working online or offline, in either synchronised or asynchronised ways via networked or non-networked computers and other electronic devices.

There are different definitions of e-learning given by different scholars. Tamm (2019) differentiated the concept of e-learning from distance learning, virtual learning, blended learning and such strands of the concept although they are certainly related to e-learning. Tamm (2019) further explained that e-learning can be conducted via the internet, where the students access their learning materials at their own choice of place and time. Electronic devices like computers (tablets and laptops) and smartphones that are either in the form of printed text or spoken or pictures are the main platforms to deliver e-learning.

Similarly, Aparicio et al. (2016) claimed that e-learning was not the first term to conceptualise the use of computerised systems to enable the learning process. In their research, they identified 23 concepts such as online learning, virtual learning, distance education, m-learning, LMSs and Massive Open Online Courses (MOOCs).

Accordingly, e-learning may include face-to-face, distance, and mixed-mode or blended delivery models. According to a study done by Task Force E-Learning - COIMBRA Group (2012), reliant on which technology is being used or which processes are being supported, there are different approaches to e-learning. E-learning is usually used in distance learning only but it also can be used in concurrence with that of the face-to-face learning-teaching process and it can also be used as a ‘blended learning’.

In addition to the above scholars, other studies in the field have defined e-learning in different ways. Das and Banerjee (2011:257) simply explain it as web-enabled learning, while Matta and Singh (2012:36) described the idea as, “playing a significant and vital part in day-to-day life as an information world”. Matta and Singh (2012:34) added that e-learning means using tangible and intangible tools to carry out the teaching-learning process via electronic methods. This application can be mainly divided into four: web-based learning; computer-based learning; virtual education opportunities; and digital collaboration.

Other authors like Omidinia, Masrom and Selamat (2011) added that e-learning involves the use of ICT to augment and/or maintain learning which covers a wide range of tools and technologies including email, internet, video streaming and virtual classrooms.

Though e-learning and distance education are often used interchangeably according to Drysdale, Flynt and Hannon-Johnson (2011), distance education is a teaching-learning process that has no face-to-face contact while e-learning has some sort of face-to-face contact in addition to its distance education nature. In other words, e-learning is an educational experience that uses an online method of delivery or electronic media. This form of education has its roots in distance education; however, it has developed a unique nature as the quality of online experiences improves.

For this study, e-learning is defined as online learning which uses various e-learning devices by using a valid e-learning framework. This type of learning requires also different ICT infrastructures like hardware, software, networking, internet, web application, LMSs, and video conferencing. As it is technology-enhanced learning that is closing the gaps that are created in distance learning.

2.3 E-LEARNING APPROACHES

E-learning can be divided into asynchronous and synchronous approaches.

2.3.1 Asynchronous E-Learning

This form of e-learning is described in many ways but Perveen (2016:22) explained it simply as follows: “Asynchronous environments provide students with readily available material in the form of audio/video lectures, handouts, articles and PowerPoint presentations. This material is accessible anytime anywhere”. Raymond, Atsumbe, Okwori and Jebba (2016:4) gave some examples of online teaching tools as follows: “the teacher may decide to deliver his lesson through Videotape, YouTube, Digital Video Disc (DVD) or Podcast while the students can later respond through the use of communication modes like email”. Accordingly, Perveen (2016:23) further described it as follows: “Lessons can be recorded and added to an e-library. Using the archived e-library, students can access and replay teacher’s lectures as many times as necessary to master the material”. Coogle and Floyd (2015:174) added that “…

students enjoy the flexibility and the work at their own pace and style provided in asynchronous environments".

2.3.2 Synchronous E-Learning

This type of e-learning is described by Perveen (2016) as a synchronous class where the teacher and the students are all gathered together at the same time. It should be a learner-centred class, where the teacher gives the instructions in the beginning and afterwards the students interact. Synchronous classes should develop a student-centred environment where all students participate, depending on the activities. Furthermore, Tabatabaei and Sharifi (2011:837) stated that "…discussion forums, online chat rooms have a greater potential of enhancing language teaching and learning because they provide synchronous, real-time interaction among participants. Participants have to process what they read on the screen quickly and give their response instantaneously." Moser and Smith (2015: 46-48) suggested some practices for the conduct of Synchronous Online Courses as follows:

1. Provide a welcome message that is displayed approximately 15 minutes before class.
2. Notify the class of your presence and encourage equipment checks.
3. Provide easily accessed methods to connect/enter the virtual classroom.
4. Record class meetings.
5. Discourage unnecessary use of video sharing.
6. Maintain virtual office hours.
7. Pre-load software that will be used during class presentations.
8. If possible have more than one monitor/display.
9. Equip your teaching/production facility with various video options.
10. Use electronic textbooks and other reference materials.
11. Encourage students to participate in virtual study sessions/group meetings.

This study focuses on both the asynchronous and synchronous approaches of e-learning.

2.3.3 Types of E-Learning

There are different types of e-learning. Online learning or e-learning started long ago and has been developed over time. The development is directed by the efficacy and

efficiency of the methods and the teaching-learning process. The following are the types of online learning as per Sener (2015):

- Classroom course – organised course activity in a scheduled meeting.
- Synchronous distributed – extending the conventional learning and the activities of the learners on the other far place but in real time using internet-based courses.
- Web-Enhanced – this is online teaching which balances the conventional teaching method with the same amount of class learner and teacher contact.
- Blended (also called hybrid) classroom course – in this type of teaching both the conventional and online teaching activities are there but excludes the face-to-face teaching process.
- Blended (also called hybrid) online course – this combines both conventional and online teaching but online teaching takes precedence except in lecturing, some discussion activities, laboratory(lab) activities and other important personal activities.
- Online Course – as the name indicated almost all teaching and learning activities are done online without any face-to-face class teachings.

There are varied ways of categorising e-learning types. According to Algahtani (2011), e-learning categorisations can be done based on their arrangement level in education. Some categorisations are also based on the timing of interaction. Algahtani (2011) also divided e-learning into two basic types: computer-based and internet-based e-learning.

Algahtani (2011) further explained that computer-based learning includes the use of the full range of hardware and software that is generally available for the use of ICT; each element can be used in either of two ways: computer-managed instruction and computer-assisted-learning. In computer assisted-learning, the traditional way of learning is replaced by computers that have interactive software installed which supports students self-learning or is used as a support in the classroom setting. In computer-managed instruction, however, computers are used to store and recover information to support the management of education.

As per the above mentioned types of e-learning, this study focused on blended learning which uses both face-to-face learning and online courses using the Learning Management System (LMS).

2.4 PRACTICE OF USING E-LEARNING

An empirical study was done by Ayele and Birhanie (2018) to survey the use of e-learning and its acceptance in Ethiopian public university technology institutes. The study used 400 university teachers as a sample using a random sampling technique. The analysis was conducted with SEM technique using a Smart Pls tool in which e-learning acceptance was evaluated and determinants were identified. The results displayed that substantial determinants of behavioural intention to use e-learning systems were low. Finally, the study concluded that user training and management support were the major factors for the actual use of e-learning systems while the impact of motivations for the use of e-learning systems was insignificant.

Anberbir (2015) conducted a study concerning the practice of e-learning in Ethiopia, challenges and good lessons in the use of e-learning in higher education by collecting data through online questionnaires and interviews. The findings of the survey revealed that the use of e-learning in higher education is still in its infancy and the lack of e-learning policies and awareness by teaching and administrative staff are the main challenges in most universities. Therefore, awareness creation and training of the teaching team on the use of e-learning should be given greater attention and priority. An e-learning policy and framework should be crafted at both the national and institutional levels.

Other researchers like Liu, Hodgson and Lord (2010) conducted a study on e-learning efficiency which depends itself on the support of the technology, the culture of the institution, the efficiency of the teachers, the openness of the students and their learning behaviour. They discussed the association between an e-learning culture and the subjects of cross-cultural delivery to explain the significance of realising what students anticipate in online interactivity. They also point out that affirmative learning outcomes and academic accomplishments are not only linked to online course interactions. However, they concluded that the students' learning behaviours also played a part in the complete success of e-learning implementation.

Zawacki-Richter, Müskens, Krause, Alturki and Aldraiwees (2015) examined the extent to which students used e-learning and Web tools and what use model could be identified attempting to answer the questions on what the students possess or could access; which media and e-learning tools were used for learning; how frequently they were used and what their added value was; and the distinction between traditional and non-traditional students concerning the acceptance of media and e-learning tools for their learning. In the study done by the above authors, 80.2% of the students stated that they were active in social networks with 43.5% using such networks several times a day (N = 2,296). The most significant aspect was the social exchange and communication with friends and acquaintances (95%) where 82% of the students specified that they also discussed academic issues. The main demand concerned the delivery of materials on a university platform (e.g., Blackboard or Moodle) throughout courses, and was widely met. Finally, the research results provided understanding into students' use of formal and informal media and learning environments and identified the consequences for selecting media and tools when designing and developing these higher education learning environments. The result indicated that students preferred digital teaching and learning forms that did not cause problems within institutional offerings.

Scholars like Kim, Pederson and Baldwin (2012), on the other hand, have performed a study on improving user satisfaction through a case-based learning (CBL) environment. The research objective was to review students' involvements with cases that enhanced the e-learning environment in a HEIs. The researchers used an observation and interview method to distinguish the areas of improvement. After the findings were analysed, the researcher decided to develop two online learning modules: a tutorial module including content knowledge on practical training and a CBL module. The result considerably increased the level of domain knowledge in both the tutorial-only group and the CBL module group. It also showed that the CBL group achieved significantly higher in terms of learners' awareness of the e-learning environment in relation to satisfaction and helpfulness.

In a similar vein, this research examines students' practice of the use of e-learning systems in Ethiopia HEIs and identifies major themes that affect the e-learning environment.

2.5 CHALLENGES OF E-LEARNING

ICT opens new prospects for the process of learning including both opportunities and challenges in higher institutions (Awodeyi, Akpan & Udo,2014).

For example, technological factors, such as IT infrastructure (Cantoni, Cellario & Porta, 2004; Sarrab, Elbasir & Alnaeli, 2016;), human factors (including IT skills, awareness among students and instructors) (Bhuasiri, Xaymoungkhoun, Rho & Ciganek, 2012; Kasse &Balunywa,2013; Sangrà, Vlachopoulos, Cabrera & Bravo, 2012), institutional factors (poor state of institutions, lack of policy alignment with e-learning activities) (Dadzie, 2009; Ansong, 2013), pedagogical factors (Cantoni et al., 2004), environmental issues associated with the political will for advancing the development of national IT policy, and related infrastructure, and challenges of systems design, affecting IT interactivity and instructional design (Ansong, 2015; Bhuasiri et al. 2012; Kasse et al. 2013; Olutola & Olatoye, 2015). To advance the adoption and transmission of e-learning, policymakers must minimise the effects of these challenges in educational institutions.

It appears that educational institutions face challenges in confirming effective teaching and learning activities in a rapidly changing technological society. According to Stepanyan, Littlejohn and Margaryan (2013), institutions need to foresee and exploit the present and future changing opportunities. In this regard, Brown (2010) stated that the technology resource would be a sustainability issue in which many universities have decided to invest to explore ways to benefit from it and enhance their training systems accordingly.

Different studies have been done on the critical challenges of e-learning in developing countries. Andersson and Grönlund (2009) conducted a systematic review of 278 papers. They used exclusion and inclusion criteria to find reliable papers that addressed the problem and then reduced the number of articles to 60. From these papers, 30 challenges were identified which were finally grouped into four categories. These categories were identified as courses, individuals, technology and context. Thus, according to the researchers, these challenges are common to both the developed and developing world’s education systems. Nonetheless, developing countries focus on the technology and context while developed countries focus on individuals.

Yet another study was done by Omidinia et al. (2011) which focused on e-learning and ICT infrastructures in developing nations' education systems. The study covered the Iranian efforts to make e-learning effective in an effort to transform the country. The main intention of the study was to review the e-learning challenges and infrastructure in developing countries. As a result, they found out that e-learning must focus on four issues: expertise implementation, technology focus, open-source technology and one-time funding.

According to a similar study by Task Force e-Learning – COIMBRA Group (2012), though there is a common understanding of the importance of ICT on pedagogical innovation, its application is still defective. The group suggested that capable design and implementation work must be done to address student-centred, competence-oriented and flexible higher education rather than to pursue the old instruction-based practices.

Even though many researchers have investigated different e-learning challenges, one of the biggest problems that had little focus is finding an e-learning framework which in turn delivers a parameter for the application of e-learning that considers technical, institutional, pedagogical, economical and contextual domains.

2.6 ADOPTION OF E-LEARNING

Different studies have focused on computer access, ownership, and computer skills, based on the hypothesis that these factors contribute to computer literacy that influences the adaption of e-learning. Bediang, Stoll, Geissbuhler, Klohn, Stuckelberger, Nko'o and Chastonay (2013) conducted a survey among students who were not conversant with the notion of e-learning and found that 17% of students did not own a personal computer. Most students who used the internet had only basic email and web-search computer skills. Another study done by Jordan, Akhu-zaheya, Khater, Nasar and Khraisat (2011) unveils that most students did not own computers at home and mostly they used it for word processing, email and web searching. The students with inadequate use of computers established computer anxiety, which led to computer illiteracy.

Hagos and Negash (2014) used a qualitative research approach on the Technology Acceptance Model (TAM) to survey the adoption of an e-learning system in Ethiopia,

a low-income country. The research was done to examine Ethiopian tertiary-level distance students' determinant factors for the acceptance of e-learning systems. The research was conducted using a questionnaire-based survey and collected data from 255 undergraduate distance learners in a higher education institute in Ethiopia. The data were analysed using the SEM technique to examine the causal model. The results indicated that apparent usefulness and ease of use meaningfully affected distance learners' behavioural intent to use e-learning systems in developing parts of the world. The research was conceivably one of the first to use the TAM model to scan the espousal of e-learning systems among undergraduate-level distance students in Ethiopia.

Furthermore, Alkharang (2014) found that e-learning in developed countries such as online learning and all the technologies which aid communication are accepted as an important element and their implementation in educational institutions is very common. The governments of such countries instructed their educational institutions to use e-learning which in turn has the benefit of decreasing costs of learning, enhances accessibility, and is more efficient in adult learning without the limitations of space and time. Not only is this as this type of learning started in the developed countries it is used as a standard despite its different nature of acceptance and capacity in the implementation process in different regions. It must be understood by all that there is not one fit-for-all way of it.

Consequently, the main objective of this research is to develop a student-centred e-learning framework that identifies the major e-learning factors in the context which benefits the Ethiopian HEIs in the facilitation of e-learning implementation.

2.7 BENEFITS OF E-LEARNING

Online learning has been used for many years and has been confirmed as efficient and cost-effective. E-learning could break the space and it is a benefit for the students who have problems with distance. Though, the advantages of thee-learning are more than just a space break. The followings are the advantages of e-learning:

1. You are capable to link the numerous resources in several different formats.
2. It is a very efficient way of delivering courses online.

3. Because of its accessibility and flexibility, the resources are available from anywhere and at any time.
4. Anyone, who are part-time students or are working full time, can take benefit of web-based learning.
5. Web-based learning encourages active and independent learning.
6. As you have access to the net 24x7, you can train yourself anytime and from anywhere also.
7. It is a very suitable and flexible option; above all, you don't have to depend on anyone for anything.
8. It gives a platform for online interaction to clear any doubt, if any, using discussion boards and chats.
9. Rewinding audio and video learning repeatedly is possible if we do not understand the topic of discussion at the first stage.

Sourced from Clover (2017)

Accordingly, the benefits of e-learning have been emphasised by various scholars. One instance can be Thomson (2010), who has elucidated that the benefit of flexibility in an online course cannot be embellished which is why students are appealed to online learning. Online learning permits students to work at any time and any place which is companionable with their learning needs. You and Kang (2014) stated that online courses are beneficial to students who support self-regulated learning. Self-regulated learners have a propensity to use several "cognitive and metacognitive strategies to accomplish their learning goals" (You & Kang, 2014:126). In the same token learners who are capable to get better on their self-regulated learning skills habitually has a good time management skill, review their material frequently, seek help from professors or peers, meet deadlines, and they have the skill of metacognition in order to reflect upon their learning (You & Kang, 2014).

Similarly, Pegu (2014) stated that among the different e-learning aids, increased access to learning, content delivery flexibility, a combination of education and work, a learner-centred approach, higher quality of education and new ways of communication, can be taken as the most important ones, while employers benefit from a high quality of professional development in the workplace because of enhanced employees' skills and increased efficiency. Bichsel (2013) added that e-learning

increases opportunities for collaborative learning so that classroom debates have no limit and do not need the presence of the teacher.

In the same way, Hirut (2011) designated that one of the benefits of e-learning is that it reduces the amount of face-to-face lecture time needed and allows the institution to cope better with the large numbers of new students each year, while it avoids shortages inhuman and material resources. He also mentioned that it can minimise lecture time so that the teachers can participate in research activities and community services and develop their technological skills, and it offers the opportunity for greater interaction between the students.

To further clarify the value of e-learning as a resource in higher education, Steffens and Reiss (2010) revealed that e-learning increases efficiency by saving costs like travel costs, facility costs, and payments for teachers which could reduce the expense considerably. Furthermore, Barr and Miller (2013) stated there is no need for the erection of large buildings because virtualisation of teaching and learning overcomes limitations on the number of learners. In addition, e-learning initiatives increase enrolment, increase revenues, enhance curricula design and improve the reputations of some higher institutions (Bichsel, 2013). Barr and Miller (2013) also suggested that, although the technological tools, software and training may be expensive in starting up and developing online programmes, the investment would pay off and would be highly cost-effective in the long run for HEIs. In particular, digital learning tools like electronic books and journals, audio devices, recorders and CD-ROMs were suggested to increase students' success in their learning.

Education must be a government priority in development plans. Thus, expenditure on education may help to cultivate economic development, improve productivity, contribute to people's personal and social development, and help reduce social inequalities. Developing countries need to use policies to apply ICT to be the major goal in HEIs and even at lower level educational stratum despite the strained resources for the high cost of ICT. Among the Arab world, Jordan ranks number one in education. The country's Ministry of Education is now making computer literacy to be mandatory for students and forced students to apply their studies in computers on their regular studies, most especially to the scientific and mathematical courses. Thus, Jordan's educational system meets international standards and its secondary

education programme is accepted in world-class universities throughout the world (Al-Shalabi, Andraws, Alrabea & Kumar, 2012).

As can be seen, the benefits of online learning are not widely applied in developing countries particularly in Ethiopia. Thus, as mentioned in the preceding chapter the main objective of this study is to explore students' practice regarding the use of e-learning and what challenges have been experienced by students as the aim of the study is to develop a student-centred e-learning framework in an Ethiopian context to support Ethiopian HEIs.

2.8 E-LEARNING FRAMEWORK AND DIMENSIONS

This study aims at developing a student-centred e-learning framework with the perspective that contribute to facilitate and implement e-learning in Ethiopian HEIs and to fill the gap in the already developed frameworks for developing nations. Garrison (2011) stated that a 21st century goal is to provide a framework that will be used for higher e-learning education.

A well-known study was conducted by Glancy and Isenberg (2013) on a conceptual e-learning framework that supports self-directed learning. This conceptual framework has been developed using three theories namely the andragogy theory, transformative learning theory, and media synchronicity theory. This framework supports self-directed learning as it has the potential to surpass not only the currently available online systems but also traditional face-to-face learning for adult education with better outcomes. Increased online activity, innovation, and creativity were the results of the study.

A study was done by Huang (2010) on hybrid e-learning models to derive a planning and implementation framework for HEIs. Using the Taiwanese part-time library and information science (LIS) in the postgraduate programme, he tried to identify the challenges faced in the administrative operation of the library by generating possible e-learning opportunities to assuage the hurdles. An interview was conducted using a qualitative approach. As a result, four practical ways were found that can help the LIS staff to formulate an action plan in the programme with the use of e-learning.

Another study on an e-learning framework was done by Kituyi and Tusubira (2013) with the objective of designing a framework to assimilate e-learning into HEIs in

developing countries. Using a questionnaire to collect data and descriptive statistics for data analysis, the researchers found out that using the implementation of the developed framework with a step-by-step approach the results of students were improved who are learning in some developing countries HEIs.

Aparicio et al. (2016) summarises various e-learning studies to derive an e-learning theoretical framework. According to this study, the theoretical framework has three dimensions: users, technology and services related to e-learning. The purpose of the study was to show that a framework can provide a foundation for e-learning studies. The study classified the relevant stakeholder groups and their relationship with e-learning systems. Thus, this e-learning framework provides a topology for the development of an e-learning system.

Another study done in Pakistan by Farid, Ahmad, Niaz, Arif, Shamshirband and Khattak (2015) showed that e-learning is not a first choice and does not occupy the place it should in the developing countries. Thus, the study identified and analysed the critical issues, which create barriers to e-learning promotion in Pakistan and developing countries. The research used a mixed-method approach to collect the data from experts in public sector universities of Pakistan. The study identified and classified five critical dimensions (factors) to promote e-learning: software, technical expertise, and institutional, personal and cultural will.

A study done by Sangheethaa (2016), found that, even though Ethiopian public universities have invested much in e-learning, the development of the system and tools used by the teaching and learning community seems to be slow. The research studied the effectiveness of e-learning systems in selected universities of Ethiopia and was conducted using three dimensions: the ability to learn autonomously using e-learning; learner-content-interaction in e-learning; and learner-instructor interaction in e-learning.

A similar study by Aguti, Walters and Wills (2014) claimed that limited studies have been done to develop an e-learning framework to use and to support HEIs' student-centred learning. The results of the survey show that by using e-learning effectively, student-centred learning can be boosted. As a result, a methodological framework was proposed with different factors which can evaluate the effectiveness of blended e-

learning based on four dimensions: e-learning readiness, e-learning course delivery strategies, quality e-learning systems; and effects of blended e-learning.

Similarly, Ayele and Birhaine (2018) conducted an empirical study that examined e-learning acceptance and its use in Ethiopian public universities. This study was conducted with some teachers who are taken as a sample. The result of the study identifies eight major determinant factors on e-learning effectiveness: perceived usefulness (PU); perceived ease of use (PEOU); organisational factor (OF); management support (MS); incentives (INC); training (TRA); behavioural intention (BI); and actual use (AU). In Table 2.1, a summary is done for the different studies conducted on e-learning and higher education.

Table 2.1: Examples of e-learning dimensions in the higher education context

Author and year	Purpose of the study	Dimensions on e-learning	Number of items created	Samples
Farid et al. 2015	To identify and analyse the impact of critical issues which are creating barriers in the promotion and implementation of e-learning in the developing countries	Five dimensions • Software • Technical • Institution • Personal • Cultural	16 critical issues	E-learning experts from different public sector universities
Aguti et al. 2014	• To propose a framework to help to understand the factors influencing the effectiveness of blended learning • To measure the level of effectiveness of blended e-learning in universities	Four dimensions of e-learning framework • Course delivery strategies • Readiness • Quality system • Effective blended e-learning	67 items were created, with 23 items for course module design strategies dimension, 24 items for e-learning readiness, 15 items for quality e-learning system dimension, and seven items for effective blended learning	Experts in the universities
Ayele and Birhanie (2018)	• To identify determinants on e-learning acceptance and its use	• PU • PEOU • OF • MS • Incentives (INC) • Training (TRA) • BI • AU	33 items	University teachers

As discussed above, though there are several studies on e-learning frameworks, Khan's e-learning framework is one of the better-known works in the area. His study is discussed below as the current study is guided by this theoretical framework.

2.9 THEORETICAL FRAMEWORK: KHAN'S E-LEARNING FRAMEWORK

A theoretical framework of a study is defined in many ways. Swanson (2013) defined it as a structure that summarises concepts and theories, which are developed from previously tested and published knowledge and which can be synthesised to provide a theoretical background, or it is the basis for the data analysis and interpretation of the research data. It includes the theories developed by experts in the field of study in which the researcher plans to ground his research and which will be used as a basis for the data analysis and interpretation of results.

For this study, Khan's e-learning framework was used as a frame to develop the interview questions that in turn helped to explore the e-learning challenges that students experienced in the learning process. Using the e-learning framework, 20 in-depth, open-ended, semi-structured interview questions were developed. Khan's framework for e-learning has been used by many researchers in the field and is used as a guide to understanding important e-learning dimensions. He cited different factors, that include a range of online learning cases in terms of their way of teaching, the technology, the school management, the support gained in terms of resources, its evaluation, the interface simplicity, institutional and ethical point of view. The eight dimensions of the framework provided guidance on the status and challenges of e-learning in Ethiopian HEIs and helped the researcher to develop a student-centred e-learning framework. Khan (2007) and Khan and Smith (2007) explained that the different elements within the eight dimensions of the framework were found to be valuable in many studies that were done to review e-learning programmes, resources and tools.

Khan (2001) explained that advances in ICT and improvements in science learning present opportunities in the e-learning arena which can be used to construct a well-designed, learner-centred, engaging, interactive, affordable, efficient, easily accessible, flexible, meaningful, distributed and facilitated e-learning environment. He also mentioned that the e-learning process requires further investigation and analysis on how to use the potential of the internet in line with the instructional design principles

and the matters that are important to various dimensions of the e-learning environment.

As mentioned above, the researcher found eight dimensions within the framework, each of which has several sub-dimensions (Khan, 2001).

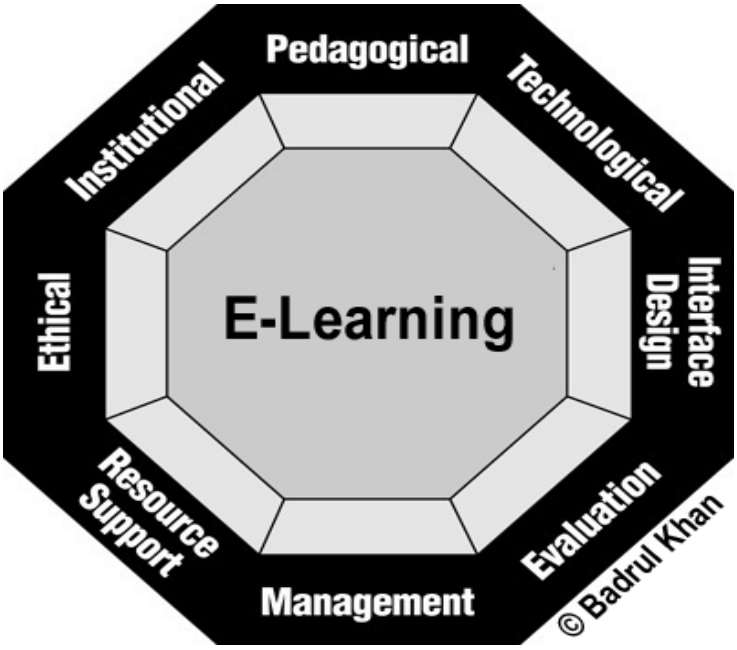


Figure 2.1: Khan's e-learning framework

Source: (Khan 2001:46)

1. Institutional dimension: this dimension is mainly concerned with issues of administration. Some of these are organisational change, curricular qualification, budgeting, and return on investment (ROI), ICT services, curriculum development and media services, marketing faculty and staff support, instructional affairs, workload, class size, compensation, and intellectual property rights; and student services. Under student services, there are other factors such as pre-enrolment services, course and programme information, orientation, advising, counselling, financial aid, registration and payment, library support, bookstore, social support network, tutorial services, internship and employment services, and other services related to e-learning. This dimension helps to explore the e-learning challenges students experienced in the teaching-learning process in selected Ethiopian HEIs and issues related to administrative affairs such as e-learning orientation, awareness and training.

2. Pedagogical dimension: this dimension of e-learning refers to the teaching and learning process. This dimension addresses issues concerning pedagogical issues like goals/objectives, content, design approach, organisation, methods and strategies, and the medium of e-learning environments. It addresses issues concerning e-learning teaching and learning, e-learning interactivity, mode of delivery and the contents update on the e-learning portal. This dimension helps to explore the e-learning challenges in the teaching and learning process for students in selected Ethiopian HEIs.
3. Technological dimension: This dimension of the e-learning framework examines issues of e-learning technological infrastructure. Technological infrastructure includes hardware, software and infrastructure planning. This dimension helps to explore students' problems on lab computers facility, ICT infrastructure, hardware and software in the e-learning administration in selected Ethiopian HEIs.
4. Interface design dimension: It refers to interface design and includes page and site design, content design, navigation, and usability testing. This, in general, refers to the overall look of the e-learning programmes. This dimension helps to explore the e-learning portal, navigation and usability in the e-learning process that students experience in selected Ethiopian HEIs.
5. Evaluation dimension: It refers to both the assessment of learners and the evaluation of instruction and the e-learning environment as a whole. This dimension refers to the feedback, examination and evaluation of students and assessment by teachers on the e-learning portal.
6. Management dimension: This dimension of e-learning refers to the maintenance of the learning environment and distribution of information between students, between students and teachers and between the institution and the staff or students.
7. Resource support dimension: This dimension of the e-learning framework examines the online support given by the teachers and other supporting staff such as, instructional and/or counselling support, technical support, career counselling services, other online support services and resources (i.e., both online and offline) that are required to cultivate a meaningful learning environment. This dimension also refers to the exploration of e-learning challenges that students experience in selected Ethiopian HEIs concerning technical and human resources, electronic resources and ICT resources.

8. Ethical dimension: This dimension of the e-learning framework denotes the relationship of e-learning to social and cultural diversity, bias, geographical diversity, learner diversity, information accessibility, etiquette, and legal ramifications. This dimension refers to the exploration of the e-learning challenges that students experience in selected Ethiopian HEIs in relation to e-learning policy, rules and regulations.

The reason that this particular research uses Khan's e-learning framework is that the eight components of the framework are globally accepted as an e-learning instructional design method in which it encompasses various important e-learning issues. Singh (2003) further approves this idea based on his research as Khan's framework helps as a guide to planning, developing, delivering, managing and evaluating blended (both face-to-face and e-learning) learning programmes.

Khan (2003) further explained that e-learning can be viewed as an inventive approach to delivering a well-designed, learner-centred, interactive (teachers and learners), and facilitated learning environment to anyone, at any place, and at any time, by using the various digital technology resources and attributes along with other forms of learning materials.

For this research, the main goal was to explore the e-learning practice and challenges that Ethiopian higher education students experience in some selected institutions and to formulate and employ major themes of e-learning practice and challenges. The researcher, therefore, developed a quantitative questionnaire, collected the data, and accordingly done analysis. After the analysis using appropriate software, a student-centred e-learning framework was developed in the context of Ethiopian HEIs.

2.10 CHAPTER SUMMARY

This chapter has included the theoretical framework of the study with an ample review of the related literature. E-learning concepts and approaches, the practice of using e-learning, challenges of e-learning, benefits of e-learning and e-learning framework dimensions. This chapter also identified and discussed the theoretical framework of the study which is Khan's e-learning framework. In the following chapter, higher education in Ethiopia and related issues are discussed.

CHAPTER 3:

E-LEARNING SYSTEMS IN ETHIOPIAN HEIS AND IN DEVELOPING COUNTRIES

3.1 INTRODUCTION

Education is the base for any nation's development as it encompasses the accumulated knowledge of the ages. It is indispensable to individuals and society; without it, one can say that failure is inevitable to an individual, a society and a nation in general. As Sree and Srinvasan (2015) explained, education is an integral part of human life as it is an essential and significant factor in the development of human beings. Consequently, higher education is considered as instrumental in achieving poverty reduction goals and augmenting social, political and economic development in developing countries like those in Africa (African Union, 2014; World Bank, 2000).

In this chapter, the status of higher education in Ethiopia; e-learning systems in Ethiopian HEIs and in developing countries; factors affecting e-learning implementation in Africa; challenges related to ICT in Ethiopian higher education; national ICT policies and strategies; and e-learning initiatives in Ethiopia are discussed. Moreover, learning theories and online learning theories are discussed. In this chapter, different e-learning factors that affect the e-learning environment in Africa, particularly in Ethiopia, are addressed.

3.2 HIGHER EDUCATION IN ETHIOPIA

Some researchers have claimed that higher education in Ethiopia is as old as the Obelisks of Axum and goes back to the monastic traditions of the Orthodox Church as far back as AD 300 (Abebe, 1995; Kebede, 2010; Saint, 2004; Teferra, 2017; Teferra & Altbach, 2004; Wagaw,1990).

The aim of church education is not only to provide training to priests and monks, however. It is also for civil servants such as judges, scribes, treasurers, governors and general administrators (Wagaw, 1979). In fact, higher education in its modern form is commonly traced back to the opening of AAU College in 1950 (Asgedom & Hagos, 2016; Wagaw, 1990). Between the 1950s and the last decade of the 20th century, the

country had only two public HEIs and there were no private higher education providers (Yirdaw, 2016).

However, expansion initiatives in the last decade of the 20th century increased the number of universities to eight (Bishaw & Melesse, 2017). According to Ethiopian Education Strategy Centre (2015), there were plans to increase the total number of public universities to 44 by 2020. To further emphasise the expansion, the Ethiopian Ministry of Education (MoE) stated that the country had 319 517 students' enrolled in its higher education system in 2007-2008. In 2017, more than 800 000 students were enrolled in the higher education system in 37 public and 124 accredited private HEIs in both undergraduate and graduate curricula (MoE 2017).

On the other hand, concerns were expressed about the increased enrolment of students that failed to take into account the limited human and other resources of universities leading to overloading of academic staff, a heavy teaching workload and repercussions for quality education (Akalu, 2014; Ashcroft, 2010; Ayalew, 2017; Tessema, 2009). Moreover, necessary infrastructure such as furniture, ICT, laboratories and library resources were also in short supply in Ethiopian universities (Akalu, 2014; Ayalew, 2017). Having a more equitable higher education system while also providing much-needed access has also been another monumental challenge for Ethiopian higher education authorities.

Accordingly, UNESCO (2015) and Raynor and Ashcroft (2012) stated that the Ethiopian government invested more than 40% of the budget in higher education. However, despite this expansion, the country's higher education system is still considered limited by global comparison, since the current gross enrolment ratio that stands at a little over 8% (UNESCO, 2015) has not reached the minimum 15% gross enrolment margin suggested by Trow (2007).

3.3 E-LEARNING SYSTEMS IN ETHIOPIAN HEIS

In terms of e-learning systems in Ethiopia, the Ethiopian Education and Research Network (EthERNet, 2014) programme, was established in 2001. It aimed to deliver a highly interconnected research system with a high-performance network to facilitate teaching-learning and information exchange. However, its effectiveness and wide use were not realised and it seems that it was still at the pilot stage (in 2020 when the

current research was conducted) and that HEIs were still waiting for the realisation of the system promised by the government. According to Dessalegn (2014), one of many reasons for the non-performance of the system is that academic staff of higher institutions barely use it: it is largely used for email correspondence and some browsing access to scholarly articles and other online resources. Karsenti, Collin and Harper-Merrett(2012) further stated that the use of ICT-supported activities for supporting teaching and learning activities is a huge challenge for many African countries with Ethiopia (Khan, 2001) being no exception.

In 2003, the strategy to further expand higher education was planned so that the contribution of higher education would directly contribute to the economic growth and poverty reduction national strategy. After that, a new Higher Education Proclamation came into force. In 2009, the Ethiopian MoE emphasised educational quality along with institutional autonomy and encouraged applied research to assist with the creation of income (MoE, 2015).

Nega (2017) stated that about 80% of the population of Ethiopia is young; the school-aged population between the ages of 5 and 24 years comprises about 50% of the total population and is growing rapidly. Figure 3.1 overleaf provides an overview of the general education and training system of the country.

The government of Ethiopia has shown dedication to expanding equality of admission to higher education over the past three decades. According to the MoE (2018), the number of public HEIs increased from 2 to 36 between 1991/92 to 2014/1 and the number of private HEIs which cater for about 15% of total admissions increased to 98. The number of both undergraduate and graduate-level students who enrolled with public HEIs between 2004/2005 and 2016/17 rose from 585,152 to 860,378 (MoE, 2018).

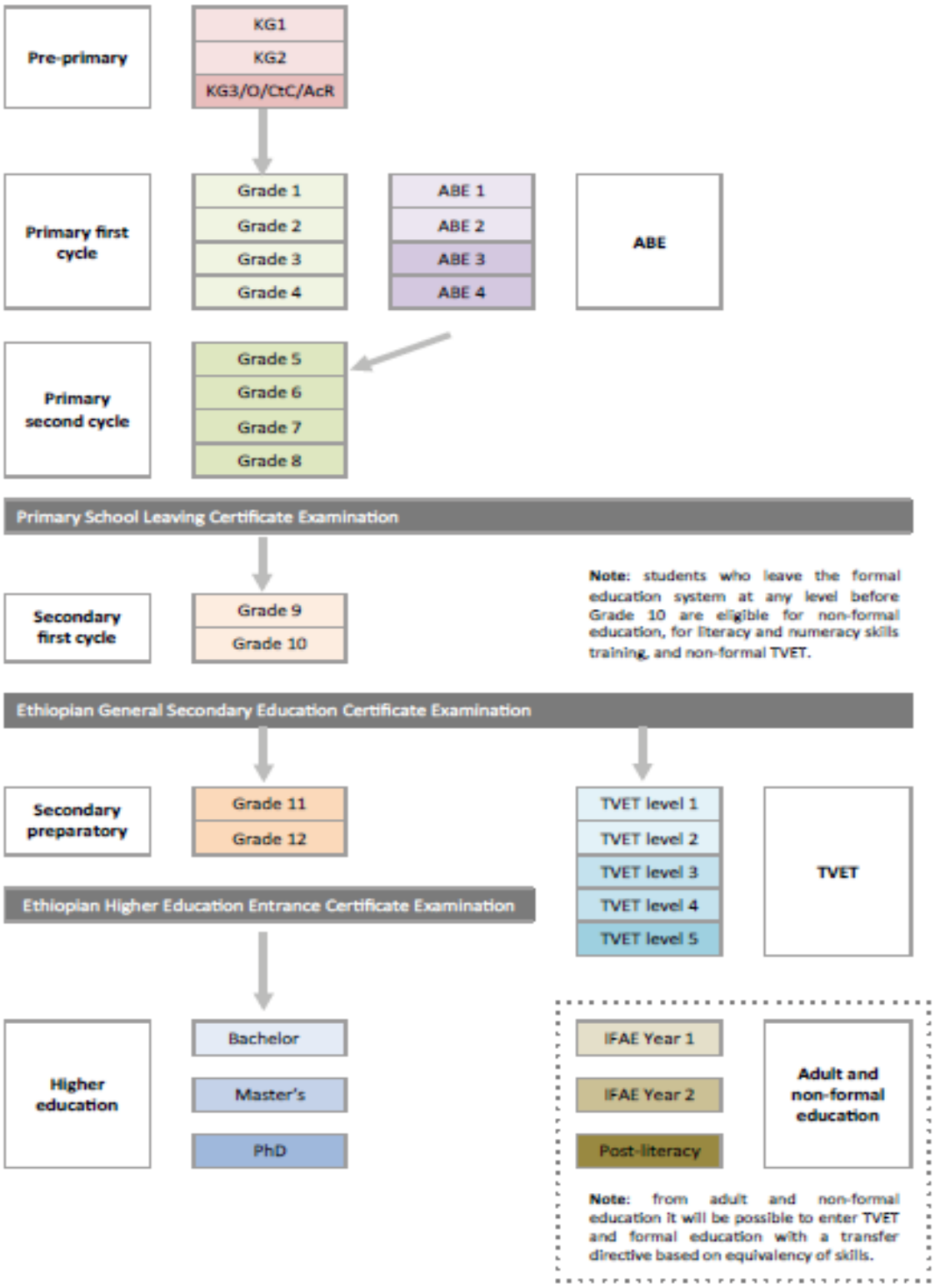
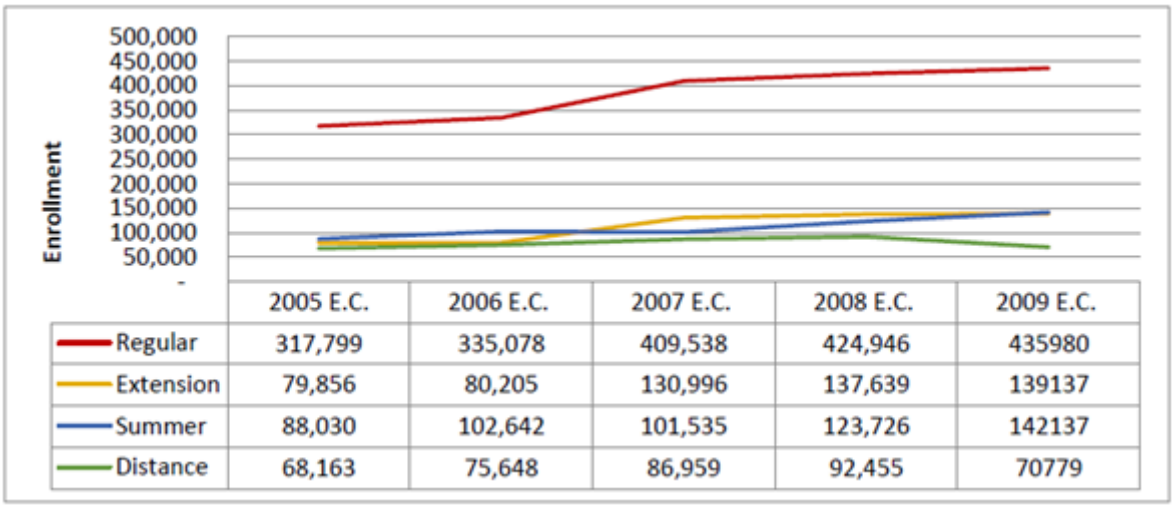


Figure 3.1: Ethiopian general educational system

Source (MoE, 2018:2)

According to educational statistics report (MoE, 2018), there is an increasing number of students enrolled in all public and private educational institutions across the country. Figure 3.2 and 3.3 show this increasing trend of higher education students in both public and private HEIs (MoE, 2018).



	2005 E.C.	2006 E.C.	2007 E.C.	2008 E.C.	2009 E.C.
Regular	317,799	335,078	409,538	424,946	435980
Extension	79,856	80,205	130,996	137,639	139137
Summer	88,030	102,642	101,535	123,726	142137
Distance	68,163	75,648	86,959	92,455	70779

Figure 3.2: Trends in undergraduate enrolment in public and private HEIs

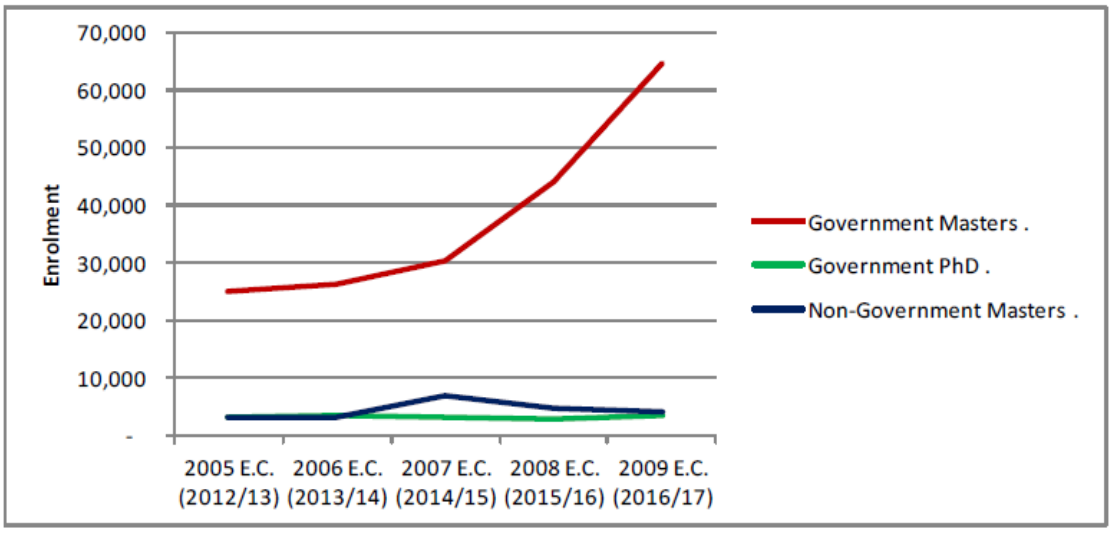


Figure 3.3: Trends in postgraduate enrolment in public and private HEIs

The demand to join Ethiopian HEIs is very high and the country cannot satisfy the demand despite the ever-increasing establishment of such institutions. The government has employed various resourceful approaches to address the quality issues in higher education spanning from applying a modular curriculum to the establishment of quality assurance offices in each university. However, universities

are still short of supplies, reference books, lab and workshop equipment and ICT facilities (MoE, 2018). The MoE experts have constantly suggested that the use of e-learning in the HEIs can provide a solution to the ongoing problems (MoE, 2018). However, some researchers have suggested that Ethiopian HEIs problems cannot be solved with the introduction and implementation of e-learning, as the challenges are insurmountable (Belwal et al., 2010; Beyene, 2010; Ketema & Nirmala, 2015).

Ethiopian HEIs such as Jimma University, Hawassa University, Bahirdar University, AAU, Arba-Minch University, AMBO University, ECSU, Haramaya University, and PESC Information Systems College are some of the HEIs adopting Moodle as their form of LMS in using e-learning to support the teaching and learning process (Ketema & Nirmala, 2015). Nevertheless, the application of such programmes still has its challenges. Beyene (2010) stated that the application of LMSs in Ethiopian HEIs (EHEIs) has not been studied thoroughly. He maintained that the problems in implementation are usually technological. He, therefore, proposed that researchers did further studies to develop a general model to identify the successes and failures. Hagos and Negash (2014) examined students' acceptance of e-learning systems in EHEIs directed by the TAM and found that the willingness of students to use e-learning systems was high but it depended on factors such as PU and PEOU of the system.

From the above studies, we can conclude that there is a rising demand to use e-learning among EHEIs to support learning such as combined learning or purely online learning. However, there are several challenges to implement and assure for the continued usage of the system.

3.4 E-LEARNING STATUS IN DEVELOPING COUNTRIES

In this technological era, the use of ICT and e-learning plays an important role in facilitating work and the learning and teaching process. The recent advancement of e-learning is helping the developed countries because of the nature of the technology's demand of infrastructure, technology, relevant content and responsive learner community. Because of the nature of e-learning, any person can use it from anywhere using the internet.

As seen in other sectors of the economy, the implementation of the technology of e-learning is very late. It has a direct relationship to the delay in establishing the internet

in those countries. Despite its lateness in reaching these nations, the demand by students and higher institutions is very high (Alkharang, 2014).

E-learning is used in many developing countries as a solution to the incremental demand for higher education. In Pakistan, for example, online education is promoted as “education for all” as it aims to reach out to students who don’t have the chance to afford the cost of conventional higher education (Iqbal & Ahmad 2010). In Botswana, e-learning solves the problems of large classrooms, increasing acceptance, and limited staff (Ikpe, 2011). Ikpe (2011) further specified that the decision to integrate e-learning was not born out of a longing to be an education system known for its technological prowess. Rather, its implementation was to solve practical problems related to access and the quality of learning experiences.

Among the various studies done on e-learning status in developing countries, a study by Unwin (2008) is one of them. According to his research report on e-learning in Africa in 2007, many of the respondents could not identify which LMS they were using from the different technological platforms. According to their responses, they were not using an integrated form of formal LMS but were instead using basic digital technologies like accessing simple web technologies for information.

Thus, all the above information shows us that that e-learning is at its start in Africa. As an outcome of this study, in 2008, the federal government of Ethiopia together with the regional states’ Technical and Vocational Education and Training (TVET) ICT sector councils devised a strategy to expand ICT and blended learning; e-module development; TVET distance education development; human capital development; and other related factors that help to avail ICT in TVET (Unwin, 2008).

Developing countries like Ethiopia are still using traditional learning mechanisms and the e-learning market does not yet seem to be apriority for the government. This might be because of the cost implications that the technology has for developing countries. Learners from these nations have financial constraints which limit their participation in the programme and limited access to get thee-learning equipment. The UN Conference on Trade and Development (UNCTAD) said in its Information Economy Report 2007–2008 that the dispersal of ICT in developing countries is increasing but such countries lag far behind the developed world in the use of ICT and its use by businesses (UNCTAD, 2008).

3.5 FACTORS AFFECTING E-LEARNING IMPLEMENTATION IN AFRICA

As the second-most populous African country, Ethiopia has realised exponential growth over the past few years in the public higher education sector as a consequence of the national higher education strategy that is characterised by investments in higher education and improved enrolment capacity (Molla, 2014). HEIs contribute by delivering increasing numbers of graduates to contribute to the national objective to reach middle-income status over the next decades (Federal Democratic Republic of Ethiopia, 2009; World Bank, 2013).

There are many dynamics which distress the e-learning implementation in the teaching-learning process in Africa. To identify these factors, various studies have been conducted, such as that on the Muhimbili University of Health and Allied Sciences (MUHAS) study from Tanzania. The results showed that quality-related factors such as the capacity of instructors and the quality of the system were perceived to be the underlying success factors for the usefulness and satisfaction of learners to use it on an ongoing basis (Lwoga, 2014). Not only that, but the results also showed that information quality plays a significant role in the usefulness of the learners' E-LMSs.

Another study on the PHEI in Johannesburg, South Africa, found that financial resources, staff technical skills, and the expense of e-learning technologies affected the implementation of e-learning in the continuing education sphere (Jakovljevic, 2009). Meyer and Warnich (2010) found that the adoption of e-learning in continuing education in South Africa was affected by inadequate teacher training resources, insufficient departmental support, overcrowded classrooms and administrative overload.

A study in Ghana disclosed that implementation of an e-learning platform was impacted by 17 factors which the researcher categorised under learner, instructor, technology and institution (Frimpon, 2012).

Another study conducted by Mavengere and Ruohonen (2010) at the University of Botswana and the Catholic University of Mozambique, categorised the factors that affect the LMSs in African Universities as computer literacy, computer infrastructure, collaboration/sharing culture, human resource (IT staff) and leadership support. The

research also showed that implementing e-learning in African HEIs needs to take the above issues into consideration.

A study conducted in three African nations – Kenya, Uganda and Tanzania – on the implementation of e-learning (Namalefe, 2010), revealed two major inhibiting factors: the curriculum and school-related factors. These factors were further categorised as access to e-learning services; internet connectivity; instructional language; software availability; school leadership; and the compulsory or optional status of subjects. Harrison (2010) found that a major problem Africa faces with the implementation of e-learning is an infrastructure problem. This is related to insufficient resources such as computers and funds; lack of proper curriculum development for e-learning teaching; and shortage of trained teachers in the areas of e-learning.

Zhu and Mugenyi (2015) conducted a study at two universities in Uganda and Tanzania. The study showed that the implementation of institutional policies, the capacity of instructors and internal investment in the educational technology sector were major threats for the universities. Another study conducted in Tanzania by Ndume et al. (2008) revealed that management systems, methodology, technology, resource accessibility and availability, the culture of education and learning styles, design of tools, intellectual investment and global business were factors that affected e-learning implementation. In addition, continuous power supply disruptions from an unstable power grid impacted the implementation of e-learning in Tanzania. The affordability of internet connectivity in Uganda and Tanzania had a major impact on e-learning implementation.

Another study was done in Tanzania by Mosha and Bea (2014) in the University of Mzumbe. The study was conducted with 50 participants selected from five faculties, two institutes, and three directories and found that lack of skills on how to research internet resources, inadequate computer hardware, lack of training on how to access and use e-resources, and poor internet connectivity were the major hindrances to e-learning implementation.

Another major study was conducted in 21 sub-Saharan African countries by Onguko (2010) and found that physical, cultural, socioeconomic and pedagogical factors limited the implementation of e-learning. These factors were categorised as lack of electricity and repeated power outages; sub-standard technology infrastructures;

congested computer labs and weak bandwidth; high satellite costs for internet connectivity; expensive software licences and high equipment maintenance costs; insufficient and inappropriate software. A study conducted in Sudan by Alamin and Elgabar (2014) found the two major factors in e-learning implementation to be technical and social.

Ssekakubo, Suleman and Marsden (2011) conducted a study in five well-known universities from four African countries, namely, Makerere University (Uganda); University of Nairobi (Kenya); University of Zambia (Zambia); Nelson Mandela Metropolitan University (South Africa), and the University of Cape Town (South Africa). The results showed there were high ICT illiteracy rates among students; low confidence in using the technology; usability issues with LMSs; poor marketing strategies; ineffective maintenance strategies and inadequate user or low technical support. Namisiko et al. (2014) conducted a study of private universities in Kenya. They identified the availability of ICT infrastructure, e-learning curriculum, instructor competencies, performance expectancy, PU of e-learning by students, and PEOU of e-learning by students as factors that supported e-learning implementation.

A study conducted in Uganda by Kasse and Balunywa (2013) found three major factors that were responsible for the failure of e-learning in institutions: infrastructural challenges (lack of electricity, lack of necessary devices like computers to facilitate continuous access to the e-learning, higher internet costs and its availability, and lack of space for the establishment of e-learning centres among others); technical competence (lack of pedagogical skills and lack of competence to set up, run and maintain e-learning centres); and attitudinal challenges (e-learning for the PEOU, e-learning for the PU, and availability of the resources). In Kenya, Gunga and Ricketts (2007) conducted a study at the African Virtual University (AVU) and found that insufficient connectivity in HEIs together with affordability and poor manageability were problems.

Muller and Evans (2009) stated that there are five dynamics that hinder e-learning applications: a unified idea and services in supporting e-learning among the different departments and faculties; investment to support programmatic change; encouraging policies and procedures to offer it; easy access to e-learning resources and support for students; a conducive ICT infrastructure to support the e-learning. Another study

done in Kenya by Wanyaga, Kamau and Gikandi(2015) using a mixed-methods approach with a questionnaire and interviews revealed that the high costs that educational institutions bear for computer hardware, software and related accessories are the major hurdles in implementing e-learning in educational institutions. Yet another study was conducted in Kenya by Ngamau (2013) at the Jomo Kenyatta University of Agriculture and Technology with 156 staff the university's main campus. The results were that individual computer literacy, organisational (MS, institutional leadership, school and institution-wide e-learning strategy, ease of use of the system, and ICT infrastructure) and technology or system factors (ICT infrastructure, PU, output quality and job relevance) contributed to the poor adoption of e-learning by the two university faculties.

Another study by Rhema and Miliszewska (2010) in Libyan HEIs pointed out that the HEIs in Libya were confronted with many problems in implementing e-learning in the HEIs: students and instructors' cultural and language background; instructors and students' awareness of e-learning and their attitude towards it; the unaffordable cost of educational technologies and underdeveloped technological infrastructure; insufficient expertise in terms of e-learning in the preparation of the curricula; and the non-existence of up-to-date supervision mechanisms to support the e-learning enterprises. Another study was conducted in the same country by Kenan, Pislaru and Elzawi (2012) who identified four kinds of e-learning barriers: implementation, technological, mismanagement and cultural barriers.

A study was conducted at the school of nursing in Ain Shams University in Egypt by Abdelaziz, Kamel, Karam and Abdelrahman (2011) on the e-learning influence versus traditional discourses. The study found that learners' ability to communicate effectively with instructors was directly affected by the lack of computer skills of the learners.

A study conducted in the East African countries of Djibouti, Eritrea and Ethiopia by Tedla (2012) found that different factors like poor ICT policies, lack of enough infrastructure, lack of instructors' competency and learners, political will, educational policy and poverty were the major problems. The 2012 Africa Report on e-learning quoted in Kasse and Balunywa (2013) stated that different countries reported different problems in e-learning. The report focused on the main problems with the implementation of e-learning from a study in selected African countries.

Table 3.1 categorises the major constraints.

Table 3.1: Major constraints

E-learning constraint factors	The country most likely to identify this as a constraint	The country least likely to identify this as a constraint
Bandwidth is limited	Zambia	Kenya
Financial resources are lacking	Zambia	Nigeria
Human resource capacity is inadequate	South Africa	Tanzania
Electricity is limited	Nigeria	South Africa
Appropriate training is lacking	Kenya	Uganda
Appropriate hardware is lacking	Tanzania	Ghana
Lack of trained teachers	South Africa	Nigeria
Appropriate software is lacking	Tanzania	Ghana
Political will is lacking	Nigeria	Uganda
Corruption and theft of resources	Uganda	Zambia
Lack of good quality educational content	Tanzania	Nigeria
Pressure of poverty	Kenya	Uganda
Sustainability is not prioritised	Kenya	Tanzania
Leadership is lacking	Nigeria	Uganda
Instability and lack of security	South Africa	Zambia

Adapted from Kasse and Balunywa (2013)

3.6 CHALLENGES RELATED TO ICT IN ETHIOPIAN HIGHER EDUCATION

The Ethiopian education sector is harmfully affected by the deficiency of a stable working ICT and internet. This problem is one of the vast problems that the country needs to conquer so that it in turn will provide the potential benefits of e-learning technology to the largest section of society (Farrell & Isaacs, 2007). The ICT pedagogy integration challenges that developing countries face are mainly caused by the digital

divide gap that makes ICT unaffordable. According to Dessalegn (2013), learning is less enjoyable to many students because of the lack of entrée of their own physical devices and the required skill to use this new technology in the education system. The Ethiopian government needs a policy-level commitment on the use of ICT in education, like upgrading school curricula for ICT assimilation; teacher training on the use of ICT; formulating an affordable financial scheme to allow teachers and students to acquire ICT hardware; and developing special ICT training programmes for women and the disabled in order to address gender and social inequalities. However, to a large extent, the policy obligation is yet to be backed up by concrete moves to ascertain a whole-school support system.

Considering e-learning and the capacity of Ethiopia in using this technology taking into account internet connectivity, its affordability and other socioeconomic factors, the country is far behind both other countries in Africa and in terms of world standards. According to a study done by McKinsey & Company, there are more than 4.4 billion people in the world who do not use the internet. Among this huge population, 77% of them are concentrated in only 20 countries. Ethiopia has the biggest offline population in East Africa which accounts for about 55% (McKinsey, 2014). The 'digital divide' is of particular concern, given the potential role of ICTs in achieving the SDGs (ITU, 2018).

Ethiopia is the least internet-connected country in the world although it is the second-largest in population size and was also the second fast-growing country, growing by 8.2% in 2018 (World Bank, 2018). According to another study done by Internet World Status (IWS), (2017), only 15.3% of Ethiopians used the internet in the same year while the world average is 58.4%, and the annual increment of internet users in the last seven years shows an increase of 1.6428% per annum (IWS, 2017). The internet bandwidth is 2,2 kbit/s per user in Ethiopia, while it is 51 in Africa and 74,5 in the world (ITU, 2017). However, Zsuzsanna (2018) stated that it is clear that students can access the internet on their mobile devices but access to the internet at home or in internet cafés is limited.

3.7 NATIONAL ICT POLICIES AND STRATEGIES

To achieve the so-called Sustainable Development Goals (SDGs) in the least developed countries (LCDs) ICT plays a crucial role for economic growth and hence

social change (ITU, 2018). The 2030 Agenda for SDG recognises that linking the digital divide and increasing the spread of ICT and global interconnectedness has enormous potential to speed up human progress (ITU, 2018).

Along with other countries, Ethiopia acknowledges the importance of ICT for the government development plan. According to the government plan to have a middle-income society by the end of 2025, it has stipulated the strategies and clear guidelines in the famous growth and transformation plan commonly known as GTP 1 and 2 each run for an independent five years. Especially in the second GTP plan, the government passed different resolutions like including the private sector to participate in the ICT infrastructure development so that the costs of using the internet would fall and the quality and reach would be increased to cover the entire country. The government drafted a National ICT Policy to develop, organise and implement the use of ICT in the day-to-day life of society (MCIT, 2009). This ICT policy was based on the vision of the World Summit for Information Society (WSIS) to create a people-centred and development-oriented information society (Mammo, 2016). The implementation began many years ago with the dedication of resources to develop the ICT sector. However, the contribution of telecommunications to the GDP stayed as low as 2% in 2017 compared to the average 4% in other East African countries (USDC, 2017).

3.8 E-LEARNING INITIATIVES IN ETHIOPIA

In the past few years, e-learning initiatives took place in different educational institutions in Ethiopia. In this section, the study evaluates some of the initiatives taken by different educational institutions.

3.8.1 Technology Faculty Computer Centre at AAiT

The AAU Technology Faculty Computer Centre is one of the users of e-learning. The manager of the computer centre gave the researcher the following brief description of the e-learning initiatives that took place at the AAiT. The idea about e-learning was conceived after the participation of the staff in the first international conference on ICT for development and education entitled “e-learning Africa” held in Addis Ababa on 24-26 May 2006. The lecturers that had the zeal and interest to incorporate e-learning in their teaching activities designed an e-learning site using the Moodle open-source content management software to enhance and support the courses given by them. On

the e-learning site, course outlines, assignments and discussions were provided to students who needed a user name and login password. Assignments and quizzes were posted by teachers and evaluated electronically by the users. The e-learning site used an IP address that could be accessed within the AAU campuses. In September 2008, the e-learning site acquired its own URL http://fotel.aau.edu.et which can be accessed from anywhere. Although the e-learning system is not fully used by all the teaching staff, some teachers are using it to improve the teaching-learning environment alongside the existing system.

The benefit observed here was that it minimised the paperwork. The challenges were that not all teachers used the system or had the enthusiasm to prepare assignments and check the responses. The time needed to prepare the online assignments reduced the interest of some of the teachers to use the system.

3.8.2 Ethiopian Civil Service University

The ECSU Development Learning Centre (ECSC-DLC) was officially established in 2000. The ECSU uses digital technology to facilitate the e-learning capability throughout the Ethiopia regions encompassed by the WoredaNet programme.

The Development Learning Centre at the university uses distance learning technologies such as VSAT-based interactive video conferencing, WorldNet (District Net) videoconferencing and e-learning technologies. It organises and implements various training programmes that can augment the efficiency and effectiveness of the public sector in Ethiopia. So far, the centre offered a range of different distance learning courses, seminars and dialogues to more than 6 000 participants through interactive videoconferencing and web technologies. According to the information obtained from the ECSU director, training coordinator and IT specialist, the services at the centre consists of:

- Interactive WoredaNet Videoconferencing Technology
- E-Learning facility
- Interactive VSAT-based Videoconferencing Technology
- Multimedia facility
- High-speed internet connection with VSAT Technology

The centre has also a videoconferencing room that can accommodate 40 participants and an additional class for conducting videoconference lectures, dialogues and panel discussions with regional capitals and Woredas in Ethiopia. Short-term training is offered to public institutions at federal level. Multidisciplinary capacity enhancement courses, seminars and dialogues geared to develop initiatives in the fight against poverty have been received from all over the world with this technology. This allows participants to have a unique opportunity to share experiences, ideas, knowledge and exchange information from various countries participating simultaneously over videoconferencing.

3.8.2.1 ICT Directorate

The university's ICT Directorate provides ICT services to the entire university community that facilitate the teaching and learning process to maximise productivity. As the main objective of the university is to give a high-tech education to its students, the university facilitates the use of ICT to advance operational competence and usefulness and augment the university's global status.

3.8.2.2 Responsibilities/services

The university's academic and administrative needs are supported by a directorate called the Information Technology Directorate (ITD) which in turn develops, implements and supports the information system and its application. The main goal of this directorate is to provide the ICT resources to the teachers, staff and students that will help them in teaching, learning, and administration.

3.8.2.3 Core functions of the directorate

This directorate has a core function of developing the ICT infrastructure and communication services, helping the students to use the services, providing ICT training and consultancy, providing user support and hardware maintenance for the university staff, and facilitating the teaching-learning technology (e-learning).

3.8.2.4 What the ICT department does

The following functions are the work of the ICT department work which is the backbone of the teaching-learning process in e-learning.

- The university's teaching-learning process is supported by the ITD so that it can reach its strategic goals.
- The accessibility of the ICT service by the user is checked by the directorate in which network cabling, configuration, hardware and software allow the users to have an easily accessible service via the network.
- The ICT help desk is available on working days from Monday to Friday in helping users of the system.
- They develop and support an Online Campus System that enhances courses and tutor feedback. They also support and upgrade audiovisual equipment across shared teaching space, where lectures are offered to students.
- They maintain, enhance and support core university systems to handle education, administrative and research data.
- Their ICT professionals of the university provide ICT training and consultancy services on the school system and other database systems.
- Give protection to the system and to the users from unauthorised access and other types of security attacks. The security team provides those services and equipment at all times.

3.8.2.5 E-learning team

The e-learning team is mainly responsible for providing e-learning maintenance services for the university. The team provides information on the teaching-learning process, maintenance, accessibility, scalability, transparency, quality, and manageability.

3.8.2.5.1 Responsibilities of the teaching-learning technology team

The responsibilities of the team include:

- Production of training and course materials in an electronic format.
- Designing and administrating LMSs to organise the teaching-learning and contents.
- Provision of induction training on blended courses developed for intended customers.
- Provision of continuous e-learning support for customers.

3.8.2.5.2 E-learning support in the university

E-learning support involves:

- Conducting discussions with different experts of subject matter specialists on how to convert resources of learning into blended learning formats.
- Recording video lectures with a PowerPoint presentations combination of, audio narrations and subtitles.
- Digitalising learning and teaching materials (modules, readers and references books) for online access.
- Editing online learning materials based on end-users' needs and uploading materials developed.
- Providing induction training and technical support for customers on e-learning platforms.

3.8.2.5.3 Overview of e-learning in the university

The e-learning platform at the university was established in 2013 with the help of an e-learning adviser. It was started with two common modules delivered in the form of blended learning. In addition, short-term training began to be delivered through e-learning methods.

3.8.2.5.4 Accomplishments

Since the inception of the e-learning platform in 2015, different courses and training have been delivered to more than 1800 students. Since the university is a government-owned public university, short-term training like HRM, supply management, resource management, capital investment and revenue enhancement plans have been given to the public sector organisations through the e-learning platform. In addition,, multilateral humanitarian organisations like GTZ have provided training to more than 180 participants in eight Ethiopian cities using WoredaNet Video Conferencing and face-to-face interactions.

3.8.2.5.5 LMS

Among the different LMSs software programs, the university is using the Drupal-based package. It was selected because of its useful standard features like its ease of content authoring, its reliability in performance and its security features. Apart from this, its

flexibility and modularity are also the core principles of the software. The tools of the software can help to build the versatile, structured content that dynamic websites require. With the help of themes, it helps to customise the content of the presentation (www.drupal.org).

The system is used to upload learning and teaching materials like power points, handouts, reference materials and assignments. In addition,, the system is used to offer e-learning courses with the help of online videos, quizzes, reading pages and forums. (Information obtained from the ICT director of the University in December 2018).

3.8.3 Arba-Minch University

Arba-Minch University is one of the government-owned universities situated in the Southern Nation and Nationalities and Peoples Region. It was established in 1986 as a water technology institute with the enrolment of 181 students for two degrees and two diploma programmes. Currently, it consists of the former institute and six colleges situated in different cities of the state with a total enrolment capacity of 32 977 students and with a total of 4 867 staff of which 170 are expatriates. The main method of teaching and learning is face-to-face; however, because of the large number of enrolments, the university is also using an e-learning system. The e-learning platform is Moodle. The system is under the control of a team called the Information and Communication Technology Team (ICTT) which manages the system and provides technological support for the university.

This ICTT has different functions, mainly: management of both the wired and wireless network infrastructure; maintenance of all campus computer classrooms and facilities and peripherals; provision of services for the website, emails, video conferencing; and giving general services to the Library System and the Student LMSs as a whole.

The ICTT is taken as the main means for supporting the academic and administrative departments as support and advice for computing and technology issues (Arba-minch University; personal communication: ICT director of the University, December:2018).

3.9 LEARNING THEORIES

Different definitions have been given to learning by different scholars. Moreover, different theories have been developed to explain how learning occurs. The three learning theories which are predominantly used are the behavioural, cognitive and constructivist learning theories. These learning theories are based on experiments conducted by prominent researchers. This section discusses the three major learning theories to explain how students' learning takes place.

3.9.1 Behavioural Learning Theory

This learning theory defines learning as a change in the behaviour of the learner because of external influences. According to this theory, learning can be increased by the reinforcement of the stimuli to which the learner is exposed. This theory claims that learning is measurable through the changes in the observable behaviour of the learner. According to Ally (2004), this learning theory does not consider the non-observable changes that occur inside the head of the learner because of the learner's exposure to the stimuli. This theory focuses only on the observable and measurable behaviours of the learner while it does not talk about the complex thought processes that take place in the mind. According to Mergel (1998), the theory considers the mind as a "black box" whereby it processes the stimulus to which the learner is exposed and it gives back the response to the stimulus. However, there are processes that happen in the mind of the learner for which the theory does not give an explanation. This theory is based on the experiments done by Pavlov, Watson, Thorndike and Skinner.

According to this theory, the teacher is the sole activator of the teaching-learning process; that is, the learners are passive recipients of all the information and knowledge that are organised and structured by the teacher. It assumes that whenever the reinforcement of the teacher over the responses that the learners give to the stimulus, which the teacher prepared, increases, the higher will be the students' retention of the information will be. It implies that learning has taken place. In a classroom where there is a diversity of background knowledge, learning styles, socioeconomic status and culture, teachers will favour only some of the learners who may have the learning styles that the teacher advocates most while most of the others will not achieve the intended outcomes. Consequently, the teacher should try to reach

every student in the classroom, which will be difficult for the teacher when most schools in the world are under pressure to enrol a large number of students at a time.

3.9.2 Cognitive Learning Theory

The emphasis that the behaviourism theory of learning gives to external influences for learning to take place resulted in the advent of another theory of learning. As stated in the previous section, behaviourism does not explain the internal thought processes that the mind carries out when learners interact with their environment. The second theory of learning, namely, the cognitive theory of learning, focuses on the different processes that take place in the mind of the learner. According to this learning theory, learning is defined as a change in knowledge stored in memory (Newby, Stepich, Lehman and Russel, 1996). This theory is based on the experiments conducted by cognitive psychologists, who claim that learning involves the use of memory, motivation, and thinking (Ally, 2004). The basis of this theory is that most behaviours, including learning, are governed by internal processes rather than by external circumstances.

The teacher in the classroom is responsible for organising and structuring knowledge to be delivered to students. As the cognitive theory of learning considers the mind as an organised rather than random entity of the body, organised knowledge will help students to make meaning out of the knowledge so that the encoded knowledge can be retrieved whenever it is needed. According to the cognitive theory of learning, memory involves three major processes: attention, encoding and retrieval. Newby et al. (1996) defined these three terms as follows: attention refers to the process of selectively receiving information from the environment; while encoding refers to the process of translating information into some meaningful for that can be remembered; and retrieval refers to the process of categorising and recollecting information for a particular purpose. Consequently, the mind of learners will follow these three steps in the process of learning new knowledge. When confronted with new information, a student’s mind focuses on the knowledge and associates this new knowledge to the previous information stored in their memory. The association of the information will help the learner to memorise what has been learned, and this information can be retrieved at the right place and time for solving problems.

Instruction through the implementation of this learning theory is designed in such a way that teachers prepare learning materials that are used for instruction in the classroom. In designing the instruction, the teacher tries to interlink the different concepts to allow the learners to observe the relationships among the different concepts treated in the classroom while they are helped to give their attention to the lesson through different instructional strategies and technologies. In classrooms where this theory is practised, the instructor tries to create an environment that will help students attend to, encode and retrieve information (Newby et al. 1996).

3.9.3 Constructivist Learning Theory

In the first two theories of learning, most emphasis is given to the content that changes the behaviour of the learner; that is, the subject specialist is expected to design the content so that it can be delivered to the learners in the classroom. Learners are assumed to be mostly passive as the content is organised and structured by the subject specialist. In recent years, there has been a shift in the focus of the teaching and learning process towards student-centred learning. Constructivism is one of the learning theories which advocates the learner-centred approach for the effective retention and application of knowledge. Constructivists see learners as being active participants rather than passive participants. Ally (2004), in elaborating on this theory of learning, stated that knowledge is not received from the outside or someone else; rather, it is the individual learner's interpretation and processing of what is received through the senses that creates knowledge. This theory places the learner at the centre of the teaching-learning process, while the teacher takes an advisory and facilitation role in the process. Learners are exposed to a real-life situation from which they are required to acquire knowledge, and they are expected to construct their own reality or interpret what they observe based on their earlier experience.

This theory is based on different experiments conducted in various fields of study. These theories support the construction of knowledge through social interactions in addition to the organised content that the learners are supposed to learn. According to Ally (2004), working with other learners gives learners the real-life experience of working in a group, and allows them to use their metacognitive skills. Consequently, the learners will be able to see how different learners observe and perceive their environment. For constructivism to be effective, learners should be active constructors

of knowledge; the teacher needs to arrange the environment for the learners to work collaboratively; learners should be given full control of the learning process; they need to be allowed to reflect on what they gained from the activities they undertook; learning should be interactive for higher-order skills and knowledge to be gained; learning should be situated in a real environment; and knowledge is constructed from experience (Ally, 2004; Mergel, 1998).

This researcher chose constructivism learning theory as the objective of the study focused on individual learner's experiences with the use of e-learning in their learning environment.

3.10 THEORY OF ONLINE LEARNING

As many theorists have argued and practitioners have experienced for themselves, online learning is a subset of learning in general (Herrington & Oliver, 1999).

3.10.1 Learner-Centred

Learner-centred context is not one in which the whims and curiosity of each learner are slavishly catered to. In fact, the system must distinguish that learner-centred perspective must also meet the requirements of the teachers, the institution, and of the larger society that provides support for the student, the institution, and often for a group or class of students, as well as for the scrupulous needs of individual learners. For this reason, Anderson (2005) argued that this attribute may be more accurately labelled learning-controlled as opposed to learner-centred.

According to Bransford and Schwartz (1999), learner-centredness includes a consciousness of the exclusive cognitive structures and understandings that each learner brings to the learning context. This will help teachers to make efforts to gain an understanding of the precondition knowledge that each learner has in the construction of the new knowledge.

3.10.2 Knowledge-Centred

Bransford et al. (1999) explained that successful learning is both defined and enclosed by the epistemology, language, and context of disciplinary thought. Each discipline or field of study includes a world view that supplies unique ways of experiencing this discourse and the knowledge structures that undergird thinking. Learners also need

opportunities to reveal expert thinking, but a lack of reflective capability greatly limits learners' capacity to convey their knowledge to unfamiliar contexts or to develop new knowledge structures. The emergent theories of learning that are based on networked contexts, such as "heutagogy" (Phelps, Hase & Ellis,2005) and "connectivism" (Siemens, 2005), help us to understand that learning is about making connections with ideas, facts, people, and communities. Apparently, the internet permits users to make these connections.

3.10.3 Assessment-Centred

Bransford et al. (1999) posited the essential for effectual learning environments to be assessment-centred. By this term, they do not give unprofessional support for summative assessments (especially those used for high stakes accountability), but they look at formative evaluation and summative assessment that serve to inspire, notify, and offer feedback to both learners and teachers.

Quality online learning offers many prospects for valuation that engage the teacher, but also those that rely on the expertise of peers and external experts; others that that use simple and composite machine algorithms to assess student learning; and maybe, most importantly, those that support learners to reflectively assess their own learning. Understanding what is most effectively – rather than most simply - assessed is a challenge for online learning designers. Development in cognitive learning theories and their application to assessment design help to create assessments that are aligned with the subject content and assess cognitive processes.

Can we do any better in online learning? The attenuation of opportunities for instant communication between learners and teachers may decrease opportunities for process assessment. The enhanced communication capacity of online learning, and the emphasis of most adult online learning in the real world of work, however, give good opportunities to make assessment activities that are project- and workplace-based; that are constructed collaboratively; that help from peer and professional review; and that are infused with opportunities for self-assessment.

A danger of assessment-centred learning systems is the potential increase in the workload demanded of busy online learning teachers. Strategies that are designed to

offer formative and summative assessment with minimal direct impact on teacher workload are most needed.

3.10.4 Community-Centred

This theory allows us to embrace the critical social component of learning in online learning designs. In this regard, Vygotsky's (1978) notion of "social cognition" is relevant, as we consider how students can work together in an online learning milieu to continuously create new knowledge. These ideas have been further explicated in Lipman's (1991) community of inquisition and Wenger, McDermott and Snyder's (2002) ideas of communities of practice, to show how members of a learning community both support and challenge each other, leading to effectual and applicable knowledge construction. Diep, Cocquyt, Zhu and Vanwing (2017) also explained that the quality of participation in online communities is underpinned by a mutual sense of trust, anticipation of learning, and commitment to partake in and contribute to the community.

3.10.5 Student-Centred Learning

Student-centred learning allows students to build up communicative and collaborative skills through group work and allows them to direct their own learning, ask questions and complete tasks independently. It encourages the active participation of students in their learning (Gunga & Rickets, 2007). Teachers' support is crucial in determining the proper blend of e-learning technologies to promote communication and cooperative learning amongst students. However, it is also essential to support teachers to lead the students in understanding the various Virtual Learning Environments (VLEs) and successfully using them. VLEs embrace LMSs such as Moodle, WebCT, Blackboard and Web 2.0 technologies which have become enablers for dual learning between students and lecturers, online discussions and distance learning. According to a study done by Britain and Liber (2003), in the developed world, almost 80% of HEIs are supporting their teaching and learning by vigorously engaging in e-learning systems, and97% of universities described to be using one or more forms of VLE. In his study, Selwyn (2014) explained that e-learning technologies are used by both teachers and students. Traditional learning is often referred to as teacher-centred learning while blended learning that presents a mix of traditional learning and use of e-learning technologies is known as student-centred learning (Motteram, 2005).

This researcher chose student-centred online theory as it promotes a blend of e-learning technologies as the type of e-learning chosen in this study. It aligns with the constructivism learning theory which advocates a learner-centred approach that allows students to direct their own learning. This supports the objective of this study that focuses on students' practice and challenges with the use of LMSs such as Moodle and Durpal in their online learning environment.

Furthermore, the main challenge for HEIs is to find a framework that can be used to assist e-learning that encourages student-centred learning. This study, therefore, addresses to identify the main challenges that influence e-learning in HEIs. The framework that is developed in this study can help to facilitate and progress effective e-learning implementation to encourage student-centred learning in higher education systems. The study research presented gaps both in the existing literature and in HEIs' practical experience and challenges concerning students blended e-learning needs. Thus, the developed student-centred e-learning framework in this study considered major e-learning factors that deliver a holistic approach to improving and applying blended e-learning initiatives within these Universities successfully.

3.11 CHAPTER SUMMARY

The chapter briefly reviewed higher education in Ethiopia and e-earning systems in Ethiopia HEIs including the status of e-learning in developing countries and factors affecting e-learning implementation in Africa, challenges related to ICT in Ethiopian higher education, national ICT policies and strategies, e-learning initiatives in Ethiopia. It includes learning theories and online learning theories. In the next chapter, the research and methodology issues related to research design, research paradigm and research strategies are discussed.

CHAPTER 4

RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

This study explores the students' experience of using e-learning in their day-to-day activities in the education system and the challenges that the Ethiopian higher learning institution students experience when using e-learning. The study also identifies the major themes of the e-learning system in the Ethiopian higher learning context and developed a quantitative survey instrument using the major e-learning themes in order to develop a framework for a student-centred e-learning system in HEIs in Ethiopia, which the very reason for the study.

4.2 THE RESEARCH DESIGN

In a scientific inquiry, a researcher needs to make annotations and then interpret in detail what they have perceived. However, before the researcher observes and analyses, they need to plan what they are going to observe and analyse to answer the "why" and "how" questions. That is what research design is all about (Babbie, 2010). This study has used both the quantitative and qualitative research methodology. The qualitative research methodology is used to discover what kind of a phenomenon occurs, to build up a theory, or explain the nature of an individual's experience while the quantitative methodology address questions about causality, generalisability, or the magnitude of effect (Fetters, Curry & Creswell, 2013). Mixed-methods research, regularly referred to as the third methodological way (Teddlie & Tashakkori, 2008), draws on the strengths of both qualitative and quantitative research. There is no universal definition of mixed-methods research. Nevertheless, Creswell and Plano Clark (2011) outline that in a single research study, both qualitative and quantitative components of data are collected and examined distinctly and combined – either concomitantly or consecutively – to address the research question.

An exploratory sequential mixed-method research design was selected for this study to explore students' experience regarding the use of e-learning and the challenges that Ethiopian higher learning institution students experience when using e-learning (Figure 4.1). As in an exploratory sequential mixed design, qualitative data is first collected and analysed, and themes are used to drive the development of a

quantitative instrument to further explore the research problem (Creswell & Plano Clark, 2011; Onwuegbuzie, Bustamante & Nelson, 2010; Teddlie & Tashakkori, 2008). As a result of this design, a two-stage analysis was conducted: the researcher first collected qualitative data and analysed it to explore the students' use of e-learning and the challenges that they experienced. Then, from this process, key e-learning themes were identified and used to develop a quantitative instrument to further explore the research problem and develop the student-centred learning framework.

This research was guided by four basic research questions:

- RQ1: What are students' experiences regarding e-learning use in Ethiopian higher learning institutions? (Qualitative)
- RQ2: What are the challenges that Ethiopian higher learning institution students experience when using e-learning? (Qualitative)
- RQ3: What are the major factors impacting e-learning in Ethiopian higher learning institutions? (Qualitative)
- RQ4: What possible e-learning framework can be developed in the context of Ethiopian HEIs? (Quantitative).

The research design is depicted in Figure 4.1.

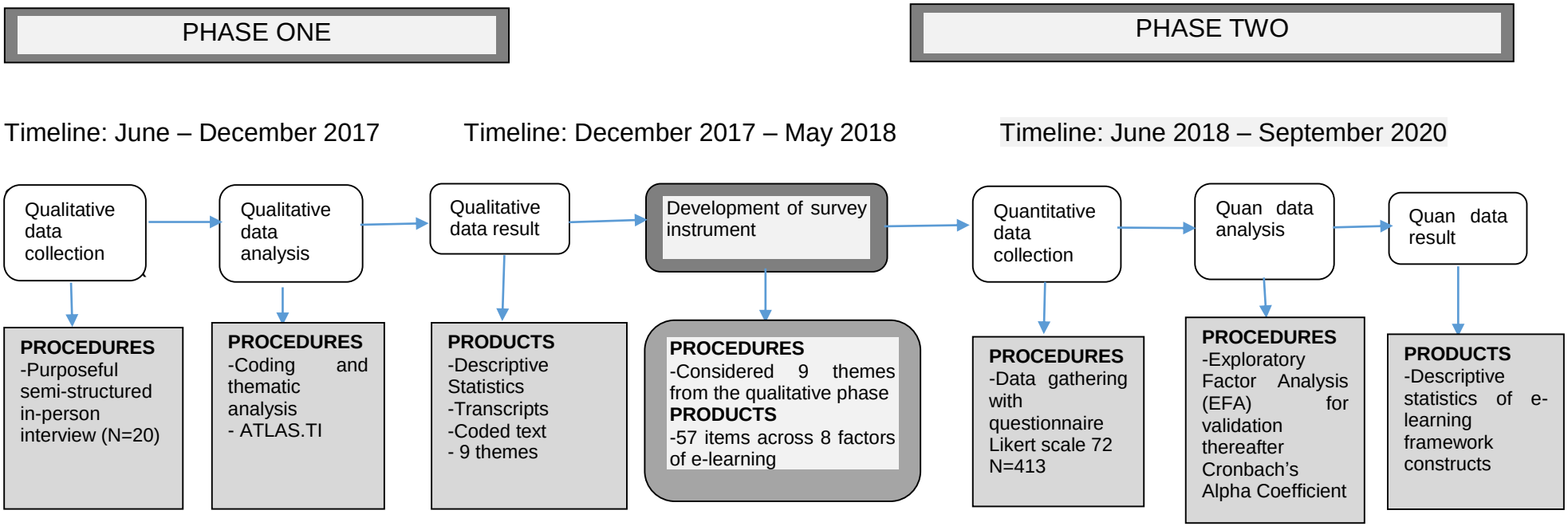


Figure 4.1: Research Design – Exploratory Sequential Mixed-Method

Phase I: This phase of the study deals with exploring students' experience regarding the use of e-learning and the challenges they experienced in EHEIs through semi-structured, in-depth interviews (see Appendix IV).

In data collection procedures during Phase 1, according to the objectives of the study, the students' experiences with e-learning use and their challenges were explored using open-ended semi-structured interview questions based on the eight dimensions of Khan's e-learning framework (see section 2.9).

Table 4.1: Eight dimensions of e-learning framework

E-Learning Dimensions	**Description**
Institutional	This dimension is concerned with administrative affairs, academic affairs and student service issues related to e-learning.
Management	This dimension refers to the upholding of the learning environment and information distribution.
Technological	This e-learning dimension examines issues of technology infrastructure in the e-learning environment. This includes hardware, software, and infrastructure planning.
Pedagogical	This e-learning dimension refers to teaching and learning. It also addresses issues concerning content analysis, audience analysis, goal analysis, media analysis, design approaches, organisation, and learning strategies.
Ethical	This e-learning dimension is related to social and political influence, cultural diversity, learner diversity, digital divide, etiquette, and legal issues.

Source: (adapted from Khan, 2005).

Phase 1 involved the qualitative approach, using semi-structured interviews (see Appendix IV and Appendix V) conducted in three selected Ethiopian universities as they used e-learning portals for teaching and learning purposes in blended learning (see Section 3.8). Data was collected through in-depth interviews and analysed using qualitative research analysis software called ATLAS.ti (see Appendix V, and Sections 5.3 and 5.4). The study units in this phase were 20 undergraduate and master's students. These students were assumed to be in a position to provide the researcher with an explanation of their experiences, opinions and challenges on e-learning usage in teaching courses and using different services provided through the e-learning portal.

Phase II: In this phase, a quantitative survey instrument was developed (see Appendix VI). The survey instrument was designed using the major e-learning themes identified in the qualitative data analysis, while in the two-phase exploration design –which was qualitative and quantitative – the results of the qualitative phase informed the second, quantitative method (Greene, Caracelli & Graham, 1989 as cited in Creswell & Plano Clark, 2011).

In this phase, pilot testing was done with 50 AMIT students as per the advice of a well-known statistician using the developed quantitative tool and a Cronbach's alpha test was done (see Section 6.3) to test the reliability of the instrument. Thereafter, an Exploratory Factor Analysis was undertaken to validate the factors for the developed student-centred e-learning framework.

Fetters, Curry and Creswell (2013) and Creswell and Plano Clark (2011) explained that the use of both qualitative and quantitative data collection methods in a single study is not adequate to classify a study as 'mixed-methods research': it is the merger of the two strands of data that defines it. Amalgamation can happen at multiple levels of a study-design-level, methods-level, or interpretation-level – and can happen in a variety of different ways – connection, building, integration, or embedding. For this study, the data linking happened at the design-point with the use of a sequential design. Thus, the results from Phase I of the research were used to construct Phase II.

4.3 RESEARCH PARADIGMS

Babbie (2010) stated that paradigms are the fundamental models or frames of reference we use to organise our observations and reasoning. Clark and Creswell (2011) described paradigms as a system of beliefs and practices that influence how researchers select their research questions and the application of methods in the study. Clark and Creswell (2011) also identified four points:

a) Post positivism is usually related with a quantitative approach;

b) Constructivism, which is normally linked with qualitative approaches, where a "from-the-bottom-up" approach is based on the participants' views to build broader themes and generate a theory interconnecting the themes;

c) Participatory, which is predisposed by political concerns; and

d) Pragmatism, which is classically related with mixed research methods, with a method that syndicates deductive and inductive thinking as the researcher mixes both qualitative and quantitative data.

In this study, the Khan's e-learning framework (discussed in chapter 2, section 2.9) was adopted as the theoretical framework. This study followed both the constructivism and pragmatism research paradigms which require a "bottom-up" approach, because the object of this study was to identify the major e-learning themes based on the students' experience of e-learning and the related challenges. The researcher developed a quantitative instrument using the themes with an exploratory mixed method research design to collect the quantitative data. The students responded to the instrument to answer the research questions .

4.4 RESEARCH STRATEGIES

As explained by different authorities in the field mainly the two categories of research methods are known as qualitative and quantitative. Myers (2013:7-8) claims that the quantitative research method emanated from the pure science field to study natural observable facts and mostly used statistical tools and packages to examine the data; while qualitative research methods were developed in the social sciences to allow researchers to study social and cultural phenomena.

On the other hand, Myers (2013:9) described qualitative research as very important if the study needs to study a particular subject in depth like exploratory research. Thus, to develop the student-centred e-learning framework for this study, this method is used by exploring the e-learning practice and challenges of the students. The major drawback of this technique is that it is often challenging to generalise the results to a large population.

The third type of research method is called mixed-methods, which combines both qualitative and quantitative methods. Creswell and Plano Clark (2018) and Plano Clark and Ivankova (2016) clarified that it purposely brings together the different perceptions, approaches, information and its evaluation which are directly related to both the qualitative and quantitative research methods to arrive at a common understanding.

The researcher used both qualitative and quantitative methods to intensify the empirical analysis of the data collected in which students' e-learning practice was qualitatively explored and the challenges students experienced in e-learning use in EHEIs were identified. Then the quantitative survey instrument was developed with the emergent qualitative themes while the quantitative data was collected and analysed using Exploratory Factor Analysis (EFA) in which a framework was prepared as a final result for EHEIs to facilitate e-learning in student-centred e-learning systems.

4.5 SAMPLING

This research used purposive sampling for both the qualitative and quantitative sections. The interviews were conducted with students taking blended online courses using e-learning portals and different e-learning services developed by the universities and a questionnaire was distributed to all 1 190 students who were using the portal.

- At the time of the research, there were over 5 500 undergraduates and 4 500 graduate (M.Sc. and PhD) students who are enrolled in AAiT; however, during the data collection time, 127 students were using the Moodle LMS e-learning portal.
- AMU is taking big steps in an intake from 8 000 registered students in 2008 to 24 000 students, in 2014 (Arba-Minch University 2014). In AMIT, during the data collection time, 300 students were using the Moodle LMS e-learning portal.
- At ECSU, there were 1 500 registered students in 2017 of which, during the data collection time, 763 students were taking online blended courses. They were using the Drupal LMS e-learning portal.

Of these, 413 undergraduate and master's students responded to the survey from the three universities (AAiT, ECSU and AMU) which were using an e-learning portal LMS (Table 4.2); i.e., a 34.7% response rate.

Table 4.2: Sample size of the quantitative survey respondents from three universities and response rates

Universities	**AAiT**	**ECSU**	**AMU**	**Totals**
Sample	127	763	300	1 190
Responses	34	228	151	413
Response rates	26.7%	29.9%	50%	34.7%

Thus, this study has taken undergraduate and master's students from AAiT technology faculty, AMU and ECSU which are using e-learning portal LMS for the classroom online teaching and learning purposes, like exam administration, assignment submission, electronic resources, discussion forum and additional e-learning services. The study collected both qualitative and quantitative data through semi-structured interviews and a survey questionnaire (see Appendix IV and Appendix VI**)** respectively.

During the exploration, three universities were selected using purposive sampling to explore the practice and challenges of e-learning. Selected universities have e-learning portals and use online blended courses. As Babbie (2010:193) pointed out, one should take into consideration the population, its elements, and the purpose of the study and the units to be observed are based on the researcher's decision on the worthiness of the representative. In addition, these universities used ICT and different portals to facilitate e-learning and they assisted the researcher to use their database. Experts within the institutions assisted in the distribution of online surveys. Therefore, these three universities (names coded as U1, U2 and U3) were assumed to be appropriate sites and their official permission letters were secured to collect data (see Appendix II).

Senior (5th year) electrical engineering undergraduate students were selected from U1 as they had experience in using the e-learning portals for courses, registration and electronic resources; and master's students were selected as they were taking online blended courses from U2; computer science and medical undergraduate students were selected from U3 as they had an ICT background in using the e-learning portals for courses and exams using their own tablets provided by the government.

- Sample of students

Selection: The final sample size (Table 4.3) from the three universities for the semi-structured interviews (Appendix IV) were 20 students in total, while eight of them were from AAiT technology faculty, seven of them were from ECSU and five of them were from AMU using a random sampling technique as the interview was done until a saturation point was reached.

Table 4.3: Sample size for qualitative in-depth interviews from the three universities

Category of respondents	AAiT	ECSU	AMU	Totals
Undergraduate	8	-	-	8
Masters	-	7	5	12
Total	8	7	5	20

4.6 INTERVIEWS

Students in different departments of the three universities were approached for in-depth interviews after getting their consent (see Appendix III). Accordingly, 20 informants were identified purposively for in-depth interviews from three universities. These interviews were conducted by the researcher using an electronic recorder and one well-trained transcriber assisted in the transcription process (see Appendix V) while the researcher was supported by university staff members when setting up the interview appointment schedule for each student.

A semi-structured interview was developed to explore issues mainly from the questionnaire while emphasis was given to questions around students' experiences of e-learning use and the challenges EHEI students' experienced when using e-learning platforms (Appendix IV). The questionnaire had two parts: Part I: Identification of practices of e-learning which is being used by the Ethiopian higher learning institution students, Part II: Identification of standard e-learning factors.

In-depth interviews were planned to be conducted among the students for issues raised above. Detailed and extensive information was obtained using the interview schedule which helped the researcher to determine whether there were other possible related issues for further discussion. The e-learning practices and challenges were explored for the use of resources and support, proficiency of the site or portal, management, technological support, the site's interface design. Ethical issues were included in the interview which ensured a better response from the interviewees using this instrument. All interviews were recorded for reference with the consent of the interviewees using electronic audio-recorder. Each interview took about 40 minutes.

4.7 DATA COLLECTION TOOLS

4.7.1 Instrument Development

As briefly explained above, interviews and questionnaires were deemed to be appropriate to gather data for this study, and the promoter and a well-known statistician approved the qualitative and quantitative questionnaires. These questionnaires were developed by the researcher and reviewed by experienced practitioners, to ensure that they were not ambiguous. These tools were not adapted from any other instruments but were derived from previous research.

4.7.2 Questionnaire Development

Two questionnaires, one for semi-structured interviews and a quantitative survey instrument were developed based on the themes identified by the qualitative interview analysis (see Appendix IV and VI). The reliability of each proposed theme and its items in the questionnaire were tested in a pilot test of 50 students. This was done to point out problems with reliability and to eliminate unreliable questions items in the questionnaire.

4.8 RELIABILITY AND VALIDITY

Reliability and validity of any research instruments are very important in any study, and researchers are expected to consider properly these factors in designing and evaluating a study (see Sections 6.3, 6.5 and 6.6).

The treatment of validity in mixed research methods is challenging because the researcher combines both quantitative and qualitative research, each with its own forms (or emerging forms) of validity (Clark & Creswell, 2008). For example, in the qualitative research paradigm, the primary focus is for researchers to capture authentically the lived experiences of people (Clark & Creswell, 2008). Though both in quantitative and qualitative research the approach is different, in both approaches, Validity serves the purpose of checking on the quality of data, results and interpretation (Creswell & Plano Clark, 2011).

4.8.1 Reliability

Reliability shows whether a specific technique is applied frequently to the same thing and produces the same result every time. Although reliability means that the use of an instrument provides the same result constantly, it does not guarantee accuracy more than accuracy does (Babbie 2010), while validity was described by Babbie (2010) as the degree to which an empirical measure satisfactorily reveals the actual connotation of the concept under thought. In other words, it means that we are essentially measuring what we say we are measuring.

Leedy and Ormrod (2013) clarified that an instrument that measures a study result is reliable, if the measuring instrument resulted in similar outcomes whenever a specific technique is applied to the same kind of items, keeping the item to be measured is constant. While Sekaran (2003) defined reliability as a pointer of stability and consistency of measures that the instrument assesses. Thus, reliability is taken as the notch to which any measurement method yields steady results over a period of time and is also an accurate version of the total population under study. This research, therefore, used Cronbach's alpha as a measure of internal consistency. Sekaran (2003) define Cronbach's alpha as a reliability coefficient that designates how well items are positively related to one another in a set.

In other words, reliability is directly related to internal consistency which George and Mallery(2019) characterised as follows: the coefficient alpha as a measure of internal consistency based on the formula α= kr/ (I + (K-I) r), where "*k"* is the number of variables in the analysis and "*r"* is the mean of the inter-item correlation. According to the authors, caution must be applied to it when the value of alpha is overshadowed by bigger variables as it will be difficult to accept its interpretation. Yet, the following rule of thumb can apply to most situations. Thus, it can be categorised "excellent", when α=0.9, while α=0.8 means "good", while α=0.7 means "acceptable", and α=0.6 means "questionable", and when α=0.5 it can be categorised as "poor", and finally α<0.5 means it is "unacceptable".

4.8.2 Validity

Validity proves that the instrument measuring an item measures what it was intended to measure (Leedy & Ormrod, 2013). Thus, Faux (2010) stressed that an effective and

practical approach to guaranteeing validity is to pre-test instruments, like questionnaires, to confirm that the questionnaire is understood by participants.

Testing validity with experienced researchers is crucial in the same way it is also imperative to pre-test instruments on potential respondents. Hence a pre-test was carried out in AMU with a randomly selected sample to strengthen the data collection instrument before conducting the main survey. Fifty (50) students were selected for the pre-test survey and they were not involved in the final sample. The results from this pilot survey were used as feedback to advance the data collection instrument by abolishing any obscurities and insufficient terms; in other words, this pre-test result has allowed the researcher to illuminate the questionnaire by selecting redundant and misunderstood items and modified them to improve its quality so that its strength and validity were improved.

4.9 DATA COLLECTION PROCEDURE

Since population and samples were determined, the researcher collected data through different means like an interview and a survey. The researcher used a research design that was appropriate to conduct the research which is called the exploratory sequential mixed-method. There are five broad reasons for mixing the methods as identified by Greene et al., cited in Creswell & Plano Clark, 2011): triangulation, complementarities, development, initiation, and expansion.

Accordingly, Creswell and Plano Clark (2011) described these reasons:

1. **Triangulation:** seeks convergence, validation, and correspondence of results from the different methods.
2. **Complementarities:** seeks explanation, improvement, illustration, and clarification of the results from one method with the results from the other method.
3. **Development:** seeks to use the results from one method to help develop or inform the other method, where development is broadly taken to include sampling and implementation, as well as measurement decisions.
4. **Initiation:** seeks the discovery of paradoxes and contradictions, new perspectives of frameworks, the recasting of questions or results from one method with questions or results from the other method.

5. **Expansion:** seeks to extend the breadth and range of inquiry by using different methods for different inquiry components.

The reason for mixing the research methods for this study was to use the results from qualitative methods to help develop or inform quantitative methods to identify the major e-learning themes or factors to develop a student-centred e-learning system framework.

4.10 DATA ANALYSIS PROCEDURE

As can be inferred from the instrumentation design, both qualitative and quantitative analyses were planned to be used in this study sequentially to identify the major themes or factors of the framework. Data encoding and analysis were processed by the latest available versions of ATLAS.ti and SPSS software. Through this software, data was categorised, summarised, organised and tabulated using thematic analysis and EFA which helped to determine the number of significant factors and tested the reliability of items of valid constructs of the e-learning framework.

Variables were coded by using a codebook which consisted of a reference sheet with a list of codes against different variables. The semi-structured interviews from qualitative results were coded and using ATLAS.ti software the transcripts were categorised thematically, while, for the statistical data analysis, the Cronbach's alpha test was used for testing the reliability of the items in the questionnaire, and the EFA which categorised the related constructs and validated to develop the framework.

4.10.1 Cronbach's Alpha Test

For this research, this test was applied to check the reliability of student's Responses on Scale Items during the pilot testing of the developed quantitative instrument before the main study data collection was done. Secondly, Cronbach's alpha test was done to test the reliability of items of valid constructs of the e-learning framework. It was developed by Cronbach in 1951. It helps the researcher to be able to measure the internal regularity of data collection instruments where the substances in an individual feature steadily measure that same dimension to find out with the correlation of which one has with the other (University of California, Los Angeles (UCLA), 2021).

It helps to measures the reliability in the fact that it helps to detect the internal reliability by determining whether the scales are dichotomous (like yes or no) or of an interval-type (like the Likert scale). As a test, we have developed a better instrument if the instrument we develop measures traits on which the value of alpha was bigger. This means a bigger alpha value has less error in measurement and healthier statistical power (Heo, Kim & Faith, 2015; McMillan, 2012; Tavakol & Dennick, 2011).

Field (2009), Heo et al. (2015) and Tavakol and Dennick (2011) stated that the coefficient of alpha values ranges between 0 and 1.0, if the alpha value is above 0.7 it means it is reliable. But as Tavakol and Dennick (2011) further explain, if the coefficient of alpha is lower than 0.7, then the reason may be that there is a small number of items or there is a lack of interrelationship among the items or a lack of uni-dimensionality; thus, the researcher should revise the items or discard them.

4.10.2 Factor Analysis

Factor analysis is a multivariate statistical process with various usages, initially; it reduces a great number of factors into a smaller set of factors. Then, it creates essential dimensions among measured variables and latent factors and allows the creation and refinement of theory. It provides factor validity evidence of the self-reporting scale (Nunnally, 1978).

They are two Factor Analysis categories called EFA and Confirmatory Factor Analysis (CFA) (Williams, Onsman & Brown, 2010).

CFA is used to study the associations between a set of perceived variables and a set of constant latent variables. When the noticed variables are categorical, CFA is also stated as item response theory (IRT) analysis (Fox, 2010; van der Linden, 2016). CFA allows the researcher to test the hypothesis that an association between the perceived variables and their causal latent construct(s) occurs. The researcher uses knowledge of the theory, empirical research, or both, hypothesises the association pattern a priori and then checks the hypothesis statistically (Suhr, 2006).

EFA is a broadly used and applied statistical approach in information systems, social science, education and psychology. Recently, EFA was applied to a range of applications, including relationships between socioeconomic, land use, activity participation variables and travel patterns (Pitombo, Kawamoto & Sousa, 2011). EFA

reduces a large number of variables (factors) into a smaller set. Furthermore, it establishes underlying dimensions between measured factors and latent constructs, thereby, allowing for the formation and refinement of theory. Moreover, it provides construct validity evidence on the self-reporting scales (Gorsuch 1983; Hair, Anderson, Tatham & Black, 1995; Tabachnick & Fidell 2001; Thompson 2004).

The main goal in the EFA is to eliminate as few factors as possible from a large set of data and to display the common variance clarified by the items. In this study, EFA was used to determine conceivable valid factors in the development of the student-centred e-learning framework for EHEIs (Field, 2009; Henson & Roberts, 2006).

As per the elucidation of the two definitions, EFA engrosses statistics of stoutly correlated variables so that some commonness can be realised from these groups of variables. EFA is one of the methods used in quantitative research; it is used to confirm the construct validity of a framework. However, we consider constructs to be constructs there must be an expressed relationship among variables (Everitt & Hothorn, 2011; Field, 2009; Pedhazur & Pedhazur Schmelkin, 1991).

As per Field (2009), the three important paybacks of using EFA are:

1. Understanding the structure of variables set.
2. Constructing a questionnaire to measure an underlying variable.
3. Reducing a data set to a manageable size while retaining the original information as much as possible.

Items with low communalities (0.2 or lower) could be considered for removal and the EFA repeated. In this study, no items were removed (all communalities are above 0.2) (see Table 6.5). Thus, we can say that EFA is not merely a statistical technique but conceptual involving art also. It is the researcher's duty to identify various constructs and give identification names when variables or items are grouped to form different constructs based on the research idea. Thus, different authors like Field (2009), Hair et al. (2014) and Henson and Roberts (2006) agree that the naming should be done by the researcher while EFA will identify the groups through correlation.

Based on the nine e-learning themes which were identified by the qualitative analysis which was conducted before the quantitative data collection began, Cronbach's alpha

test was conducted to check the reliability of the instrument but EFA was used in the main study to check the validity of constructs of e-learning framework.

The study attempted to develop a framework that is proposed for the facilitation of e-learning in EHEIs. For this research, EFA was used to enable the researcher to decrease the number of items in the instrument based on the factor loadings results by removing the items with less than a cut-off point of ±.40, to make the framework constructs more valid (See Chapter 6, Section 6.5.1.2). In addition to this, as per Field (2009) and Henson and Roberts (2006), EFA is used as a basis for other multivariate statistical techniques like the multiple regression method.

Four important guiding features should be checked before subjecting a data set to EFA. Firstly, according to Everitt and Hothorn(2011) and Field (2009), if the sample size is larger than 200, then it is wise to use a screen plot which can help in understanding how much proportions of the data should be clustered together. Secondly, as per Henson and Roberts (2006), Bartlett's Test of Sphericity, EFA should be less than 0.05 and displays if the correlations of the variables are necessary. Thirdly, Field (2009) depicts that as per the measure which measures sampling adequacy, the Kaiser-Meyer-Olkin (KMO) test, shows the extent to which the variables in the set of data are inter-correlated and should be bigger than 0.5. Fourthly, the default factorisation structure which is "value greater than one" shows the variation explained by a dimension can be replaced according to the study done by (Chadha, 2009:321). According to Hair (2014), a total variance of 60% value is more acceptable in EFA; but if it is less than 60% of the total variance it is acceptable in the social science fields.

There are various ways to extract factors: principal components analysis (PCA), principal axis factoring (PAF), image factoring, maximum likelihood, alpha factoring, unweighted least squares, generalised least squares and canonical (Tabachnick & Fidell 2001; Thompson 2004; Costello and Osborne 2005). PCA and PAF are often used in quantitative studies (Tabachnick & Fidell 2001; Thompson 2004; Henson and Roberts 2006). Thus, for this study, PAF used. Furthermore, there are two main rotation methods called orthogonal and oblique in EFA which makes the interpretation of factors easier (Chadha, 2009; Everitt & Hothorn, 2011; Field, 2009; Hair et al., 2014), in this study oblique rotation were used.

Correlation coefficients of a factor loading reveal the extent to which a single item from a set of data is related to its factor, then it also shows the degree of its influence in that particular factor building. As Domino and Domino (2006) and Field (2009) explained items that fall in one factor are related to each other and can be implicitly homogenous. Cut-off points that range between 0.3-0.4 can be used to categorise items of the same type (Nunnally, 1978, cited in Sass, 2010). In the same way, Hair et al. (1995) and Tabachnick and Fidell (2007) characterised these loadings using another rule of thumb as ±0.30=minimal, ±0.40=important, and ±.50=practically significant. If no correlations are greater than 0.30, then the researcher should re-evaluate whether factor analysis is the appropriate statistical method to use. For this research, a cut-off point of ±.40 was used (see Table 6.6 in Chapter 6).

4.10.3 Statistical Measures of Means and Medians

In statistical measurement, the mean is the mathematical average of a set of data. Means can be calculated by using a total of the observations divided by the number of observations. It is the most popular measure and very easy to calculate. It is a unique value for one group in that there is only one answer. In the computation of mean, all the observations are used (Altman 1999; Sundaram 2014).

Median is defined as the middle observation if data are arranged either in increasing or decreasing order of magnitude. The median is not as popular as the mean (Altman 1999).

4.10.4 KMO and Bartlett's Test Sphericity

Several tests should be used to assess the suitability of the respondent data for EFA before the extraction of the factor. Before the extraction of the factor, several tests should be used to access the suitability of the respondent data for EFA. These tests include the KMO (Kaiser 1974a; Kaiser 1974b) and Bartlett's Test of Sphericity (Bartlett 1950). The KMO index ranges from 0 to 1, with 0.50 considered suitable for EFA(Hair et al. 1995; Tabachnick & Fidell, 2007). The KMO index ranges from 0 to 1, with 0.50 considered suitable for EFA (Hair et al. 1995; Tabachnick & Fidell, 2007). In this research, the KMO value is 0.96 which indicated that it is suitable to conduct EFA (see Table 6.3).

Snedecor and Cochran (1989) defined Bartlett's test in statistics as a test that measures equal variances in a population using *k* samples. Thus, if the results show equal variances across the population of study then we call it homoscedasticity or homogeneity. Some statistical tests, for example, the analysis of variance (ANOVA), assume that variances are equal across groups or samples. Thus, the use of this test helps to confirm that hypothesis.

4.11 CHAPTER SUMMARY

The research design, its model, strategies of the research, data collection procedures, sampling technique, instrument development, data collection procedures, data analysis and reliability and validity were the main areas of focus of the chapter. The chapter also discussed the sampling procedure, the validity and reliability of the research, the data collection procedures and the analysis that were used in the study. In Chapter 5, the first phase of qualitative analysis and its results are presented.

CHAPTER 5:

ANALYSIS AND RESULT OF THE QUALITATIVE STUDY – PHASE I

5.1 INTRODUCTION

In Chapter 4, the research design of the empirical survey was described. In this chapter, data are reported on and analysed. The results from the empirical data are compared to the existing literature discussed in Chapters 2-3 to determine whether they support existing literature or whether any new trends are emerging. As stated in Chapter 4, the aim of the empirical survey was to explore students' use of e-learning, to identify the challenges Ethiopian higher institution students experience when using e-learning, to identify major e-learning themes and to develop an e-learning framework for EHEIs.

5.2 BACKGROUND CHARACTERISTICS OF QUALITATIVE PARTICIPANTS

Based on 40 minute face-to-face interviews (see Appendix V) of students the following results are recorded.

Descriptive statistics such as frequencies and percentages relating to the socio-demographic characteristics of students who participated in the qualitative study and status of the e-learning systems in the AAiT, AMIT and ECSU are presented in Table 5.1 and Table 5.2 respectively.

Table 5.1: Socio-demographic characteristics of respondents

Variable	Category	Count	Percentage
Sex	Female	3	15
	Male	17	85
	Total	20	100
Age	Under 17	-	-
	18-28	13	65
	28-38	3	15
	38-48	4	20
	Total	20	100
Degree	BA/BSc	13	65
	MA/MSc	7	35
	Total	20	100

University	AMIT	5	25
	AAiT	8	40
	ECSU	7	35
Department	Computer Science	5	25
	Electrical Engineering	8	40
	Development Studies	7	35

Table 5.2: Status of the e-learning systems in AAiT, AMIT and ECSU respectively.

Variable	Category	Count	Percentage	Valid Percentage
Mode of Learning	Blended	20	100	100
Status	Now	12	85	60
	Previously	8	100	40
Number of Courses	1	8	40	40
	2	5	25	25
	3 or more	7	35	35
Status	Poor	8	65	40
	Satisfactory	5	35	25
	Good	7	35	35

The interviews were conducted in Addis Ababa in their respective institutions' classrooms or boardrooms. The interviews were conducted during the period of June 2017 to September 2017.

The characteristics of respondents who participated in the study showed that majority of respondents (85%) were men. The age range of 65% of students were between the ages range of 18-28. More than half of respondents were undergraduate students. As shown below (see Table 5.2), five students were from AMIT, eight students were from AAiT and seven students were from ECSU.

The e-learning approach in these universities was blended and 60% percent of students were using e-learning at the time of the interview while 40% students used e-learning in previous courses. Each semester, AAit students took only one course while AMIT students took two courses and ECSU masters students took more than three courses per semester. The results of the interviews with the students were that the status of e-learning was poor in AAiT, and satisfactory in AMIT while it was good

in ECSU because there is good technology infrastructure and e-learning support provided in this university.

5.3 QUALITATIVE DATA ANALYSIS

According to the semi-structured interviews with 20 students from the three universities, the following results were found. Since the qualitative data analysis was done using ATLAS.ti 7.5, multiple activities were performed (see 5.3.1, 5.3.2, 5.3.3 and 5.4) to arrive at the expected result.

The researcher used a bottom-up approach to classify and categorise the codes according to the responses. The researcher also took into account the preliminary literature review findings while categorising the first line codes and creating the thematic areas.

Semi-structured interview analysis done for assessing students' use of e-learning and the challenges students experienced when using e-learning in the selected universities and major themes of e-learning were identified.

Using ATLAS.ti for coding encouraged a cyclical and iterative approach to data analysis that would have been difficult to accomplish through a manual analysis using note cards, word processing, or spreadsheet applications. ATLAS.ti provided the "ability to express relationships between codes, concepts, and themes in a range of different ways, and often these cannot be represented in a hierarchical list" (Silver & Lewins, 2014:210).

Hence, the analysis was done in the following three stages based on counts and interrelations of responses by ATLAS.ti.

5.3.1 First-Stage Coding or Open Coding

In this stage, analysis was done at a basic level for first-time coding in order to have a descriptive account of the data; i.e., this is what was said, but no comments were made as to why or how. It provides search tool that counts the number of incidences a term appears in an article. Most of the time during analysis, any line of data which could be important or significant was coded. First-stage coding results in mere indexing – a "first attempt at systematically gathering together segments that are instances of the

aspects of interest to the research" (Silver & Lewins, 2014:189). The results of this process pointed out 102 open or vivo codes.

5.3.2 Second-Stage Coding or Axial Coding (Categorisation in to Families)

It is the second step in the analysis process, similar codes were grouped together, merged into higher-order categories, and continually compared and revisited (Silver & Lewins, 2014). The first-stage codes were printed out and the codes which were alike or correlated were merged. Little-used codes which were dead ends or irrelevant were also removed during the second-stage coding.

5.3.3 Third-Stage Co-occurrence or Selective Coding

Higher level or latent level of analysis is a more interpretive analysis that is concerned with the response as well as what may have been inferred or implied. Data and codes were revisited, searching for themes, concepts and relationships (Silver & Lewins, 2014). Table 5.3 shows the emergent themes.

Table 5.3: The emergent themes and sub-themes

Emergent themes	**Sub-themes**
Institutional	• e-learning awareness • orientation about e-learning portal • encouraging to use e-learning
Technological Facility	• lab computers facility • ICT infrastructure • e-learning access coverage
Pedagogical/Instructional	• e-learning teaching and learning • e-learning interactivity • e-learning use • frequency of using e-learning portal
Resource	• electronic resources availability • technical and human resources • access to ICT devices
Functionality	• e-learning portal services • feedbacks and evaluation on the e-learning portal • online exam security
Feature	• interface design of the e-learning portal • user friendliness

	• e-learning portal interactivity and navigation • e-learning accessibility and usability • data security
Policy	• e-learning facilities policy • ethical rules and regulations
Learner Readiness	• students' motivation • preference of mode of learning • technical skill requirement
System management	• e-learning system maintenance • System management on e-learning environment • training on the use of e-learning system • update on e-learning portal

5.4 QUALITATIVE RESULTS

The first and second research objectives were focused on exploring students' experiences and challenges with using e-learning systems and identifying major e-learning themes.

In latest studies of student understandings on the mixing of emerging technology into classroom instruction, students generally report positive practices with the technology; however, findings also show that instructional design and comfort with technology are important factors (Armstrong 2011; de Winter, Winter bottom & Wilson, 2010; Enriquez, 2010; Shuler, Hutchins & LaShell, 2010; Yang & Lin, 2010). Students have recognised negative qualities in instructional technology because of futile implementation in classrooms and learning activities (Armstrong, 2011).

Based on the categorisation of the codes, the e-learning practice and challenges generated nine themes (institutional, technological facility, pedagogical/instructional, resource, functionality, feature, policy, student readiness, and system management).

Each theme characterises a group of issues that needed to be undertaken so that it will help to develop an instrument for the quantitative survey on which to base a framework for student-centred e-learning system. These themes are presented in the following sections.

5.4.1 Institutional Theme

The institutional theme is concerned with issues of managerial affairs, educational affairs, and student facilities related to e-learning (Khan, 2001). As per the students' responses, the study identified various parameters in relation to the institutional theme: e-learning awareness; orientation about e-learning portal; and encouraging the use of e-learning which facilitates blended learning; and assessing the intuitions' readiness for it which is crucial for the execution of e-learning. Haney (2002, as cited in Oketch & Achieng, 2013) noted that before initiating, implementing, and using e-learning, it is important to assess institutions' readiness for the systems by recognising their goals, needs, motivators, resources and constraints. Chaney (2010) advised that a successful distance education programme requires a significant amount of institutional support geared toward promoting the quality of distance teaching and learning. Thus, institutional factors play a crucial part in enhancing the level of e-learning implementation. According to Khan, institutional dimensions are the important dimensions of the e-learning environment (see Section 2.9).

5.4.1.1 Challenges of e-learning awareness

Concerning the challenges of e-learning awareness, Participant [1] said:

> *"First, I have mentioned that one of the challenges is the awareness gap between the concerned bodies and students. So, that gap has to be at least narrowed. The concerned bodies should encourage students to use the e-learning module. And they can do this in many ways. They can use posters. They can disseminate the information through the SIS portal website which a lot of students visit, through their Facebook page. These are a few of the many ways that they can use students to use e-learning."* (Participant [1], line number 232-238).

Regarding awareness Participant [4] said:

> *"The major reason most people are not using it is the lack of awareness. For example, the whole first year I didn't know that course material were uploaded and I started using it only during second year.*" (Participant [4], line number 1227-1229).

Moreover, Participant [7] also said:

> *"… awareness should be created among both teachers and students. I don't think that even teachers have that much information about e-learning, its purpose, advantages and disadvantages. I don't think they are aware of it either. So, awareness is the basic thing."* (Participant [7], line number 1746-1749).

Moreover, Participant [8] said:

> "*One of the challenges is awareness. There are some who think e-learning is additional burden imposed on them."* (Participant [8], line number 2024-2025).

As per Sangheethaa's (2016) findings regarding the challenges of e-learning, many universities' e-learning systems are available, although the percentage of the use of e-learning system among the teaching-learning community is minimal because there is no awareness of the e-learning technologies among the teaching and learning community.

Furthermore, Participant [1] elaborated more by saying:

> *"Because, before we can use it, first of all, the university community has to promote it. They used to tell us to see upcoming events on the platform and other schedules. But, they no longer do that. Even the one I told you about earlier was not advertised by the university but by individual instructors. So, unless you are told that there is an e-learning module provided by the campus, them how we would know about it let alone start using it. There is a gap here between students and the concerned bodies in the university. That's the problem*". (Participant [1], 40-46-line number)

Chaney, Elizabeth and James (2010) suggested that successful distance education requires a significant amount of institutional support geared toward promoting the quality of distance teaching and learning. Various researchers have found that institutional factors affect e-learning in Africa (Mavengere & Ruohonen, 2010; Ngamau, 2013) (see Section 3.5).

In addition, Participant [12] said:

> "From the motivation or awareness point of view, there hasn't been that much support. I found out about the e-learning module from my instructors. That's how most of my friends learned about it." (Participant [12], line number 3125-3127).

Moreover, Participant [1] said:

> *"… the information gap between the concerned bodies and the students. I mean it is not well promoted. Students are not being encouraged to use the module. They just get to know the module through the instructor. Other than that, you may hear about it from your colleague or friend. So, this information gap is another challenge."* (Participant [1], line number 154-158).

The findings of a survey done by Anberbir (2015) were that, although the university's ICT staffs are trying to implement ICT for education infrastructures and working hard to integrate e-learning into teaching-learning processes, because of the lack of awareness by teachers and administrative staff, e-learning usage in teaching is still in its preliminary stage.

5.4.1.2 Orientation to the e-learning portal provided by the institutions

Concerning orientation to e-learning portal provided by the institutions, Participant [8] said:

> *"It provides orientation at the beginning and continuous support to students who find it still challenging after the orientation. The technicians are always on standby to offer support to anyone who needs it. They are sensitive on this regard but students as well as the whole university still need a change of attitude toward e-learning."* (Participant [8], line number 2087-2091).

Moreover, Participant [11] said:

> *"Yes, at the beginning it wasn't easy till we got used to it. It requires IT knowledge. We used to ask for the technicians help at the beginning. It requires some computer literacy and knowing how to use the internet."* (Participant [11], line number 2719-2721). "

On the other hand, Participant [9] said:

> *"When you begin to use it the first time, you need some knowledge and the centre has given us a half-day orientation. Then we knew how to use it and have been using it from inside our dorms. We don't need to come here unless we encounter a problem with the system itself."* (Participant [9], line number 2165-2168).

In this regard, Participant [12] also said:

> *"About the beginning of the first semester, I was so confused about the use of e-learning that I hardly used it but in the second semester they gave us some training and when we began to take Public Administration and that was when I started using it with a little more confidence. An hour or two of training should be offered at least for an hour or two a week if not daily to help students like me."* (Participant [12], line number 3036-3040).

Moreover, Participant [14] said:

> *"Because to use this technique it needs some… to begin with, when a system is introduced, the advantages that come from it are well thought of. So, first before we use that system, we were told about its purpose and how to use it. So, when I follow the instruction that I was given I didn't find it so difficult."* … "*There are instructions and orientation on the use of e-learning." … "As soon as we meet the instructor in class, he tells us about e-learning and a day is set aside for us on which we go into the lab and receive instruction on the purpose of e-learning and how to create password.* (Participant [14], line numbers 3720-3723, 3737, 3816-3818).

On the other had Participant [19] said:

> *"They don't give us. Now it is only us who are taking the E- learning. I mean I have never heard of engineering students and stuff. They never use. Totally they don't know it, even its name. The name E- learning, they don't know it. We ourselves have known it this year. We have known it now. We took an English course with it, but it was only for a day or two that we entered and took English exam with it. We took exam about English then we got out. That is all. We took*

it now in the second semester for the course E- commerce and came to know properly about E- learning." (Participant [19], line number 5365-5371).

Moreover, Participant [6] said:

"There has never been a training in which I participated." (Participant [6], line number 1656).

5.4.1.3 Encouraging the use of e-learning

Concerning encouraging the use of e-learning, Participant [1] said:

"…But only one instructor used the electronic resource and encouraged us to use it. And unless the instructors post the material, I don't think you can use it." (Participant [1], line number 95-97).

Furthermore, Participant [4] said:

"The first is that not many teachers uploaded materials on the system. Only a few teachers uploaded on it. The others gave materials to a class representative from whom we photocopied materials or shared them in other ways." (Participant [4], line number 1113-1115).

In this regard, Participant [1] explained:

"Yes. Again, I remember they were discussing one difficult question that appeared on the assignment. They were asking the instructor if he could explain it and he was giving them feedback. As I said before, only this instructor was doing so. I haven't seen other instructors in the discussion sessions." (Participant [1], line number 105-108).

According to Rhema and Miliszewska (2010), a number of researcher highlighted that the technical factors which affect the educational and training institutions of Africa include the absence of educational administration instruments to support the initiatives of e-learning (see Section 3.5).

Moreover, Participant [1] said:

> *"Yes, for the course C++, I remember the instructor holding a discussion session with students, discussing assignment, exams*." (Participant [1], line number 101-102).

Pertaining to institutional themes, this study identified awareness, orientation and encouragement regarding the use of LMS as the most critical challenge that the institutions need to consider to facilitate e-learning. This indicates a huge problem with the implementation of e-learning in the HEIs in Ethiopia.

According to Grönlund and Islam (2010), many developing countries are keen to implement the e-learning paradigm; however, they are experiencing different issues such as resources, infrastructure, internet access, and support from the authorities, personal characteristics as well as culture and policy in the promotion of an e-learning paradigm (Bhuasiri et al., 2012; Nawaz, 2012). (See Section 3.5).

5.4.2 Technological Facility Theme

The technological facility theme of e-learning looked at issues of technology infrastructure in e-learning environments. The technological theme includes the hardware, software, and infrastructure (Khan, 2001). This theme also helps to fulfil the objective and goals of educational institutions by helping to select with the most suitable LMS and communication tools like the audio and video conferencing platforms. Technical requirements such as the server capacities, lab computers functionality, bandwidth, security, backups, and other infrastructure issues are also addressed. Mosa et al. (2016) emphasised that the technological aspect has a significant importance in a good e-learning system; therefore, features of the technology must be scrutinised so that the e-learning readiness will be investigated.

As per the responses of the students, the study identified various parameters in relation to technological facility and infrastructure which included ICT laboratories, ICT infrastructure and e-learning access coverage. According to Khan (2001), the technological dimension is one of the important dimensions of the e-learning environment (see Section 2.9).

5.4.2.1 Lab computers facility

In relation to the challenges of lab computers facility, Participant [1] said:

> *"In some of the labs they are functional for example in the postgraduate labs, which we are not allowed to use. Most of them are not functional. There is one lab here inside the graduating class lab in which most of the computers are functional. I have used them for one course. So, I cannot generalise or evaluate them qualitatively. And regarding the software, either you have to install them or use your own PC. They don't upgrade the software regularly."* (Participant [1], line number 253-258).

Furthermore, Participant [2] mentioned:

> *"Some of the PCs are not functional. The problem with some of the PCs might have been caused by students who don't use them with care. The PCs labs are in need of air conditioning."* (Participant [2], line number 628-630).

Participant [1] also said:

> *"…Most of the PCs are not functional and that is another challenge".* (Participant [1], line number 219-220).

Many researchers highlighted lack of ICT infrastructure is the most important factor to affect Africa's e-learning implementation. (Kasse & Balunywa, 2013; Mavengere & Ruohonen, 2010), inadequate numbers of computers in the laboratories, ICT infrastructure, lack w-fi to provide constant access to e-learning (see Section 3.5).

Furthermore, regarding the status of lab computers Participant [5] said;

> ***"****We have computers that are functional and a lot of computers that do not work."* (Participant [5], line number 1377-1378).

In addition, Participant [4] elaborated about the status of lab computers as:

> *"Only some of them are functional while most others are not."* (Participant [4], line number 1179).

On the other hand, Participant [10] said:

> *"The computers are functional but their number is too small."* (Participant [10], line number 2636).

Tegegne (2014) confirmed that students reported the lack of ICT lab classrooms and their facilities such as chairs, accessories including cables, power interruptions and lack of internet connectivity, and lack of sufficient numbers of internet-connected computers even though connectivity was working.

Seemingly, Participant [1] said:

> *"… the number of PCs inside the labs which sometimes cannot accommodate the students who want to use them. There were times when I returned home or went to other places just to access the internet because all the rooms and all the PCs were occupied. So, the number of PCs is one challenge."* (Participant [1], line number 213-217).

Moreover, Participant [10] said:

> *"No, they are not enough. Some of them break down. I cannot say there are enough computers because they don't match with the number of students. If it were not for many students who bring their own laptops, the computers in the lab would not have been useful for anybody. There are not more than 10 to 15 computers in a lab under one block. The students are too many while the computers are too few and therefore they are not enough.*" (Participant [10], line number 2578-2583).

Regarding this challenge, Tegegne (2014) emphasised the challenges encountered on the quota of connected computers per student both during the e-learning sessions and outside the sessions. He also recommended that there was a need to fulfil the required technology facilities as far as the economic capacity of Jimma University allowed.

Participant [2], more elaborated about the lab computers challenges as:

> *"We have a PC lab in our campus. But the PCs are not enough to accommodate the number of students who use them. There should be more PCs."* (Participant [2], line number 623-624).

In relation to this Participant [4] said:

> *"When I was a fresh student, I used to go to the lab looking for a computer and it was not easy to get one. You had to come first to secure a computer because there were many who wanted computers. You could use computers during lunch time or wait in a long line for your turn. The computers are too few and it was not* easy to get them." (Participant [4], line number 1164 -1168).

Moreover, Participant [5] stated:

> *"The e-learning it has its own problems. In the lab you have to wait in a queue because there is nowhere to sit and use a computer."* (Participant [5], line number 1361 -1362).

In this regard, Participant [6] explained:

> *"There are computers though not many and when exam days' approach, too many students want to use the computers and there are not enough to go around for everybody. I don't see other problems except these."* (Participant [6], 1590-1592).

In relation to this resources challenge, Tegegne (2014) revealed that students in the Jimma mathematics department confirmed that shortage of sufficient time to work in the lab was one of the problems raised.

Furthermore, Participant [10] said:

> *"No, they are not enough. Some of them break down. I cannot say there are enough computers because they don't match with the number of students. If it were not for many students who bring their own laptops, the computers in the lab would not have been useful for anybody. There are not more than 10 to 15 computers in a lab under one block. The students are too many while the*

computers are too few and therefore they are not enough." (Participant [10], line number 2578-2583).

Furthermore, Participant [3] said:

"If you have no laptop and the computer provided by the university is occupied when you want to use it, that's a challenge for a student." (Participant [3], line number 922-923).

With respect to the challenges of insufficient lab computers, Participant [4] said:

"They are not sufficient but most students have their own laptop and use them. What we want more is a better access to the internet." … *"When I was a fresh student, I used to go to the lab looking for a computer and it was not easy to get one. You had to come first to secure a computer because there were many who wanted computers. You could use computers during lunch time or wait in a long line for your turn. The computers are too few and it was not easy to get them."* (Participant [4], line number 1160 -1161; 1164 -1168).

In relation to this, Participant [15] said:

"…So, there is a lack of PC access as well. I mean compared to the number of students. And consequently, if it is required that students use e-learning a lot, there must be enough, the student or of himself or otherwise, there must be PCs available in the campus." (Participant [15], line number 4034-4037).

Moreover, Participant [4] said:

"Yes. However, many students have their own laptop and they would rather be in the dormitories for using the internet than going to the lab." (Participant [4], line number 1171-1172).

In addition, Participant [5] elaborated the challenges of the available e-learning resources as follows:

"The e-learning it has its own problems. In the lab you have to wait in a queue because there is nowhere to sit and use a computer." (Participant [5], line number 1361-1362).

Participant [20] said:

> *"I don't think it is sufficient because even we split into two classes, divided as such to take the exam and as we split, the teacher would go there to release the exam and staff upon which time many things would occur in the interim. It requires a different invigilator and staff … and besides he has to check whether lab is occupied or not. It is just after so many checking that you take that thing because. Yes, it is insufficient. Since it is insufficient, we will occupy two, three labs to take exam. And while we are there taking exam, that means that another person who wants to use will sit outside."* (Participant [20], line number 5633 - 5641).

Moreover, Participant [8] said:

> *"To begin with, the resources are not sufficient. If most students don't come with their own laptop, the computers here will not be enough for all."* (Participant [8], line number 2056 - 2057).

Similarly, Participant [11] said:

> *"Well, if many courses were given through e-learning, the computers would not be enough. We are taking five subjects in one semester and if we take all through e-learning, we will need twice as many computers and more human power."* (Participant [11], line number 2882-2884).

Moreover, Participant [14] said:

> *"There is Wi-Fi for every dormitory. But when it comes to labs, the university is offering e-learning courses in various semesters. If all groups or departments take e-learning courses in one semester, maybe not every student has a computer. About half of the students have taken e-learning course in the first semester and half are taking now."* (Participant [14], line number 3750 -3754)."

On the other hand, in relation to this issue, Participant [8] said:

> *"Internet access is what makes Civil Service College better than other colleges, even better than Addis Ababa University. There is a twenty-four-hour internet access in the dormitories. In addition, there are computers in every building*

which is good for students. Most students who don't have their own laptop can use the computers in the labs and in the library." … *"To begin with, the resources are not sufficient. If most students don't come with their own laptop, the computers here will not be enough for all. The strength of internet signal is also different from one building to another. In some buildings the signal is very strong while in others it is totally down. So, they have to go to the library or go to another building."* (Participant [8], line number 2048-2052; 2056-2060).

However, Participant [13] from the same institution said:

"There is a lab for every department and there are computers. There are computers also at the centre and that what makes this university different from others" (Participant [8], line number 3493-3495).

Moreover, Participant [3] said:

"*There are many computers, more than enough. If you have no laptop, you can use the computers in the lab. There is also good connection unless it is congested by many students using it at once.*" … *"If you have no laptop and the computer provided by the university is occupied when you want to use it, that's a challenge for a student."* (Participant [3], line number 914-916; 922-923).

5.4.2.2 ICT infrastructure

In relation to the ICT infrastructure challenges related with limited coverage, weak/poor speed and unreliable internet connectivity, Participant [5] said;

"Our main problem is the infrastructure, the internet access. You cannot get internet connection whenever you want. So, as we were using the e-learning module the main problem was the internet. It can be down for a day or two. So, if you have internet, and also when you have there may be a problem of connection with the server. It may be down too. I think it is more connected with the internet and the server; that the main problem. But the platform is very simple. There is simplicity. It is not sophisticated. It is not well developed." (Participant [5], line number 1333-1339).

Several researchers stated that of the factors that are affecting the implementation of e-learning in Africa, the ICT infrastructure is the most important aspect (Alamin &

Elgabar, 2014; Bates, 2009; Kisanga & Ireson, 2015; Lwoga, 2012; Namisiko et al., 2014; Ngamau, 2013; Rambe & Mawere, 2011; Venter et al., 2012) (see Section 3.5)

In addition, Participant [1] stated:

> *"… I can't speak generally but there are specific areas where you can get good internet connection. But in most of the areas you don't. You have to be authenticated to get access but the authentication is only for the staff. You need to have the user's credentials to have access to the Wi-Fi."* (Participant [1], line number 268-271).

Concerning the challenges related to ICT infrastructure, Sangheethaa (2016) stated that there was limited funding for the management of e-learning infrastructure.

Concerning the Wi-Fi internet connection challenges, Participant [1] said:

> *"…The coverage of Wi-Fi hotspot, there are only few and even those hotspots are secured with passwords. Sometimes, I wonder who they are placed for. Students should be able to access the internet almost everywhere inside the campus. This university is one of the best at least among other universities in Ethiopia. It should be able to fill these gaps. For example, if you want to access the internet wirelessly, that means using Wi-Fi, you have to go to this green area where you can find only two or three access points which are being used or accessed by hundreds of students. So, the coverage itself is one problem. Inside libraries, for example, there should be sufficient coverage of the service. I think the coverage is another problem." … "Yes, it is a challenge. There should be enough access points in the campus. If … wants to be a leading centre, this is one of the things that must be improved or worked on"* (Participant [1], line number 220-229; 278-280).

Many researchers have emphasised that there are infrastructural factors that are affecting e-learning in Africa like limited bandwidth and ICT infrastructure to facilitate continuous access to e-learning.

Moreover, Participant [5] said:

> *"…There is Wi-Fi connection at some places on the premises but it is not functioning well. I think the users are too many and the load is too high on the*

network. You can connect your laptop to the internet but you cannot download or upload data. The speed is very low." (Participant [5], line number 1363-1366).

In relating to the insufficient bandwidth, Frimpon (2012) mentioned that inaccessibility of enough bandwidth, and the source of uncertainty are difficulties in implementing e-learning education in Africa.

In relation to the reliability of the internet, Participant [2] said:

> *"The internet is not reliable. The signal comes and goes every now and then. It becomes strong early in the morning and at midnight."* (Participant [2], line number 637-638).

Moreover, Participant [9] said

> *"One of the challenges is internet disconnection because of power failure. As a result, the Wi-Fi network near our dormitory goes on and off every now and then with the power. You sit down to listen to a lecture but you are suddenly interrupted because of power failure."* (Participant [9], line number 2278-2281).

A number of researchers highlighted that most African countries educational institutions are affected by the lack of internet outages which is categorised under technical factor of the e-learning (Millham & Thakur, 2014). Moreover, Mosha and Bea (2014) stated that the lack of reliable technical support is also a factor that affects the e-learning.

Similarly, Participant [10] said:

> *"I encountered some problem while using the e-learning module. As I said earlier, internet is disconnected most of the time in the campus. Even when there is internet connection, the centre where e-learning is managed gets disconnected. There may be internet connection around our dormitory."* (Participant [10], line number 2506-2509).

On the other hand, Participant [3] said:

> *"It is very reliable. We always had connection except for the two days of grade twelve national exam when it was shut down. It is reliable. The only problem is*

when it gets congested because of many students using it. And that is a problem of the bandwidth. (Participant [3], line number 934-937)."

Participant [1] also said:

> *"…If you have a poor internet connection, not only can you not access dynamic contents like video or audio, but you cannot even access a simple webpage easily. So that is another challenge posed by the resources."* (Participant [1], line number 211-213).

Similarly, Participant [13] said:

> *"The main challenge is internet access and without it you cannot listen to tutorials. Besides, not everybody has a laptop and that also is a challenge. There should be access to the internet and it needs follow-up."* (Participant [13], line number 3438-3440).

Concerning the internet connection challenges Participant [5] said:

> *"…If you have a laptop, you may encounter a connection problem. There is Wi-Fi connection at some places on the premises but it is not functioning well. I think the users are too many and the load is too high on the network. You can connect your laptop to the internet but you cannot download or upload data. The speed is very low."* (Participant [5], line number 1362-1366).

Moreover, Participant [7] also shared the concerns of others in relation to internet connection problem. She said:

> *"Yeah, even those who have Wi-Fi in the dorms say the Wi-Fi is weak. We wait too long to just download something.*" (Participant [7], line number 1836-1837).

Moreover, Participant [14] said:

> *"Sometimes, there is a connection problem or electric power problem. If there is some restricted time, we record that. There is a generator but this year for some weeks the internet was blocked in relation with the grade twelve national exams. And you cannot use the system without access to the internet.*" (Participant [14], line number 3725-3728).

In relation to this, Participant [1] said:

> *"…poor internet connection is one of them. If you have a poor internet connection, not only can you not access dynamic contents like video or audio, but you cannot even access a simple webpage easily."* (Participant [1], line number 210-212).

Regarding the reliability of internet connection, Participant [1] said:

> *"No. Even we fifth year students face problems accessing the internet most of the time to do projects or assignments. The signal fluctuates. There is no consistent service. So, I would say the internet connection is not reliable."* (Participant [1], line number 248-250).

In relation to ICT infrastructure challenges, Participant [15] said;

> *"…even if you have your own PC, though it is nationwide, there is a problem with connection. In our campus, connection is erratic and stuff. There is this kind of thing. Next to that this Wi-Fi, there is no socket in its access points. Your PC, if it doesn't last long, it means that you cannot sit and access it for a long time. Meaning both the e-learning and other things. So, either there will be this thing, access point, but there is no socket at that access point. These too are one challenges, problems. I couldn't see any other." … "One of the challenges is internet disconnection because of power failure. As a result, the Wi-Fi network near our dormitory goes on and off every now and then with the power. You sit down to listen to a lecture but you are suddenly interrupted because of power failure. Fortunately, the technicians are on standby and they fix problems whenever they arise. For example, if your password fails, you contact them and they quickly reset it for you".* (Participant [9], line number 4020-4026; 2278-2283)."

Similarly, Participant [16] said:

> *"Yeah, the main challenge is within Arba-Minch there is a power problem with the power down the server also gets down, so we can't access the server at that moment."* (Participant [16], line number 4464-4466).

Various researchers emphasised that infrastructural factors such as the shortage of electricity affecting e-learning in Africa (Hennessy & Onguko, 2010; Kasse & Balunywa, 2013).

Concerning video conferencing facility, Participant [16] stated:

> *"Video conferences are available, but it is not for E- learning purpose... It helps for online examination if it is available.*" (Participant [16], line number 4482-4488).

5.4.2.3 E-learning access coverage

Concerning e-learning access coverage in the campus, Participant [1] confirmed that the service is limited with in the internal areas of the campus, he said:

> *"Well, I have never tried it outside campus. I don't think it is accessible from outside campus. I don't know why but my experience it is accessible only from inside campus. We can access it by connecting devices to wireless network within the campus but since I have never tried it outside, I cannot speak for what happens outside campus."* (Participant [1], line number 112-116).

Similarly, Participant [5] supported the inaccessibility of e-learning portal outside the campus area. He reported as follows:

> *"It's not accessible outside. If you are in this compound, it is possible to access it though sometimes it doesn't work. In my opinion, it is not developed well. Just as an idea or initial practice it is good but it lacks a lot of features. So, you cannot access it from another place".* (Participant [5], line number 1313-1316)

Moreover, Participant [6] said;

> *"That was the most difficult part. We were able to access the module only from the labs in the Amist Kilo campus. It was too hard to access it from another location especially at the beginning. But later the coverage was expanding and we were able to access it even from Sidist Kilo. However, most of the time, it was not working". …* "*One of the greatest challenges was not being able to access the e-learning portal from where you are*." (Participant [6], 1552-1556;

Participant [11], line number 2833-2835; Participant [6], line number 1575-1576).

Furthermore, Participant [11] said:

> *"No, you can't access it and that's why I save the videos. It works only here. I haven't been to other places where internet is available and I have no access to the internet at home."* (Participant [11], line number 2833-2835).

On the other hand, Participant [3] said

> *"Yes, you can access it as long as you are connected to the internet. Yes, if I have internet connection, I can access it easily. But if there is no internet connection, then I cannot access the system."* (Participant [3], line number 862-866).

This study identified the technological facility challenges in Ethiopia HEIs which are functionality of lab computers, lack of enough ICT resources and low bandwidth. This implies that with the existing technological facility running e-learning courses with the lab computers and available internet bandwidth is difficult.

In relation to the challenges related to ICT infrastructure, Song (2010) indicated that, it is mandatory to use the e-learning technology to accomplish their task in the e-learning situation. However, the bandwidth, the hardware and software are crucial because students are easily fragile when the internet speed slow which might lead them to frustration and in worst scenarios up to dropping of some of their subjects. Thus, inspection of the technological readiness must precede its implementation.

5.4.3 Pedagogical/ Instructional Theme

The pedagogical/instructional theme of e-learning refers to teaching and learning. This dimension addresses issues concerning content analysis, audience analysis, goal analysis, media analysis, design approach, organisation, and learning strategies (Khan, 2001).

According to the students' responses, the study identified various parameters in relation to pedagogical theme which included e-learning teaching and learning, e-learning interactivity, the extent of use of an e-learning system and frequency of using

an e-learning portal. The pedagogical dimension deals with many e-learning methods and learning strategies which includes presentation, demonstration, tool and exercises and lectures (Khan, 2001). According to Khan (2001), the pedagogical dimension is one of the significant dimensions of the e-learning environment (see Section 2.9).

5.4.3.1 E-learning teaching and learning

> *Concerning e-learning teaching and learning Participant [5] said "Obviously, using e-learning simplifies things. The instructor just uploads materials and you can find any material on any subject. Ideally, you can get materials categorised by subject and you can download soft wares too. If it were developed well, it could enhance the teaching and learning process. If it could be accessed from another place, they could develop it well and if it is structured well, I think it could make a lot of things easier."* (Participant [5], line number 1318-1323).

In relation to this Participant [13] said:

> *"We started it only with Public Administration and I think it is not difficult. The presenters of the tutorial both speak and write and, therefore, it is easy to follow them. The difference of e-learning from plasma is that you don't see the presenter but their voice and see the subtitles. You don't see the presenter. We are more accustomed to attending face-to-face classes. We took the e-learning in the first semester and most people were not listening to the teaching on the video"... "Yes. A student should take all the lessons and the quizzes and to do so he needs a strict follow-up. If you stick to the textbook only and neglect the e-learning portal, there will be some important point which you will miss. For example, there is the change on the portal which you don't find in the book."* (Participant [13], line number 3401-3404; 3444-3447).

As per the study conducted by Tedla (2012) in the East Africa countries (Eritrea, Ethiopia, and Djibouti), the study discovered that constraining factors included technological illiteracy and shortage of pedagogical skills.

With respect to this Participant [8] said:

> *"Yes. There is also explanation on the video and I can play it over and over until I understand. It would be interesting if all courses were presented through the*

e-learning. One teacher is different from another in competence, teaching methods and approach. But the teachers we find on the e-learning are very competent and come well prepared. Thirdly, even people who have never touched a computer have started using it because of the e-learning. They are getting exposure to technology." (Participant [8], line number 1969-1974).

In relation to this, Participant [11] said:

"We have a course, Ethiopian Public Administration prepared by the university. It has two parts: modular and e-learning. The e-learning part is offered by the university which I follow from the notes and videos all the way to the quizzes." (Participant [11], line number 2715-2717).

In this regard, Participant [13]

There are schedules which the teachers have told us about at the beginning. The materials are prepared in two ways. They give hard copy of the notes and then we get the rest of the lesson on power point. You need to read the hard copy first because they speak too fast" …" The online tutorial is very fast. You have to pause the videos to take notes. So, we use the hardcopy and video tutorials together". (Participant [13], line number 3318-3321; 3323-3324).

Furthermore, about e-learning teaching and learning, Participant [8] said:

"At the beginning of the course, there is a reader and you can play the video only after you have gone through the reader. The lecturer on the video introduces himself and then process to the lecture. There are many videos in one chapter. After the videos there is a quiz. When you have done the quizzes, you may go to the next chapter. You can also give comments, feedbacks and ask questions." … It is a problem of attitude. They don't know that it is for their own good. Some don't read the lessons but try to do the quizzes while others even take the answers to the quizzes from those who have done them before. So, a student simply copies the answers from another without bothering to learn the lesson. Or one student may do the quizzes for others on different computers. Public Administration is a very simple course but many students are not reading the lessons and they perform poorly at the exam. Many are not paying attention." (Participant [8], line number 1986-1990; 2027-2033).

Moreover, Participant [1] said about live streaming course:

> ***"****It is live streamed from here. There is a camera inside the room. So, the lecture will be recorded and live streamed to other campuses." … "Yes. For example, this university has a culture of inviting guests to Ethiopia from different universities to give lectures, block courses to students and not just in this campus but also in other campuses. They use it for that. If you are interested, I can show you the room."* (Participant [1], line number 185-186; 193-196).

5.4.3.2 E-learning interactivity

Concerning e-learning interactivity, Participant [1] said:

> *"It is interactive. A lot of people, including me, prefer learning interactively to just reading books. So, the fact that e-learning is interactive makes it easy and preferable to use."*(Participant [1], line number 126-128)

On the other hand, Participant [3] said:

> *"That's easy but sometimes you may not understand the courses you have downloaded. At such times, you may find it difficult and you need instructors' help."* (Participant [3], line number 876-878).

E-learning interactivity was elaborated more by Participant [7] as follows:

> *"I hope so, I personally hope so. You know it is becoming boring and boring lectures class are long. Up to seventy to hundred students are in one class so it will be more interesting and interactive."* (Participant [7], line number 1806-1808).

Furthermore, Participant [7] stated:

> *Yeah, I always say as an institute it is not only needed you know co-curricular activities should be involved in my opinion. Those co-curricular activities should be included because of – let me speak in Amharic – education is not just about classroom lessons, there are co-curricular activities which the institute has not recognised well. Attending lectures is all a student needs to grow. There are many people who have come from different backgrounds to the university. Discussion with these people, knowing their background, coming up with new*

ideas, and talking about social issues are not common practices. Since people are getting used to the internet, it would be good if these things were introduced to e-learning and social issues like charity or voluntarism were incorporated it would be very good. The usual thing is that you would take about four courses which are all delivered in class and are boring." (Participant [7], line number 1877-1887).

In line with the extent of use of e-learning system, Participant [1] said:

"Yes, I do. I was using e-learning for some time but currently I am not using it"..." I don't feel like I need it and the school doesn't provide it anymore. The school used to provide e-learning when I was a second year student and that's when I was using it. But even then only two or three instructors were using it. I was encouraged to use it in those days but not anymore." (Participant [1], line number 7-8; 10-13).

Moreover, Participant [4] said:

"Yes, I use it. There was something they called module where books were uploaded and we used to download them from it. I think the domain has expired and needs to be renewed. I think they don't renew subscription to the site when it expires and then you can no longer access the site." … "However, we were using the system because our teachers were uploading all the material we needed there. It was a well-organised site and found whatever we needed." (Participant [4], line number 1050-1053; 1059-1061).

Moreover, Participant [16] said:

"Only for major courses" …" Like programming more, it related courses like programming." (Participant [16], line number 4350; 4352).

Moreover, Participant [4] said:

"Yes, I use it. There was something they called module where books were uploaded and we used to download them from it. I think the domain has expired and needs to be renewed. I think they don't renew subscription to the site when it expires and then you can no longer access the site." (Participant [4], line number 1050-1053).

Participant [2] further elaborated the practice of use e-learning as follows:

> *"Actually, since there is not structured e-learning facility in our campus, I cannot say that I am using e-learning. This is supported by the report of Unwin (2008) that stated "summarised information about the status of e-learning in Africa" but when I was second year student, there was a module site in our faculty or institute and we were using that facility. Now, however, I think the teachers are not using it. If the teachers are not posting anything, there is nothing for us to do with it. So, currently, I am not using e-learning. Personally, especially last year when I was an intern and I used international e-learning websites like Coursera. I registered for some courses and eagerly followed them taking the tests and the assignments." … "The university should learn and understand the benefits first before providing the facility to students. The university community should understand and consider the importance of e-learning structure for students. And the next thing is if the university wanted to launch this programme, it can get a lot of assistance from other universities. The university can also gather students and ask them questions like you are doing now and with that the university can get an idea of how –".* (Participant [2], line number 431-438; 478-483).

Moreover, Participant [2] said:

> *"As I told you before, most of the teachers are not using the module. I don't know if they don't know how to use it or prefer not to use it. They don't post the lecture slides or any reference materials for us to use them. At this time, it is not functioning. So, the module is of no use at this moment."* (Participant [2], line number 444-447).

Additionally, Participant [15] responded on the practice of the use of e-learning that:

> *"In order to use more, first, teachers should push. The teachers themselves should also use it. Because, if the teacher uses, the thing that a teacher wants there, to the question that they the students raise, if he kind of gives answer and stuff, they might enter thereon for the sake of exam. The question that has been answered will appear on exam. If the answer to an assignment is put there, it means the student will enter to see that. So, this might be the way that*

it will become a habit. This is one. So, first teachers must use. If teachers use properly, for example, a certain teacher uses, a certain teacher doesn't use. That is the problem there is. The student enters for a certain course, and when that course is over, he doesn't. But if all the teachers were made to use, and when teachers use, if only they could come up with a means by which they will force students to enter. For example, it could be by putting the answer to an assignment thereupon. By putting [on] the forum things that can be of help for final exam, including that in the discussion and stuff, it is possible to attract the students." (Participant [15], line number 3867-3880).

Accordingly, Participant [7] said:

"The teacher himself didn't even take it practically the e-learning system but he tried his best to introduce the e-learning system. But he even." (Participant [7], line number 1826-1827).

5.4.3.3 E-learning use

In relation to e-learning use, Participant [8] said:

"It is only one course and I am not even using it properly because of time and because it is only one course. If all courses were given online, I would pay more attention. And when I use it I only do the quizzes. I see the videos and do the quizzes. The e-learning is very good but most of us don't have patience to see the video. If all courses were provided through e-learning, we would pay attention. We do only the quiz because they know whether we did it or not." (Participant [8], line number 1951-1956).

Moreover, Participant [20] said:

"Yes, I have begun using it now, that is to say this year... When there are such staff as quizzes and tests and when we are given assignments and staff, to download soft copies since teachers uploads for us, I mean. For such things I use. Yes, I mean from all teachers, there is one teacher who use it for us. It is in e-commerce, junior's e-commerce lessons that so far we know e-learning." (Participant [20], line number 5431-5439).

Moreover, Participant [14] said:

> *"Whenever we talk about e-learning, I can only talk about Public Administration. That is the only course for which we are using the e-learning system. We get some online materials from our teachers and we also submit soft copies of assignments."* (Participant [14], line number 3769-3772).

Furthermore, Participant [12] said:

> *"There is a course known as Public Administration which has videos on the portal. We use the e-learning portal for that course but as I was saying before, we are not using it well because of knowledge gap on how to use the e-learning portal. Not only Public Administration but also there are other courses for which we use the internet but because of lack of knowledge we are not doing as much as we ought to. Sometimes, we are so ashamed of asking repeatedly for help that we avoid it altogether. There are technicians working in the university's lab whom we approach for help. Sometimes, they give us just a little help and promise more another time but it is hard to get hold of them afterwards. Sometimes they are not happy to help. We have faced a lot of challenges because of the fact that we come from various regions of the country where we had had no chance to practice surfing the web or in some cases even using a computer"* (Participant [12], line number 3012-3023).

Regarding use of e-learning, Participant [12] said:

> *"We use e-learning but not very often. We started using it at the beginning but we had issues with how we used it. The university had tried to give us some training on the use of e-learning but we didn't know very well. It was a half-day training and we didn't get adequate knowledge though it. Therefore, whenever we encountered a problem, we appealed to the technicians for help. We had lots of problems with e-learning and I don't think we are getting as much as we ought to get from it. They have tried everything in their power to help us but I believe they also have a shortage of human power."* (Participant [12], line number 3000-3007).

In the same vein, Participant [7] said,

> *It is easy, it makes it easy. I couldn't even thoroughly say I learned e-learning. It is not totally practical, you know. Just somehow there was an idea of learning by e-learning that time. We didn't thoroughly use e-learning but partially we have that. Theoretically, it is interesting."* (Participant [7], line number 1815-1818).

About the use of e-learning Participant [14] said:

> *"Actually, I use e-learning for the course of Public Administration only. And we have six chapters and those chapters are categorised based on the instructor's lecture and video lecture. Using this e-learning is mandatory for final exam. So, in line with the lecture that I receive from my instructor, I try to use the e-learning. After I get some theoretical know how from the instructor and interact also to use the video lecture. Then, finally I try to interrelate what exists in the lecture of the instructor and the contents of the e-learning."* (Participant [14], line number 3631-3637).

However, Participant [3] said:

> *"Yes, I do. To some extent I use e-learning mostly to explore the contents of the courses I am taking. But I think e-learning is very useful because, unlike the traditional learning ways, we can access e-learning whenever we like from any place."* (Participant [3], line number 724-727).

Furthermore, Participant [19] said:

> *"Yes, we had used it. We used it for exam. To download PDF's and we also upload assignments. We have used assignments. And sometimes to read also. Many times, chapters, units and stuff, at every chapter they upload on that for us. Some students upload on that."* (Participant [19], line number 5194-5197).

Similarly, Participant [6] said:

> *"It started when I was a third-year student. They told us about it and we started using it. But then, they locked it with a password. So, we had to go ask for the password when we wanted to access the e-learning portal. Some of the*

documents posted on the site were copyrighted and we could not download them. Only books were uploaded on it and there were not additional materials." (Participant [6], line number 1504-1508).

In relation to this, Participant [10] said:

"E-learning is a new experience for me and for most other students. They were at first confused about how to go about using it but once they began to use it they no longer believed it was challenging. I haven't seen any student being challenged with the use of e-learning." (Participant [10], line number 2588-2591).

Moreover, Participant [15] said:

"Yes. But I use e-learning to take various courses, various online courses such as Era, Edeks and on things like that, the campus's current portal but not the previous type, though not the module type, I use e-learning." … [However] "I don't think I use [it] properly... The reason is, first not all the students have the awareness about e-learning. That is one. And secondly, teachers seldom use it. Although the department of ICT prepared it, yet teachers, courses, books, for there aren't such, like forum discussion, the student doesn't have the initiative. When it began some time ago, some students use. But many students, for their friends never heard, and for many friends do not use, they do not have the initiative. I mean to go in and use." (Participant [15], line number 3849-3851; 3856-3861).

Moreover, Participant [17] said:

"E- learning. First, while we were fresh, a course was given to us. Then while we were third year, a course was given to us. But, what I saw between the two is we use it. Once in a while, we also submit assignment with it, that is to say the online system. Teachers send questions for us. That much we use it. Though not much, by and large we use it." … "I mean; the system is very troublesome. For example, when it is online, access is hardly gotten. Of course. there is Wi-Fi and stuff. Even so, there are many problems with it. For example, when it is online, if the exam is online, teachers cannot include workout and stuff; I mean it is only choice and true false. And this, the student will cheat

and… for us it is very easy, I mean the system. Besides you can work form a handout. The system hasn't anything that can be made on or off. You can work searching online if the invigilator is laissez-faire. So, it has got such problems. It might be for this that the majority of teachers do not use it." (Participant [17], line number 4658-4651; 4664-4671).

Furthermore, Participant [18] described about their practice of e-learning as follows:

"There is nothing specified. I mean sometimes as we search for PDF, for it is uploaded there, in order to download what has been uploaded, we go online. Now, in this semester, we took the test for e commerce with it. But it is very hard. I mean the distance between the computers is very close and for the size of the lab is not that much, and for there are many computers at close quarters, the student sitting here might see the student next to him easily. And … at random is a bit difficult, we seldom use that. And e commerce is our very first exam itself. It is for this that we used it otherwise do not use it much." (Participant [18], line number 4994-5001).

Participant [10] said about the use of e-learning:

"The purpose of e-learning is to get knowledge. So, I just turn on my computer and play the audio or video teachings uploaded on the e-learning platform. And I test my understanding by doing to quizzes at the end of each session. If I make a passing mark, above 70 out of hundred, on the quizzes, it allows me to go on to the next chapter. If I score under 70, it orders me to take the lesson again." (Participant [10], line number 2399-2403)."

Differently, Participant [1] said:

"One big challenge that I forgot is the one that is on the side of the concerned bodies, the people who are responsible for the entire e-learning thing. It could be IT administrators, software developers, the scientific faculty director. I think the problem is on that area. If you work on that area, then it is up to students to use things like this. And trust me students have no problem using the module or the e-learning platform. I can safely say that we all acknowledge it, we all cherish it. We all want to use the e-learning module. I don't know if there is a way you can solve the problem going on in concerned bodies' area. If you come

and if you have the chance, and if you have the motivation and the courage, I think it will be nice to interview one of them." (Participant [1], line number 385-394).

Concerning the frequency of using e-learning portal, Participant [3] said:

"I use it for downloading course materials but I don't know how often I use it. Sometimes, I may check it many times a day other times once a week. Sometimes I may not use the e-learning portal if I get the materials I want from another place." (Participant [3], line number 730-733).

Moreover, Participant [5] said:

"I think when I was second year or third-year student, we used e-learning when it was starting. Our instructors uploaded assignments on the portal so we can download materials from it. I remember using it almost daily. I visited it daily and downloaded assignments. So, it was very useful. But after that the website has been down for some time. There is a problem. It couldn't reload or something. I remember we used it extensively at some point but this time I don't think it is functional." (Participant [5], line number 1275-1280).

In relation to this, Participant [16] said:

"Twice in semester for two courses at most… Mostly after the normal classes. Mostly at night when lab is accessible and internet is accessible... Two hours mostly… Yeah, five days per week." (Participant [16], line number 4354-4366).

Moreover, Participant [19] said:

"We do not use it daily. The course we were taking, the course that we were taking through E -learning was one course. It was E- commerce that we were taking. That course we use it once a week and we use once a week. It is when we take exam that we use it many times. And we were using it to download a chapter." (Participant [19], line number 5200-5203).

On the other hand, Participant [9] said:

"We are taking e-learning in the BA programme. The course is very interesting, so I was using e-learning daily." (Participant [9], line number 2156-2157).

Regarding the times of using e-learning, Participant [6] said:

> *"Yes, I use e-learning but not very frequently. Most of the time, internet connection fails and you cannot find what you are looking for. The service is not satisfying."* (Participant [6], line number 1500-1502).

Moreover, Participant [9] said:

> *"We are taking e-learning in the BA programme. The course is very interesting, so I was using e-learning daily. The course had six chapters and even after we finished it I was using it whenever the internet connection was good. There are video lectures and quizzes. You take the quiz and if you don't pass, you will do it again. Even after you pass the quiz and finish it, you have the opportunity to revisit the questions you have done wrong. You must score above 70 to go on to the next chapter."* (Participant [9], line number 2156-2162).

However, Participant [13] said:

> *"So many times, I cannot count the number but I use it so many times".* (Participant [13], line number 3267).

Moreover, Participant [14] said:

> *"Actually, in my experience, I tried to use it just I have programmes within a week. As I tried to mention early, I use it in line with the lecture of the instructor. We do have a day in a week for lecturing theoretical part. Then, after I come back from the lecture, I try to use e-learning mostly two days a week."* (Participant [14], line number 3639-3642).

5.4.3.4 Frequency of using the e-learning portal

Regarding the frequency of using the e-learning portal, Participant [17] said:

> *"That depends on the teacher. When teachers upload assignments for us we'll use it. But normally, while taking this course e- commerce, we had twice a week or so class and that means we were using it. It is online that we attend everything. Things that we see, handouts and stuff we see it there online. All the system is online. The exams too are online. It just means we were using it.*

That is at least twice a week. That much we were using it". (Participant [17], line number 4736-4741).

Furthermore, Participant [12] said:

> *"About the beginning of the first semester, I was so confused about the use of e-learning that I hardly used it but in the second semester they gave us some training and when we began to take Public Administration and that was when I started using it with a little more confidence. An hour or two of training should be offered at least for an hour or two a week if not daily to help students like me." … "We have assignments most of the time for which we need to use the computer or internet connection. I turn on my own laptop spending on it at least thirty minutes to one hour a day. That may not be enough but when there are assignments, I spend about three to four hours on my laptop."* (Participant [12], line number 3036-3040; 3044-3047).

Concerning the e-learning material, Tagegne (2014) stated that students complained that they could not easily understand the notes as some of the concepts were challenging to catch up so it took considerable time to take notes as the notes were lengthy.

This study identified pedagogical instructional challenges in relation to teaching and learning, e-learning interactivity and frequency of using the e-learning portal. This indicates that in general the online teaching and learning is new for the Ethiopian HEIs students though the students are interested to learn via the e-learning system. Thus, this shows that only a few courses are delivered using e-learning and the e-electronic materials are outdated as most of the instructors were unfamiliar with the online learning mode. In addition, the security issue is also a problem in taking examinations. Thus, this indicates that the LMS is not well-developed and students are not trained on the system. Thus, the e-learning is at its infant stage in the Ethiopia HELs.

5.4.4 Resource Theme

The resource theme of the e-learning considered the availability of online resources, online support and electronic resources which are essential to undertake the major role for e-learning. In relation to resources, Sangheethaa (2016) also explained that many institutions had implemented e-learning systems but only partially because of

lack of resources. As per the students' responses, the study identified one parameter, namely, electronic resources availability. According to Khan (2001), the resource dimension is one of the significant dimensions of the e-learning environment (see Section 2.8)

5.4.4.1 Electronic resources availability

In relation to electronic resources availability in the institution, Participant [1] said:

> *"Yes, there were important resources. For example, we used to download textbooks for Digital Logic Design. We were also downloading assignments. But not many students were aware of it."* (Participant [1], line number 61-63).

Moreover, Participant [2] said:

> *"The e-learning materials are text and reference books. Lecture notes and power point slides are also posted. If the teacher is eager to share materials with students, he might post lecture videos from other universities."* (Participant [2], line number 618-620).

Concerning availability of e-learning resources, Participant [1] elaborated more by saying:

> *"I have downloaded course materials and course information and documents like textbooks and lecture notes, schedules about upcoming events, texts, mid-exams, final exams and assignments."* … *"Yes, for the course C++, I remember the instructor holding a discussion session with students, discussing assignment, exams."* … "*The first and most common one is PDF documents and Word documents about schedules, assignments, electronic resources like videos."* (Participant [1], line number 89-91; 101-102; 167-168).

Moreover, Participant [2] said:

> *"That's obvious. They go there and read the materials and do their assignments using the various application software."* (Participant [2], line number 634-635).

In addition, Participant [5] said:

> *"Currently there is a digital library launched by the university but sometimes it works and other times it doesn't. There is the modular portal from which we can download assignments and materials. There is also a digital library but it has problems. It is not functioning well. You can seldom use it successfully."* (Participant [5], line number 1351-1354).

Moreover, Participant [10] said:

> *"We get soft copy of reading materials on the computers. Some of the materials are in the form of power point slides and we read them. We also get audio lectures which we can use as help before or after reading text materials on the same topic.".* (Participant [10], line number 2517-2520).

However, Participant [4] said:

> *"The first is that not many teachers uploaded materials on the system. Only a few teachers uploaded on it. The others gave materials to a class representative from whom we photocopied materials or shared them in other ways."* (Participant [4], line number 1113-1115).

Regarding electronic resources, Participant [1] said:

> *"…electronic documents like e-books inside this library. If you want digital books, you can go to the circulation area and they can show you how you can search and find and have them on memory stick so you can take them home and use them. I have never used it but I have heard them talking about an electronic equipment which they use for distance learning. There is a camera which is used when guest lecturers come from the United States (US) or other countries. The lecture is conducted here but at the same time it is live streamed to other universities. I have seen the equipment."* (Participant [1], line number 173-180).

The resource factors and sub-factors are specified by different researchers in which availability of resources is one of the main factors (Kasse & Balunywa, 2013).

5.4.4.2 Technical and human resources support

Concerning technical and human resources support, Participant [11] said:

> *"They … trained us and I have found the training very helpful. And after that training, I have become even a better user of the internet. He has taught us how to sign up for an email account and helped some of us create our email address besides showing us how to use the university's e-learning portal."* (Participant [11], line number 2947-2951).

Moreover, Participant [14] said:

> *"Because to use this technique it needs some… to begin with, when a system is introduced, the advantages that come from it are well thought of. So, first before we use that system, we were told about its purpose and how to use it. So, when I follow the instruction that I was given I didn't find it so difficult." … "As soon as we meet the instructor in class, he tells us about e-learning and a day is set aside for us on which we go into the lab and receive instruction on the purpose of e-learning and how to create password."* (Participant [14], line number 3720-3723; 3816-3818).

Poon (2013) proposed that technical support should be considered as a means to facilitate student learning and it is suggested that technical support is one of the vital elements necessary to ensure that users to have a positive perception of adopting a technology (Alshammari et al., 2016).

5.4.4.3 Access to ICT devices

In relation to access to ICT devices, Participant [4] said:

> *"… most students have their own laptop and use them. What we want more is a better access to the internet." … "When I was a fresh student, I used to go to the lab looking for a computer and it was not easy to get one. You had to come first to secure a computer because there were many who wanted computers. You could use computers during lunch time or wait in a long line for your turn. The computers are too few and it was not easy to get them."* (Participant [4], line number 1160-1161; 1163-1168).

In relation to this, Participant [15] said:

> *"…So, there is a lack of PC access as well. I mean compared to the number of students. And consequently, if it is required that students use E- learning a lot, there must be enough, the student or of himself or otherwise, there must be PCs available in the campus."* (Participant [15], line number 4034-4037).

Moreover, Participant [4] said:

> *"… many students have their own laptop and they would rather be in the dormitories for using the internet than going to the lab."* (Participant [4], line number 1171-1172).

In addition, Participant [5] elaborated the challenges of the available e-learning resources as follows:

> *"The e-learning it has its own problems. In the lab you have to wait in a queue because there is nowhere to sit and use a computer."* (Participant [5], line number 1361-1362).

In relation to this, Participant [8] said:

> *"To begin with, the resources are not sufficient. If most students don't come with their own laptop, the computers here will not be enough for all."* (Participant [8], line number 2056-2057).

Similarly, Participant [11] said:

> *"Well, if many courses were given through e-learning, the computers would not be enough. We are taking five subjects in one semester and if we take all through e-learning, we will need twice as many computers and more human power."* (Participant [11], line number 2882-2884).

Furthermore, Participant [14] said:

> *"There is Wi-Fi for every dormitory. But when it comes to labs, the university is offering e-learning courses in various semesters. If all groups or departments take e-learning courses in one semester, maybe not every student has a*

computer. About half of the students have taken e-learning course in the first semester and half are taking now." (Participant [14], line number 3750-3754)

The resource factors and sub-factors are specified by different researchers in which availability of resources is one of the main factors (Kasse & Balunywa, 2013).

Concerning availability of electronic resources, students have major problems as the digital library system is not working most of the time and there is a lack of computers. This impacts the learning process as the electronic materials system is down frequently meaning that students are unable to get electronic material.

5.4.5 Functionality Theme

The functionality theme reference about the different services of the e-learning portal regarding uploading, downloading, sending instant messages, the discussion forum, online assignments, online exams and feedback/evaluation on the e-learning portal. As per the students' response, the study pointed out issues related with e-learning portal services feedbacks and evaluation on the e-learning portal regarding to e-learning portal functionality and e-learning feedback, assessment and evaluation.

5.4.5.1 E-learning portal services

Concerning e-learning portal services, Participant [5] said;

*"First, our instructors upload different assignments on the portal and also we can download materials and assignments. We are provided with links to other websites like MIT. We have links and click on those links and access other videos. So, it was very useful. Also, we can download apps." (Participant [5], line number 1294-1297). Moreover, Participant [3] said "…I use it to get course information, schedules, to see deadlines of assignments, and to download videos." (*Participant [3], line number 825-826).

On the other hand, another Participant [10] said concerning assignments:

"Actually, we don't do assignments online. The instructors give us assignments in person in class. They give us the titles and then we search for information and submit the assignment to them. After that we present our findings in class.

We submit our works in hardcopy and the instructor marks them." (Participant [10], line number, 2435-2438)".

In addition, the same student said about assignments:

"Yes, it can be helpful because it is a practice again of doing assignments differently from the way we used to do them. It helps to save time and get more information. Both online and in class interactions can be helpful. I cannot suggest that online education is helpful." (Participant [10], line number, 2441-2444).

Moreover, about the functionalities on the e-learning portal, Participant [16] said:

"For downloading course materials, for submitting assignments, even handouts are released on e-learning websites." (Participant [16], line number 4360-3361)."

However, Participant [15] said:

"*What I remember is the thing that they were using currently on the module. First, there were things like discussions. There are books. I don't remember staff like video. I don't think there are, I mean things like video. The other thing is stuff like assignments, they were put thereupon, assignments. There is nothing much to it.*" (Participant [15], line number 3924-3927).

In relation to discussion forum, Participant [6] said:

"Once when we were taking C++ during third year, we used the portal for discussion. But we have never used it for discussion after that. The teacher had motivated us in those days to ask questions and hold discussions." (Participant [6], line number 1546-1548).

Moreover, Participant [9] said:

"*There is a forum where we can exchange ideas, ask questions, and receive answers. We have the access to do all of these."* (Participant [9], line number 2202-2203).

Moreover, Participant [1] said:

> "*Yes. Again, I remember they were discussing one difficult question that appeared on the assignment. They were asking the instructor if he could explain it and he was giving them feedback. As I said before, only this instructor was doing so. I haven't seen other instructors in the discussion sessions."* (Participant [1], line number 105-108).

Differently Participant [17] described about the exam functionality challenge on the e-portal. The Participant said:

> *"I mean; the system is very troublesome. For example, when it is online, access is hardly gotten. Of course, there is Wi-Fi and stuff. Even so, there are many problems with it. For example, when it is online, if the exam is online, teachers cannot include workout and staff, I mean it is only choice and true false. And this, the student will cheat and… for us it is very easy, I mean the system. Besides you can work form a handout. The system hasn't anything that can be made on or off. You can work searching online if the invigilator is leisure faire. So, it has got such problems. It might be for this that the majority of teachers do not use it.".* (Participant [17], line number 4664-4671).

Moreover, Participant [7] said*:*

> *"Some useful materials would be uploaded there and the teacher would give us some information about the exam. Sharing materials by a flash drive with your friends is much simpler than finding internet connection and downloading from the system."* (Participant [7], line number 1761-1764).

In relation to discussion forum function, Participant [17] said:

> "*That it doesn't"..." If it had that thing, it would be very great" …" That means we will get information easily. I mean, we will get something from our seniors. Now while we were fresh, we suffered a lot. Had this system been there, it would have simplified that thing."* (Participant [17], line number 4808;4810;4806-4814).

On the other hand, Participant [14] said:

> "*No, there is no discussion actually. Everything is fixed there. There are some guideline questions before you proceed to the theoretical aspect, there are some questions and then before you proceed to the details of the content, the instructor video lecture raises important questions. And they inform me at the end of this chapter, you can assess yourself to see if you can answer the questions."* (Participant [14], line number 3671-3675).

Moreover, Participant [17] said:

> *"…And I think it is because of such problems that we do not use them oftentimes."* … *"That would be great. And it has advantages. By the way this thing, its advantages, it reduces time cost. Think of it. If there is fifty or so students in a class, it is fifty or so papers that go to waste. But if this is online, there is nothing that you waste. I mean it highly reduces cost, time too. If the time is thirty minutes, when it is thirty minutes, it will shut down by itself, I mean the system will stop. And the other benefit is you will not run around with a teacher. You will not be saying check this for me or do that for me. Normally it is there and then that it checks and puts for you. It has these advantages. It has disadvantages too… And the disadvantage, above all, let's say, for example if you misspell a letter, you are wrong. This is very tough. I mean a student is required to know a concept, and if he understands that, knows that, whether he misspells a word or not is no big deal.* (Participant [17], line number 4674-4675; 4680-4692).

In addition, Participant [19] said:

> *"Difficult about E- learning, for example now we, for example as I see it on the exam, there is supply type on the exam, right? Supply type asks us to complete blanks. That is what it can ask us. And that 'Fill in the blank' may not read spelling errors and stuff. So, it is the teacher that will see that again. «I will see to the spelling error and check it for you» he said then to us. That can be a problem. And it includes multiple choice, true false and stuff mostly. That is bad, I mean it should include supply type. For me…"* … *"I mean anybody, if they happen to know my password, can use it. You give password, if they know the*

password, anybody can log in and take even my exam. Anybody, for me if I tell my friend to take the exam in my stead, he can just go, type my password as Participant [19], entering my password can take the exam". (Participant [19], line number 5276-5282; 5302-5305).

In relation to functionalities on e-learning portal Participant [18] said:

"Whatever we need we can upload on it but what we use... is, as I told you earlier, they upload PDFs for us and we go and download whatever we need. The course I told you about, E- commerce, this course instead of e-mailing the guy via our individual email, it kind of saves time." (Participant [18], line number 5026-5029).

In relation to this Participant [2] said:

"I was benefitting by downloading lecture notes. Actually, it depends on the teacher. I remember that our C++ teacher posted a tutorial video on that page and we were downloading that video. And there was a forum even though I have not used it." (Participant [2], line number 534-537).

5.4.5.2 Feedback and evaluation on the e-learning portal

In relation to the feedback and evaluation on the e-learning portal, Participant [9] said:

*"Yes. You can write comments and they write you back. It has room for comments at the end of every course. You can leave comments on the system. You can comment on anything, you can comment on the course or you can leave suggestions."(*Participant [9], line number 2250-2254).

Concerning assignment submission, the same Participant said:

"We submit assignments through email. We submit both hardcopy and softcopy...If it were not for unexpected power blackout, we could take exams on the system. Sometimes, we may be attending class with the notes on soft copy but when a power failure happens, we turn to hard copy." (Participant [9], line number 2384-2390).

Moreover, Participant [13] said:

> *"There is a space for comments at the end of every chapter."* (Participant [13], line number 3327).

According to Khan (2001), evaluation is one of the important sub-dimensions of the e-learning environment (see Section 2.9)

In addition, Participant [8] said about feedback and comments on the portal

> *"They are of two kinds. There is room for comments on the technology and there is also space for comments and questions on the subject."* … *"The system keeps the teacher posted on who is doing what and have far everybody has progressed through the course."* (Participant [8], line number 1997-1998; 2083-2084).

Similarly, Participant [10] said:

> *"Yes. The instructor has a means of telling who has used the material and who has not. He comes with a list of names to class and tells us where each of us is on the course. He complements those who are on schedule and encourages those who are lagging behind to catch up."* (Participant [10], line number 2662-2665).

5.4.6.3 Online exam security

About online exam security, Participant [2] said

> *"When you register for a course on Coursera, the person who registers for the course and who does the quizzes should be the same. To make sure the same person is taking the courses and doing the quizzes, the use webcam to capture your image and they check that against the original image you submitted for registration. That kind of feature should be added to our module for the purpose of checking identity of students. If quizzes are being conducted on that page, there is high chance for students to search the web and to find answers to the quizzes and they can forward the answers for the quizzes to other students. So, they should know how to restrict students' use of other sites during quizzes."* (Participant [2], line number 502-510).

However, the portal they were using did not provide this function. In relation to this Participant [17] said:

> *"We have never been given, normally as the teacher invigilates for example, as I told you he says, 'you cannot use internet'; he says, 'normally you are given from this time to that time, just do not plug in flash and stuff'. I mean you cannot carry anything into the exam. You go in bare hands. Yet, we of course do. Of course, I am disclosing a secret, we do!"* (Participant [17], line number 4959-4963).

In relation to this, Participant [13] said:

> *"Yes. We go three times a week to the lab for e-learning and it would be to have somebody watch students while there are doing online quiz" … "Yes. He sees the report. The system informs the instructor on how many chapters every student has taken."* (Participant [13], line number 3473-3474; 3478-3479).

Regarding the evaluation, Participant [17] said:

> *"Yes. Kind of evaluation that appears there on the system for you".* (Participant [17], line number 4795).

In relation to this, Participant [10] said:

> *"I am saying it would be helpful to have continuous evaluation in class too. The quizzes in the e-learning system are not used for determining if a student passes or fails. If it were used for that purpose, every student would participate in it."* (Participant [10], line number 2544-2546).

Moreover, Participant [14] said:

> *"This is performance evaluation. It is for the purpose of self-assessment. For example, if I fail the online exam, I can go back to it and see my mistakes and learn from them. There are unlimited chances for doing so. But we still take exams in class in the university and some of the questions we encountered online may reappear in the class tests." … "Yes, that is the implication but we also hear that if you don't complete the online chapters, you may not be allowed to sit for exam. The coordinator informs the instructor on where in the chapters*

every student is. Students are encouraged to complete all the chapters. The courses are the same except that in class the presentation is live and physical while online it is a video. So, what you learn in class you reinforce online." (Participant [14], line number 3789-3793; 3801-3806).

The LMS has different functions. However, the online exam service is not secure and there is no discussion forum which the students need to discuss course-related issues. This shows that the confidentiality of the exams is at risk. Moreover, students cannot share important information concerning course-related matters which has an impact on the teaching and learning process.

5.4.6 Feature Theme

The interface design means the general outer shell and touch of the e-learning programme. As Khan (2001) explains it integrate the web page and its design and also includes the routing, accessibility and functional testing.

As per the analysis of Kahn (2001), there are five sub-dimensions which address the interface design concerns that helps the user interface of this educational technology to be eye catching and acceptable by users to take this technology courses: web design, content design, navigation, accessibility, and usability testing. The user interface creates the lasting impression on students as it is the first impression, when thy go to take the programme as this part determines the ease of use and interface look for the programme and students.

As per the students' response, the study pointed out various parameters in relation to interface design of the e-learning portal that are e-earning portal interactivity and navigation, e-learning accessibility and usability, online exam security and data security.

5.4.6.1 Interface design of the e-learning portal

Concerning the challenges of interface design of the e-learning portal, Participant [2] said:

"First, the design of the page should be appealing. Some basic functions like updating profile picture… It is not very user-friendly." (Participant [2], line number 684-687).

Moreover, Participant [18] said:

> *"This one is not that attractive, the interface. I mean since it is for education, of course, this kind of thing, you might say, is not that … but the more attractive the interface is. Since attractiveness is the goal when it was first designed, it makes people to access it properly."* (Participant [18], line number 5096-5099).

According to Khan (2001), interface dimension is very important scope of the e-learning environment (see Section 2.8)

Moreover, Participant [2] said there was a need to add some to the existing e-learning portal interface design:

> *"…The interface, like the lay out and colour of graphics should be updated and made more appealing."* (Participant [2], line number 689-690).

5.4.6.2 User-friendliness

In relation to user friendless, Participant [5] said:

> *"I think the main problem is with being able to access it or not. If you couldn't access it, it is not user-friendly. So, it should be very easy to access. And it must be very helpful in a way of providing you with materials and things. So, for example to make it more user-friendly, you can develop apps that you can use on your mobile."* (Participant [5], line number 1429-1433).

In relation to this, Participant [6] said:

> *"First of all, the website takes too long to load and it will take even longer when videos are uploaded on it. The layout design of the website is not attractive compared with others.*" (Participant [6], line number 1663-1665).

Participant [7] also said:

> *"It was not very interesting. It could be improved with the addition of pictures. As I told you, the teacher started it by himself. And we don't know much about it. He was trying hard. He had little awareness like us. Therefore, the e-learning system was not attractive but we went in and out and practised it a little just*

because our survival in college depended on it." (Participant [7], line number 1909-1913).

Participant [8] added:

> *"It would look more attractive if some images were uploaded with it. The tutorials come with only audio files. The plasmas in high schools are interesting because they offer both sound and video. They are attractive for students. If the same thing were done with the e-learning portal, it would be more interesting for students."* (Participant [8], line number 2096-2099).

On the other hand, about the interface of the portal Participant [16] said:

> *"Yeah, on the web. But when you come to mobile I think it is not good."* (Participant [16], line number 4612).

Moreover, Participant [14] said:

> *"It is very easy to use. It is not easy to speak for everybody but the procedure is available. There are various departments, course and chapters in their own category. There are videos also and instructions on how and where to download them. All the steps are made as clear as possible."* (Participant [14], line number 3828-3831).

5.4.6.3 E-learning portal interactivity and navigation

With regard to e-learning portal interactivity and navigation, Participant [2] said:

> *"The features that should be included are… currently all the teachers and their courses are not very interactive for students. The lecturers on the e-learning should not be these common lecturers that are lecturing us now. There should be very experienced lecturers, experienced in their field of study and in instructing students. Only such teachers should give the lectures on the module. Assignment should be given through that page. The programme is given according to the regular course schedule, so that cannot be an additional feature."* (Participant [2], line number 489-495).

Moreover, in relation to the e-learning portal interactivity, Participant [5] said:

> *"I think it should be developed well. There shouldn't be an access problem. When you want to access something, you have to access it. You have to download it right away… It would be good also if you could upload assignments. Now you can download things but you cannot upload. If you could submit assignments and upload materials and exchange materials with other students, that could be very good. Also, it should be very reliable when you access it."* … (Participant [5], line number 1342-1348).

5.4.6.4 E-learning accessibility and usability

Concerning e-learning accessibility and usability features, Participant [6] said:

> *"There are many e-learning websites abroad like Coursera, Udacity where you find videos and PDF books. These sites are user-friendly because you don't need to hunt the teacher for password but you get your own password. You can access them any time you wish with your username and password. It would be good if we had our own individual username and password here on our university's e-learning site. The materials to be posted on the site should first be evaluated. They shouldn't be uploaded just because they are books."* (Participant [6], line number 1510-1516).

Moreover, Participant [2] said:

> *"When you register for a course on Coursera, the person who registers for the course and who does the quizzes should be the same. To make sure the same person is taking the courses and doing the quizzes, the use webcam to capture your image and they check that against the original image you submitted for registration. That kind of feature should be added to our module for the purpose of checking identity of students. If quizzes are being conducted on that page, there is high chance for students to search the web and to find answers to the quizzes and they can forward the answers for the quizzes to other students. So, they should know how to restrict students' use of other sites during quizzes."* (Participant [2], line number 502-510).

Furthermore, Participant [2] said;

"… The problems have to do with passwords. Most of the students forget their passwords and some courses are locked by teachers. In order to access the materials of that course, the teachers should give you the password to that course. By the end of a semester, I wanted to see what courses we were going to take in the next semester but I found that the courses were locked by the teachers." (Participant [2], line number 586-590).

In relation to this Participant [3] further said:

"You need to follow the steps for acquiring username and password or you cannot access the system. That's one challenge. The other challenge is internet connection without which you cannot access the system and that's challenging." (Participant [3], line number 891-893).

In relation to accessibility and usability, Participant [5] said;

"… It must be very easy for you to access that thing so that you can download and upload materials very easily. So, that can make it user-friendly. But if you cannot access it in the first place, you wouldn't know if this is friendly or not. In fact, you may not be in a position to visit it another time. You would use other sources. Most of the time, we use Google. We Google something and we use MIT websites and other websites to look for materials." (Participant [5], line number 1433-1438).

On the other hand, Participant [18] said;

"Yes, it is accessible. But sometimes they shut it off. It when they upgrade it they shut it off. And sometimes when we are to take exam, it is shut off. Because freeing the teacher until he controls the students and stuff, it is shut off. Except for in such circumstances, it is accessible everywhere." (Participant [18], line number 5054-5048).

Similarly, Participant [3] said:

"I have already mentioned one, for example online registration, and accessing your grades online, which is great" …" We should be able to log in and access the portal. Once you are logged in, you will easily find everything you are looking

for. There is nothing difficult about it." (Participant [3], line number 962-964; 999-1000).

On the other hand, Participant [20] described the usability e-learning portal (module) as follows:

> *"There isn't those that can be for e-learning. But, for example there is this course telecom. We take it… via a video. I mean the teacher, being there, records his own voice. On top of that you see a soft copy. I mean what does that help you for! While sitting in our dorm, this time we may not need to go to class. Or otherwise, while in class you will forget what he has taught there. But now you can listen to it over and over again as it suits you. So, the man's … we took it that way up to the final."* (Participant [20], line number 5658-5663).

5.4.6.5 Data security

Concerning data security, Participant [3] said:

> *"I have talked about it earlier. If you don't have username and password, you cannot access the portal.... You have to be a student of this university to access the portal. If you don't have username and password, you cannot log in."* (Participant [3], line number 1007-1010).

Moreover, Participant [1]

> *"Just one challenge and I think I have mentioned it before. It has to do with authentication. The instructors had to give you username and password without which you cannot access the module. And I don't even think that is a challenge. Once you know the username and password, you can share it with your friends and your friends with their friends and so on." … "There are guest privileges and other account privileges. The privilege is limited. The privileges are different when you log in as a guest and as another user or as an administrative user. I think there is another level of user other than guest and administrative. The challenges come from the privileges. There are sections which are greyed out and you cannot click."* (Participant [1], line number 131-135; 150-154).

According to the findings of the study done by Tegnegne (2014), students reported that there was a challenge related with the password and authentication which created

an overlap in creating user names and challenges with opening some subjects on some computers.

This study revealed that the interface design of the portal is not appealing or user friendly and it takes a long time to download and upload electronic materials which has an impact on the motivation of the learners to use the LMS.

5.4.7 Policy Theme

The policy theme addresses issues relating to social and political effect, diversity, bias, the digital divide, information accessibility, etiquette, and legal matters (Khan, 2001). Legal matters include privacy, plagiarism and copyright issues. As per the students' responses, the study identified parameters in relation to e-learning facilities policy and ethical rules and regulations. The study conducted by Tedla (2012) in the East Africa countries of Eritrea, Ethiopia and Djibouti, revealed that the most constraining aspect that shape the execution of e-learning in Africa is the unrealistic policies of ICT.

5.4.7.1 E-learning facilities policy

Concerning use of e-learning facilities policy, almost all of the interviewed students agreed on the importance of having an e-learning platform related policy. In line with this, Participant [4] said:

> *"When it comes to the use of the lab computers, there are some who browse Facebook on the computers. And some students watch fun videos on YouTube. But there is no rule of time limit for such students. So, they leave the computers only when they are tired. I think it would be good to have rules against the use of social media."* (Participant [4], line number 1259-1263).

In relation to this challenge, Participant [15] said:

> *"In relation to the module, first, for I don't have my own PC, it could be my personal challenge, I can't access it whenever I want to. Again, the ICT labs are filled and occupied quickly. Again, if a student occupies them – the PCs – he never gets up quickly and stuff. It hasn't any time… what … so that too is a challenge." … "First, when students with no PC go to the lab, the lab is occupied. There is this kind of thing. Or else, if they necessarily want to use,*

they have to sleep in the daytime and go there at night. For all is occupied." (Participant [15], line number 4016-4019; 4032-4034)

Regarding this issue, Participant [1] said:

"…There should be rules and regulations on how to access them." (Participant [1], line number 243-244).

Moreover, Participant [11] said:

"…As the number of students is increasing, rules on the use of the lab would be necessary. I haven't seen the facilitators asking those who have been in the lab for many hours to leave so that others could take their turn to use the computers. I was in the Addis Ababa University main campus and we were allowed to use certain books from the library only for some hours. Some punishment would be imposed on you if you didn't return those books in time. There may be some students who use a computer in the lab just for fun. So, it would be good to have rules and regulations. I have seen some wasting time on Facebook. There should be rules on how long a student can stay on a computer." … "No, there is no rule. I haven't seen any. A student goes into the lab and may stay there the whole day. I have been only a few times to the computer lab and I am not aware of any rules." (Participant [11], line number 2979-2987; 2975-2977).

Additionally, Participant [11] said:

"Yes, at critical times like when you are preparing proposal for senior essay, many students may want to use the lab. Rules are important for proper use of the lab at such times." (Participant [11], line number 2989-2991).

In relation to e-learning services policy, Participant [8] said

"… I think also that it would be a good idea to have all students enter the lab for e-learning. For example, if three hours have been allocated for e-learning, it would be good to use one hour for discussion among students, one hours to have all students in the lab using the computers together at the same time instead of everybody accessing the system from where they want. This way

everybody will get used to the rules from time to time." (Participant [8], line number 2123-2128).

Regarding this, Participant [9] said;

> *"There are rules and you can see them when you walk into the lab. The rules clearly tell you what you can and cannot do in the lab. For example, what is your purpose when you go into the lab? And the rules tell you that you should not use the lab for other purposes."* (Participant [9], line number 2372-2375).

Moreover, Participant [15] said:

> *"As to agreement, nothing, it is as I told you earlier. Even a student can use as long as he wants to. There is no limit to it. Just if there were rule for this, another student also can address. The longer a person stays, having gained what he is looking for, he will watch other videos. Even in connection to this, sometimes unnecessary things on face book and u tube this especially it could be as a rule. There are notices put up saying «watching is not allowed, using face book is not allowed, and watching such things as porn in the lab is not allowed. This by itself is one rule. We can see this. So, it is possible to say there is."* (Participant [15], line number 4302-4309).

Moreover, regarding this issue Participant [16] said:

> *"In the labs there are rules, but to others the websites itself it has its own security measures."* (Participant [16], line number 4636-4637).

In addition, Participant [10] said;

> *"Such rules would be very useful because we have seen what you described happening in the lab. Sometimes, we go to the lab when we want to do a project in group. Some people may use a computer for a long time on irrelevant activity like browsing Facebook. If there were rules as you said they could deal with situations like this. There are a lot of free resources on the internet which many people want to access. But when someone holds a computer for many hours just for fun, they are wasting the time of those who want the computer for a worthier purpose.*" (Participant [10], line number 2691-2697).

On the other hand, in this regard, Participant [12] stated:

> *"Yes. I think rules are important and rules can benefit the e-learning process. Rules on ways of accessing the modules are important but I don't think they will be that much effective and comfortable for students because you don't know how long one student wants to use the e-learning module. Students use the PC or their laptop or the internet connection for many purposes besides e-learning. So, the timing thing is not going to work but another solution that I would suggest is bringing additional resources. There are plenty of rooms that are vacant. They are not used for anything. So, you can use those rooms and the funds from the government for additional resources to accommodate greater number of students into the service. So, additional resources could be solution."* (Participant [12], line number 3158-3167).

Moreover, Participant [3] said:

> *"Upgrading the facility, for example, bringing in more computers instead of telling one student to leave a computer for another can solve that problem."* (Participant [3], line number 1026-1027).

5.4.7.2 Ethical rules and regulations

Concerning ethical rules and regulations, Participant [5] said:

> *"To my knowledge, there are no regulations on this. First of all, what could you possibly do to that? You have a username and password. You just log in see what you want. You can register for newcomers. They do that. They just register online. They get things online. That even has problem and we have been using the portal where our teachers could upload things and see. The feature doesn't allow you to do anything. So, there is no need for rules. Actually, it is very simple; you have a password and username. You log in and click on the respective subject you need. You download what you want. You cannot upload anything. If there were a possibility for uploading, there would be a rule on what you are not allowed to upload. Even if there is a rule or not, the website doesn't allow you to do much. So, I haven't heard of any rules.*" (Participant [5], line number 1448-1458).

According to Khan (2001), ethical rules are very important sub-dimensions of the e-learning environment (see Section 2.9).

Furthermore, Participant [5] said:

> *"Yeah, they have certain rules. You cannot talk in the lab. You cannot chat. And also, you cannot bring related materials to the lab like data cables or something. At some point, they were saying you could not enter the lab carrying a laptop. It is not as a rule or regulation. They just write on the wall."* (Participant [5], line number 1469-1272).

Moreover, Participant [8] said:

> *"Yes, there are regulations. For example, I cannot proceed to the next chapter before doing the quiz for the current chapter. I cannot take the quiz before listening to the audios first. The system doesn't allow that.*" (Participant [8], line number 2112-2114).

In relation to this, Participant [6] said:

> *"I am not aware of any officially declared rule" … "Yes, there are some rules about guarding our usernames and passwords. They were giving us that kind of warning when we first signed up for our account. Otherwise, there are no rules" …" Yes. The sites I was telling you about have rules and the rules are the first thing you encounter when you log on to the site. They tell you what you can do and what you cannot do."* (Participant [6], line number 1686; 1688-1690; 1692-1694).

Participant [1] said:

> *"The rules regarding accessibility, it shouldn't be just students of the campus that can have access to the resources but others from outside the campus should be allowed to access the resources. But other people outside the campus should be able to access it. I am not saying that bluntly because when you give access to outsiders your network…" … "Yes. So, most of the rules and regulations should be about the security like data protection and the one you mentioned... I forgot it. I think on security, rules and regulations play a major*

role. On other aspects, you should have a system that safely allows outsiders access." (Participant [1], line number 346-350; 352-355).

Regarding this, Participant [3] said:

"I have talked about it earlier. If you don't have username and password, you cannot access the portal which is one rule. You have to be a student of this university to access the portal. If you don't have username and password, you cannot log in." … "No, I mean for those who use the computers. Every student has their personal account on the computer. So, unless you share your username and password with others, there is no risk of losing your personal data. Or a person may log in as a guest where they will not find anybody's data." (Participant [3], line number 1007-1010; 1038-1041).

Accordingly, Participant [1] said:

"I believe rules are important but to be honest, I don't think they play a major role in promoting the e-learning process. Nothing comes to mind that indicates that rules will be effective solutions." (Participant [1], line number 333-335).

Similarly, Participant [7]:

"Yes, it would be helpful to have rules that guide for example when there is good internet connection a student should at least check their account once a week or once a month. If a student doesn't check the portal at least once a month, then he is not learning at all." (Participant [7], line number 1934-1937).

With regard to rules, Participant [6] also said:

"Yes, there are some rules about guarding our usernames and passwords. They were giving us that kind of warning when we first signed up for our account. Otherwise, there are no rules." (Participant [6], line number 1688-1690).

Another Participant [3] said, concerning the user name and password:

"…If you don't have username and password, you cannot access the portal which is one rule. You have to be a student of this university to access the portal. If you don't have username and password, you cannot log in." (Participant [3], line number 1007-1010).

Because of no rules and regulation in using the lab computers Participant [15] said:

"As far as I know, they are not. Even if you plug in your flash in their PC, they are highly infected with virus – the PCs and that stuff. When you plug it in your PC, if you have anti-virus that provides good protection, the flash is highly infected with virus. So, first there are all sorts of students who come and plug in flash and stuff. So, from different PC, from different places, different things for the PC, unwanted soft wares and stuff. There they …. So highly ICT labs are highly… infected with virus and such things." (Participant [15], line number 4193-4199).

Participant [18] further said:

"I haven't seen with E- learning. The policy, since it has to be, is written. But the E- learning, the policy is at Arba-Minch sight. I haven't seen on the E- learning". (Participant [18], line number 5163-5164).

Moreover, Participant [9] said:

"… the computer lab also opens twenty-four hours during exams. There are no restrictions about the use of memory sticks or other devices." (Participant [9], line number 2356-2357).

On the other hand, Participant [9] said:

"By the way, there are rules and regulation posted near the door of the lab. Most of the students are mature people and besides the technicians are always around and they will be watching everybody." (Participant [9], line number 2366-2368).

However, Participant [10] said:

“I am not aware of such rules and mostly I use my own laptop. We were not given rules on what to use or what not to use.” (Participant [10], line number 2685-2686).

Moreover, Participant [12] said:

“Yes. So, most of the rules and regulations should be about the security like data protection and the one you mentioned... I forgot it. I think on security, rules and regulations play a major role. On other aspects, you should have a system that safely allows outsiders access. The authentication - I don’t understand why we were being given guest username and password. That means as you can understand from the name guest itself, when you are a guest you have limited access and privileges. Why isn’t there a student privilege?” (Participant [12], line number 3188-3196).

Participant [7] maintained:

Yes, it would be helpful to have rules that guide for example when there is good internet connection a student should at least check their account once a week or once a month. If a student doesn’t check the portal at least once a month, then he is not learning at all”... “Yes, he might miss materials posted on the portal. So, a student has to check the portal at least once a week or once a month when the connection is good. It would be good to have such rules so that students would be forced to check the portal once a week at least.” (Participant [7], line number 1934-1937; 1939-1942).

Moreover, Participant [8] said:

“I think it would be important to have rules. I think also that it would be a good idea to have all students enter the lab for e-learning. For example, if three hours have been allocated for e-learning, it would be good to use one hour for discussion among students, one hours to have all students in the lab using the computers together at the same time instead of everybody accessing the system from where they want. This way everybody will get used to the rules from time to time.” (Participant [8], line number 2123-2128).

Concerning e-learning policy, the extracts indicate that there is no e-learning policy in the e-learning system which shows the reason for the computers being misused in the computer laboratories. This implies that if the computer in the laboratories are not used properly implementing e-learning is difficult.

5.4.8 Learner Readiness Theme

As per the students' responses, the study identified various parameters in relation to students' motivation, preference of mode of delivery, technical skill requirement and access to ICT devices as the most critical aspects for attaining successfully implementation of e-learning programmes in higher education. Realising the role of this factor could help university management to implement effective and efficient e-learning projects. Regarding this theme, Rohayani (2015) emphasised that readiness of learners for the use of e-learning technology is influenced by various factors between the ability and willingness to use ICT.

5.4.8.1 Students' motivation

In relation to students' motivation to use e-learning portal, Participant [1] said;

> *"As I said before, I have used it only two or three times. I cannot say it has motivated me. I think I should have used it more times to see if it would motivate me, to see if it would have any impact on my academic progress."* (Participant [1], line number 119-121).

On the other hand, Participant [3] said:

> *"It does motivate me. The traditional way could sometimes be boring and you think of alternatives like the e-learning through which you get the lessons."* (Participant [3], line number 868-869).

However, Participant [16] said:

> *"…Maybe they motivate the lecturers but I don't think they motivate us." "Because most students don't like to use e-learning so they just come to class and use the normal."* (Participant [16], line number 4587; 4543-4544).

According Amoozegar et al., (2017), learner characteristics (motivation, self-regulated learning and self-efficacy) were factors contributing to course satisfaction among distance learners in Mali.

Participant [8] said about his e-learning readiness on the;

> *"It is good. I have positive feelings toward e-learning. You can learn lots of things using e-learning. You can earn a certificate on a field of your choice. It provides the opportunity to learn from home without wasting time by going back and forth between home and university. Besides, the lessons are well-organised and presented by very competent people. Another advantage is that it is suitable to everybody's need and you can take it at your own pace. In class, the lessons could be too fast for the slow learner or boring to the fast learner." … "I think all courses should be supported by e-learning instead of just one course. There may be tough courses and nobody is likely to say that they are taking just one course and be rid of e-learning. If all courses are given with e-learning, students will be convinced that they will need to pay attention. There are some who still question the importance of taking courses through an online system like the module"* (Participant [8], line number 2002-2008; 2036-2041).

Similarly, Participant [11] said:

> *"I am very positive. I like it very much and I would welcome any improvement. Some of the lectures are too fast for me and I wish they could be just a little slower."* (Participant [11], line number 2792-2794).

In relation to this issue, Participant [9] said:

> *"I feel it should be expanded. We are taking other courses now and e-learning is our fifth course. The teacher supports us in class and the additional tutorial we get through e-learning is very helpful. It gives you the opportunity to repeat lessons and revise them as often as you want. It would be good if the e-learning were applied to other courses too." … There are two things that make e-learning special: you can both see and hear. Some people understand more readily when they see while others understand when they hear. If the lesson is presented as an audio file those who are more inclined to seeing are going to miss the lesson. But on the video, you can both hear explanations and see*

subtitles and diagrams. Therefore, I believe it is very helpful." … "There are two things that make e-learning special: you can both see and hear. Some people understand more readily when they see while others understand when they hear. If the lesson is presented as an audio file those who are more inclined to seeing are going to miss the lesson. But on the video, you can both hear explanations and see subtitles and diagrams. Therefore, I believe it is very helpful." (Participant [9], line number 2210-2214; 2217-2222).

In the same vein, Participant [10] said:

> *"E-learning is good in that it familiarises us with technology helps us get the information we need easily. It enhances our understanding with the help of audio lectures. When you listen to a lecture without interruption, you can concentrate on it. For example, I engage in this kind of activity in my dormitory without disturbing anybody and nobody disturbing me. Therefore, I can concentrate on what I am listening to and take notes. If I can't understand it, I can rewind it and hear it again until I can understand it well. Once I am sure I have learned the lessons and understood them, I can go on to the next lesson. But some of the problems are slow internet connection or total disconnection. At such times, you cannot do anything. Otherwise, it is ok."* (Participant [10], line number 2456-2465).

Similarly, Participant [14] said:

> *"For me e-learning is a very interesting and helpful technology for students. For example, with respect to this specific course, sometimes the methods of instruction vary among instructors. So, after you get some know how from the instructor, there is such kind of opportunity to follow or to attend this help you to understand things in a better way."* (Participant [14], line number 3705-3709).

In relation to the motivation for the course offered through e-learning Participant [4] said:

> *"…. If can get what you want when you want it and can download it quickly instead of asking someone for it and waiting until they give it to you, why not? The e-learning is more motivating to me."* (Participant [4], line number, 1156-1158).

Moreover, Participant [3] said:

> *"That's a good question. There should be announcements. For example, I was a third-year student when I knew about it and that because our teachers told us about it. They told us that materials had been uploaded for us and that we could check any time and download whatever was available for us."* (Participant [3], line number 793-796).

Additionally, Participant [5] elaborated about the motivation of use of e-learning in his studies as follows:

> *"Obviously, using e-learning simplifies things. The instructor just uploads materials and you can find any material on any subject. Ideally, you can materials categorised by subject and you can download software too. If it were developed well, it could enhance the teaching and learning process. If it could be accessed from another place, they could develop it well and if it is structured well, I think it could make a lot of things easier."* (Participant [5], line number, 1318-1323).

> In the same vein, Participant [7] said:

> *"I hope so, I personally hope so. You know it is becoming boring and boring lectures class are long. Up to seventy to hundred students are in one class so it will be more interesting and interactive."* (Participant [7], line number, 1806-1808).

Moreover, Participant [8] said:

> *"I think all courses should be supported by e-learning instead of just one course. There may be tough courses and nobody is likely to say that they are taking just one course and be rid of e-learning. If all courses are given with e-learning, students will be convinced that they will need to pay attention. There are some who still question the importance of taking courses through an online system like the module."* (Participant [8], line number 2036-2041).

Similarly, Participant [6] said:

> *"I believe it motivates me in my studies if it is used consistently. But we are no different from those who have no access to the module. We log on to the site just to get books and notes. I think it would be more interesting if it included discussion forums. As I told you earlier, we used discussion forum once but only for one course."* (Participant [6], line number 1558-1561).

Moreover, Participant [15] said:

> *"Very much. E-learning is very good. Even now when we are working on thesis project, we use it to do such things. Device was put on three years ago. It is new and we couldn't find solid reference in it. But when we joined such thing as forums, there are discussions. I have encountered this type of problem, how can I solve it and stuff, it is by looking at answers given to that that we did much of, beginning from first semester, our project. So, it is very helpful, obviously."* … "*Learning long hours doesn't interest me much. Some forty minutes, at most an hour, more than that I cannot sit focused in the classroom. So, it is more on connection that I want to … many of the thing. Even, instead of opening a book, I prefer to refer there, if there is connection."* (Participant [15], line number 3975-3980; 3990-3993).

Moreover, Participant [11] said:

> *"The e-learning is better than the face-to-face teaching. I have performed well in one course without the teacher teaching me anything in class. The e-learning can also make up for a teacher on a sick leave or absent for some other reason. I wish all subjects were taught through the e-learning system."* (Participant [11], line number 2941-2944).

5.4.8.2 Preferred mode of learning

Concerning the preferred of mode of learning, Participant [1] said

Moreover, Participant [2] said;

> *"The University should learn and understand the benefits first before providing the facility to students. The university community should understand and*

believe in the importance of e-learning structure for students. And the next thing is if the university wanted to launch this programme, it can get a lot of assistance from other universities. The university can also gather students and ask them questions like you are doing now and with that the university can get an idea of how." (Participant [2], line number 478-483).

With respect of mode of delivery Participant [11] said:

"Yes. The lessons we take face-to-face in class with the use of power point. That's just to guide us along the way. The e-learning is more helpful. Personally, when I don't understand a certain point during classroom lecture, I go to the online video. There are two advantages to watching the video: first you see with your eyes and hear with your ears. That's why it is better than the reading material and the classroom lectures. I would rather watch the videos than read the notes."... "The face-to-face class can go on as it is but blended with e-learning it can be better. The e-learning is better than the face-to-face teaching. I have performed well in one course without the teacher teaching me anything in class. The e-learning can also make up for a teacher on a sick leave or absent for some other reason. I wish all subjects were taught through the e-learning system." (Participant [11], line number 2735-2740; 2940-2944).

Moreover, Participant [8] said:

"It is related. There is a reader which is very long and boring. There is also power point. But on the e-learning, the materials are concise and can be used along with the power point. I use a camera for taking pictures of the slides. The video tutor puts the most important points of his lecture shortly on power point slides and I take photos of the slides to save the notes" … "Yes. There is also explanation on the video and I can play it over and over until I understand. It would be interesting if all courses were presented through the e-learning. One teacher is different from another in competence, teaching methods and approach. But the teachers we find on the e-learning are very competent and come well prepared. Thirdly, even people who have never touched a computer have started using it because of the e-learning. They are getting exposure to technology." (Participant [8], line number 1962-1966; 1969-1974).

Moreover, Participant [8] said:

> *"At the beginning of the course, there is a reader and you can play the video only after you have gone through the reader. The lecturer on the video introduces himself and then process to the lecture. There are many videos in one chapter. After the videos there is a quiz. When you have done the quizzes, you may go to the next chapter. You can also give comments, feedbacks and ask questions."* (Participant [8], line number 1986-1990).

Furthermore, Participant [9] said:

> *"Yes. We have both hard copy and soft copy through the e-learning portal."* … *"We all started at the same time but some have finished the chapters while others are still in Chapter 2 or 3. It requires follow-up and students have to work on it frequently. You have to sit on for a long time and there are some students who get tired of spending time on it. When we ask some of our friends why they have not finished the chapters yet, they said they found them too long."* (Participant [9], line number 2343; 2268-2272).

In relation to this Participant [10] said:

> *"Yes, I believe video would make the learning experience better as you have to see some practical demonstrations. We learn more by seeing in addition to what we learn by hearing and reading. The quizzes can be taken over and over if a student's first performance is not good enough. But a student may misuse this privilege and just keep trying over and over without studying. Such a student is more intent on passing the quiz than learning the lesson. The lessons presented in class may be wide and the evaluation is done once only. That means there is almost no evaluation by the instructor except one assignment or two and the test. The difference is that with the online module, you are evaluated frequently."* (Participant [10], line number 2530-2538).

In relation to this, Participant [8] said:

> *"Yes, there is. Monitor attendance in the lab can help keep some students from taking the quizzes without learning the lessons. There are discussion sessions but most of us attend the discussion sessions and participate in them without*

reading the materials and without preparing ourselves. But if the teacher gives us discussion questions which require studying the notes uploaded on the system and tells us to come prepared for discussion that would motivate most of us to use the portal." (Participant [8], line number 2137-2143).

In relation to mode of learning Participant [9] said:

"I feel it should be expanded. We are taking other courses now and e-learning is our fifth course. The teacher supports us in class and the additional tutorial we get through e-learning is very helpful. It gives you the opportunity to repeat lessons and revise them as often as you want. It would be good if the e-learning were applied to other courses too." (Participant [9], line number 2210-2214).

5.4.8.3 Technical skill requirements

Regarding to technical skill requirements, Participant [12] said:

"There are problems which I face while using the portal because of gaps in technical knowledge. As a result, we don't use it as much as we ought to. Sometimes, when I don't know what to do, I go for help to those who know better. I still don't know very well how to use the e-learning portal." (Participant [12], line number 3049-3052).

Moreover, Participant [20] said:

"Yes it is required. Not anybody can come and use it. I mean if he can't, if you do not know how to use it, many things, once we were given an assignment and staff. If you don't know how to hand in with that … the assignment immediately on time… even with an assignment you have to check all the time by going there because the way you learn when an assignment is given is thereon the teacher uploading it. And assignments there are a few students without him knowing an assignment was given and there is time allotted, it never accepts beyond that time. That means he never hands in his assignment. So, if you do not check on and staff all these things, you cannot hand in assignments." (Participant [20], line umber 5459-5467).

Moreover, Participant [11] said:

> *"Yes, at the beginning it wasn't easy till we got used to it. It requires IT knowledge. We used to ask for the technicians help at the beginning. It requires some computer literacy and knowing how to use the internet" … "You need to know how to access the internet and after that there are steps to finding the videos. Going through these necessary steps takes some IT knowledge."* (Participant [11], line number 2719-2717; 2724 -2726).

The study conducted by Tegegne (2014) also found that students in Jimma University mathematics department in Ethiopia stated that they did not have sufficient practical skills to handle the computer, and as an outcome they suffered from lack of basic skills in operating the computer and its different programmes.

In relation to this, Participant [14] said:

> *"Actually, before I directly tried to use it, we were given an orientation and a password. Finally, using the password we created or was given us by the centre, we tried to access it. So, still I don't face any sort of problem. In the introductory phase, it is mandatory because it is a new system for us. But after you take the orientation, it is possible to use. This is my personal opinion. But if you face problems, you can come back to the person in the centre and they will help you."* (Participant [14], line number 3647-3655).

Furthermore, Participant [12] said:

> *"As far as I am concerned, yes it requires a lot of technical skills. Those who have the skills are benefitting a lot while those who don't know much are not benefitting as they should."* (Participant [12], line number 3055-3057).

Moreover, Participant [7] said:

> *"It doesn't require special skill but basic knowledge like how to use email, basic skills of Word, Excel and etc."* (Participant [7], line number 1752-1753).

Moreover, Participant [13] said:

> *"Yes it does, because to begin with, e-learning is a new thing. Logging in with your own username and password and finding the subject you want require*

technical knowledge." … "It is basic computer skills and the course offered by the university on how to use the e-learning system. You have to enter the portal and find your own course and you have to know how to do that." (Participant [13], line number 3298-3300; 3302-3304).

Moreover, the same Participant said:

"This is a new experience. It can be difficult at the beginning till you get used to it. But once you get used to the technology, it will not take you long. The lessons are very well prepared and the presentation is attractive but we are taking only one course through e-learning. If all subjects were taught through the portal there would be the same standard. The online tutorials are sometimes so fast that you can hardly catch up with them." (Participant [13], line number 3358-3363).

Similarly, Participant [3] said:

"I don't think so. One doesn't know what to do with computers cannot use the e-learning portal whereas one who can use computers and surf the internet can use the e-learning portal." (Participant [3], line number 817-819).

Accordingly, Participant [5] said:

"Internet is needed. You have to learn how to use browsers to browse the internet. So, a basic computer skill is enough." (Participant [5], line number 1290-1291).

Moreover, Participant [8] said:

"One has to know how to surf the internet and how to enter username and password. After that it is very simple. It is just about clicking the forward and backward buttons. Moreover, one has to understand English. That's all it takes." (Participant [8], line number 1982-1984).

Accordingly, Participant [12] said

"There are problems which I face while using the portal because of gaps in technical knowledge. As a result, we don't use it as much as we ought to. Sometimes, when I don't know what to do, I go for help to those who know

better. I still don't know very well how to use the e-learning portal." (Participant [12] line number 3049-3052).

Many researchers in Africa emphasised that the training factors like lack of support for IT training and skill were mentioned (Vencatachellum & Munusami, 2006).

Concerning students' skill to use technologies, Participant [2] said:

> *"It doesn't require that much technical skill. All it requires is the basics of using and browsing the internet. I remember that they have uploaded student manual on how to use the module. So, by reading the manual, any student can learn how to use the module."* (Participant [2], line number 526-529).

Similarly, Participant [10] said:

> *"I mean, just for the purpose of using that e-learning module, I have enough knowledge but I can't say that I have more knowledge about technology. But I mean that based in the training I have received, I know how to use this portal. I don't need long term training to use the e-learning module. I don't have to be a computer science graduate to use the portal. The training I have received is enough. That is why I said it is easy.*" (Participant [10], line number 2499-2504).

Participant [5] said:

> *"No, I don't think so. You will be provided with a password, you have a username, so if you are someone who can read and understand the English language, its communication language is English. All you need is to be able to read and understand English*." (Participant [5], line number 1285-1288).

Moreover, Participant [1] said:

> *"No. It requires no technical skills. All it requires is authentication or credentials ". So, students who know how to use computers can successfully use the e-learning platform."* (Participant [1], line number 75-78).

Furthermore, Participant [15] said:

> *"Properly. There isn't anything difficult about it. Compared to others, the existing module, in comparison, is similar to other websites on which we see online*

courses on other websites. There is nothing difficult about the thing to access…" There is no such special skill that it requires. But if a person has basic understanding of a computer, that thing he can use it directly by logging in with his IPRS." (Participant [15], line number 3903-3905,3909-3911).

Similarly, Participant [8] said:

"Because it doesn't require technical knowledge and as I told you earlier, even people who have never touched a computer are using e-learning and they have completed the course. Therefore, it is not difficult. Even farmers in the country are using the internet let alone a master's student. We just log into our account on the portal and take the lessons." (Participant [8], line number 2018-2022).

Similarly, Participant [10] said:

"There is no need for a sophisticated knowledge or a long term training to use the e-learning portal. Just the basic knowledge of how to use a computer is enough to use the e-learning module. All you have to do is just turn on your computer and launch the internet browser. Then you enter your username and password. And finally, follow instructions to find what you are looking for. It's very simple. For the first few days, it might be somehow difficult to operate. After a week or two, it gets easier and easier." (Participant [10], line number 2412-2418).

According to this study, students are motivated and ready for the e-learning mode of learning. This indicates that majority of the students agree on the blended learning. However, the e-learning system is still in its infancy in Ethiopian HEIs. This implies that if more courses are offered with the support of e-learning, the gap on the university community to believe in the importance of e-learning system needs to be improved. Only then can the e-learning system be effectively implemented in the environment.

5.4.9 System Management Theme

An e-learning management refers to the preservation of learning environment and diffusion of information. This management element addresses the continuation, apprising, and keeping up of the learning environment (Khan, 2001.) This continuation

matter determines the performance and sufficiency of the educational technology atmosphere and whether the instruction is meeting its goal.

As per the students' responses, the study identified various parameters in relation to e-learning system management which are e-learning system maintenance, MS on e-learning environment, training on the use of e-learning system, update on e-learning portal and facilities, technical and human resources and update on e-learning portal.

5.4.9.1 E-learning system maintenance

In relation to e-learning system maintenance, Participant [2] said;

> *"There is an office set up for this kind of purpose. The major purpose of this office is to give password to students."* (Participant [2], line number 666-667).

Participant [5] said about the maintenance of the e-learning system:

> *"I think when I was second year or third-year student, we used e-learning when it was starting. Our instructors uploaded assignments on the portal so we can download materials from it. I remember using it almost daily. I visited it daily and downloaded assignments. So, it was very useful. But after that the website has been down for some time. There is a problem. It couldn't reload or something. I remember we used it extensively at some point but this time I don't think it is functional."* (Participant [5], line number 1275-1280).

In relation to this, Participant [10] said:

> *"… However, we cannot get connected with the centre. That means, while internet connection is available, the portal may not be active. This is a recurrent problem. The other problem is that the passing mark is 70 and above. When students score 70, they don't pass and the system has to be fixed manually by a technician so that the student who made 70 can pass. Otherwise, the student will have to do the tests again and score 80 or 90 so that the system can automatically recognise the grade as a passing mark."* (Participant [10], line number 2509-2515).

Moreover, Participant [5] raised the poor system management as a challenge:

> *"As a layman, I would say one of the problems is the internet but also there is a problem with website itself. Sometimes it says it couldn't access the server. The website management should do something about it. It should be managed, developed and structured well. It should be very reliable." … "The reason is poor management. The management is not good. I think they just launch it and start a new lab but after that the management is not there to check and replace things that need replacing. So, I think the management is a problem."* (Participant [5], line number 1356-1359; 1380-1383).

> *Regarding the lab maintenance one student said "Yes. For example, sometimes the computers in the lab break down and may stay long without being fixed. So, the computers are no use for students as long as they are not fixed."* (Participant [6], line number 1603-1605).

In addition, Participant [7] pointed out the lack of follow-up and maintenance. The Participant said:

> *"I don't think so because I don't think there is someone to take care of those computers. They talk and install something on that desktop, then no one cares about that desktop. It needs follow-up or something. The desktops damage or something, I don't think they do something."* (Participant [7], line number 1853-1856).

Similarity, Participant [12] described the absence of adequate human power for the maintained of the system:

> *"The University needs to have enough human power in the lab so that we can get help whenever we need it. There is a problem of materials and equipment in the lab. Some of the computers have broken down and have not been fixed. I believe we will benefit if the computers are fixed."* (Participant [12], line number 3025-3028).

On the other hand, Participant [18] said about maintenance:

> *"Yes. Those who sit there, they maintain, it is not us, but them. They say there is maintenance. But since the computer is new, it doesn't require much."* (Participant [18], line number 5122-5123).

However, Participant [5] said:

> *"Yes, there is. One thing that I see as a problem in this campus is that they start things and they launch things but there is no continuity. There is a video conference lab. We have classrooms which are set up for this purpose but some of the equipment are not there. So, it is not really functional. The just set it up but they don't continue using it."* (Participant [5], line number 1385-1389).

5.4.9.2 Challenges of systems management on e-learning environment

Concerning the challenges of system management on e-learning environment, Participant [15] said:

> *"…To some extent, I mean. In terms of provision, in terms of providing maintenance service, there are such gaps in the management. Even this weakness could be the department of ICT itself. Because whenever there are PC'S that are out of order, there are maintenance service providers in the campus. There is a maintenance section. So that section, that thing, when a socket stops working, if it could maintain that socket, leaving alone the strength of the Wi-Fi connection, even with the available material, that would be one thing to secure a reliable connection."* (Participant [15], line number 4179-4185).

Moreover, Participant [1] said:

> *"…There should also be not only maintenance of the PCs but looking after them."* (Participant [1], line number 243-244).

Similarly, Participant [5] said:

> "*That's the problem. They just start it but they don't update it."* (Participant [5], line number 1422).

According to Khan (2001), management is one of the important dimensions of the e-learning environment (see Section 2.9).

Moreover, Participant [15] said:

> *"I don't think it supports. I mean the ICT'S have kind of complaints. Those guys in the management are not so focused. For example, if, when a demand to purchase PC is raised, when that kind of thing is raised, they will kind of say «what we have is enough» I mean that is what is mostly there in the admin. So, there is a problem in the administration.*" (Participant [15], line number 4175-4179).

On the other hand, Participant [16] said:

> *"They only update the website."* (Participant [16], line number 4583).

5.4.9.3 Training on the use of the e-learning system

Concerning training on the use of e-learning system, Participant [2] said;

> *"… Students are not on the same level of knowledge and experience when it comes to using the module. There are some who have deep knowledge and refined skill as well as others who have no idea at all about using these resources. So, there should be training…"* (Participant [2], line number 676-679).

Participant [10] said:

> *"I see it from two perspectives. The first one is using technology which by itself is not that much complicated. If there is short-term training, it doesn't require sophisticated skill. So, with a short-term training for everybody, using the technology will not be difficult for anyone. The other one is from the perspective of using the e-learning system. Getting knowledge through the use of this technology is not difficult for me or for anybody. I can get any information through that portal because I know how to use it."* (Participant [10], line number 2491-2497).

Many researchers in Africa underlined that lack of e-learning training on how to access and use e-resources is a delinquent (Mosha & Bea, 2014).

However, Participant [7] said:

> *"There has been no support. For example, a training should have been organised before we started using e-learning. It would be good if a training were provided and the computers were updated."* (Participant [7], line number 1892-1894).

In relation to this, Participant [16] said:

> *"The website serves us some documentation but there is no training… online help educational and other. …. frequently asked questions they will be answered on that site. On the document."* (Participant [16], line number 4594-4603).

On the other hand, Participant [18] said:

> *"It is as I have told you. There is nothing that requires a training as such. To begin with, those of us who are using it are a computer science …"* (Participant [18], line number 5128-5129).

Moreover, Participant [10] said "Yeah, I can use it easily because when we were introduced to this type of learning, we were given a short training for one day. Based on that training I am able to manipulate the portal and I can use it easily. Therefore, when it comes to using the portal, there is not much difficulty". (Participant [10], line number 2407-2410).

5.4.9.4 Updates on the e-learning portal

Concerning regular updates on e-learning portal, Participant [4] said**:**

> *"The first is that not many teachers uploaded materials on the system. Only a few teachers uploaded on it. The others gave materials to a class representative from whom we photocopied materials or shared them in other ways." … "Yes. But the internet is not very good around here. We prefer Sidist Kilo to Amist Kilo where the internet is faster. We use the material from other sources more than those made available on the module."* (Participant [4], line number 1113-1137).

Regarding the updates and maintenance of the e-learning portal, Participant [1] said:

"I don't think so because the two or three courses that I have used on e-learning are a year or a semester apart. And all the pages I used for C++ are the same as the pages I used for Introduction to Control Engineering. Even the contents are not removed, they are not updated when the course is finished. You may even get some of the contents that you had been using two or three years ago." (Participant [1], line number 294-298).

Similarly, Participant [4] mentioned:

"As far as I am concerned even the university's website is not updated frequently".(Participant [4], line number 1194-1195).

Moreover, Participant [6] said:

"As I have told you, I have never seen the facilities updated or upgraded. Only documents may be updated when new assignments are uploaded. Otherwise, I haven't seen much updating of facilities." (Participant [6], line number 1650-1652).

In relation to system management, this comments revealed that the LMS was often down and not available even though there was an internet connection. There was also a lack of training on the use of e-learning system. This indicates that system has been launched but the maintenance is poor. This has had a huge impact on the implementation of e-learning. This implies that there is a poor management especially of the ICT infrastructure and operation management and there is no adequate training on the use of LMS. The university management thus needs to give direction in this regard.

5.5 CHAPTER SUMMARY

In this chapter, the first phase of the mixed-method research study data was collected from AAiT, AMIT and ECSU students the one used LMS. The qualitative data was collected using semi-structured interviews with a purposeful sample (20), reflective of diversity of academic disciplines. The focus of the interview was on the students' experience of the use of e-learning in EHEIs and the challenges students experienced when using e-learning. Transcriptions were entered into ATLAS.ti 7.5 qualitative

analysis software and any line of data which could be important or relevant was coded. Based on the categorisation of the codes and the students' experience, nine e-learning challenge themes emerged (institutional, technological facility, pedagogical/instructional, resource, functionality, feature, policy, student readiness and system management). Each theme represented a group of issues that needs to be deliberated in order to develop an instrument for the quantitative survey as a plain for development of a framework for a student-centred e-learning system. The next chapter presents the quantitative results.

CHAPTER 6:

ANALYSIS AND RESULT OF QUANTITATIVE STUDY PHASE II

6.1 INTRODUCTION

This analysis and result chapter shows the correlations between the objectives of the research, the literature and theory in the study field, which were presented in Chapters 2 and 3 previously, and the methods applied in responding to the research questions of Chapter 4 and the findings of Chapter 5 will be presented.

6.2 DEVELOPMENT OF SURVEY INSTRUMENT

Data from the qualitative analysis phase generated nine major e-learning themes (see Section 5.4.1 – 5.4.9) which were used to develop the survey instrument for the second quantitative phase of the mixed-methods research study (see Appendix IV). Each theme characterises a group of matters that need to be deliberated to develop an instrument for the quantitative survey.

6.3 PILOT STUDY

The survey instrument was developed using the nine themes identified in the qualitative analysis result. The data collected from the pilot testing of the survey instrument was used to test the reliability of the survey instrument and the identified themes (see Section Table 6.1 and Appendix VII). As per the statistician's advice, a sample of 50 undergraduate students were selected from the AMU computer science department since they used the e-learning portal more than other departments. Based on the results of the pilot test, the quantitative survey instrument was accepted as it was because the Cronbach's alpha coefficient values ranged from a low of .749 to a high of .915 which are considered as acceptable and good (Davis, 2000; Nunnally, 1978, Sekaran, 2003). As per Sun et al., (2007) to assess the internal consistency of a research reliability of scale with several items we use Cronbach's coefficient which is widely used in the research world.

Table 6.1 presents the results for all variables tested using Cronbach's alpha.

Table 6.1: Summary of Pilot Test Reliability Test from Student's Responses on Scale Items

Variables	Items	Items left Out	Cronbach's Alpha	Reliability
Factor: Institutions	1,2,3,4,5,6	None	0.829	Good
Factor: Technology and facilities	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19	None	0.915	Excellent
Factor: Functionalities	20, 21, 22, 23, 24, 25, 26, 27, 28	None	0.914	Excellent
Factor: Features	29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39,	None	0.887	Good
Factor: E-learning Resources	40, 41, 42, 43, 44, 45, 46, 47	None	0.853	Good
Factor: Policy and Ethical	48, 49, 50, 51	None	0.849	Good
Factor: System Management	52, 53, 54, 55, 56, 57, 58, 59, 60, 61	None	0.912	Excellent
Construct: Pedagogical and Instructional	61, 62, 63, 64, 65, 66, 67	None	0.847	Good
Construct: Learner's Readiness	68, 69, 70, 71, 72	None	0.749	Acceptable

Note: N=50

As the result of the pilot testing described in Table 6.1, the main study data collection continued using the quantitative survey instrument with a total of 413 students described in Table 6.2.

6.4 CHARACTERISTICS OF RESPONDENTS

Table 6.2: Students demography who participated in the main study

Socio-demographic variables	Category	Count	n=413
			%
Age	17-28	216	52.3
	29-35	120	29
	36-45	65	16
	46-55	10	2.4
	56 and above	2	0.5
	Total	413	100
Gender	MALE	309	75
	FEMALE	104	25

Socio-demographic variables	Category	Count	n=413 %
	Total	413	100
Degree	Master's Degree	228	55
	Bachelor Degree	185	45
	Total	413	100
Universities	AMU	151	37
	ECSU	228	55
	AAiT	34	8
	Total	413	100
Fields registered in	LL.M International Law	9	2
	LL.M Comparative Public and Management	4	0.9
	MA Federalism and Inter-Government Studies	10	2.4
	MA Policy Analysis	12	2.9
	MA Development Policy	3	0.7
	MA Social Policy	10	2.4
	MA Public Policy Studies	7	1.6
	MA Public Procurement and Asset Management	14	3.3
	MA Tax Administration	16	3.8
	MA Customs Administration	14	3.3
	MA Public Finance Management	13	3
	MA Development Policy	11	2.6
	MA Social Security Management	13	3
	MA Public Management	16	3.8
	MSc Property Valuation and Asset Management	2	0.5
	MSc Urban Housing Provision and Management	2	0.5
	MSc Urban Infrastructure Provision and Management	19	4.6
	MSc Transport Planning and Management	9	2
	MSc Urban Land Development and Management	6	1.4
	MA Urban Management	8	1.9
	MSc Urban Planning and Development	9	2
	MSc Urban Environment and Climate Change	21	5
	Nature Science	4	0.9
	Engineering	34	8
	Computing	64	16
	Health	87	21
	Total	225	97.5

As shown in Table 6.2, the data was collected from 413 respondents. The age range of the majority of the respondents was between 17–28 years of age (i.e., 52.3%; 216 respondents). Next, a fair number of respondents were in the range of 29–35 (29%;

120 respondents). These figures showed that the majority of e-learning users are young students as they had levels of high interest in using technology. According to the data, regarding gender composition, most of the respondents were men (74.8%; (309) of respondents) while 25% (104) of the respondents were women. A fair number of respondents were from the Southern region. AMIT students who participated in this study totalled 36.5% (151) followed by ECSU with 55% (228) as they have a good internet connection and facilities in the university compound; the least number of learners who partaken in the study were students in Addis AAiT, i.e., 8% (34) as they were taking few courses online although the e-learning portal was available for other courses.

The majority of the respondents were master's degree students: 55% (228) of the students came from the ECSU because they were taking different online blended courses and the rest of respondents were bachelor's degree students: 45% (185) from AAit and AMU combined. The respondents were registered in different fields of study in the three universities. The master's students were registered in different fields in all departments of ESCU while the respondents in AMU were registered in the department of computing, (16%, 64), or in the health faculty (21%, 87), and the respondents in AAiT were registered in one department of AAiT: Engineering (8%, 34) as all students in AAiT are Engineering students.

6.5 VALIDITY OF FACTORS OF E-LEARNING FRAMEWORK

The third and fourth objectives were to determine major factors impacting e-learning and validate the e-learning framework factors.

The main EFA techniques are divided into two: EFA and CFA. EFA attempts to reveal a multifaceted model by investigating the dataset and testing predictions while CFA tries to substantiate hypotheses and uses path analysis diagrams to characterise variables and factors Child (2006). In this study, only EFA is considered as this study focuses on determining valid factors for the development of a student-centred e-learning framework based on students' responses in the qualitative phase. The validity of all factors in the questionnaire was tested. EFA was executed to define the individual questions to load on the factors as proposed in the questionnaire. To be considered as a factor, it should have at least three variables, though this determined by the design of the study (Tabachnick & Fidell, 2007). In general, rotated factors that have

two or fewer variables and are only considered reliable when the variables are highly correlated with each other (r >.70) but fairly uncorrelated with other variables. To perform EFA, the suggested sample size is at least 300 participants, and the variables that are subjected to EFA each should have at least 5 to 10 observations(Comrey & Lee, 1992). In this study, there were 413 respondents which is an appropriate number for performing EFA. EFA operates on the basis that measurable and observable variables can be reduced to fewer latent variables that share a common variance and are unobservable, which is known as reducing dimensionality (Bartholomew et al., 2011).

EFA uses statistical techniques for the generalisation of interrelated measures to discover patterns in a set of variables (Child, 2006).EFA is used when a researcher wants to determine the number of factors influencing variables and to analyse which variables ‘go together’ (DeCoster, 1998).In this study, EFA is used as a first step in the validation procedure as the aim of the study is to establish valid constructs or factors to develop the student-centred e-learning framework for the facilitation of e-learning implementation in EHEIs.

There are three extraction methods in EFA: maximum likelihood, PAF and alpha factoring (Chadha, 2009; Everitt & Hothorn, 2011; Field, 2009; Hair et al., 2014). The current study used PAF because the method is based on the notion that all variables belong to the first group and when the factor is extracted, a remaining matrix is calculated. Factors are then extracted successively until there is a large enough variance accounted for in the correlation matrix (Tucker & MacCallum, 1997). Moreover, PAF is recommended when the data violates the assumption of multivariate normality (Costello & Osborne, 2005). Furthermore, in EFA, there are orthogonal rotation methods and oblique rotation methods that make interpretation of dimensions easier. For the study, Oblimin with Kaiser Normalisation was used, which falls under oblique rotation. Oblique rotation is when the factors are not rotated 90° from each other, and the factors are considered to be correlated. Oblique rotation is more complex than orthogonal rotation since it encompasses one of two coordinate systems: a system of primary axes or a system of reference axes (Rummel, 1970).

6.5.1 Step 1: Determine the Number of Factors

Initially, the number of factors from the 72 individual statements (questions: 1:72), (see Appendix VI) must be determined. An EFA will produce one or more factors from the items/statements under consideration.

To determine the number of factors the following criteria were applied:

- Cumulative percentage explained by the factors > 60%
- Eigenvalues > 1 (also called the Kaiser Guttman rule)
- Look at a significant decline in the Scree plot

To decide to conduct this study using the EFA, the necessary KMO test and Bartlett's Test of Sphericity has done. If the correlation structure between individual variables in the EFA is too weak, then it is not valuable to conduct EFA. The KMO value differs between 0 and 1 with a cut-off point of 0.5 to conduct viable EFA Hair et al.1995; Tabachnick and Fidell (2007). In this study, the KMO value indicated the measure of the appropriateness to conduct EFA is viable (see Table 6.3).

Table 6.3: KMO and Bartlett's Test

KMO Measure of Sampling Adequacy		.962
Bartlett's Test of Sphericity	Approx. Chi-Square	21653.599
	Df	2556
	Sig.	.000

Since the KMO value is 0.96 it indicates that it is feasible to perform an EFA.

The output is shown in Table 6.4:

Table 6.4: Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	29.235	40.604	40.604	28.811	40.015	40.015	16.247
2	3.261	4.529	45.134	2.817	3.913	43.928	15.456
3	2.640	3.667	48.800	2.199	3.055	46.983	7.543
4	2.396	3.328	52.128	1.988	2.762	49.745	13.767
5	1.797	2.496	54.624	1.382	1.919	51.664	17.391
6	1.758	2.441	57.065	1.342	1.864	53.528	13.132
7	1.584	2.200	59.265	1.135	1.576	55.104	6.719
8	1.335	1.854	61.119	.888	1.234	56.338	9.022
9	1.253	1.741	62.860				
10	1.099	1.527	64.387				
11	1.065	1.479	65.866				
12	.993	1.379	67.244				
13	.974	1.353	68.597				
14	.901	1.252	69.849				
15	.834	1.159	71.008				
16	.776	1.078	72.086				
17	.760	1.055	73.141				
18	.757	1.051	74.192				
19	.727	1.010	75.201				
20	.710	.986	76.188				
21	.670	.930	77.118				
22	.640	.889	78.007				
23	.617	.856	78.863				
24	.613	.851	79.714				
25	.595	.826	80.540				
26	.563	.782	81.322				
27	.543	.754	82.076				
28	.536	.744	82.820				
29	.505	.702	83.522				
30	.497	.690	84.212				
31	.483	.671	84.882				
32	.474	.659	85.541				
33	.439	.609	86.150				
34	.432	.599	86.750				
35	.412	.572	87.322				

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
36	.398	.553	87.875				
37	.382	.530	88.405				
38	.374	.520	88.925				
39	.366	.508	89.433				
40	.352	.489	89.921				
41	.351	.487	90.409				
42	.347	.482	90.891				
43	.332	.461	91.352				
44	.322	.447	91.799				
45	.319	.443	92.242				
46	.306	.425	92.667				
47	.301	.418	93.084				
48	.294	.408	93.493				
49	.284	.394	93.887				
50	.269	.374	94.260				
51	.263	.366	94.626				
52	.255	.354	94.980				
53	.252	.351	95.331				
54	.246	.341	95.672				
55	.236	.327	96.000				
56	.227	.316	96.315				
57	.223	.310	96.626				
58	.210	.291	96.917				
59	.209	.290	97.207				
60	.204	.283	97.491				
61	.190	.264	97.754				
62	.184	.255	98.009				
63	.175	.244	98.253				
64	.173	.240	98.493				
65	.165	.229	98.722				
66	.158	.220	98.942				
67	.153	.212	99.155				
68	.142	.197	99.351				
69	.130	.181	99.532				
70	.125	.174	99.706				
71	.112	.155	99.861				
72	.100	.139	100.000				

Extraction Method: PAF

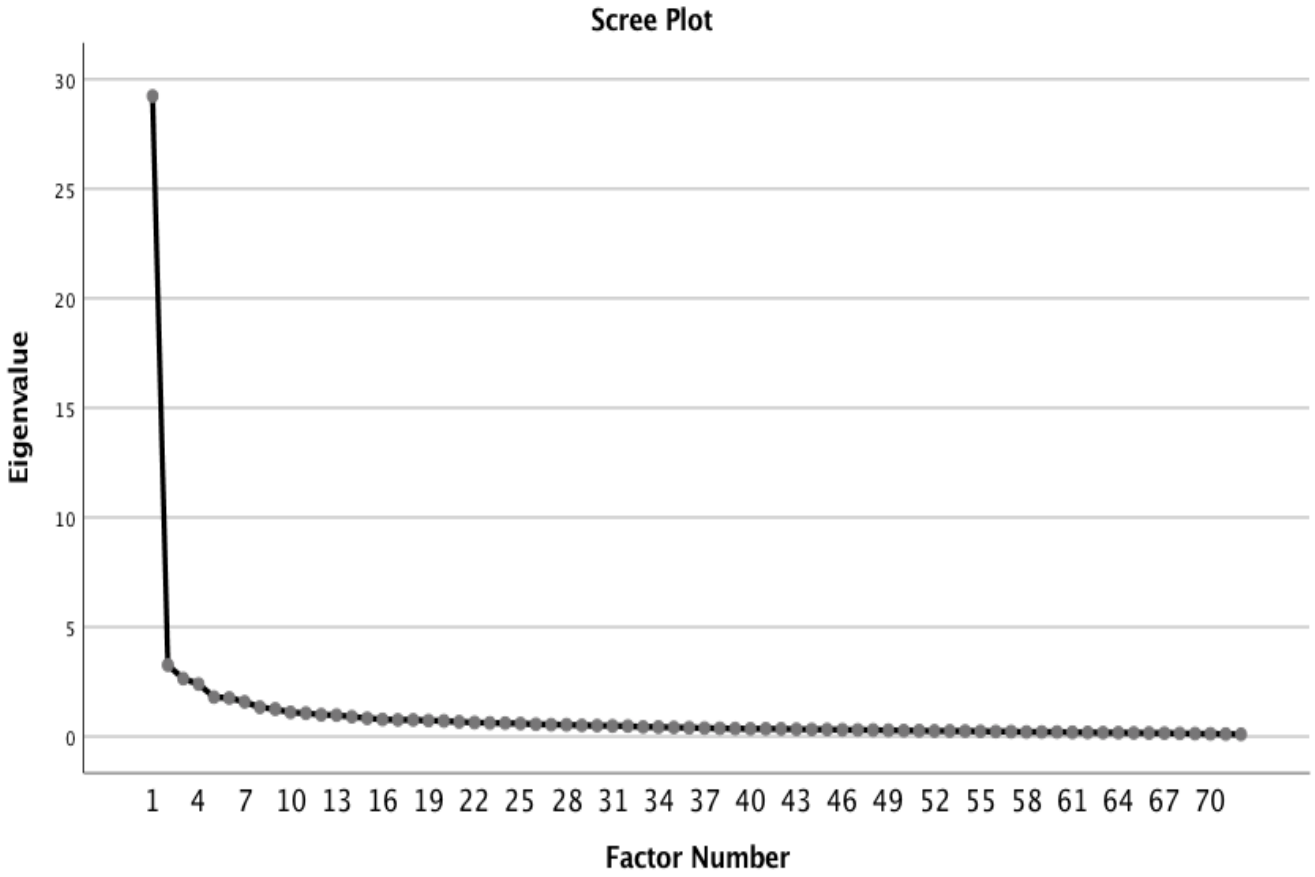


Figure 6.1: Scree plot that shows factor numbers

The output of the total variance shows that 61% cumulative variance is explained by eight factors. Eleven factors have Eigenvalues larger than 1. This means that the items/statements may be reduced to 11 factors. Solutions of 11, 10, 9 and 8 factors were used for the rotation. Some factors of the 11-, 10- and 9-factor solutions had less than three items (one factor with only 1 item). Therefore, the 8-factor solution was chosen which still accounts for 61% of the cumulative variance. The method used for extraction was PAF and the oblique rotation method was used to maintain the correlation between the factors. Following the extraction and rotation of the factors, the communalities and factor loading were produced.

Table 6.5: Communalities output

	Initial	Extraction
Inst1Inst6_Inst1	.520	.460
Inst1Inst6_Inst2	.651	.560
Inst1Inst6_Inst3	.622	.482
Inst1Inst6_Inst4	.605	.527
Inst1Inst6_Inst5	.710	.578
Inst1Inst6_Inst6	.720	.627
TechF1TechF13_TechF1	.598	.518
TechF1TechF13_TechF2	.616	.495
TechF1TechF13_TechF3	.520	.388
TechF1TechF13_TechF4	.590	.526
TechF1TechF13_TechF5	.415	.249
TechF1TechF13_TechF6	.699	.637
TechF1TechF13_TechF7	.694	.630
TechF1TechF13_TechF8	.696	.593
TechF1TechF13_TechF9	.603	.510
TechF1TechF13_TechF10	.705	.590
TechF1TechF13_TechF11	.676	.488
TechF1TechF13_TechF12	.737	.694
TechF1TechF13_TechF13	.561	.470
Func1Func9_Func1	.625	.533
Func1Func9_Func2	.621	.510
Func1Func9_Func3	.672	.562
Func1Func9_Func4	.674	.554
Func1Func9_Func5	.590	.519
Func1Func9_Func6	.624	.573
Func1Func9_Func7	.599	.531
Func1Func9_Func8	.641	.568
Func1Func9_Func9	.658	.584
Feat1Feat10_Feat1	.694	.639
Feat1Feat10_Feat2	.672	.579
Feat1Feat10_Feat3	.709	.673
Feat1Feat10_Feat4	.728	.676
Feat1Feat10_Feat5	.658	.591
Feat1Feat10_Feat6	.701	.555
Feat1Feat10_Feat7	.644	.445
Feat1Feat10_Feat8	.646	.594
Feat1Feat10_Feat9	.655	.602
Feat1Feat10_Feat10	.594	.517

	Initial	Extraction
ELReas1ELReas8_ELReas1	.668	.606
ELReas1ELReas8_ELReas2	.698	.659
ELReas1ELReas8_ELReas3	.667	.611
ELReas1ELReas8_ELReas4	.609	.531
ELReas1ELReas8_ELReas5	.591	.480
ELReas1ELReas8_ELReas6	.644	.516
ELReas1ELReas8_ELReas7	.579	.434
ELReas1ELReas8_ELReas8	.540	.427
Policy1Policy4_Policy1	.790	.696
Policy1Policy4_Policy2	.767	.700
Policy1Policy4_Policy3	.732	.633
Policy1Policy4_Policy4	.713	.656
SysMgmt1SysMgmt10_SysMgmt1	.709	.592
SysMgmt1SysMgmt10_SysMgmt2	.761	.669
SysMgmt1SysMgmt10_SysMgmt3	.715	.633
SysMgmt1SysMgmt10_SysMgmt4	.704	.566
SysMgmt1SysMgmt10_SysMgmt5	.733	.589
SysMgmt1SysMgmt10_SysMgmt6	.706	.579
SysMgmt1SysMgmt10_SysMgmt7	.671	.595
SysMgmt1SysMgmt10_SysMgmt8	.732	.674
SysMgmt1SysMgmt10_SysMgmt9	.703	.612
SysMgmt1SysMgmt10_SysMgm10	.700	.591
PedaInst1PedaInst7_PedaInst1	.619	.545
PedaInst1PedaInst7_PedaInst2	.689	.589
PedaInst1PedaInst7_PedaInst3	.671	.548
PedaInst1PedaInst7_PedaInst4	.695	.538
PedaInst1PedaInst7_PedaInst5	.623	.537
PedaInst1PedaInst7_PedaInst6	.694	.618
PedaInst1PedaInst7_PedaInst7	.749	.725
LearnerR1LearnerR5_LearnerR1	.524	.388
LearnerR1LearnerR5_LearnerR2	.549	.468
LearnerR1LearnerR5_LearnerR3	.622	.518
LearnerR1LearnerR5_LearnerR4	.706	.638
LearnerR1LearnerR5_LearnerR5	.704	.574

Extraction Method: PAF

The output displays the communalities for the eight extracted factors. Communality refers to common variance (the variance that is shared with other items) as opposed to a variance that is unique to that item. Communality indicates the proportion of an item's variance that is communal with the other items (factor structure).

The communalities, therefore, show the amount to which an individual item ‘relates’ to the factor structure (the rest of the items). A value near 1 indicates a high proportion of ‘common’ variance. This item, therefore ‘relates’ to the other items as opposed to a communality near 0 where the item is ‘unique’.

Items with low communalities (0.2 or lower) could be considered for removal and the EFA recurrent. In this study, no items were removed (all communalities are above 0.2) (Field, 2009; Hair et al., 2014; Henson &Roberts, 2006).

6.5.2 Step 2: Determine the Factors

The pattern matrix in Table 6.6 below and Appendix VIII shows the factor loadings for the eight extracted factors. The loading of an item shows the degree to which an individual item ‘loads’ onto a factor. When interpreting the factors, it is important to consider the loading to label the strength of the relationships. Factors can be identified by the largest loadings; however, it is also necessary to examine the zero and low loadings to confirm the identification of the factors (Gorsuch, 1983). A value near 1 indicates that an item loads highly on a specific factor. A loading of 0.40 and larger can be considered meaningful.

Table 6.6: Rotated factor loadings

Pattern Matrix[a]								
	Factor							
	1	2	3	4	5	6	7	8
[58. Technological skills training is provided for students to make use of e-learning.] System Management	.649							
[54. Technical support is provided in the computer labs.] System Management	.567							
[59. There is administrative (management) support in the implementation of e-learning.] System Management	.548							
[67. Students' preferences and capacity are considered in the process of the e-learning session.] Pedagogical/ Instructional	.540					.331		
[57. The lab computers are regularly maintained.] System Management	.519							
[53. The ICT facilities in the institution are up-to-date.] System Management	.511							
[50. The e-learning policy documents (rules and regulation) are available on your institution's website or any other accessible location.] Policy	.507							.303
[60. There is orientation, guidelines and tutorial on the use of the e-learning system and services.] System Management	.493							
[56. There is an online help facility in the e-learning system.] System Management	.476							
[65. It is a student to decide the study method during the e-learning session.] Pedagogical/ Instructional	.466							
[55. There is an ICT help desk for support and maintenance for the e-learning system.] System Management	.460							
[66. In the existing e-learning system, the students' efficiency is considered on the pace of the teaching and learning process (such as duration of an online exam and online assignment submission).] Pedagogical/ Instructional	.408							
[52. Your e-learning system supports resources management (upload, access and download)] System Management	.407			.351				

Pattern Matrix[a]								
	Factor							
	1	2	3	4	5	6	7	8
[47. There are proper rules and regulations on the use of electronic resources in your institution.] Policy	.387							.327
[62. The e-learning system is organised from a student point of view to start, pause, save or close sessions.] Pedagogical/ Instructional	.322							
[63. The e-learning system supports all the learning and teaching process (course delivery, assessment and evaluation, feedback etc.) Pedagogical/ Instructional	.305							
[61. The existing e-learning system resources are self-managed which allows students to access, operate, change and update them.] Pedagogical/ Instructional								
[12. There is good wireless internet connectivity.] Technological Facility		.664						
[13. There is proper network infrastructure for e-learning.] Technological Facility		.663						
[18. There is a reliable internet connection to access, download and view text, audio and video e-learning material.] Technological Facility		.636						
[6. The instruction aware students about the e-learning system.] Institutional		.608						
[5. The institute provides regular orientation for newly admitted students about the use of the exiting e-learning system.] Institutional		.596						
[8. There are computer labs with required updated applications.] Technological Facility		.593						
[7. All hardware and software components in the labs are functional.] Technological Facility		.543						
[14. There is sufficient internet connection in the labs to facilitate e-learning.] Technological Facility		.540						
[16. The e-learning system can be accessed smoothly from anywhere in the campus.] Technological Facility		.523						
[15. There are enough computers in the labs to facilitate e-learning.] Technological Facility		.508						

Pattern Matrix[a]								
	Factor							
	1	2	3	4	5	6	7	8
[10. The computer labs in the institution I am studying are easily accessible.] Technological Facility		.500						
[9. I have the necessary ICT devices (i.e., tablets, mobile and laptop) that facilitate the e-learning courses that you are taking.] Technological Facility		.478						
[2. Your institution provides the required facilities to assist e-learning.] Institutional		.462	-.308					
[17. In the institution that I am enrolled at, the e-learning system is accessible anytime from any destination.] Technological Facility		.427						
[3. The institution/instructors encourage you to use e-learning in your course.] Institutional		.402						
[4. Culturally, there are positive attitudes on e-learning and IT in your institution/instructors.] Institutional		.369						.363
[11. The institution has a backup generator in cases when there is a power interruption.] Technological Facility		.356						
[19. There is videoconferencing facility in the institution for the e-learning purpose.] Technological Facility		.334						
[71. You have the basic computer skills to use the existing e-learning system (i.e., using an application like Word, Excel, PDF, audio/video documents and browsing the internet).] Learner Readiness			-.613					
[70. You prefer e-learning with the support of face-to-face teaching and learning system.] Learner Readiness			-.533					
[72. You have the access to ICT devices (e.g., laptop, desktop, tablet, mobile) to attend e-learning sessions.] Learner Readiness			-.471					
[1. E-learning is a necessary tool for the teaching and learning process in your institution.] Institutional		.313	-.450					

Pattern Matrix[a]								
	Factor							
	1	2	3	4	5	6	7	8
[69. You prefer face-to-face teaching and a learning system with the support of e-learning.] Learner Readiness			-.439					
[40. The e-learning resource material supports image/picture/GIF/JPG.] E-learning Resources				.718				
[39. There are text type e-learning resources available like handouts, lecture notes, worksheets, course outlines and other course-related (i.e., PDF, word, excel or any other format)] e-learning Resources				.676				
[41. There is video and audio-supported resources in your e-learning system (i.e., multimedia resources).] E-learning Resources				.535				
[20. The e-learning system provides uploading, downloading and accessing academic and related documents.] Functionality				.448				
[42. Your e-learning system has software resources to download and use.] E-learning Resources				.438				
[43. There are additional resources in your e-learning system (i.e., books, articles and journals).] E-learning Resources				.396				
[44. The e-learning resources are locally developed and uploaded on the e-learning by your institution.] E-learning Resources				.376				
[51. There is a specific unit (i.e., ICT department, Instructor or any other assigned person) to support the accessibility of user accounts (user name and password) in your institution.] System Management				.361				
[32. The e-learning system Web portal interface is easily adaptable (that I can always manage to make use of its services).] Features					-.731			
[31. The e-learning system is easy to use.] Features					-.713			
[33. The e-learning system is available all the time.] Features					-.639			

Pattern Matrix[a]								
	Factor							
	1	2	3	4	5	6	7	8
[29. The e-learning system is user-friendly and enables students to access it smoothly.] Features					-.571			
[30. The e-learning system can be modified (i.e., you can start, play and pause the audio or video resources).] Features					-.497			
[36. Confidentiality of data is secured/protected.] Features					-.460			
[34. Online exams through the existing e-learning system are reliable as during the power and internet interruption it will continue from where it has stopped.] Features					-.449			
[38. The e-learning system is secured from unauthorised users (i.e., the unique user name and password are used by each student to access the e-learning services).] Features					-.401			
[35. Assignment submissions through the existing e-learning system are reliable as during the power and internet interruption it will continue from where it has stopped.] Features					-.373	.301		
[26. The e-learning system provides online assignment submission.] Functionality						.661		
[27. The e-learning system provides online exam correction and results.] Functionality						.641		
[25. The e-learning system provides an assessment and evaluation mechanism (i.e., continuous assessment like a mid-term exam, final exam etc).] Functionality						.603		
[28. The e-learning system provides a feedback system to the students to evaluate the use of the e-learning system in your institution.] Functionality						.505		
[37. Online exams can be securely conducted.] Features					-.389	.431		
[46. The e-learning sources are mostly downloaded from international sources.] E-learning Resources						.338		
[45. The e-learning resources are developed and shared by other institutions.] E-learning Resources						.309		

Pattern Matrix[a]								
	Factor							
	1	2	3	4	5	6	7	8
[24. The e-learning system allows different user changes (such as the colour of the interface, setting of the fonts, background etc) as per your preference.] Functionality								
[22. There is a discussion forum for courses related issues to share views and opinions among students.] Functionality							-.526	
[23. There is a discussion forum for course-related issues to share views and opinions with your instructor.] Functionality							-.514	
[21. The e-learning system has instant messaging (SMS) for announcements and newly updated resources.] Functionality							-.394	
[64. There is a reliable monitoring and evaluation e-learning system (such as completion of topics, frequency of access to the e-learning system and assignment submission on due dates).] Pedagogical/ Instructional								
[48. There are proper rules and regulations on the use of e-learning facilities (i.e., duration of computer use in the lab, session limitation of the e-learning system) in your institution.] Policy	.311							.494
[49. Students know their roles and responsibilities in an e-learning environment.] Policy								.405
[68. You prefer e-learning courses to traditional face-to-face teaching and learning system.] Learner Readiness								.341

Extraction Method: PAF

Rotation Method: Oblimin with Kaiser Normalization.[a]

Rotation converged in 35 iterations.

For an item to load on a factor an item was said to load on a given factor if the factor loading was 0.40 or greater for that factor and less than 0.40 for the other factors. If an item has loadings of greater than 0.40 on more than one factor the item is ‘cross-loading, a closer inspection is warranted and a decision made to which factor the item belongs. Cross loadings may be the result of ambiguity in the item/statement.

Using these criteria, 13 items (58, 54, 59, 67, 57, 53, 50, 60, 56, 65, 55, 66, 52), were found to load on the first factor which was subsequently named “E-LMSs”; 15 items (12, 13, 18, 6, 5, 8, 7, 14, 16, 15, 10, 9, 2, 17, 3), were found to load on the second factor which was subsequently named “Technological infrastructure and facilities”; five items were found to load on third factor which was subsequently named “Learner Readiness”; five items (40, 39, 41, 20, 42), were found to load on the fourth factor which was subsequently named “E-learning Resources Accessibility”; eight items (32, 31, 33, 29, 30, 36, 34, 38), were found to load on fifth factor which was subsequently named “E-learning System Features”; five items (26, 27, 25, 28, 37), were found on the sixth factor which was subsequently named “e-learning services”; three items (22, 23, 21), were found to load on the seventh factor which was subsequently named “E-learning Communication”; item 21 was taken as it was very close to fulfil the three items criteria and two items (48,49), were found on the eighth factor which was subsequently named “e-learning policy”. Factor eight had only two items to load so it was considered as a limitation.

The individual items were then allotted to each of the eight factors based on their discrete factor loadings. The three items then form the constructs or dimensions in the questionnaire. These factors make logical and theoretical sense.

EFA was applied to the responses to the 72-item questionnaire. The principal axis method was used to extract the factors, and this was followed by an oblimin (oblique) rotation. Although the first 11 factors exhibited Eigenvalues greater than or near 1; the scree plot suggested a possible seven or eight factors. Some factors of the 11-, 10- and 9-factor solutions had less than three items (one factor with only one item) therefore the 8-factor solution was chosen which still accounts for 61% of the cumulative variance.

6.6 TESTING THE RELIABILITY OF THE ITEMS OF VALID FACTORS OF E-LEARNING FRAMEWORK

Item analysis is done to assess the reliability of the different factors in the questionnaire via Cronbach's alpha values after the final data collection.

Table 6.7: Coefficient Alpha Reliability Estimates for the Study's Variable

Variables	Items	Items left out	Cronbach's alpha	Reliability
Factor 1: E-learning Management System	58, 54, 59, 67, 57, 53, 50, 60, 56, 65, 55, 66	None	0.94	Excellent
Factor 2: Technological infrastructure and facilities	12, 13, 18, 6, 5, 8, 7, 14, 16, 15, 10, 9, 2, 17, 3	None	0.93	Excellent
Factor 3: Learner Readiness	71, 70, 72.1, 69	None	0.83	Good
Factor 4: E-learning Resources Accessibility	40, 39, 41, 20, 42, 43	None	0.88	Good
Factor 5: E-learning System Features	32, 33, 31, 29, 30, 36, 34, 38	None	0.90	Excellent
Factor 6: E-learning Services	26, 27, 25, 28, 37	None	0.85	Good
Factor 7: E-learning Communication	22, 23, 21	None	0.82	Good
Factor 8: E-learning Policy	48, 49	None	0.82	Good

Note: N = 413

In Table 6.7, information for the first factor is items that are part of the first factor, items left out, the Cronbach's alpha value (0.90) and interpretation of reliability (Excellent). Estimates of internal consistency as measured by Cronbach's alpha, all exceeded 0.80 as reported in Table 6.7. The result showed that all the valid factors are reliable and excellent.

6.7 DESCRIPTIVE STATISTICS OF FACTORS

6.7.1 E-LMSs

In the E-LMSs factor, different e-learning services are addressed which can help to implement e-learning; i.e., e-learning policy documents, rules and regulations, issues related to ICT facilities updates in the learning institutions, technical support in computer laboratories. In general, ICT support and maintenance of e-learning system and use, technological skill and training as a whole included all the administrative (management) support in the implementation of e-learning.

Table 6.8: Frequency table of E-LMSs Factor

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		All	Mean	Median
	N	%	N	%	N	%	N	%	N	%	N		
50. The e-learning policy documents (rules and regulations) are available on your institution's website or any other accessible location.	38	9.20%	67	16.22%	118	28.57%	128	30.99%	62	15.01%	413	3.26	3.00
53. The ICT facilities in the institution are up-to-date.	28	6.78%	63	15.25%	126	30.51%	129	31.23%	67	16.22%	413	3.35	3.00
54. Technical support is provided in the computer labs.	29	7.02%	53	12.83%	109	26.39%	157	38.01%	65	15.74%	413	3.43	4.00
55. There is an ICT help desk for support and maintenance for the e-learning system.	29	7.02%	55	13.32%	112	27.12%	154	37.29%	63	15.25%	413	3.40	4.00
56. There is an online help facility in the e-learning system.	35	8.50%	82	19.90%	132	32.04%	111	26.94%	52	12.62%	412	3.15	3.00
57. The lab computers are regularly maintained.	32	7.75%	73	17.68%	142	34.38%	119	28.81%	47	11.38%	413	3.18	3.00
58. Technological skills training is provided for students to make use of e-learning.	42	10.17%	80	19.37%	99	23.97%	132	31.96%	60	14.53%	413	3.21	3.00
59. There is administrative (management) support in the implementation of e-learning.	41	9.93%	65	15.74%	99	23.97%	150	36.32%	58	14.04%	413	3.29	4.00
60. There is orientation, guidelines and tutorial on the use of the e-learning system and services.	31	7.51%	65	15.74%	86	20.82%	145	35.11%	86	20.82%	413	3.46	4.00
65. It is a student to decide the study method during an e-learning session.	32	7.77%	85	20.63%	116	28.16%	122	29.61%	57	13.83%	412	3.21	3.00
66. In the existing e-learning system the student's efficiency are considered on the pace of the teaching and learning process (such as duration of an online exam and online assignment submission).	30	7.26%	76	18.40%	129	31.23%	127	30.75%	51	12.35%	413	3.23	3.00
67. Students, preference and capacity are considered in the process of the e-learning session.	34	8.23%	74	17.92%	115	27.85%	137	33.17%	53	12.83%	413	3.24	3.00

According to the above frequency Table 6.8 of E-LMSs Factor items (60,54,55,59), the agreed and strongly agreed percentages by the students are relatively high, i.e., 55.93%; 53.75%; 52.54%; 50.36% with the mean and median values of 3.46, 3.43, 3.40, 3.29 and 4.00, 4.00, 4.00,4.00 respectively. This shows that students agreed on the availability of e-learning system orientation and guidelines including ICT help desk support and maintenance together with technical supports in the laboratories. Moreover, there is administrative (management) support for the implementation of e-learning. On the other hand, in terms of the items (56,57,65,66), the agreed and strongly agreed percentages by the students are low: 39.56%, 40.19%, 43.44%, and 43.1% with the mean and median values of 3.15; 3.18; 3.21; 3.23 and 3.00,3.00,3.00,3.00 respectively which means that in the existing e-learning system, the online help facilities and students' capacity and e-learning preferences are not considered. Moreover, the computers in the laboratories are not maintained regularly.

6.7.2 Technological Infrastructure and Facilities

The technological infrastructure and facilities factor addressed issues related to ICT infrastructure and facilities provided by the institution to implement e-learning, including the orientation and awareness about the existing e-learning portal. The main issues in this factor were the functionality of hardware and software components in the computer laboratories, availability of ICT devices i.e., laptops, tablets and mobiles which are required to take courses via e-learning. Moreover, the availability of network infrastructure (Local Area Network (LAN) and Wire Less Network (Wi-Fi)) reliable internet connectivity to download texts and video study materials.

Table 6.9: Frequency table of technological infrastructure and facilities factor

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		All	Mean	Median
	N	%	N	%	N	%	N	%	N	%	N		
2. Your institution provides the required facilities to assist e-learning	24	5.81	59	14.29	91	22.03	163	39.47	76	18.40	413	3.50	4.00
5. The institute provides regular orientation for newly admitted students about the use of the exiting e-learning system.	40	9.69	62	15.01	79	19.13	124	30.02	108	26.15	413	3.48	4.00
6. The instruction aware students about the e-learning system	32	7.77	79	19.17	81	19.66	127	30.83	93	22.57	412	3.41	4.00
7. All hardware and software components in the labs are functional	51	12.35	89	21.55	107	25.91	123	29.78	43	10.41	413	3.04	3.00
8. There are computer labs with required updated applications	30	7.28	66	16.02	105	25.49	141	34.22	70	16.99	412	3.38	4.00
9. I have the necessary ICT devices (i.e., tablets, mobiles and laptops) that facilitate the e-learning courses that you are taking	36	8.72	54	13.08	75	18.16	159	38.50	89	21.55	413	3.51	4.00
10. The computer labs in the institution I am studying are easily accessible.	30	7.26	70	16.95	97	23.49	139	33.66	77	18.64	413	3.39	4.00
12. There is a good wireless internet connectivity	36	8.72	63	15.25	77	18.64	139	33.66	98	23.73	413	3.48	4.00
13. There is proper network infrastructure for e-learning.	26	6.30	67	16.22	101	24.46	150	36.32	69	16.71	413	3.41	4.00
14. There is sufficient internet connection in the labs to facilitate e-learning.	31	7.51	56	13.56	94	22.76	151	36.56	81	19.61	413	3.47	4.00
15.There are enough computers in the labs to facilitate e-learning.	29	7.02	74	17.92	108	26.15	151	36.56	51	12.35	413	3.29	3.00
16. The e-learning system can be accessed smoothly from anywhere in the campus.	39	9.44	88	21.31	90	21.79	135	32.69	61	14.77	413	3.22	3.00
17. In the institution that I am enrolled at, the e-learning system is accessible anytime from any destination.	34	8.23	95	23.00	109	26.39	119	28.81	56	13.56	413	3.16	3.00
18. There is a reliable internet connection to access, download and view text, audio and video e-learning material.	31	7.51	74	17.92	78	18.89	147	35.59	83	20.10	413	3.43	4.00

According to Table 6.9, Factor items 9,2,12,14 and 18 were agreed and strongly agreed by the students with a percentage of 60.05%; 57.87%; 57.39%; 56.17% and 55.69% with the mean and median value of 3.51,3.50,3.48, 3.47,3.43 and 4.00, 4.00 4.00, 4.00, 4.00 respectively. Therefore, institutions provide the required and reliable internet connection to assist e-learning. However, items 7, 16, 17 were agreed and strongly agreed by the students with a percentage of 40.19%, 47.46% and 42.37 % respectively with the mean and median values of 3.04, 3.22, 3.16 and 3.00 respectively. The problem of maintenance of lab computers and functionality issues was raised on the E-LMSs factor and this problem is also raised on this factor. Moreover, accessibility of the e-learning system anytime from anywhere was not possible on the existing e-learning portal. Students disagreed regarding the availability of the e-learning system all the time (factor item number 33) because the e-learning portal works only via the university network with limited bandwidth.

6.7.3 Learner Readiness

The learner readiness factor covered the issues related to students' preference on the teaching and learning process such as their readiness for the e-learning blended courses, whether they prefer face-to-face programmes with the support of e-learning or e-learning courses with the support of face-to-face programmes. Furthermore, learner readiness includes their basic computer skills in using the existing e-learning portal in their institution. In addition, it would require an evaluation of the extent to which they are using different applications, e.g., Microsoft Office, PDF, audio and video documents including browsing the internet. Moreover, the ability of secure ICT devices, i.e., laptops and tablets to access e-learning resources anytime and anywhere.

Table 6.10: Frequency table of learner readiness factors

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Median
	N	%	N	%	N	%	N	%	N	%		
69. You prefer a face-to-face teaching and learning system with the support of e-learning.	22	5.33	39	9.44	95	23.00	155	37.53	102	24.70	3.67	4
70. You prefer e-learning with the support of face-to-face teaching and learning system.	23	5.57	44	10.65	101	24.46	145	35.11	100	24.21	3.62	4
71. You have the basic computer skills to use the existing e-learning system (i.e., using an application like Word, Excel, PDF, audio/video documents and browsing the internet).	22	5.34	37	8.98	76	18.45	156	37.86	121	29.37	3.77	4
72. You have the access to ICT devices (e.g., laptop, desktop, tablet, mobile...) to attend e-learning sessions.	31	7.51	39	9.44	76	18.40	149	36.08	118	28.57	3.69	4
1. E-learning is a necessary tool for the teaching and learning process in your institution.	28	6.78	23	5.57	53	12.83	158	38.26	151	36.56	3.92	4

According to Table 6.10 of Learner Readiness Factor items 1, 71, and 72 “e-learning is a necessary tool for the teaching and learning process in your institution”, “You have the basic computer skills to use the existing e-learning system (i.e., using an application like Word, Excel, PDF, audio/video documents and browsing the internet).” and “You have the access to ICT devices (e.g., laptop, desktop, tablet, mobile...) to attend e-learning sessions” were agreed and strongly agreed by the students with a percentage of 74.82%,67.23% and 64.65% with the mean and median value of 3.92, 3.77, 3.69 and 4.00, 4.00,4.00 respectively. This shows that the students’ readiness to learn with the e-learning system is high as the score of “e-learning is a necessary tool for the teaching and learning process in your institution” was strongly agreed by the students and they agreed they had the basic skills to use the existing e-learning system as well as access to ICT devices to learn through e-learning.

6.7.4 E-Learning Resources Accessibility

The E-Learning Resources Accessibility factor deals with the access of uploading and downloading academic documents, i.e., text type handouts, lecture notes, worksheets and course outlines and related e-learning resources; the format compatibility of the e-learning system such as access to images, video and audio-supported multimedia resources; the availability of software resources to download for free from the e-learning portal which can be helpful to use it for academic purposes; and more e-learning resources, i.e., books, articles and journals on the e-learning portal to do different assignments.

Table 6.11: Frequency table of e-learning resources accessibility factor

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		All	Mean	Median
	N	%	N	%	N	%	N	%	N	%	N		
20. The e-learning system provides uploading, downloading and accessing academic and related documents.	20	4.84	49	11.86	97	23.49	157	38.01	90	21.79	413	3.60	4.00
39. There are text type e-learning resources available like handouts, lecture notes, worksheets, course outlines and other course-related materials (i.e., PDF, word, excel or any other format).	27	6.55	40	9.71	83	20.15	163	39.56	99	24.03	412	3.65	4.00
40. The e-learning resource material supports image/picture/GIF/JPG.	23	5.58	59	14.32	105	25.49	150	36.41	75	18.20	412	3.47	4.00
41. There is video and audio-supported resources in your e-learning system (i.e., multimedia resources).	26	6.31	48	11.65	102	24.76	146	35.44	90	21.84	412	3.55	4.00
42. Your e-learning system has software resources to download and use.	30	7.28	53	12.86	96	23.30	159	38.59	74	17.96	412	3.47	4.00
43. There are additional resources in your e-learning system (i.e., books, articles and journals).	26	6.31	47	11.41	110	26.70	156	37.86	73	17.72	412	3.49	4.00

According to Table 6.11, items 39,20,41,42 are agreed and strongly agreed by the students with a percentage of 63.59%,59.8%, 57.38% and 56.55 % with the mean and median values of 3.65,3.60,3.55, 3.47 and 4.00, 4.00, 4.00, 4.00 respectively. This means that students agreed about the availability of e-learning academic resources in different formats and types including the free software resources to download from the existing e-learning portal, although they agreed more on the availability of text type e-learning resources available like handouts, lecture notes, worksheets and course outlines.

6.7.5 E-Learning System Features

The E-learning system features factor includes the issues related to the e-learning portal interface user-friendliness and easily adaptability by students. Therefore, the e-learning system can be modified; i.e., the students can start, play and pause the audio and video resources. Moreover, it addresses its availability all the time, online exams reliability including power and internet interruptions while disconnected. This factor also deals with the issues of data confidentiality and security with the user name and password authentication to avoid vulnerability to unauthorised users.

Table 6.12: Frequency table of E-Learning System Features Factor

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		All	Mean	Median
	N	%	N	%	N	%	N	%	N	%	N		
29. The e-learning system is user-friendly and enables students to access it smoothly.	38	9.20	51	12.35	95	23.00	159	38.50	70	16.95	413	3.42	4.00
30. The e-learning system can be modified (i.e., you can start, play and pause the audio or video resources).	31	7.51	68	16.46	104	25.18	139	33.66	71	17.19	413	3.37	4.00
31. The e-learning system is easy to use.	37	8.98	42	10.19	81	19.66	170	41.26	82	19.90	412	3.53	4.00
32. The e-learning system Web portal interface is easily adaptable (that I can always manage to make use of its services).	23	5.58	69	16.75	118	28.64	138	33.50	64	15.53	412	3.37	3.00
33. The e-learning system is available all the time.	36	8.72	86	20.82	98	23.73	136	32.93	57	13.80	413	3.22	3.00
34. Online exams through the existing e-learning system are reliable as during the power and internet interruption it will continue from where it has stopped.	58	14.04	91	22.03	117	28.33	103	24.94	44	10.65	413	2.96	3.00
36. Confidentiality of data is secured/protected.	29	7.02	46	11.14	118	28.57	141	34.14	79	19.13	413	3.47	4.00
38. The e-learning system is secured from unauthorised users (i.e., a unique user name and password is used by each student to access the e-learning services).	36	8.72	50	12.11	86	20.82	140	33.90	101	24.46	413	3.53	4.00

According to Table 6.12 of E-learning System Features Factor items 61, 58, 41, 42 were agreed and strongly agreed by students with percentages of 61.16% and 58.36% respectively with mean and median values of 3.53 and 3.53 mean and 4.00 respectively which means students agreed the existing e-learning portal is easy to use and is secured with user name and password so that the system is not vulnerable to unauthorised users. However, items 34, 33 and 32 were agreed and strongly agreed by the students with percentages of 35.59%, 46.73% and 49.03% respectively with the mean and median values of 2.96, 3.22,3.37 and 3.00. This shows that taking online exams on the existing e-learning portal is not reliable and the e-portal is not available all the time. Moreover, the Web portal interface is not easily adaptable.

6.7.6 E-Learning Services

E-Learning Services factors included the services provided by the e-learning portal that are linked to assessment and evaluation mechanisms, i.e., mid-term and final exams, online assignment submission, online exam marking, online feedback system (evaluation) on the use of e-learning portal in the institution and security of online exams are all included in the e-learning services.

Table 6.13: Frequency Table of E-learning Services Factor

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		All	Mean	Median
	N	%	N	%	N	%	N	%	N	%	N		
25. The e-learning system provides an assessment and evaluation mechanism (i.e., continuous assessment like a mid-term exam, final exam etc).	45	10.90%	73	17.68%	94	22.76%	133	32.20%	68	16.46%	413	3.26	3.00
26. The e-learning system provides online assignment submission.	37	8.96%	73	17.68%	107	25.91%	131	31.72%	65	15.74%	413	3.28	3.00
27. The e-learning system provides online exam correction and results.	50	12.11%	66	15.98%	105	25.42%	128	30.99%	64	15.50%	413	3.22	3.00
28. The e-learning system provides a feedback system to the students to evaluate the use of the e-learning system in your institution.	47	11.38%	78	18.89%	103	24.94%	130	31.48%	55	13.32%	413	3.16	3.00
37. Online exams can be conducted securely.	47	11.38%	54	13.08%	123	29.78%	119	28.81%	70	16.95%	413	3.27	3.00

According to Table 6.13, E-Learning Service Factor 25, 26, 27, 28 and 37 are agreed and strongly agreed by the students with a percentage of 48.66%, 47.46%, 46.49%, 44.29% and 45.76% respectively with mean and median values of 3.26, 3.28, 3.22, 3.16, 3.27 and 3.00, 3.00, 3.00, 3.00, and 3.00 respectively, which means students were not agreed on the availability of online exams and the feedback facility, online assignment submission service and online exam security on the existing e-learning portal which are very important services.

6.7.7 E-Learning Communication

E-learning communication factors refer to the availability of the short message system (SMS) that is used to transmit announcements and newly updated resources to the students and advise them of discussion forums for course-related issues to share opinions among students and instructors.

Table 6.14: Frequency table of e-learning communication factors

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		All	Mean	Median
	N	%	N	%	N	%	N	%	N	%	N		
21. The e-learning SMS for announcements and newly updated resources.	40	9.69	77	18.64	118	28.57	112	27.12	66	15.98	413	3.21	3.00
22. There is a discussion forum for course-related issues to share views and opinions among students.	40	9.69	69	16.71	123	29.78	125	30.27	56	13.56	413	3.21	3.00
23. There is a discussion forum for course-related issues to share views and opinions with your instructor.	45	10.90	88	21.31	115	27.85	116	28.09	49	11.86	413	3.09	3.00

According to Table 6.14, items 21,22 and 23 were agreed and strongly agreed by the students with percentages of 43.1%, 43.83% and 39.95% respectively with the mean and median values of 3.21,3.21,3.09 and 3.00, 3,00, and 3.00 respectively which means students did not agree on the availability of the SMS for announcements on the existing e-learning system including e-learning communications, i.e., course-related discussion forums among students to share views and opinions with their instructors regarding online exams and the feedback facility, online assignment submission service and online exam security services on the existing e-learning portal which are very important for conducting courses through e-learning portal.

6.7.8 E-Learning Policy

The e-learning policy is a factor with limitations as it had only two items but it referred to critical issues about e-learning systems relating to proper rules and regulation on the use of e-learning facilities, i.e., duration of computer uses in the computer laboratories and web portal idle session limitation. Moreover, it focuses on students' awareness of their roles and responsibilities in using the e-learning environment.

Table 6.15: Frequency Table of E-Learning Policy Factors

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		All	Mean	Median
	N	%	N	%	N	%	N	%	N	%	N		
48. There are proper rules and regulations on the use of e-learning facilities (i.e., duration of computer use in the lab, session limitation of the e-learning system) in your institution.	35	8.47	60	14.53	125	30.27	135	32.69	58	14.04	413	3.29	3.00
49. Students know their roles and responsibilities in the e-learning environment.	36	8.72	68	16.46	115	27.85	125	30.27	69	16.71	413	3.30	3.00

According to Table 6.15, items 48 and 49 were agreed and strongly agreed by the students with a percentage of 46.73% and 46.98% respectively with the mean and median value of 3.29, 3.30, 3.00, and 3.00 respectively which means students did not agree on the availability of an e-learning policy concerning the use of computer laboratories and e-learning facilities including students' responsibilities in the e-learning environment in which an e-learning policy is critical. This factor was considered with its limitation as it had only two items; but, the e-learning policy is an important factor for the implementation of e-learning.

6.8 COMPARING FACTORS

The factors in the Table 6.16 below indicates the mean, median, Std and Skewness value of that the identified major factors to what degree e-learning being used and e-learning challenges experienced in Ethiopia Ethiopian higher learning institution students.

Table 6.16: Major factors in the e-learning framework

Factor	Mean	Median	Std	Skewness
E-LMSs	3.29	3.33	0.88	-0.24
Technological Infrastructure and Facilities	3.37	3.4	0.85	-0.31
Learner Readiness	3.73	4	0.88	-0.90
E-learning Resources Accessibility	3.54	3.66	0.88	-0.61
E-learning System Features	3.36	3.37	0.90	-0.34
E-learning Services	3.2	3.2	0.96	-0.176
E-learning Communication	3.1	3	1.02	-0.17
E-learning Policy	3.3	3.5	1.07	-0.29

Table 6.16 above showed that the mean, median, Std Dev and Skewness values of eight factors were identified to develop an e-learning framework based on the students' actual e-learning use and e-learning challenges and experiences. These eight factors were identified to develop an e-learning framework and factors are validated using EFA. The major mean and median values for each of the Factor are 3.29 and 3.33 for the Factor of E-LMSs; 3.37 and 3.4 for the Factor of Technological Infrastructure, 3.74 and 4 for the Factor of Learner Readiness; 3.54 and 3.66 for the Factor E-learning Resources Accessibility, 3.36 and 3.37 for the Factor of E-learning System Features, 3.2 and 3.2 for the factor of e-learning services, 3.1 and 3 for the factor of E-learning Communication; and 3.3 and 3.5 for the factor of E-learning Policy. These results show that Factor Learner Readiness scores were high compared to other factors which means that students are

ready and agreed on the implementation of e-learning though they did not use the existing e-learning portal extensively because of different challenges. Considering the dispersion of the means, median and Std. Dev. of the Factors E-LMSs, Technological Infrastructure, E-learning Resources Accessibility and E-learning Features of the items from the total mean, the total median and the total standard deviation for all four Factors was between 3.29 and 3.54 which means students' responses of their actual experiences of e-learning system and challenges were relatively similar. With regard to the total mean and median scores of the Factors of E-Learning Services, E-learning Communication and E-learning Policy Factors, the students' responses had lower mean and median values compared to other Factors. This showed the AU students had different e-learning challenges with E-Learning Services including Communication and the existing e-Learning Policy.

6.9 TESTING THE CORRELATION BETWEEN DIFFERENT FACTORS USING A CORRELATION MATRIX

To test the strength of the relationships between the different factors, a correlation matrix was calculated. The most commonly used methods for investigating the relationship between two quantitative variables are correlation and linear regression. Correlation quantifies the strength of the linear relationship between a pair of variables, whereas regression expresses the relationship in the form of an equation (Bewick et al., 2003). In this study, the Pearson product-moment correlation (r) was used when both variables considered were continuous and the Spearman correlation was used when one or both the variables were ordinal. Most often, the term correlation is used in the context of a linear relationship between two continuous variables and expressed r. The r is typically used for jointly normally distributed data (data that follow a bivariate normal distribution). For non-normally distributed continuous data, for ordinal data, or data with relevant outliers, a Spearman rank correlation (ρ) can be used as a measure of a monotonic association. Both correlation coefficients are scaled such that they range from –1 to +1, where 0 indicates that there is no linear or monotonic association, and the relationship gets stronger and ultimately approaches a straight line (r) or a constantly increasing or decreasing curve (ρ) as the coefficient approaches an absolute value of 1 (Schober, Boer & Schwarte, 2018).

Interpretation of correlation between the factors:

The correlation coefficient (r) denotes the strength of the relationship between two variables (or factors). The r-value can range from -1 to 1.

According to Gogtay and Thatte (2017) by measure, the r it can be interpreted based on its value as shown below:

r=1: a perfect positive correlation

r=0:no correlation

r=-1: a perfect negative correlation

A ***positive correlation*** indicates that as values for one variable increase, values for the second variable also increase.

With a **negative correlation,** as values for one variable increase, values for the second variable decreases.

The second characteristic of a correlation coefficient is its size. Larger absolute values of a correlation coefficient indicate a stronger relationship between the two variables (Gogtay & Thatte, 2017).

According to Senthilnathan (2019), the following ideal range as a basic spectrum of interpreting r in social science studies for interpreting the strength of the linear relationship between two variables, based on the absolute value of the coefficient:

±1.00 = perfect correlation

±0.80 = strong correlation

±0.50 = moderate correlation

±0.20 = weak correlation

±0 = no correlation

Table 6.17: Correlations: Row-wise method. Output:

	E-learning Management System	Technological Infrastructure and Facilities	Learner Readiness	E-learning Resources Accessibility	E-learning System Features	E-learning Services	E-learning Communication	E-learning Policy
E-LMSs	1.0000	0.6949	0.5685	0.6517	0.7210	0.6610	0.5585	0.7301
Technological Infrastructure and Facilities	0.6949	1.0000	0.5827	0.6158	0.6879	0.5897	0.5189	0.6000
Learner Readiness	0.5685	0.5827	1.0000	0.5957	0.5983	0.4123	0.3773	0.4585
E-learning Resources Accessibility	0.6517	0.6158	0.5957	1.0000	0.6704	0.6036	0.6082	0.5720
E-learning System Features	0.7210	0.6879	0.5983	0.6704	1.0000	0.6721	0.5290	0.6401
E-learning Services	0.6610	0.5897	0.4123	0.6036	0.6721	1.0000	0.5761	0.5207
E-learning Communication	0.5585	0.5189	0.3773	0.6082	0.5290	0.5761	1.0000	0.4446
E-learning Policy	0.7301	0.6000	0.4585	0.5720	0.6401	0.5207	0.4446	1.0000

The positive correlation (0.73) illustrated in the Table 6.17 shows the relationship between “E-LMSs” and “E-Learning Policy”. You can see that respondents who scored “E-LMSs” low and also scored “E-learning Policy” low. At the same time, respondents who scored “E-LMSs” high and also scored “E-Learning Policy” high. Therefore, these variables are positively correlated.

The positive correlation of 0.73 indicates a strong relationship between “E-LMSs” and also scored “E-learning Policy”.

Table 6.18: Correlation probability

	E-learning Management System	Technological Infrastructure and Facilities	Learner Readiness	E-learning Resources Accessibility	E-learning System Features	E-learning Services	E-learning Communication	E-learning Policy
E-LMSs	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Technological Infrastructure and Facilities	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Learner Readiness	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
E-learning Resources Accessibility	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
E-learning System Features	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
E-learning Services	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
E-learning Communication	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
E-learning Policy	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

Statistical Significance:

A statistical examination must be carried out to decide whether the correlation is noteworthy. We could say the p-value (probability value) is produced if the calculated p-value is less than 0.5.

The correlation of 0.73 between “E-LMSs” and the “E-Learning Policy” was significant at a 99% level of confidence since the p-value ($p<0.0001$) was smaller than 0.01. This means that the correlation (0.73) differed significantly from 0.

6.10 CHAPTER SUMMARY

In this chapter, the second phase of the mixed-methods research study data was conducted, as per nine major e-learning themes identified from qualitative analysis, the survey instrument designed and the pilot testing conducted to test the reliability of the instrument. Therefore, based on the results of a pilot test, the quantitative survey instrument was accepted because Cronbach’s alpha coefficient values ranged from a low of.749 to a high of.915 which are considered acceptable and good. Thus, the main study data collection continued with the developed instrument with a total of 413 students. The quantitative data was analysed with SPSS 25 software using EFA. The validity of factors of e-learning framework, determining the number of factors, determine the factors and testing the reliability of the valid factors of e-learning framework was determined. Furthermore, descriptive statistics of the factors with the frequency and percentages table of each factor with the mean and median analysed and “agreed” and “strongly agreed” items of each factor described. Thus, comparing the factors with the mean, median, Std. Dev. and Skewness values of the identified major factors indicated to what extent e-learning was being used and what e-learning challenges were experienced by EHEI students. Accordingly, the correlation between the different factors was tested using the correlation matrix. The positive correlation of 0.73 indicates a strong relationship between “E-LMSs” and “E-learning Policy” in which respondents who scored “E-LMSs” low also scored “E-learning Policy” low. At the same time, respondents who scored “E-LMSs” high also scored “E-learning Policy” high. Finally, according to the findings, the student-centred e-learning framework proposed and presented at the international world conference (ICDE) and the feedback included. In the next chapter, the research overview, discussion, conclusion, recommendations, and recommendations for further research are covered.

CHAPTER 7

OVERVIEW, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

7.1 INTRODUCTION

This chapter is designed to accommodate mainly the conclusions drawn from the findings. In addition, a conceivable recommendation along with the way forward and the research's contribution to the scientific society in terms of knowledge and some recommendations for further studies are clarified.

The main focus of the research was to address the following research questions:

1. What are students' experiences regarding the use of e-learning in Ethiopian higher learning institutions?
2. What are the challenges that Ethiopian higher learning institution students experience when using e-learning?
3. What are the major factors impacting e-learning in Ethiopia higher learning institutions?
4. What possible e-learning framework can be developed in the context of Ethiopian higher learning institutions?

In concluding this study, the chapter confirms the above research questions are addressed in the chapters.

7.2 OVERVIEW

In Chapter 2, the theoretical framework of the study was developed. The core concepts of e-learning, the e-learning approaches, e-learning technologies, practice, challenges and e-learning framework dimensions in the higher education context were discussed.

Chapter 3 provided a literature study of higher education in Ethiopia, the history of higher education in Ethiopia, e-learning in Ethiopian learning institutions, the current position of e-learning in the developing countries and Ethiopia, e-learning in the Ethiopian context, challenges related to ICT in Ethiopia higher education, e-learning initiatives in Ethiopia, learning theories and online learning theories and Ethiopia education system and policies were discussed.

Chapter 4 presented the drive of the empirical survey and research design and, focused on the reasons for choosing an exploratory sequential mixed-method design. The research design, research paradigms, research strategies, sampling interviews, instrumentation, reliability and validity, data collection procedure and data analysis procedure were addressed.

Chapter 5 provided the qualitative analysis and results of the qualitative study Phase I. Research questions number 1, 2 and 3 were answered on students' experiences and the challenges they experienced on using e-learning. Eight major themes and various sub-themes emerged.

Chapter 6 provided the analysis and results of quantitative study Phase II. The development of the survey instrument; pilot study; the validity of factors of e-learning framework; the number of factors testing the reliability of the items of valid factors of e-learning framework; descriptive statistics of factors comparing factors and testing the correlation between different factors using correlation matrix were addressed. The finding provided a platform for the development of an e-learning framework, which could be used at HEIs to improve or implement the e-learning system. Research question number 4 was answered.

7.3 DISCUSSION

The objectives of the empirical research were achieved. The main objective of the survey was to explore students' e-learning experiences and the challenges EHEIs students had when using e-learning in order to identify major impacting e-learning factors in EHEIs and to develop a student-centred e-learning framework in the context of the study.

The e-learning themes identified in the qualitative analysis from 20 students were further tested by developing an instrument based on the findings from the qualitative results. The second phase instrument development was done by using the themes and quotes from qualitative data analysis in which the codes helped to develop variables that grouped the items and themes to scale development. The scale development also needed a proper procedure for instrument design, construct validity and reliability estimates (DeVellis, 2012). Thus, the survey conducted with 413 students with the developed quantitative instrument (Appendix VI) and the quantitative

data was analysed using EFA (see Section 6.5). The construct validity and reliability results created a base for the development of a student-centred e-learning framework in the context of EHEIs. These themes and sub-themes emerged from qualitative results:

Table 7.1: Themes and sub-themes

Theme	**Sub-Themes**
Institutional	E-learning awareness, orientation about e-learning portal and encouraging to use e-learning
Technological facility	Lab computers facility, ICT infrastructure and e-learning access coverage
Pedagogical/instructional	E-learning teaching and learning, e-learning interactivity e-learning use and frequency of using e-learning portal
Resources	E-learning resources availability, technical and human resources, access to ICT devices
Functionality	E-learning portal services, feedback and evaluation on the e-learning portal and online exam security
Features	E-learning portal, e-learning portal interactivity and navigation, interface design of the e-learning portal, User friendliness, e-learning portal interactivity and navigation, e-learning accessibility and usability and data security
Policy	E-learning facilities policy and ethical rules and regulations
Learner readiness	Students' motivation, preference of mode of delivery and technical skill require
System management	E-learning system maintenance, system management on e-learning environment, training of the use of e-learning system, and update on the e-learning portal

Thus, the themes and sub-themes were used in the development of the quantitative research instrument. This was the integration part of the qualitative and quantitative design which involved using qualitative findings to inform the design of the quantitative phase of this research for the development of new instruments or new variables (Creswell & Plano Clark, 2018). Therefore, the survey was conducted data was analysed with EFA. Validated factors – "E-LMSs", "technological infrastructure and facility", "learner readiness", "e-learning system features", "e-learning services", "e-learning communication" and "e-learning policy"–emerged from the result of

quantitative analysis and these factors were used for the development of a student-centred e-learning framework (see Section 7.5).

In line with this study, Anberber (2015) conducted a study on the use of e-learning in higher education which revealed that the use of e-learning was still in its infancy and that e-learning policy and awareness were the major themes. However, the research at hand identified nine major themes that need to be considered for the effective implementation of e-learning. Pertaining to this study, Ayele and Birhaine (2018) conducted a survey on university teachers' acceptance of e-learning which showed that behavioural intentions to use e-learning system were low. Finally, the study concluded that user training and management support were major factors in the actual use of e-learning while the motivation to use it was insignificant. On the other hand, Hodgson and Lord (2010) did a study on e-learning efficiency which found that support for the technology, the culture of the institution, the efficiency of the teachers, the openness of the students and their learning behaviour played a part in the success of e-learning implementation. In line with this study technological factors, such as IT infrastructure, were identified by Cantoni, Cellario and Porta (2004) and Sarrab, Elbasir and Alnaeli (2016); human factors (including IT skills, awareness among students and instructors) were identified by Bhuasiri, Xaymoungkhoun, Rho and Ciganek (2012), Kasse and Balunywa (2013) and Sangrà, Vlachopoulos, Cabrera and Bravo (2012); and institutional factors (poor state of institutions, lack of policy alignment with e-learning activities) were identified by Dadzie (2009) and Ansong (2013). Moreover, pedagogical factors were identified by Cantoni et al. (2004), and environmental issues associated with the political will for advancing the development of national IT policy, and related infrastructure, and challenges of systems design, affecting IT interactivity and instructional design were identified by Ansong (2015), Bhuasiri et al. (2012), Kasse et al. (2013) and Olutola and Olatoye (2015). Similarly, Omidinia et al.'s (2011) study identified e-learning challenges and infrastructure in developing countries and the result found out that e-learning requires attention to four issues: expertise implementation, technology, open source technology and on-time funding.

In line with this study Aguti, Walters and Wills (2014) claimed that limited studies had been done to come up with an e-learning framework to use and to support HEIs student-centred learning. As a result, a methodological framework was proposed with

different factors which can evaluate the effectiveness of blended e-learning based on four dimensions: e-learning readiness, e-learning course delivery strategies, quality e-learning systems; and effects of blended e-learning. Ayele and Birhaine (2018) conducted an empirical study which examined e-learning acceptance and its use in Ethiopian public universities. The study identified eight major determinant factors on e-learning effectiveness: perceived usefulness (PU); perceived ease of use (PEOU); organisational factor (OF); management support (MS); incentives (INC); training (TRA); behavioural intention (BI); and actual use (AU).

In addition, there are many concerns about the implementation of e-learning in Africa. To identify these factors, various studies have been conducted (see Table 3.1) which summarises the major constraints in African countries. However, the study at hand identified nine major e-learning themes from 20 participants by means of qualitative in-depth interviews as the objective of this study was to identify the e-learning practices and challenges which formed the basis of the quantitative survey instrument used to validate the factors by means of EFA with 413 participants and develop the student-centred e-learning framework (see Figure 7.2). In this study, new themes and sub themes were identified (see Table 7.1). Thus, the major e-learning themes and sub themes identified and developed quantitative survey instrument that can be used by universities to evaluate their existing e-learning within their own contexts. Moreover, this study contributes a framework for a student-centred e-learning system in the context of higher learning institutions in Ethiopia. Each factor in this e-learning framework offers a practical and detailed checklist to serve as a self-assessment instrument for the institutions to evaluate their education technology readiness or their opportunities for growth or change.

7.4 CONCLUSION

To facilitate the implementation of e-learning in EHEIs there is a need for an e-learning framework in the context that must be in place to ensure its successful implementation. The researcher identified nine major e-learning themes in students' responses to the semi-structured open-ended questions (Research Question 1 and 2). Each theme described the students' experiences and challenges of the use of e-learning in their universities. The themes were: 1) institutional, 2) technological facility, 3)

pedagogical/instructional, 4) resources, 5) functionality, 6) feature, 7) policy, 8) student readiness, 9) system management (see Section 5.4).

In the quantitative result the mean, median, Std Dev. and Skewness values of eight factors were identified to develop an e-learning framework based on eight factors loaded using factor validity in the EFA result. The major mean and median values for each of the factors were 3.29 and 3.33 for the factor of E-LMSs; 3.37 and 3.4 for the factor of technological infrastructure; 3.74 and 4 for the factor of learner readiness; 3.54 and 3.66 for the factor e-learning resources accessibility; 3.36 and 3.37 for the factor of e-learning system features; 3.2 and 3.2 for the factor of e-learning services; 3.1 and 3 for the construct of e-learning communication; and 3.3 and 3.5 for the construct of e-learning policy (Section 6.8).

These results showed that factor learner readiness scored high compared to other factors which means that students were ready and agreed on the implementation of e-learning though they did not actually use the existing e-learning portal enough because of different challenges. Bearing in mind the dispersion of the means, median and Std of the factors “E-LMSs”, “technological infrastructure”, “e-learning resources accessibility” and “e-learning features” of the items from the total mean, the total median and the total standard deviation for all of the four factors was between 3.29 and 3.54 which meant that students’ responses about their actual experiences of e-learning system and challenges were relatively comparable. With respect to the total mean and median score of the factors of “e-learning services”, “E-learning communication” and “e-learning policy” factors there was less agreement in the students’ responses with lower mean and median values compared to other factors. This showed that AU students were not satisfied with e-learning services including communications and the existing e-learning policy.

The conclusion is made as per the compared variables in the correlation matrix. The positive linear relationship or negative linear relationship between the two variables were specified with the sign of the coefficient. To inspect whether there is a relationship between E-LMSs and e-learning policy, r was tested. The results revealed a significant and positive relationship ($r = 0.73$, $N = 413$, $p < 0.0001$) that illustrates a strong correlation. Thus, this showed that the higher levels of E-LMSs were associated with higher levels of e-learning policy (see Figure 7.1).

The assumptions of the statistical analysis were satisfied.

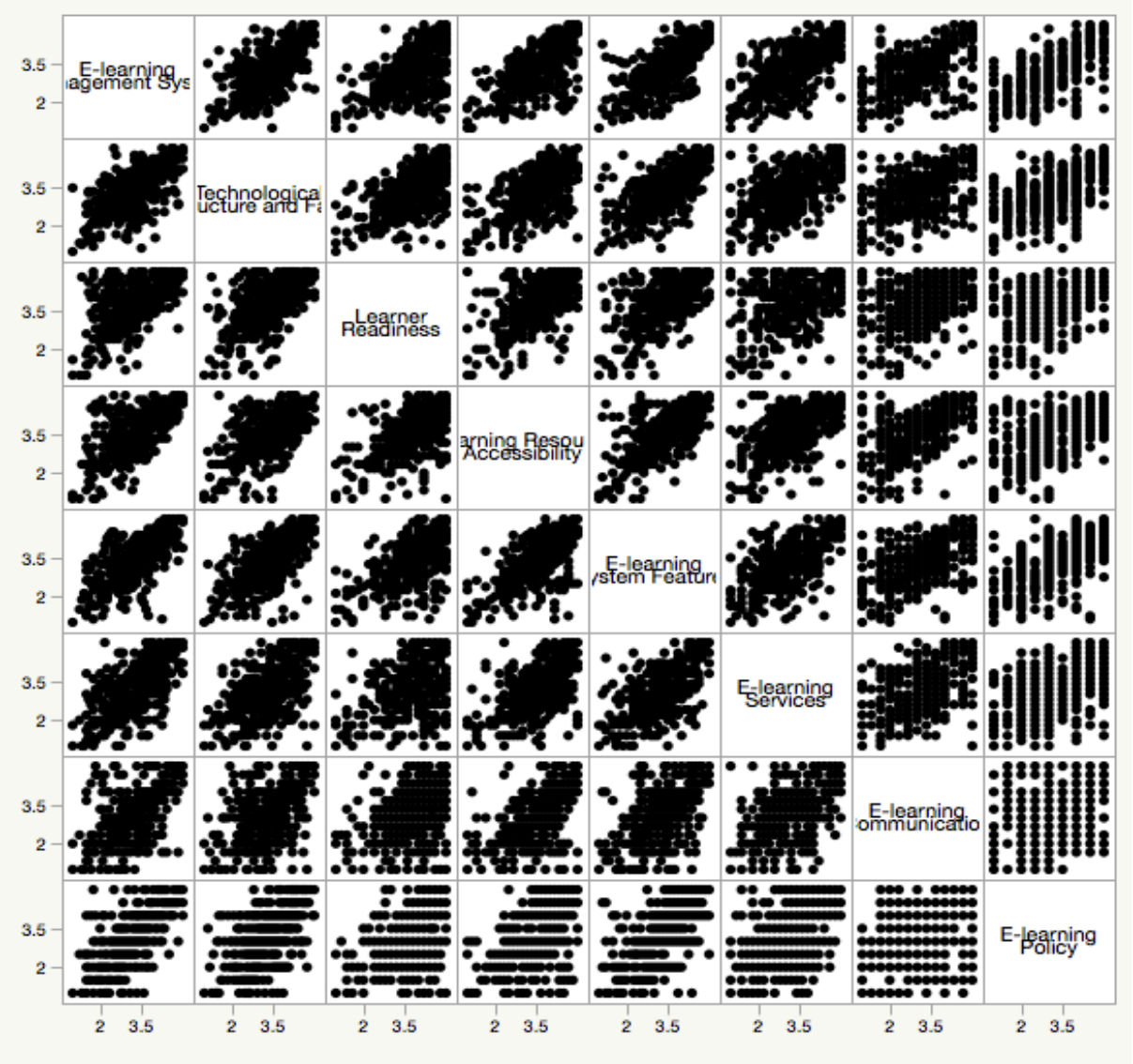


Figure 7.1: Correlation matrix

7.5 PROPOSED E-LEARNING FRAMEWORK

The 4th research objective was to develop an e-learning framework in the context of Ethiopian higher learning institutions.

Using the qualitative and quantitative data collected, the number of e-learning framework factors was determined. Therefore, the e-learning framework (Figure 7.2) was developed which can be used to improve the existing e-learning system and to facilitate the implementation of e-learning in EHEIs.

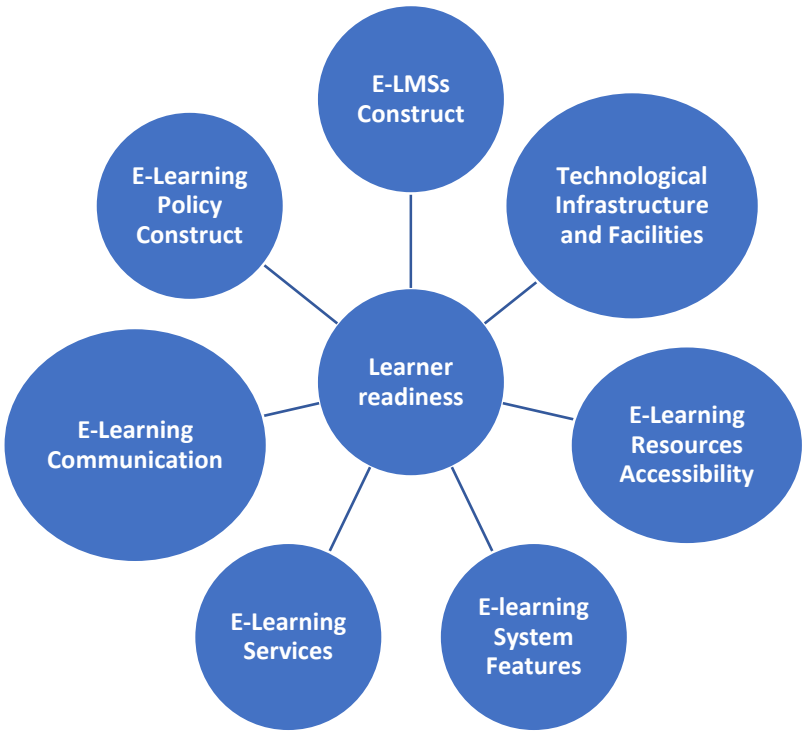


Figure 7.2: A framework for student-centred e-learning system in higher learning institutions in Ethiopia

These factors offer a practical and detailed checklist to serve as a self-assessment instrument for institutions for evaluation of their educational technology readiness or their opportunities for growth or change. The draft of this framework was presented at the 26th ICDE conference in Canada, Toronto and the comments from senior ODEL professors were incorporated for the development of the proposed e-learning framework named "A Framework for Student-Centred E-Learning System in Higher Learning Institutions in Ethiopia". Finally, this proposed framework was blind peer-reviewed by at least two members of the International Review Panel and judged to meet the acceptance criteria for this major international conference of the 28th International Conference International Council for Distance Education (ICDE) and presented at the learning conference which took place in Dublin from 3-7 November 2019.

7.5.1 Learner Readiness

The learner readiness factor covered the issues related to students' preferences on the teaching and learning process. Their readiness for the e-learning blended courses, whether they preferred face-to-face tuition with support of e-learning or e-learning

courses with the support of face-to-face tuition was assessed. Their basic computer skills to use the existing e-learning portal in their institution and to what extent they were using different applications i.e., Microsoft Office, PDF, audio and video documents including browsing the internet were evaluated. Moreover, the ability of secure ICT devices, i.e., laptops and tablets to access e-learning resources at any time and anywhere was evaluated. In general, students are ready to take e-learning blended courses in their institutions. The major points that need to be considered under the learner readiness factor to implement e-learning are as follows:

- Students might prefer face-to-face teaching and learning system with the support of e-learning.
- Students might prefer e-learning with the support of face-to-face teaching and learning system.
- Basic computer skills are required to use an e-learning system (i.e., using applications like Word, Excel, PDF, audio/video documents and browsing the internet).
- It is mandatory to have access to ICT devices (e.g., laptop, desktop, tablet, mobile...) to attend e-learning sessions.
- E-learning should be counted as a necessary tool for the teaching and learning process in an institution.

7.5.2 E-LMSs Factor

In this factor, different e-learning services are addressed which can help to implement e-learning; i.e., e-learning policy documents, rules and regulations, issues related to ICT facilities updates in the learning institutions, and technical support in computer laboratories. In general, ICT support and maintenance of e-learning system and use, technological skill and training as a whole included all the administrative (management) support in the implementation of e-learning. The major points need to be considered under E-LMSs factor to implement e-learning as follows:

- E-Learning policy documents (rules and regulations) need to be available on the institution’s website or other accessible location.
- ICT facilities in the institution need to be up-to-date.
- Technical support should be provided in the computer labs.

- ICT help desk for support and maintenance is required for the e-learning system.
- An online help facility is required in the e-learning system.
- Lab computers need to be regularly maintained.
- Technological skills training should be provided for students to make use of e-learning.
- Administrative (management) support is needed in the implementation of e-learning.
- There is a need for orientation, guidelines and tutorials on the use of the e-learning system and services.
- Students should be offered to decide the study method during the e-learning session.
- Students efficiency needs to be considered in terms of the pace of the teaching and learning process (such as duration of online exams and online assignment submissions).
- Students' preferences and capacity must be considered in the e-learning sessions.

7.5.3 Technological Infrastructure and Facilities Factor

The technological infrastructure and facilities factor addressed issues related to ICT infrastructure and facilities provided by the institution to implement e-learning, including the orientation and awareness about the existing e-learning portal. The main issues in this factor were the functionality of hardware and software components in the computer laboratories, availability of ICT devices; i.e., laptop, tablet and mobile which are required to take courses via e-learning. Moreover, the availability of network infrastructure (LAN and Wire Less Network (WI-FI)) reliable internet connection to download texts and video study materials was evaluated. The major points that need to be considered under technological infrastructure and facilities factor to implement e-learning are as follows:

- Institutions need to provide the required facilities to assist e-learning.
- Regular orientation needs to be given to newly admitted students about the use of the existing e-learning system.
- Institutes should provide regular orientation for newly admitted students about the use of the existing e-learning system.

- Institutes need to advise students about the e-learning system.
- Hardware and software components in the labs should be functional.
- Computer labs with required updated applications must be available.
- Students should have necessary ICT devices (i.e., tablets, mobiles and laptops) that facilitate the e-learning courses they are taking.
- Computer labs in the institution must be easily accessible.
- Good wireless internet connectivity needs to be available in the institution.
- Proper network infrastructure needs to be installed to implement e-learning.
- There should be sufficient internet connections in the labs to facilitate e-learning.
- Enough computers should be available in the labs to facilitate e-learning.
- The e-learning system should be accessed smoothly from anywhere in the campus.
- The e-learning system should be accessible at any time from any destination. There is a need to have a reliable internet connection to access, download and view text, audio and video e-learning material

7.5.4 E-Learning Recourses Accessibility Factor

This factor deals with the access of uploading and downloading academic documents i.e., text type handouts, lecture notes, worksheets and course outlines and related e-learning resources. It addresses the format compatibility of the e-learning system in which access to images, video and audio-supported multimedia resources; the availability of software resources to download for free from the e-learning portal which can be helpful to use for academic purposes; and more e-learning resources, i.e., books, articles and journals on the e-learning portal to do assignments and research. The major points that need to be considered under the e-learning resources accessibility factor to implement e-learning are as follows:

- The e-learning system should provide for uploading, downloading and accessing academic materials.
- Text type e-learning resources should be available like handouts, lecture notes, worksheets, course outlines and other course-related materials (i.e., PDF, Word, Excel or other formats).
- The e-learning resource material must support image/picture/GIF/JPG.

- There is a need for video- and audio-supported resources in an e-learning system (i.e., multimedia resources).
- E-learning systems should have software resources to download and use.
- Additional resources are helpful in the e-learning system (i.e., books, articles and journals).

7.5.5 E-Learning System Features Factor

These features include the issues related to the e-learning portal interface user-friendliness and adaptability to be operated and managed by students smoothly. Therefore, the e-learning system can be modified; i.e., the students can start, play and pause the audio and video resources. Moreover, the e-learning system must be available and reliable during a power interruption and internet disconnection as a session should continue from where it has stopped. This factor also deals with the issues of data confidentiality and security with the user name and password authentication to avoid vulnerability to unauthorised users. The major points that need to be considered under the e-learning system features factor to implement e-learning are as follows:

- The e-learning system needs to be user-friendly and enable students to access it smoothly.
- The e-learning system should be modified (i.e., start, play and pause the audio or video resources).
- The e-learning system web portal interface need to be easily adaptable (to manage to make use of its services).
- The e-learning system must be available all the time.
- Online exams through the existing e-learning system must be reliable; during the power and internet interruptions, it should continue from where it has stopped.
- Confidentiality of data needs to be secured/protected.
- The e-learning system should be secured from unauthorised users (i.e., a unique user name and password should be used by each student to access the e-learning services).

7.5.6 E-Learning Services Factor

This includes the services provided by the e-learning portal: assessment and evaluation mechanism, i.e., mid-term and final exam, online assignment submission, online exam marking, online feedback system (evaluation) on the use of e-learning portal in the institution and security of online exams. The major points that need to be considered under the e-learning services factor to implement e-learning are as follows:

- The e-learning system should provide an assessment and evaluation mechanism (i.e., continuous assessment like mid-term exams and final exams).
- The e-learning system should provide for online assignment submission.
- The e-learning system should provide for online exam corrections and results.
- The e-learning system should provide a feedback system to the students to evaluate the use of the e-learning system in the institution.
- Online exams need to be securely conducted.

7.5.7 E-Learning Communication Factor

E-learning communication refers to the availability of an SMS system to be used to transmit announcements and newly updated resources to the students and discussion forums for the course-related issues to share opinions among students and instructors. The major points that need to be considered under the e-learning communication factor/construct to implement e-learning are as follows:

- The e-learning system should have instant messaging (SMS) for announcements and newly updated resources.
- There is a need for a discussion forum for course-related issues to share views and opinions among students.
- There is a need for a discussion forum for course-related issues to share views and opinions among students and instructors.

7.5.8 E-Learning Policy Factor

The e-learning policy construct is a factor with limitations as it had only two items but it includes critical issues about the e-learning system related to proper rules and regulations on the use of e-learning facilities; i.e., duration of computer use in the computer laboratories and session limitation of e-learning system in the institution.

Moreover, it focuses on students' awareness of their roles and responsibilities in the use of the e-learning system. The major points that need to be considered under the e-learning policy factor to implement e-learning are as follows:

- Proper rules and regulations are required on the use of e-learning facilities (i.e., duration of computer use in the lab, session limitation of the e-learning system) in the institution.
- Students should know their roles and responsibilities in the e-learning environment.

7.6 RECOMMENDATIONS

As per the data obtained from the interviews and the questionnaire, the following student-centred e-learning framework is proposed to improve the use of the e-learning system and to facilitate the e-learning system implementation in Ethiopian universities.

The recommendations are suggested for the management of the universities at different levels of administration, instructors, ICT technicians, learning management portal developers and ICT policymakers. Therefore, the concerned bodies should:

- Improve the awareness of students on the use of e-learning systems.
- Encourage instructors to incorporate e-learning courses.
- Work on changing students, instructors and institutions' attitudes towards e-learning.
- Confirm that the lab computers are functional and upgraded.
- Provide enough lab computers.
- Provide air-conditioners in the laboratories.
- Make the power generators available to facilitate e-learning.
- Provide enough bandwidth internet connection (i.e., LAN, WAN, Wi-Fi).
- Offer more courses online.
- Believe in the importance of e-learning.
- Obtain feedback from students concerning the e-learning system.
- Guide the instructors to use e-learning and to encourage their students to use e-learning.
- Provide online assignments.
- Encourage blended learning.

- Provide a webcam during online exams.
- Make the e-learning portal interface user-friendly and attractive.
- Make the e-learning Web portal pages (i.e., images, contents) easy to access, upload and download from the Web portal easily.
- Provide an e-learning policy (rules and regulations).
- Provide training on the use of the e-learning system.
- Provide video conferencing to facilitate e-learning in addition to the portal.

Although the proposed framework and recommendations are based on the findings from three higher institutions in the Ethiopian context, they may be relevant to any international context.

7.7 RECOMMENDATION FOR FURTHER RESEARCH

This study has considered only students in the three institutes and used 20 interviews and 413 respondents. Therefore, there are numerous reasons to pursue further research by extending the study to all universities and a larger sample size. As a recommendation for future studies, it would be good to include instructors and management of HEIs, which would give other perspectives on the issue of e-learning.

7.8 FINAL WORD

In the past decade, ICT has enormously affected the way education is provided. E-learning is a concept that uses the internet and LMS for the teaching and learning process. HEIs uses different learning management portals such as Moodle and Drupal. Most of the universities have invested in e-learning systems. However, the extent of using this e-learning system and tools in the teaching and learning environment is at a low level in developing countries like Ethiopia even though there is a high motivation and readiness by students to have e-learning courses. This can be achieved by using the e-learning framework specially developed in the context of EHEIs which helps to evaluate and improve the existing e-learning system and implement the new e-learning system in the institutions.

In general, there is a considerable drive for e-learning by both the government and universities; however, there are various e-learning practices and challenges in Ethiopia, and the use of e-learning is still very low across the universities. Thus, the

awareness creating and training to teachers and students should be given priority. The E-LMSs and e-learning policy should also be adopted so that instructors and students will be forced to use the e-learning system in the teaching-learning process. Since only a few universities are aware of the benefits of ICT in their institutions and the ICT infrastructure available, other institutions should learn and share resources and experience although many challenges remain to be addressed.

REFERENCES

Addis Ababa Institute of Technology. 2013. *AAiT Moodle guide*. Available at: www.aait.edu.et/moodle.pdf

Abdelaziz, M., Kamel, S. S., Karam, O. & Abdelrahman. 2011. An evaluation of E-learning program versus traditional lecture instruction for undergraduate nursing students in a faculty of nursing. *Teaching and Learning in Nursing,* 6(2), 50-58.

Abebe, G. 1995. Ethiopian traditional education and useful lessons. In *IER (Ed.), Proceedings of the National Workshop on Strengthening Educational Research.* Available at: https://eric.ed.gov/?id=ED383284

Adeyinka, T. & Mutula, S. 2010. A proposed model for evaluating the success of WebCT course content management system. *Computers in Human Behavior*, 26 (6), 1795-1805.

African Union. 2014. *AU outlook on education report.* Available at: www.adeanet.org/portalv2/sites/default/files/au_outlook_continental_english_2014_w.pdf

Aguti, B., Walters, R. & Wills, G. 2014. Effective use of e-learning technologies to promote student-centered learning paradigms within higher education institutions. *International Journal for e-Learning Security,* 4, (3/4),1-8.

Akalu, G.A. 2014. Higher education in Ethiopia: expansion, quality assurance and institutional autonomy. *Higher Education Quarterly*, 68(4), 394-415.

Akhu-Zaheya, L. M., Khater, W., Nasar, M. & Khraisat, O. 2011. Baccalaureate nursing students' anxiety related computer literacy: a sample from Jordan. *Journal of Research in Nursing*, 18(1), 36–48.

Alamin, H.A.A. & Elgabar, E.E.A. 2014, Success factors for adopting e-learning application in Sudan. *International Journal of Soft Computing and Engineering,* 3(4), 128-131.

Alenezi, H., Tarhini, A. & Sharma, S.K. 2015. Development of quantitative model to investigate the strategic relationship between information quality and e-government benefits. *Transforming Government: People, Process and Policy*, 9 (3).

Algahtani, A.F. 2011. *Evaluating the effectiveness of the e-learning experience in some universities in Saudi Arabia from male students' perceptions.*Doctoral Thesis. Durham University, Durham.

Alkharang, M.M. 2014. *Factors that influence the adoption of e-learning: An empirical study in Kuwait.* Doctoral dissertation. Brunel University, London.

Ally, M. 2004. Foundations of educational theory for online learning. In Anderson, T. & Eloumi, F. (Eds.), *Theory and Practice of Online Learning.* Athabasca: Athabasca University. 3-31.

Almajali, D.A., Masa'deh, R. & Tarhini, A. 2016. Antecedents of ERP systems implementation success: a study on Jordanian healthcare sector. *Journal of Enterprise Information Management*, 29 (4), 549-565. https://doi.org/10.1108/JEIM-03-2015-0024

Al-Shalabi, H., Andraws, S., Alrabea, A.I. & Kumar, A.S. 2012. V model of e-learning using Gagne nine steps of education. *Journal of Software Engineering and Applications,* 11 (5).

Alshammari, S.H., Ali, M.B. & Rosli, M.S. 2016. The influences of technical support, self-efficacy and instructional design on the usage and acceptance of LMS: A comprehensive review.*Turkish Online Journal of Educational Technology,* 15(2),116-125.

Altman, D.G. 1999. *Practical statistics for medical research*. London: CRC Press.

Amoozegar, A., Daud, S.M., Mahmud, R. & Jalil, H.A. 2017. Exploring learner to institutional factors and learner characteristics as a success factor in distance learning. *International Journal of Innovation and Research in Educational Sciences*, 4 (6), 647-656.

Amos, F., Awodeyi, Ekemini, T., Akpan, Ifiok, J. & Udo, I.J. 2014. Enhancing teaching and learning of mathematics: Adoption of blended learning pedagogy in University of Uyo. *International Journal of Science and Research (IJSR),* 3(11), 40-45.

AMU.2014.*Arba Minch Institute of Technology [Homepage of AMIT].* Available at: http://www.amu.edu.et/index.php?option=com_content&view=article&id=4&Itemid=6.

Anberbir, T. 2015. *Survey of use of e-learning in higher education in Ethiopia*. Available at https://www.researchgate.net/Publication/318317502.

Anderson, T. 2005. *Distance learning – Social software's killer app*? Available at: https://auspace.athabascau.ca/bitstream/handle/2149/2328/distance_learning.pdf?sequence=1&isAllowed=y

Andersson, A.S. & Grönlund, Å. 2009. A conceptual framework for e-learning in developing countries: A critical review of research challenges. *The Electronic Journal of Information Systems in Developing Countries*, 38.

Al-Shalabi, H., Andraws, S., Alrabea, A.I. & Kumar, A.S. 2012. V model of e-learning using Gagne nine steps of education, *Journal of Software Engineering and Applications,* 5 (11), 850-854.

Ansong, C., Wu, S., Meng, D., Liu, X., Brewer, H.M., Kaiser, B.L.D., Nakayasu, E.S., Cort, J.R., Pevzner, P., Smith, R.D. & Heffron, F., 2013. Top-down proteomics reveals a unique protein S-thiolation switch in Salmonella Typhimurium in response to infection-like conditions. *Proceedings of the National Academy of Sciences*, 110 (25), 10153-10158.

Ansong, E.R.I.C. 2015. *Determinants of e-learning adoption in universities: Evidence from a developing country*. Doctoral dissertation. University of Ghana, Accra.

Aparicio, M., Bacao, F. & Oliveira, T. 2016. An e-learning theoretical framework. *Educational Technology & Society*, 19 (1), 292–307.

Armstrong, D. A. 2011, Students' perceptions of online learning and instructional tools: A qualitative study of undergraduate students use of online tools. *Turkish Online Journal of Educational Technology,* 10(3), 222-226.

Asgedom, A. & Hagos, T. 2016. Governance reforms in higher education in Africa: The case of autonomy and accountability in Ethiopian higher education. In Varghese, N.V. (Ed.) *Reforms and changes in governance of higher education in Africa*. Paris: UNESCO. 41-61

Ashcroft, K. 2010. *Ethiopia: expanding and Improving Higher Education*. University World.

Awodeyi, A.F., Akpan, E.T. & Udo, I.J. 2014. Enhancing teaching and learning of mathematics: adoption of blended learning pedagogy in University of Uyo. *International Journal of Science and Research*, 3(11), 40-45.

Ayalew, E. 2017. Once a flagship always a flagship?Addis Ababa University in perspective. In Teferra, D. (Ed.) *Flagship Universities in Africa*. Cham: Palgrave Macmillan. 91-142.

Ayele, A.A. & Birhanie, W.K. 2018. Acceptance and use of e-learning systems: The case of teachers in technology institutes of Ethiopian Universities. In *Applied Informatics*, Vol. 5 (1), 1. Berlin: Springer.

Babbie, E.R. 2020.*The practice of social research*. (12th ed.) Belmont: Cengage learning.

Barr, B.A. & Miller, S.F. 2013. *Online teaching and learning. Higher education: The Online teaching and learning experience.* University of Phoenix Faculty School of Advanced Studies.

Bartholomew, D.J., Knott, M. & Moustaki, I. 2011. *Latent variable models and factor analysis: A unified approach.*London: John Wiley & Sons.

Bartlett, M.S. 1950. Tests of significance in factor analysis. *British Journal of Psychology*, 3 (Part II), 77-85.

Bass, J.M. 2011. An early-stage ICT maturity model derived from Ethiopian education institutions. *International Journal of Education and Development using Information and Communication Technology,* 7 (1), 5-25.

Bates, T. 2009. Technology should be used as integral part of teaching and learning activities. *EQUIBELT Project Newsletter*, 6.

Bediang, G., Stoll, B., Geissbuhler, A., Klohn, A., Stuckelberger, A., Nko'o, S. & Chastonay, P. 2013. Computer literacy and E-learning perception in Cameroon: the case of Yaounde Faculty of Medicine and Biomedical Sciences. *BMC Medical Education,* 13,57.

Belwal, R., Ayalew, D. & Gaim, M. 2010. The challenges of the Curtin-AVU-AAU distance learning program in Ethiopia: A case study. *Journal of Online Learning and Teaching*, 6 (4), 799.

Bewick, V., Cheek, L. & Ball, J. 2003. Statistics review 7: Correlation and regression. *Critical Care*, 7 (6), 451

Beyene, B. 2010.*A model for an e-portfolio-based reflective feedback: Case study of e-learning in developing countries*. PhD Thesis. Hamburg: Universtat Hamburg.

Bhuasiri, W., Xaymoungkhoun, O., Zo, H., Rho, J.J. & Ciganek, A.P., 2012. Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty. *Computers & Education*, 58(2), 843-855.

Bichsel, J. 2013. *The state of e-learning in higher education: An eye towards growth and increased access (research report).* Louisville: EDUCAUSE Center for Analysis and Research.

Bishaw, A. & Melesse, S. 2017. Historical analysis of the challenges and opportunities of higher education in Ethiopia. *Higher Education for the Future*, 4 (1), 31-43.

Bransford, J.D. & Schwartz, D.L. 1999. Chapter 3: Rethinking transfer: A simple proposal with multiple implications. *Review of Research in Education*, 24(1), 61-100.

Britain, S. & Liber, O. 2003, A Framework for the Pedagogical Evaluation of Virtual Learning Environments. JISC. UK.

Brown, R. 2010. *What future for UK higher education? Research & occasional paper series.*Available at: http://cshe.berkeley.edu/publications/publications.php?id=355

Cantoni, V., Cellario, M. & Porta, M., 2004. Perspectives and challenges in e-learning: towards natural interaction paradigms. *Journal of Visual Languages & Computing*, 15(5), 333-345.

Chadha, N.K. 2009. *Applied psychometry.* New Delhi: Sage.

Chaney, D., Chaney, E. & Eddy, J. 2010. The context of distance learning programs in higher education: Five enabling assumptions. *Online Journal of Distance Learning Administration,* 13 (4): 1-7.

Child, D. 2006. *The essentials of factor analysis*. (3rd ed.). New York: Continuum.

Clark, V.L.P. & Creswell, J.W. 2008.*The mixed methods reader*. Thousand Oaks: SAGE.

Clover, I. 2017. *Advantages and disadvantages of e-learning.* Available at: https://elearningindustry.com/advantages-and-disadvantages-of-elearning

Comrey, A. L. & Lee, H. B. 1992. *A first course in factor analysis* (2nd ed.). Hillsdale: Lawrence Erlbaum.

Coogle, C. & Floyd, K. 2015. Synchronous and asynchronous learning environments of rural graduate early childhood special educators utilizing Wimba© and Ecampus. MERLOT. *Journal of Online Learning and Teaching*, 11(2), 173-187.

Costello, A.B. & Osborne, J.W. 2005. Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research, & Evaluation*,10, 1-9

Creswell, J.W. 2009. *Research design qualitative, quantitative, and mixed methods approaches.* San Francisco: SAGE.

Creswell, J.W. & Plano Clark, V.L. 2011. Choosing a mixed methods design. In *Designing and Conducting Mixed Methods Research* (2nd ed.) Thousand Oaks: SAGE. 53-106.

Creswell, J. W. & Plano Clark, V.L. 2018. *Designing and conducting mixed methods research* (3rd ed.).Thousand Oaks: SAGE.

Dadzie, P.S., 2009. E-learning and e-library services at the University of Ghana: Prospects and challenges. *Information development*, 25 (3), 207-217.

Darawsheh, S., ALshaar, A. & AL-Lozi, M. 2016. The degree of heads of departments at the University of Dammam to practice transformational leadership style from the point of view of the faculty members. *Journal of Social Sciences (COES&RJ-JSS),* 5 (1), 56-79.

Das, A. & Banerjee, D.K. 2011. Implementation of e-learning in West Bengal to enhance the present GER in higher education. *International Journal of Innovation, Management and Technology*, 2 (3), 257.

Davis, R.J. 2000. Signal transduction by the JNK group of MAP kinases. In *Inflammatory Processes.* Birkhäuser, Basel. 13-21

De Winter, J., Winterbottom, M. & Wilson, E. 2010. Developing a user guide to integrating new technologies in science teaching and learning: Teachers' and pupils' perceptions of their affordances. *Technology, Pedagogy & Education*, 19(2), 261-267. doi: 10.1080/1475939x.2010.491237.

Decoster, J. 1998. *Overview of factor analysis.*Available at: http://www.stat-help.com/notes. html

Dessalegn Y. 2013. *Mining quality of life divide from access to internet divide: Towards evidence-based ICT policy*. Available at: https://www.cisco.com/web/strategy/docs/scc/ioe_citizen_svcs_white_paper_idc_2013.pdf

Dessalegn Y. 2014. *Mining quality of life divide from access to internet divide: Towards evidence-based ICT policy*. Available at: https://www.cisco.com/web/strategy/docs/scc/ioe_citizen_svcs_white_paper_idc_2016.pdf.

DeVellis, R.F. 2012. *Scale development: Theory and application* (3rded.) Thousand Oaks: SAGE.

Diep, N. A., Cocquyt, C., Zhu, C. & Vanwing, T. 2017. Online interaction quality among adult learners: The role of sense of belonging and perceived learning benefits *Turkish Online Journal of Educational Technology,* 16 (2), 71-78.

Doculan, J.A. 2016. E-learning readiness assessment tool for Philippine higher education institutions. *International Journal on Integrating Technology In Education*, 5(2), 33-43. Doi: 10.5121/Ijite.2016.5203.

Domino, G. & Domino, M.L. 2006. *Psychological testing: An introduction*. London: Cambridge University Press.

Drysdale, J., Flynt, J. & Hannon-Johnson, S. 2011. *E-learning: Emergence of the profession.*Available at: https://www.academia.edu/1549060/E_Learning_Emergence_of_the_Profession

Eke, H.N. 2011. Modeling LIS students' intention to adopt e-learning: a case from university of Nigeria, Nsukka. *Library Philosophy and Practice*, (1), 113.

Enriquez, A.G. 2010. Enhancing student performance using tablet computers. *College Teaching*, 58 (3), 77-84. doi: 10.1080/87567550903263859.

Ethiopian Education Strategy Centre. 2015. *University Leadership and Management Capacity Development Project (ULMCD): Project final report.* Addis Ababa: ESC.

Everitt, B., & Hothorn, T. 2011. *An introduction to applied multivariate analysis with R.* New York: Springer

Farid, S., Ahmad, R., Niaz, I.A., Itmazi, J. & Asghar, K. 2014. Identifying perceived challenges of e-learning implementation. *Paper presented at the first International Conference on Modern Communication & Computing Technologies (MCCT14).* Nawabshah, Pakistan.

Farid, S., Ahmad, R., Niaz, I.A., Arif, M., Shamshirband, S. & Khattak, M.D. 2015. Identification and prioritization of critical issues for the promotion of e-learning in Pakistan. *Computers in Human Behavior*, 51, 161-171.

Farrell, G. & Isaacs, S., 2007. *Survey of ICT and education in Africa: A summary report based on 53 country surveys*. Available at: https://www.infodev.org/infodev-files/resource/InfodevDocuments_353.pdf

Faux, J. 2010. Pre-testing survey instruments. *Global Review of Accounting and Finance,*1 (1), 100-111.

Federal Democratic Republic of Ethiopia. 2009. *Higher Education Proclamation. Proclamation number 650/2009.* Addis Ababa: FDRE.

Fetters, M.D., Curry, L.A. & Creswell, J.W. 2013. Achieving integration in mixed methods designs – Principles and practices. *Health Services Research*48(6. Pt 2): 2134-2156. http://www.dx.doi.org/10.1111/1475-6773.12117

Field, A. 2009. *Discovering statistics using SPSS*. London: SAGE.

Fox, R.J. 2010. Confirmatory factor analysis. In*Wiley International Encyclopedia of Marketing*. New York: Wiley.

Frimpon, M.F. 2012. A re-structuring of the critical success factors for e-learning deployment. *American International Journal of Contemporary Research*, 2(3), 115-127.

Garrison, D.R. 2011.*E-learning in the 21st century: A framework for research and practice.* New York: Taylor & Francis.

Garrison, D.R. 2017. *E-learning in the 21st century: A community of inquiry framework for research and practice*. (3rd ed.) New York: Routledge.

George, D. & Mallery, P. 2019. *IBM SPSS Statistics 26 step-by-step: A simple guide and reference*. London: Routledge.

Glancy, F.H. & Isenberg, S.K. 2013. A conceptual learner-centered e-learning framework*. Journal of Higher Education Theory & Practice*, 13 (3): 22-35.

Gogtay, N.J. & Thatte, U.M. 2017. Principles of correlation analysis*. Journal of the Association of Physicians of India,*65 (3), 78-81.

Gorsuch, R.L. 1983. *Factor analysis* (2nd ed.). Hillside: Lawrence Erlbaum Associates.

Greene, J.C., Caracelli, V.J. & Graham, W.F. 1989. Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis,* 11(3): 255-274. http://www.dx.doi.org/10.3102/01623737011003255

Grönlund, Å. & Islam, Y.M. 2010. A mobile e-learning environment for developing countries: The Bangladesh virtual interactive classroom. *Information Technology for Development,*16(4): 244-259.

Gunga, S. & Ricketts, I. 2007. Facing the challenges of e-learning initiatives in African universities. *British Journal of Educational Technology*, 38(5), 896–906.

Hagos, Y. & Negash, S. 2014. The adoption of e-learning systems in low income countries: the case of Ethiopia. *International Journal for Innovation, Research and Education*, 2 (10), 79-82.

Hagos, Y., Anteneh, S. & Garfield, M.J. 2018. A conceptual model of e-learning systems success and its implication for future research. In 2018*17th International Conference on Information Technology Based Higher Education and Training (ITHET)*. IEEE. Portugal, Olhaeo. 1-9.

Hair, J., Anderson, R.E., Tatham, R.L. & Black, W.C. 1995. *Multivariate data analysis*. Upper Saddle River: Prentice-Hall.

Hair, J.F., Black, W.C., Babin, B.J. & Anderson, R.E. 2014. *Multivariate data analysis.*(7th ed.). Edinburgh Gate: Pearson Education International.

Hajir, J.A., Obeidat, B.Y. & Al-dalahmeh, M.A. 2015. The role of knowledge management infrastructure in enhancing innovation at mobile telecommunication companies in Jordan. *European Journal of Social Sciences*, 50 (3), 313-330.

Hare, H. 2007. *Survey of ICT and education in Africa. Ethiopia ICT in education in Ethiopia*. Available at: www.infodev.org/en/Publication.

Harrison, D. 2010. Teacher factors influencing classroom ICT use. In *Research Report No. 1.Developing the Use of Information and Communication Technology to Enhance Teaching and Learning in East African Schools: Review of the*

Literature. Dar es Salaam: Centre for Commonwealth Education & Aga Khan University Institute for Education Development-Eastern Africa. 67-95.

Hennessy, S., Harrison, D. & Wamakote, L. 2010. Teacher factors influencing classroom use of ICT in Sub-Saharan Africa. *Itupale Online Journal of African Studies*, 2 (1), 39-54.

Hennessy, S. & Onguko, B. 2010. *Implications for developing educational uses of ICT in East Africa.Developing use of ICT to enhance teaching and learning in East African schools: a review of the literature.* Pakistan: The Aga Khan University, 96-101.

Henson, R.K. & Roberts, J.K. 2006. Use of exploratory factor analysis in published research: common errors and some comment on improved practice. *Educational and Psychological Measurement*, 66 (3), 393-416.

Heo, M., Kim, N. & Faith, M.S. 2015. Statistical power as a function of Cronbach alpha of instrument questionnaire items. *BMC Medical Research Methodology*, 15 (86), 1-9, DOI 10.1186/s12874-015-0070-6.

Herrington, J. & Oliver, R. 1999. Using situated learning and multimedia to investigate higher-order thinking. *Journal of Interactive Learning Research*, 10 (1), 3-24.

Hirut, B. 2011. *The challenges and current status of e-learning in Ethiopian higher education Institutions: Case of Mekelle University.* Master's Thesis. Addis Ababa University.

Huang, L.K. 2010. Planning and Implementation Framework for a Hybrid E-Learning Model: The Context of a Part-Time LIS Postgraduate Programme. *Journal of Librarianship and Information Science*, 42 (1), 45-69.

Ikpe, I.B.2011. E-learning platforms and humanities education: An Africa case study. *International Journal of Humanities and Arts Computing*, 5 (1), 83-101.

International Telecommunication Union (ITU). 2017. *Measuring the Information Society Report - Volume 2.* Available at: https://www.itu.int/en/ITUD/LDCs/Documents/2017/Country%20Profiles/Country%20Profile_Ethiopia.pdf

International Telecommunication Union (ITU) 2018. *ICTs, LDCs and the SDGs - Achieving universal and affordable Internet in the least developed countries.* Available at: https://www.itu.int/dms_pub/itu-d/opb/ldc/D-LDC-ICTLDC-2018-PDF-E.pdf

Internet World Stats (IWS). 2017. *Internet users statistics for Africa.* Available at: https://www.internetworldstats.com/stats1.htm

Iqbal, M.J. & Ahmad, M. 2010. Enhancing quality of education through e-learning: The case of study of Allama Iqbal Open University. *Turkish online Journal of Distance Education*, 11,84-97.

Ishtaiwa, F.F. 2006. *Factors influencing faculty participation in E-learning: The case of Jordan.* Dissertation.University of Washington.

Islam, M.K. 2013. A framework for e-learning in developing countries: Challenges and solutions. *Journal of Electronics and Computer Science Research,* 2 (1), 45-69.

Jakovljevic, M. 2009, Creating an effective learning environment through an E-Learning Instructional Programme. *Journal of Information and Organizational Sciences*, 33 (2), 255-267.

Kaiser H.F. 1974a. Little jiffy, Mark IV. *Education and Psychological Measurement*; 34.

Kaiser H.F. 1974b. A second-generation little jiffy. *Psychometrika,* 35(4):40,1-15

Karsenti, T., Collin, S. & Harper-Merrett, T. 2012. *Pedagogical integration of ICT: Successes and challenges from 100+ African Schools*. Ottawa: IDRC.

Kasse, J.P. & Balunywa, W. 2013. An assessment of e-learning utilisation by a section of Ugandan universities: challenges, success factors and way forward. In *Conference Papers–International Conference on ICT for Africa*. (Vol.15).

Kebede, M. 2010. Comparing traditional and modern education: The decentring of Ethiopia. In Milkias, P. & Kebede, M. (Eds.), *Education, Politics, and Social Change in Ethiopia*. Los Angeles: Tsehai Publishers. 25-37.

Kenan, T., Pislaru, C. & Elzawi, A. 2012. *Analysing the effectiveness of e-learning based on national and international cultures and approaches to pedagogy.* London: Oxford University Press.

Ketema, T. & Nirmala, M. 2015. The impact of e-learning to enhance quality of education: The case of Adama Science and Technology University. *African Journal of Computing & ICT*, 8 (1), 155-162.

Khan, B.H. 2001. *A framework for e-learning.* LTI Magazine.

Khan, B.H. 2003. *The global e-learning framework.* The Technology Source by Michigan Virtual University. STRIDE, 42.

Khan, B.H. (Ed.) 2005. *Managing e-learning: Design, delivery, implementation, and evaluation*. Pennsylvania and London: Information Science Publishing.IGI Global.

Khan, B.H. 2007. Obstacles encountered during stages e-learning process. In B.H. Khan (Ed.) *Flexible Learning*. Englewood Cliffs: Educational Technology.

Khan, B.H. & Smith, H.L. (2007). Student evaluation instrument for online programs. In Khan, B.H. (Ed.) *Flexible Learning*. Englewood Cliffs: Educational Technology Publications.

Kim, H. J., Pederson, S. & Baldwin, M. 2012. Improving user satisfaction via a case-enhanced e-learning environment. *Education & Training*, 54, (2/3), 204-218.

Kisanga, D. & Ireson, G. 2015. Barriers and strategies on adoption of e-learning in Tanzanian higher learning institutions: Lessons for adopters. *International Journal of Education and Development using ICT*, 11(2).

Kituyi, G. & Tusubira, I. 2013. A framework for the integration of e-learning in higher education institutions in developing countries. *International Journal of Education & Development using Information & Communication Technology*, 9 (2), 19-36.

Leedy, P.D. & Ormrod, J.E. 2013. *Practical research planning and design* (10th ed.). Boston: Pearson Education.

Lipman, B.L. 1991. How to decide how to decide how to...: Modelling limited rationality. *Econometrica: Journal of the Econometric Society*, 59 (4), 1105-1125.

Liu, A., Hodgson, G. & Lord, W. 2010. Innovation in construction education: The role of culture in e-learning. *Architectural Engineering and Design Management*, 6 (2), 91-102.

Lwoga, E. 2012. Making learning and Web 2.0 technologies work for higher learning institutions in Africa. *Campus-Wide Information Systems*, 29 (2), 90-107.

Lwoga, E. 2014. Critical success factors for adoption of web-based learning management systems in Tanzania. *International Journal of Education and Development using Information and Communication Technology,* 10 (1), 4-21.

Mammo, Y. 2016 Analysis of Ethiopia's national ICT policy and strategy: Insights into policy issues and policy goals. *Ethiopian Journal of Education and Sciences*, 11 (2), 75-89.

Maqableh, M., Rajab, L., Quteshat, W., Masa'deh, R.M.T., Khatib, T. & Karajeh, H. 2015. The impact of social media networks websites usage on students' academic performance. *Communications and Network*, 7, 159-171. http://dx.doi.org/10.4236/cn.2015.74015

Masa'deh, R., Tarhini, A., Bany, M.A. & Maqableh, M. 2016. Modelling factors affecting student's use behaviour of e-learning systems in Lebanon. *International Journal of Business and Management,* 11 (2), 299-312.

Matta, P. & Singh, N. 2012. A methodological model for e-learning: A step towards quality assurance and enhancement. *Journal of Information and Operations Management,*3 (1), 34-37.

Matti, T., Ngumbuke, F. & Kemppainen, J. 2010. Infrastructure, human capacity, and high hopes: A decade of development of e-Learning in a Tanzanian HEI. *Revista de Universidad y Sociedad del Conocimiento*, 7 (1), 7–20.

Mavengere, N.B. & Ruohonen, M.J. 2010. Using open source software for improving dialog in computer science education – Case Mozambique University. In

Information Technology and Managing Quality Education. Heidelberg: Springer. 52-61.

McKinsey & Company. 2014.*Offline and falling behind: Barriers to internet adoption.* Available at: https://www.mckinsey.com/~/media/mckinsey/dotcom/client_service/high%20tech/pdfs/offli ne_and_falling_behind_full_report.ashx

McMillan, J.H. 2012. *Educational research: Fundamentals for the consumer*. (6th ed.). Boston: Pearson Education.

Mergel, B. 1998. *Instructional design and learning theory.* Available at: http://www2.yk.psu.edu/~jlg18/506/PDF%20Files/instructional%20design/Instructional%20Design%20by%20Mengal.pdf

Meyer, L.W. & Warnich, P.G. 2010, Outcomes-based education and outcomes-based assessment in South African schools: the way forward. In Meyer, L., Lombard, K., Warnich, P. & Wolhuter, C. (Eds.) *Outcomes-Based Assessment for South African Teachers*. Pretoria: Van Schaik. 161-173

Millham, R. & Thakur, S. 2014, Evaluating the effectiveness of e-learning and core skills interventions for South African secondary school learners. Durban: CoLabs

Ministry of Education. 1997. The future directions of higher education Addis Ababa: MOE.

Ministry of Education. 2010. Education Sector Development Program (ESDP IV): Program Action Plan. MOE.

Ministry of Education 2015. *The second growth and transformation plan for the higher education sector*. Addis Ababa: MoE.

Ministry of Education. 2017. *Education statistics annual abstracts (2015/2016).* Addis Ababa: MoE.

Ministry of Education.2018. Annual educational statistical report. Available at: http: www.moe.gov.et

Molla, T. 2014. Knowledge aid as instrument of regulation: World Bank's non-lending higher education support for Ethiopia. *Comparative Education*, 50 (2), 229-248.

Moravec, T., Stepanek, P. & Valenta, P. 2015, The influence of using e-learning tools on the results of students at the tests. *Procedia Social and Behavioural Sciences*, 176, 81-86.

Mosa, A. A., Naz'ri bin Mahrin, M. & Ibrrahim, R. 2016. Technological aspects of e-learning readiness in higher education: A review of the literature. *Computer and Information Science,* 9 (1), 113-127. doi:10.5539/cis.v9n1p113

Moser, S. & Smith, P. 2015. Benefits of synchronous online courses. *ASCUE Proceedings*. Available at: https://files.eric.ed.gov/fulltext/ED571270.pdf

Mosha, G.E. & Bea, G.K. 2014. Barriers of using internet resources in higher learning institutions: a case of Mzumbe University in Morogoro Region in Tanzania. *Information and Knowledge Management*, 4 (8), 64-72.

Motteram, G. 2005. Blended education and the transformation of teachers: A long-term case study in postgraduate UK Higher Education. *British Journal of Educational Technology*, 37 (1), 17-30.

Muller, W. & Evans, N.D. 2009. *University of Zululand e-learning implementation strategy and plan*. Available at: uzulu. ac. za/docs/e-Learning

Mulugeta, S.S. & Buckley S. 2015. Theoretical perspective: E-learning challenges and proposed framework in developing countries. Beyond development. *Paper presented at the 9th IDIA conference*, IDIA2015. Nungwi, Zanzibar. 368-377

Myers, M.D. 2013. *Qualitative research in business and management*. Thousand Oaks: SAGE.

Nagunwa, T. & Lwoga, E. 2013. Developing an e-learning strategy to implement medical competency based curricula: Experiences from Muhimbili University of Health and Allied Sciences. *International Journal of Education and Development using Information and Communication Technology*, 8 (3), 7–21.

Namalefe, S. 2010. Curriculum and school related factors influencing integration of ICT in primary and secondary classrooms: Evidence from Uganda, Kenya and

Tanzania. *Developing use of ICT to enhance teaching and learning in East African schools: a review of the literature.* Dar es Salam: The Aga Khan University, 57-66.

Namisiko, P., Munialo, C. & Nyongesa, S. 2014. Towards an optimization framework for e-learning in developing countries: A case of private universities in Kenya. *Journal of Computer Science and Information Technology, 2* (2), 131-148.

Navani, Y. & Ansari, M.A. 2016. A study of e-learning readiness of university faculty. *International Journal of Current Research*, 8 (08), 52-56.

Nawaz, A. 2012. E-learning experiences of HEIs in advanced states, developing countries and Pakistan. *Universal Journal of Education and General Studies*, 1 (3), 72-83.

Ndume, V., Tilya, F. & Twaakyondo, H.2008. Challenges of adaptive e-learning at higher learning institutions: a case study in Tanzania*. International Journal of Computing and ICT Research*, 2 (1), 47-59.

Nega, M. 2017. The public-private divide in Ethiopian higher education: Issues and policy implications. *Universal Journal of Educational Research*, 5 (4), 591-599.

Newby, T.J., Stepich, D.A., Lehman J.D.& Russel, J.D. 1996. *Instructional technology for teaching and learning: Designing instruction, integrating computers, and using media*. Englewood Cliffs: Prentice-Hall.

Ngamau, K.2013.*Factors affecting effective adoption of e-learning in Kenyan Universities: The case of Jomo Kenyatta University of Agriculture and Technology.* Doctoral dissertation. United States International University-Africa.

Nunnally, J.C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.

Oates, B.J. 2006. *Researching information systems and computing*. London: SAGE.

Obeidat, B., Al-Suradi, M. & Tarhini, A. 2016. The impact of knowledge management on innovation: An empirical study on Jordanian consultancy firms. *Management Research Review*, 39 (10), 22-42.

Oketch, & Achieng, H. 2013. *E-learning readiness assessment model in Kenya's higher education institutions: A case study of University of Nairobi.* Master's thesis. University of Nairobi.

Olutola, A.T. & Olatoye, O.O. 2015. Challenges of e-learning technologies in Nigerian university education. Journal of Educational and Social Research, 5(1), : 301-301.

Omidinia, S., Masrom, M. & Selamat, H. 2011. Review of e-learning and ICT infrastructure in developing countries (Case Study of Iran). *American Journal of Economics and Business Administration*, 3 (1), 120-125.

Onguko, B. 2010. *Design, implementation and institutionalization of mobile learning in higher education.* Dar es Salam: Institute for Educational Development, Eastern Africa and University of Calgary.

Onwuegbuzie, A.J., Bustamante, R.M. & Nelson, J.A. 2010. Mixed research as a tool for developing quantitative instruments. *Journal of Mixed Methods Research*, 4(1), 56-78.

Pedhazur, E.J. & Pedhazur Schmelkin, L. 1991. *Exploratory factor analysis. Measurement, design and analysis: An integrated approach.* London: Taylor and Francis.

Pegu, U.K. 2014. Information and communication technology in higher education in India: Challenges and opportunities. *International Journal of Information and Computation Technology,* 4(5), 513-518.

Perveen, A. 2016. Synchronous and asynchronous e-language learning: A case study of Virtual University of Pakistan. *Open Praxis*, 8(1), 21-39.

Phelps, R., Hase, S. & Ellis, A. 2005. Competency, capability, complexity and computers: exploring a new model for conceptualising end-user computer education. *British Journal of Educational Technology*, 36(1), 67-84.

Pitombo, C. S., Kawamoto, E. &Sousa, A.J. 2011. An exploratory analysis of relationships between socioeconomic, land use, activity participation variables and travel patterns. *Transport Policy,* 18 (2): 347-357.

Plano Clark, V.L. & Creswell, J.W. 2008. *The mixed methods reader*. Thousand Oaks: SAGE.

Plano Clark, V. & Ivankova, N. 2016. Why use mixed methods research? Identifying rationales for mixing methods. *Mixed methods research: A guide to the field*. Thousand Oaks: SAGE. 79-104.

Poon, J. 2013. Blended learning: An institutional approach for enhancing students' learning experiences. *Journal of Online Learning and Teaching*, *9*(2), 271-288.

Rambe, P. & Mawere, M., 2011. Gibbons straddles the Mozambican public education system: Critical literacy challenges and moral dilemmas in Mozambican new curriculum. *International Journal for Educational Integrity*, 7(1).

Raymond, E., Atsumbe, B.M., Okwori, R.O. & Jebba, M.A. 2016. Comparative effects of the synchronous and the asynchronous instructional approaches concerning the students' achievements and interests in electrical engineering at the Niger State College of Education. *International Journal of Engineering Pedagogy,* 6 (3), 4-9. doi: https://onlinejournals.org/index.php/i-jep/article/view/5302

Rayner, P. & Ashcroft, K. 2012. Ethiopian higher education: Expansion, dilemmas and quality. *World Education News and Reviews,* 1 June 2011 Available at: http://wenr.wes.org/2011/06/wenr-june-2011-feature/

Rhema, A. & Miliszewska, I. 2010. Towards e-learning in higher education in Libya. *Issues in Informing Science and Information Technology,* 7, 423–437.

Rhema, A. & Miliszewska, I. 2011. Reflections on a Trial Implementation of an E-Learning Solution in a Libyan University. Issues in informing Science and Information Technology, 8, 61-76.

Rodrigues, H., Almeida, F., Figueiredo, V. & Lopes, S.L. 2019. Tracking e-learning through published papers: A systematic review. *Computers and Education,* 136, 87–98.

Rohayani, A.H. 2015. A literature review: readiness factors to measuring e-learning readiness in higher education. *Procedia Computer Science*, 59, 230-234.

Rummel, R.J. 1970. *Applied factor analysis.* Evanston: Northwestern University Press.

Saint, W.S, 1999. Tertiary distance education and technology in Sub-Saharan Africa. Washington, DC: World Bank.

Saint, W. 2004. Higher education in Ethiopia: the vision and its challenges. *Journal of Higher Education in Africa*, 2 (3), 83-113.

Salter, S.M., Karia, A., Sanfilippo, F.M. & Clifford, R.M. 2014. Effectiveness of E-learning in pharmacy education. *American Journal of Pharmaceutical Education*, 74(8).

Sangheethaa, S, Korath, A & Metsihe, D. & Kefayalew, D.K. 2016. Effectiveness of e-learning in select Ethiopian Universities. *International Journal of Latest Technology in Engineering, Management & Applied Science (IJLTEMAS),* V (XI).

Sangrà, A., Vlachopoulos, D., Cabrera, N. & Bravo, S. 2011. *Towards an inclusive definition of e-learning.*Barcelona: E Learn Centre, UOC Open University Catalonia.

Sarrab, M., Elbasir, M. & Alnaeli, S. 2016. Towards a quality model of technical aspects for mobile learning services: An empirical investigation. *Computers in Human Behavior*, 55, 100-112.

Sass, D.A. 2010. Factor loading estimation error and stability using exploratory factor analysis. *Educational and Psychological Measurement*, 70(4), 557-577.

Schober, P., Boer, C. & Schwarte, L.A. 2018. Correlation coefficients: appropriate use and interpretation. *Anesthesia & Analgesia*, 126(5), 1763-1768.

Sekaran, U. 2003. *Research methods for business: A skill-building approach*. (4th ed.) New York: John Wiley & Sons.

Selwyn, N. 2014. *Digital technology and the contemporary university: Degrees of digitization.* New York: Routledge, Taylor & Francis Group.

Sener, J. 2015. *Updated e-learning definition*,. Available at: https://onlinelearningconsortium.org/updated-e-learning-definitions-2

Senthilnathan, S. 2019. *Usefulness of correlation analysis*. Available at SSRN 3416918.

Shuler, P., Hutchins, G. & LaShell, B. 2010. Student perceptions of tablet computers in a cooperative learning environment. *NACTA Journal*, 54 (2), 11-17.

Siemens, G. 2005. Learning development cycle: Bridging learning design and modern knowledge needs. *Elearnspace Everything E-learning*, 48 (9), 800-809.

Silver, C. & Lewins, A. 2014. *Using software in qualitative research: A step-by-step guide*. (2nd ed.). Thousand Oaks: SAGE.

Singh, H. 2003. Building effective blended learning programs. *Issue of Educational Technology,* 43 (6), 51-54.

Snedecor, G.W. & Cochran, W.G. 1989. *Statistical methods*. (8th ed.) Ames: Iowa State University Press Iowa, 54, 71-82.

Song, S.M. 2010. *E-learning investigating students' acceptance of online learning in hospitality programs.* Doctoral thesis,Ames: Iowa State University.

Sree, G.D. & Srinivasan, P. 2015. Education as a means of social control of emotion. *International Journal of Social Science & Interdisciplinary Research*, 4 (6), 134-137.

Ssekakubo, G., Suleman, H. & Marsden, G. 2011. Issues of adoption: have e-learning management systems fulfilled their potential in developing countries? In *Proceedings of the South African Institute of Computer Scientists and Information Technologists Conference on Knowledge, Innovation and Leadership in a Diverse, Multidisciplinary Environment*, October 2011, 231-238. Available at: https://dl.acm.org/doi/abs/10.1145/2072221.2072248

Steffens, D. & Reiss, M. 2010. *Performance of blended learning in university teaching: Determinants and challenges.* Available at: https://eleed.campussource.de/archive/6/2627/?searchterm=None

Stepanyan, K., Littlejohn, A. & Margaryan, A. 2013. Sustainable e-learning: toward a coherent body of knowledge. *Educational Technology & Society*, 16 (2), 91–102.

Suhr, D.D. 2006. *Paper 200-31 exploratory or confirmatory factor analysis*? https://support.sas.com/resources/papers/proceedings/proceedings/sugi31/200-31.pdf

Sun, W., Chou, C. P., Stacy, A. W., Ma, H., Unger, J. & Gallaher, P. 2007. SAS and SPSS macros to calculate standardized Cronbach's alpha using the upper bound of the phi coefficient for dichotomous items. *Behavior Research Methods*, 39 (1), 71-81.

Sundaram K.R., Dwivedi, S.N. &Sreenivas, V. 2014. *Medical statistics principles and methods*. (2nd ed.) New Delhi: Wolters Kluwer India.

Swanson, R. A. 2013. *Theory building in applied disciplines*. San Francisco: Berrett-Koehler.

Tabachnick, B.G. & Fidell,L.S. 2001. *Using multivariate statistics.* Boston: Allyn & Bacon. Needham Heights, MA.

Tabachnick, B.G. & Fidell, L.S. 2007. *Using multivariate statistics* (5th ed.). Boston: Allyn & Bacon.

Tabatabaei, O. & Sharifi, R. 2011. Online discussion: Self-repair enhancement of EFL Learners. *Theory and Practice in Language Studies*, 1(7), 837-846.

Tamm, S. 2019. *What is E-learning? Defining what is e-learning is not as easy as it might first appear*. Available at: https://e-student.org/what-is-e-learning/

Tarhini,A.,El-Masri,M.,Ali,M.&Serrano,A.2016. ExtendingtheUTAUTmodeltounderstandthecustomers'acceptanceanduseofinternetbankinginLebanon:Astructuralequationmodelingapproach.*InformationTechnology&People*,29 (4),830-849.https://doi.org/10.1108/ITP-02-2014-0034

Task Force e-Learning - COIMBRA Group. 2012. e-Learning at the Coimbra Group Universities. *Journal of e-Learning and Knowledge Society*, 8 (2), 107-111.

Tavakol, M. & Dennick, R. 2011. Making sense of Cronbach's alpha.*International Journal of Medical Education*, 2, 53-55.

Teddlie, C. & Tashakkori, A. 2008. *Foundations of mixed methods research: Integrating quantitative and qualitative techniques in the social and behavioral sciences.* Thousand Oaks: SAGE.

Tedla, B.A. 2012. Understanding the importance, impacts and barriers of ICT on teaching and learning in East African countries. *International Journal for e-Learning Security(IJeLS),* 2(3-4), 199-207.

Teferra, D. 2017. *African flagship universities in the era of massification*. Cham: Palgrave Macmillan.

Teferra, D. & Altbach, P.G. 2004. African higher education: Challenges for the 21st century. *Higher Education*, *47*(1), 21-50.

Tegegne, K.M. 2014. Perception of university students before and after the e-learning implementation in one of the mathematics courses: The case of mathematics students in Jimma University. *EthiopianJournal of Education and Sciences*, 9(2), 61-82.

Tesfalidet, K. & Nirmala, M. 2015. The impact of e-learning to enhance quality of education: The case of Adama Science and Technology University. *African Journal of Computing & ICT,* 8(1), 155162.

Tessema, K.A. 2009. The unfolding trends and consequences of expanding higher education in Ethiopia: massive universities, massive challenges. *Higher Education Quarterly*, 63 (1), 29-45.

The Ethiopian Education and Research Network (EthERNet). 2014. Available at: http://www.ubuntunet.net/ethernet.

The Ministry of Communication and Information Technology (MCIT) 2009. *The national information and communication technology policy and strategy.* MCIT. Available at: http://www.ethiopia.gov.et/policies-and-strategies//asset_publisher/f4J0Jqrj9180/content/the-national-information-and-communicationtechnology-ict-policy-and-strategy?inheritRedirect=false

Thompson, B. 2004. *Exploratory and confirmatory factor analysis.* Washington, DC: American Psychological Association.

Thomson, L.D. 2010. Beyond the classroom walls: Teachers' and students' perspectives on how online learning can meet the needs of gifted students. *Journal of Advanced Academics*, 21(4), 662-712.

Tibebu, D., Bandyopadhyay, T. & Negash, S. 2009. ICT integration efforts in higher education in developing economies: The case of Addis Ababa University, Ethiopia. *International Journal of Information and Communication Technology Education*, 5, 34-58.

Trow, M. 2007. Reflections on the transition from elite to mass to universal access: Forms and phases of higher education in modern societies since WWII. In *SpringerInternational Handbook of Higher Education, Vol. 18,* 243-280. Springer, Dordrecht.

Tucker, L. R. & MacCallum, R. C. 1997. Exploratory factor analysis. Unpublished manuscript, Ohio State University, Columbus.

University of Zululand. 2009. *E -learning strategy plan for University of Zululand:* Available at: http://elearn.uzulu.ac.za/docs/eLearning%20implementation%20strategy%20and%20plan%20of%20Unizulu.pdf

UNCTAD, 2008. *Report of the international conference: Moving towards gender sensitisation of trade policy.* New Delhi, India, 25-27 February 2008. New Delhi: United Nations Conference on Trade and Development.

UNESCO, UNICEF & World Bank. 2015. *Final report: World declaration on education for all. Meeting basic learning needs*. March (5-9). Available at: https://unesdoc.unesco.org/ark:/48223/pf0000121147

University of California, Los Angeles. 2021. *What does Cronbach's alpha mean?* Available at: https://stats.idre.ucla.edu/spss/faq/what-does-cronbachs-alpha-mean/#:~:text=Cronbach%E2%80%99s%20alpha%20is%20a%20measure%20of%20internal%20consistency%2C,does%20not%20imply%20that%20the%20measure%20is%20unidimensional.

Unwin, T. 2007. *Survey of e-Learning in Africa based on a Questionnaire survey of people on the e-Learning Africa Database in 2007*. Available at: http://www.gg.rhul.ac.uk/ict4d/workingpapers/elareport.pdf

Unwin, T. 2008. *Survey of e-Learning in Africa.*Royal Holloway, University of London.

U.S. Commercial Service of the U.S. Department of Commerce. 2017.*Ethiopia - Information and Communication Technology.* Available at:https://www.export.gov/article?id=Ethiopia-Information-andCommunication-Technology [Accessed 30 June 2018]

Van der Linden, S., 2016. A conceptual critique of the cultural cognition thesis. *Science Communication*, 38(1), 128-138.

Vencatachellum, I. & Munusami, V.2006, *Barriers to effective corporate e-learning in Mauritius*. Available at: https://www.ufhrd.co.uk/wordpress/wp-content/uploads/2008/06/1-1_vencatachellum_munusami.pdf

Venter, P., Van Rensburg, M.J. & Davis, A. 2012. Drivers of learning management system use in a South African open and distance learning institution. *Australasian Journal of Educational Technology*, 28 (2), 183-198.

Vygotsky, L.S. 1978. *Mind in society*. Cambridge: Harvard University Press.

Wagaw, T.G. 1979. *Education in Ethiopia: Prospect and retrospect*. East Lansing: University of Michigan Press.

Wagaw, T.G. 1990. *The development of higher education and social change: The Ethiopian experience.* East Lansing: Michigan State University Press.

Wanyaga, M.F., Kamau, J.W. & Gikandi, J. 2015. ICT infrastructural factors that influence the adoption of e-learning in public secondary schools in Kenya, *International Journal of Science and Research*, 4(6), 1061-1067.

Webometrics 2016. *Ethiopia.* Available at: http://www.webometrics.info/en/Africa/Ethiopia.

Wenger, E., McDermott, R. & Snyder, W. 2002. *Cultivating communities of practice: A guide to managing knowledge*. Cambridge: Harvard University Press.

Williams, B., Onsman, A. & Brown, T. 2010. Exploratory factor analysis: A five-step guide for novices. *Australasian Journal of Paramedicine*, *8*(3).

World Bank. 2013. *Ethiopia overview.* Available at: www.worldbank.org/en/country/ethiopia/overview

World Bank. 2018. Sub-Saharan Africa report. In *World Bank, Global Economic Prospects.* Available at: http://pubdocs.worldbank.org/en/575011512062621151/Global-EconomicProspects-Jan-2018-Sub-Saharan-Africa-analysis.pdf

World Bank. 2000. *Higher education in developing countries: Peril and promise*. Washington, DC: The Task Force on Higher Education and Society.

Yang, J.C. & Lin, Y.L. 2010, Development and evaluation of an interactive mobile learning environment with shared display groupware. *Journal of Educational Technology & Society*, 13(1), 195-207.

Yin, R.K. 2014. *Case study research: Design and methods*. (5th ed.) Thousand Oaks: SAGE.

Yirdaw, A. 2016, Quality of education in private higher institutions in Ethiopia: The role of governance. *SAGE Open*, 6 (1), 1-12.

You, J.W. & Kang, M. 2014. The role of academic emotions in the relationship between perceived academic control and self-regulated learning in online learning. *Computers & Education*, 77, 125-133.

Zawacki-Richter, O., Müskens, W., Krause, U., Alturki, U. & Aldraiweesh, A. 2015. Student media use patterns and non-traditional learning in higher education. *International Review of Research in Open and Distributed Learning*, 16(2), 136-170.

Zhong, L. 2015. A systematic overview of learning analytics in higher education. *Journal of Educational Technology Development and Exchange,* 8(2), p.3.

Zhu, C. & Mugenyi, J.K. 2015. A SWOT analysis of the integration of e-learning at a university in Uganda and a university in Tanzania. *Technology, Pedagogy and Education*, 24(5), 1-19.

Zsuzsanna, N.A.G.Y. 2018. *The role of information and communication technologies for the improvement of veterinary education standard in Ethiopia*. Doctoral dissertation. School of Oriental and African Studies.

APPENDIX I: ETHICAL CLEARANCE FORM

UNISA college of science, engineering and technology

Dear Mrs Simret Solomon Mulugeta (44448414)

Date: 2015-05-29

Application number:
058/SSM/2015

REQUEST FOR ETHICAL CLEARANCE: (Framework for Strategic E-Learning Implementation: The Case of UNISA Ethiopia and Ethiopian Higher Learning Institutions)

The College of Science, Engineering and Technology's (CSET) Research and Ethics Committee has considered the relevant parts of the studies relating to the abovementioned research project and research methodology and is pleased to inform you that ethical clearance is granted for your research study as set out in your proposal and application for ethical clearance.

Therefore, involved parties may also consider ethics approval as granted. However, the permission granted must not be misconstrued as constituting an instruction from the CSET Executive or the CSET CRIC that sampled interviewees (if applicable) are compelled to take part in the research project. All interviewees retain their individual right to decide whether to participate or not.

We trust that the research will be undertaken in a manner that is respectful of the rights and integrity of those who volunteer to participate, as stipulated in the UNISA Research Ethics policy. The policy can be found at the following URL:
http://cm.unisa.ac.za/contents/departments/res_policies/docs/ResearchEthicsPolicy_apprvCounc_21Sept07.pdf

Please note that the ethical clearance is granted for the duration of this project and if you subsequently do a follow-up study that requires the use of a different research instrument, you will have to submit an addendum to this application, explaining the purpose of the follow-up study and attach the new instrument along with a comprehensive information document and consent form.

Yours sincerely

Prof Ernest Mnkandla
Chair: College of Science, Engineering and Technology Ethics Sub-Committee

Prof IOG Mochie
Executive Dean: College of Science, Engineering and Technology

RECEIVED
2015 -06- 10
OFFICE OF THE EXECUTIVE DEAN
College of Science, Engineering and Technology

University of South Africa
College of Science, Engineering and Technology
The Science Campus
C/o Christiaan de Wet Road and Pioneer Avenue,
Florida Park, Roodepoort
Private Bag X6, Florida, 1710
www.unisa.ac.za/cset

UNISA college of science, engineering and technology

APPENDIX II: WRITTEN PERMISSION FROM AAIT, ECSU AND AMIT

አርባ ምንጭ ዩኒቨርሲቲ
Arba Minch University
የመረጃና ኮሙዩኒኬሽን ቴክኖሎጂ ዳይሬክቶሬት
Information and Communication Technology Directorate

ፖ ሣ ቁ 21 ስልክ +251-46-8811153
P.O.Box Tel +251-91-0069925
አርባምንጭ፡ ኢትዮጵያ
Arba Minch, Ethiopia

ማጣቀሻ
ቁ. ICTC 2/07
Ref. NO
ቀን:- 26/08/07
Date

To School of computing College of Science, Engineering & Technology
UNISA

Dear Sir or Madam

Mrs. Simret Solomon Mulugeta is a UNISA PhD (Computer Science) student. She has requested us to write a letter indicating our willingness to allow her to collect data from Arba Minch University students for her doctoral research.

Thus we are willing to allow her to collect data from students and also closely collaborate with Mrs. Simret Solomon Mulugeta in collecting the data from AMU students. The output of the study will benefit AMU in order to enhance the teaching and learning process with the facilitation of e-learning and serve as guideline to improve the e-learning.

Please feel free to call us on +251468811153 write or write e-mail at tamirat.c@amu.edu.et

Best Regards,

Hussien Seid Worku (Dr.)
INFORMATION & COMMUNICATION TECHNOLOGY DIRECTORATE DIRECTOR

መልሱንለጽፉልንየኖንቁጥርይጥቀሱ Fax: +251-468-817941
E-mail: ictc@amu.edu.et When replying please indicate our reference No. +251-468-810820

AAiT
Addis Ababa Institute of Technology
አዲስ አበባ ቴክኖሎጂ ኢንስቲትዩት
Addis Ababa University
አዲስ አበባ ዩኒቨርሲቲ

Scientific Director Office
ምሳይንቲፊክ ዳይሬክተር ቢሮ

Dr. Berhanu Assefa
Deputy Scientific Director

Tel: 011 - 12324 - 35
Mobile: 09-11-40-54-91
Fax: 011 - 12394 - 80
Mail: hmberhanu@yahoo.com

Date 30 - April - 2015
Ref. number: AAiT-SD-2250-07-15

To: School of computing
College of Science, Engineering & Technology
UNISA

Dear Sir or Madam

Mrs. Simret Solomon Mulugeta is a UNISA PhD (Computer Science) student. She has requested us to write a letter indicating our willingness to allow her to collect data from Addis Ababa Institute of Technology (AAiT) students for her doctoral research.

Thus, I express that Institute is willing to allow her to collect data from AAiT students and Support Mrs. Simret Solomon Mulugeta in collecting the data from AAiT students. I believe that the output of the study will behelpful in its plan to enhance the teaching and learning process through e-learning for further information, free to call you can write e-mail at berhanu.assefa@aait.edu.et

Best Regards,

Berhanu Assefa (PhD)
Deputy Scientific Director, AAiT

To All concerned
plse facilitate her data collection effort

UNISA university of south africa

31 JANUARY, 2017

UNISA-ET/KA/ST/29/31-01-17

Ethiopian Civil Service University
Addis Ababa

Dear Madam/Sir,

The University of South Africa (UNISA) extends warm greetings. By this letter, we want to certify that Ms. Simret Solomon Mulugeta (student number 44448414) is a PhD student in the Department of Computing at UNISA. Currently, she is at the stage of data collection on her doctoral thesis entitled "***Framework for Strategic E-Learning Implementation: The case Ethiopian Higher Learning Institutions***."

This is therefore to kindly request your cooperation in providing the student access to data sources among students who learn through the e-learning mode. We would like to thank you in advance for all the assistance that you would provide to her.

Sincerely,

Tsige GebreMeskel Aberra
Deputy Director – Academic and ICT Support

UNISA REGIONAL LEARNING CENTRE
PO BOX 13836 ADDIS ABABA ETHIOPIA
TEL +251-114-350141
+251-114-350073
FAX +251-114-351243
MOBILE +251-912-191483

APPENDIX III: THE CONSENT FORM

Informed consent form/participant declaration

This is consent form for a research project. It is a research project to explore to what extent e-learning is being used and to identify the e-learning challenges in order to develop a strategic e-learning framework to facilitate e-learning in developing countries like Ethiopia Higher Learning institutions. This is informed consent form for projects not dealing with medical research, children and young adults, people with learning difficulties and crime.

Please note that all participation by users is completely voluntary, that participants will remain anonymous, and that information they provide will be pooled together and used sole for the academic purpose only.

Please also be aware that findings of this study may be published in a thesis and in academic Publications. All the data that users provide during the study will be handled confidentially. This means that access to the data will be strictly limited to the researcher, and the supervisor of the study. No identification of individual users will be linked to any of the data.

I, the undersigned, confirm that (please tick box as appropriate):

1.	I have read and understand that the project is designed to gather information about academic work and perspective about e-leaning and e-learning challenges.	☑
2.	I have been given the opportunity to answer questions about the project and my participation in this project is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time without penalty. If I decline to participate or withdraw from the study, no one in my university will be informed.	☑
3.	I voluntarily agree to participate in the project and participation involves filling the questionnaire and being interviewed by researchers. The interview will last approximately 30-45 minutes. Notes will be written during the interview. An audio tape of the interview and subsequent dialogue will be make. If I don't want to be taped, I will not be able to participate in the study.	☑
4.	I understand that I can withdraw at any time without giving reasons and that I will not be penalized for withdrawing nor will I be questioned on why I have withdrawn.	☑
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of	☑

	names, pseudonyms, anonymisation of data, etc.) to me. I understand that the researcher will not identify me by name in any reports using information obtained from this questionnaire interview, and that my confidentiality as a participant in this study will remain secure. Subsequent uses of records and data will be subject to standard data use policies which protect the anonymity of individuals and institutions.	
6.	Directors and Instructors from my University will neither be present at the interview nor have access to raw notes or transcripts. This precaution will prevent my individual comments from having any negative repercussions.	☑
7.	The use of the data in research, publications, sharing and archiving has been explained to me. I understand that this research study has been reviewed and approved by the Ethics Review Committees (ERC) of all collaborating institutions.	☑
8.	I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form. I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study.	☑
9.	I, along with the researcher, agree to sign and date this informed consent form. I do not want my name used in this project	☑
10	I confirm that I have been adequately informed by the researcher about the nature, conduct and benefits. I have also received, read and understood the above written information.	☑

Participant:

Moges TiGABU — Name of Participant

Signature

17/07/2017 — Date

Researcher:

S S Mulugeta — Name of Researcher

Signature

17/07/2017 — Date

APPENDIX IV: SEMI-STRUCTURED INTERVIEW QUESTIONS

Domain	Potential	Explanation	Interview Questions
Students' Practice on e-learning use	Extent of use	Is e-learning being used regularly or not?	1. Do you use e-learning? 2. If no, Why are you not using it? How can we get you to be able to use it? 3. If yes, How often do you use it? When do you use it?, What do you use it for? 4. On average how much time daily do you use e-learning? 5. How many days in week do you use e-learning?
	Competency about site/portal	Are students competent to use site/portal?	1. Can you use site/portal for e-learning? 2. Do you require any special technical skill to use site/portal? 3. What do you use site/portal for? Do you use it for Instructor info; Course info; Course documents; Schedules; Assignment; Electronic Resources; Video; or Audio-supported e-tutorials? 4. Do you ever use the site/portal to discuss any course content with your fellow student(s)? 5. If yes/no, why?
	Feeling/Opinion	Feeling/Opinion towards e-learning	1. What is your opinion/feeling about e-learning? Can you access it anywhere? 2. Does the use of e-learning motivate in your studies? 3. If no/yes, why? 4. Do you find e-learning use easy/difficult? 5. Why do you find e-learning use easy/difficult?
Challenges of e-learning on students	Explore e-learning Challenges	E-learning challenges encountered by students	1. Do you encounter any challenges with e-learning? 2. If yes, what type of challenges do you encounter? 3. If no, why don't you have any challenges with e-learning? 4. Do you think your fellow students have challenges with e-learning? 5. If yes, why do you think they have challenges? 6. If no, why do you think they don't have challenges?
	Resource and Support	Exploring e-learning resource and support availability	1. What e-learning resource(s) are there in your university? 2. Are the resources sufficient for every students? 3. Do the available resources pose challenge to students? 5. If yes, what type of challenges? 6. Why do you think students have any challenges with the available resources? 7. Are the available resources helpful to students? 8. How are they helpful to students? 9. Why do students find the available resources helpful?
	Technological	Exploring e-learningtechnological related challenges	1. Does your university provide reliable internet connection? 2. Is the internet connection provided good?

			3. Are the hardware and software components in the computer labs functional? 4. Is there good wireless internet connection in your university? 5. Is there videoconferencing sessions for academic discussions audible and legible? 6. Is there any other e-learning feature that is available in your university? Is it accessible? if no, why?
	Management	Exploring e-learning management related challenges	1. Is there any support provided for the use of e-learning? 2. Do the e-learning facilities in your university regularly updated?
	Institutional	Exploring e-learning institutionally related challenges	1. Does your university provide any e-learning training for the students? 2. If they do, how often is the training provided?
	Interface design	Exploring e-learning site/portal related challenges	1. What features make the e-learning site user-friendly or not user-friendly? 2. Is it accessible to students? 3. If yes, how accessible is it? 4. If not, why is it not accessible?
	Ethical	Exploring e-learningEthicalrelated challenges	1. Does your university have rules on the use of e-learning? 2. Why do you think rules are important for e-learning?

APPENDIX V: SAMPLE OF TRANSCRIPTION PROCESS

Participant [1]

Good morning, Participant [1]. We will start our interview. We can use Amharic or English, whichever you are comfortable with. You have already filled out the consent form, so we can start with the first question.

Researcher: Do you use e-learning?

Participant [1]: Yes, I do. I was using e-learning for some time but currently I am not using it.

Researcher: Why are you not using e-learning currently?

Participant [1]: I don't feel like I need it and the school doesn't provide it anymore. The school used to provide e-learning when I was a second year student and that's when I was using it. But even then only two or three instructors were using it. I was encouraged to use it in those days but not anymore.

Researcher: Are you a fifth year student?

Participant [1]: Yes, I'm a fifth year student. I have been using other e-learning platforms provided by this campus; for example, the online e-learning platform Coursera. Can that be considered as an e-learning platform?

Researcher: Yes, of course, but currently I am focusing on the learning management system which your university provides and which is already in place in your University. How much are you using this e-learning portal? I understand you are not using it this year but from your experience I want to know to what extent you were using that module of learning management system provided by the university. Does it mean you are not benefitting much from the module learning system which the university provides? Is that why you shifted to other e-learning portals? Your course is not provided on that e-learning portal.

Participant [1]:They are not provided. They post online some of the materials, video lectures and course outlines, upcoming events, exams, tests and stuffs like that.

Researcher: In which e-learning portal is that? The one provided by the university?

Participant [1]: Yes. The one that is provided by the university.

Researcher: Ok, good. I would like to hear about it.

Participant [1]: Ok, if you are talking about that like I said before, it's been a while since I have used it but I have used it. For example, I have taken Introduction to Control Engineering through it. The instructor used to post upcoming events like tests, assignments, worksheets and other updates on the course. That was basically the main way he communicated with us. The other one was for Introduction to Computing, which is another name for C++. The instructor used the module and was posting some video lectures upon students' recommendation. That's how much I was using e-learning. However, for the last two or three years I have not used it.

Researcher: Why is that?

Participant [1]: Because, before we can use it, first of all, the university community has to promote it. They used to tell us to see upcoming events on the platform and other schedules. But they no longer do that. Even the one I told you about earlier was not advertised by the university but by individual instructors. So, unless you are told that there is an e-learning module provided by the campus, them how would know about it let alone start using it. There is a gap here between students and the concerned bodies in the university. That's the problem.

Researcher: But, do you think the system is still available? The information I have now is that the system is still available.

Participant [1]: Well, how would I know?

Researcher: And you are not taking any course with it?

Participant: No. I am not taking any course with it.

Researcher: But you were taking courses once.

Participant [1]: Yes. But we cannot call it taking courses because they just post materials and we download them.

Researcher: What about assignment submission?

Participant: I don't remember submitting an assignment. I believe that there are some students who don't know that the modules exist. I have come across students who ask what the module is and what you do with it. So, there is a gap.

Researcher: But by the time you were using it, do you think there were important resources in it?

Participant [1]: Yes, there were important resources. For example, we used to download textbooks for Digital Logic Design. We were also downloading assignments. But not many students were aware of it.

Researcher: How often were you using it?

Participant [1]:I think I was using it once a week because initially the instructors were posting most of the materials ahead of time. If there was anything new, it would be an exam or some unscheduled event. So, you have no reason to check it every day.

Researcher: Do you think this module portal is usable? Can you use it for e-learning?

Participant [1]:Yes. As I said before, if you provide the appropriate materials, lecture notes, assignments, worksheets ahead of time or on schedule, then you don't need anything basically. You have books, worksheets and assignments to work on.

Researcher: And you can use it for e-learning.

Participant [1]:Yes.

Researcher: Does it require any special skill to use the module?

Participant [1]:No. It requires no technical skills. All it requires is authentication or credentials.

Researcher: So, students who know how to use computers can successfully use the e-learning platform.

Participant [1]:Yes.

Researcher: So, the requirement only knows how to operate a computer or surf the internet.

Participant [1]:Yes.

Researcher: So, when you were using the portal of this module, what were you using it for? Were you using it for assignments or schedules or what were you using that website for?

Participant [1]:I have used it for all of them except audio-supported e-tutorials. I have never used audio-supported e-tutorials.

Researcher: What exactly where you using?

Participant [1]:I have downloaded course materials and course information and documents like text books and lecture notes, schedules about upcoming events, texts, mid-exams, final exams and assignments. Well, I don't understand what electronic resources means.

Researcher: It's a tutorial like YouTube video containing audio and video together and it helps you to facilitate that specific course.

Participant [1]:Yes, I have used that. But only one instructor used the electronic resource and encouraged us to use it. And unless the instructors post the material, I don't think you can use it.

Researcher: Ok, you mean if they provide the material manually or with a flash disk, you cannot use the electronic resources. Did you ever use this site or portal to discuss any course content with your fellow students as in a discussion forum?

Participant [1]:Yes, for the course C++, I remember the instructor holding a discussion session with students, discussing assignment, exams.

Researcher: You were using it for discussion about assignments for that course. And was it helpful?

Participant [1]:Yes. Again, I remember they were discussing one difficult question that appeared on the assignment. They were asking the instructor if he could explain it and he was giving them feedback. As I said before, only this instructor was doing so. I haven't seen other instructors in the discussion sessions.

Researcher: I would like to know your feelings about e-learning. Can you access it anywhere? Can you access it from cafés or from cell phone? What is your opinion about its accessibility? Is it accessible anywhere?

Participant [1]:Well, I have never tried it outside campus. I don't think it is accessible from outside campus. I don't know why but my experience it is accessible only from inside campus. We can access it by connecting devices to wireless network within the campus but since I have never tried it outside, I cannot speak for what happens outside campus.

Researcher: Do you think the use of e-learning has motivated you in your studies? Was it motivating you in your studies or does it have no difference from other courses?

Participant [1]: As I said before, I have used it only two or three times. I cannot say it has motivated me. I think I should have used it more times to see if it would motivate me, to see if it would have any impact on my academic progress.

Researcher: Do you find the use of e-learning easy or difficult in general?

Participant [1]: It is quite easy.

Researcher: What specifically makes it easy for you? What are the things that make it easy for you? This might help other students?

Participant [1]: It is interactive. A lot of people, including me, prefer learning interactively to just reading books. So, the fact that e-learning is interactive makes it easy and preferable to use.

Researcher: Now we come to challenges. Did you encounter any challenge while using e-learning?

Participant [1]: Just one challenge and I think I have mentioned it before. It has to do with authentication. The instructors had to give you username and password without which you cannot access the module. And I don't even think that is a challenge. Once you know the username and password, you can share it with your friends and your friends with their friends and so on.

Researcher: Do you all use one username and password?

Participant [1]:Yes, we use the same username and password. I guess you can see the privilege we have for accessing the module. There were just some sections of the module which we could access. Others were greyed out or blurred out so that we could not use them.

Researcher: It is like common things that you get in the system.

Participant: Yes.

Researcher: So, if your assignment is marked and sent to this assignment system, can it be private?

Participant [1]: I don't remember submitting an assignment using the module.

Researcher: In general, you said there were challenges. What kind of were they?

Participant [1]:The first one was the authentication issue.

Researcher: What do you mean when you say the authentication issue? Is it not easy to get it or it is not working?

Participant [1]: There are guest privileges and other account privileges. The privilege is limited. The privileges are different when you log in as a guest and as another user or as an administrative user. I think there is another level of user other than guest and administrative. The challenges come from the privileges. There are sections which are greyed out and you cannot click. The second one was the information gap between the concerned bodies and the students. I mean it is not well promoted. Students are not being encouraged to use the module. They just get to know the module through the instructor. Other than that, you may hear about it from your colleague or friend. So, this information gap is another challenge.

Researcher: Do you think your fellow students might also have encountered challenges with e-learning?

Participant: My friends, you mean? No, I don’t think so. Anyone with basic computer skills can use it without difficulty. If you visited the website of the module, have you?

Researcher: I have checked it with the developers in the IT department.

Participant [1]:Then you yourself have seen how easy it is to navigate through the pages and find the content that you want.

Researcher: What e-learning resources are there in your university?

Participant [1]: The first and most common one is PDF documents and Word documents about schedules, assignments, electronic resources like videos.

Researcher: And in general, can you tell me about resources like availability of computers and related equipment?

Participant [1]:You mean inside labs?

Researcher: Yes. What resources do you have in the labs or libraries?

Participant [1]:We have computers, internet connection and electronic documents like e-books inside this library. If you want digital books, you can go to the circulation area and they can show you how you can search and find and have them on memory stick so you can take them home and use them. I have never used it but I have heard them talking about an electronic equipment which they use for distance learning. There is a

camera which is used when guest lecturers come from the US or other countries. The lecture is conducted here but at the same time it is live streamed to other universities. I have seen the equipment.

Researcher: Is it video conferencing?

Participant [1]:Yes, it is like video conferencing but it is not video conferencing; it is video lecturing and live streaming.

Researcher: Is it broadcast from other countries or from here?

It is live streamed from here. There is a camera inside the room. So, the lecture will be recorded and live streamed to other campuses.

Researcher: Of Addis Ababa University?

Participant [1]:Yes, but I am not sure if the receiving campuses are those of Addis Ababa.

Researcher: You mentioned international universities. Are they coming here?

Participant [1]:No. lecturers from international universities come here to give lectures.

Researcher: Oh, now I get it. It’s like a new kind of knowledge sharing.

Participant [1]:Yes. For example, this university has a culture of inviting guests to Ethiopia from different universities to give lectures, block courses to students and not just in this campus but also in other campuses. They use it for that. If you are interested, I can show you the room.

Researcher: You have heard about it and know about it. But is it accessible?

Participant [1]:No. Students cannot access it. The room is locked and we only get access to the room when there are different theses, master’s theses, PhD theses. They are conducted in special rooms like this, not just for broadcasting but because the room is very quiet and comfortable for the judges to evaluate the person.

Researcher: But benefitting from this system is not for you.

Participant [1]:No. Not for undergraduate students. Only MSc and PhD students use it.

Researcher: But do you think if that were applicable for all –

Participant [1]:Yes. I think they have a problem letting you inside the room. It just depends on the situation. I mean the situation itself has to allow you to use the system. Why would I need it? Even the lectures are too advanced for us to attend.

Researcher: Do the available resources pose and challenge to students?

Participant [1]:Yes, sometimes they do. For example, a poor internet connection is one of them. If you have a poor internet connection, not only can you not access dynamic contents like video or audio, but you cannot even access a simple webpage easily. So that is another challenge posed by the resources. The second one is the number of PCs inside the labs which sometimes cannot accommodate the students who want to use them. There were times when I returned home or went to other places just to access the internet because all the rooms and all the PCs were occupied. So, the number of PCs is one challenge. If you have the chance you may visit the lab. Some of the PCs are not functional. Most students have their own laptops. So, they unplug the cables from the PCs and plug them into their laptops. Most of the PCs are not functioning and that is another challenge. I have mentioned internet. The coverage of Wi-Fi hotspot, there are only few and even those hotspots are secured with passwords. Sometimes, I wonder who they are placed for. Students should be able to access the internet almost everywhere inside the campus. This university is one of the best at least among other universities in Ethiopia. It should be able to fill these gaps. For example, if you want to access the internet wirelessly, that means using Wi-Fi, you have to go to this green area where you can find only two or three access points which are being used or accessed by hundreds of students. So, the coverage itself is one problem. Inside libraries, for example, there should be sufficient coverage of the service. I think the coverage is another problem.

Researcher: Do you think these resources are helpful? How can the university make them more useful for students? What should the university do?

Participant [1]: First, I have mentioned that one of the challenges is the awareness gap between the concerned bodies and students. So, that gap has to be at least narrowed. The concerned bodies should encourage students to use the e-learning module. And they can do this in many ways. They can use posters. The can disseminate the information through the SIS portal website which a lot of students visit, through their Facebook page. These are a few of the many ways that they can use

students to use e-learning. From the resources point of view, by working on the resources, they not only encourage students or facilitate the e-learning process but there are other benefits. The coverage is one problem. There is not sufficient Wi-Fi coverage inside the campus. The number of PCs in the lab should be enough to accommodate the number of students who want to use them. There should also be not only maintenance of the PCs but looking after them. There should be rules and regulations on how to access them. Places should be provided for people who come with laptops because people have many reasons for using their own laptops. Maybe the Wi-Fi coverage solution can solve this problem.

Researcher: Does the university provide reliable internet connection?

Participant [1]:No. Even we fifth year students face problems accessing the internet most of the time to do projects or assignments. The signal fluctuates. There is no consistent service. So, I would say the internet connection is not reliable.

Researcher: Are the hardware and software components in the computer lab functional?

In some of the labs they are functional for example in the postgraduate labs, which we are not allowed to use. Most of them are not functional. There is one lab here inside the graduating class lab in which most of the computers are functional. I have used them for one course. So, I cannot generalise or evaluate them qualitatively. And regarding the soft-wares, either you have to install them or use your own PC. They don’t upgrade the soft-wares regularly.

Researcher: What do you think is the problem? Is it a monitoring problem or…?

Participant [1]:Yes. The cause for this problem is lack of efficient monitoring, even when it comes to applying the existing rules and regulations regarding not just e-learning but also the resources.

Researcher: Is there good wireless internet connection in your university?

Participant [1]: Yes. Good in terms of what? Signal strength or coverage?

Researcher: All in all, it can be the strength of the signal or the bandwidth. Is it fast or does it have a wide area coverage like you said? Is it useful for you? Can you say there good wireless internet connection?

Participant [1]:Yes. Well, like I have said, I can't speak generally but there are specific areas where you can get good internet connection. But in most of the areas you don't. You have to be authenticated to get access but the authentication is only for the staff. You need to have the user's credentials to have access to the Wi-Fi.

Researcher: You have your own username and password, right?

Participant [1]:No, we don't. There are only a few access points which students can access and that are not locked.

Researcher: But, can we say that there is wireless internet for students?

Participant [1]:Yes, but not enough.

Researcher: So, this is a barrier to facilitating e-learning.

Participant [1]:Yes, it is a challenge. There should be enough access points in the campus. If … wants to be a leading centre, this is one of the things that must be improved or worked on.

Researcher: Is the video conferencing session for academic discussion? Have you ever used video conferencing kind of sessions?

Participant [1]:No.

Researcher: Do you think it would be helpful if there was one which you could share with international students and local students as you said?

Participant [1]:Yes, it would be very helpful. Most of us prefer learning interactively. So, that is one of providing that interactive feature of e-learning is through video conferencing or video lecturing.

Researcher: Is there any support provided for the use of e-learning?

Participant [1]:From the motivation or awareness point of view, there hasn't been that much support. I found out about the e-learning module from my instructors. That's how most of my friends learned about it.

Researcher: Are the e-learning facilities in your university regularly updated?

Participant [1]:I don't think so because the two or three courses that I have used on e-learning are a year or a semester apart. And all the pages I used for C++ are the same as the pages I used for Introduction to Control Engineering. Even the contents are not

297 removed, they are not updated when the course is finished. You may even get some
298 of the contents that you had been using two or three years ago.

299 Researcher: Are soft wares upgraded?

300 Participant [1]:No. They used to upload soft wares.

301 Researcher: They used to give you free software?

302 Participant [1]:Yes, like Logis Visual Studio, C++, Logism for logic, Digital Logic
303 Design. They upload these soft wares in order for us to download and use them.

304 Researcher: So, in general, you are saying in e-learning facilities in your university are
305 not regularly updated?

306 Participant [1]: No, they are not.

307 Researcher: Does your university provide e-learning training for students?

308 Participant [1]:No.

309 Researcher: Do you think it would benefit students if it were provided?

310 Participant [1]:Yes, it would benefit students regarding motivation and awareness.

311 Researcher: To give them technical skills and make them more comfortable with the
312 system?

313 Participant [1]:Yes. All it takes is three or four days of sessions in the auditorium which
314 accommodates about four hundred students. You can train an entire batch in three or
315 four days.

316 Researcher: Do you know any ethical challenges? Does your university have rules on
317 the use of the e-learning system?

318 Participant [1]:No, I don’t think so.

319 Researcher: If they develop a rule for the use of the e-learning system, do you think
320 that will be important for e-learning? For example, if there was a limit for the length of
321 time one student is allowed to stay on a PC, would that be helpful?

322 Participant [1]:Yes. I think rules are important and rules can benefit the e-learning
323 process. Rules on ways of accessing the modules are important but I don’t think they
324 will be that much effective and comfortable for students because you don’t know how
325 long one student wants to use the e-learning module. Students use the PC or their

laptop or the internet connection for many purposes besides e-learning. So, the timing thing is not going to work but another solution that I would suggest is bringing additional resources. There are plenty of rooms that are vacant. They are not used for anything. So, you can use those rooms and the funds from the government for additional resources to accommodate greater number of students into the service. So, additional resources could be solution. And about the rules and regulations…

Researcher: What kind of rules do you think would be helpful?

Participant [1]:I believe rules are important but to be honest, I don't think they play a major role in promoting the e-learning process. Nothing comes to mind that indicates that rules will be effective solutions.

Researcher: My question was to explore if there were rules. If there are rules, what are the challenges of those ethical rules?

Participant [1]:I can't answer that question with a yes or no because I don't know them. So, the answer should be I don't know.

Researcher: Yes, normally I am asking you anyway that if we suggest to have ethical rules and regulations for e-learning, what can be as an input from your side? If you think that rules are important for e-learning…

Participant [1]: They are important but…

Researcher: There are rules for e-resources like you can copy this and you can download this. There are many rules.

Participant [1]:The rules regarding accessibility, it shouldn't be just students of the campus that can have access to the resources but others from outside the campus should be allowed to access the resources. But other people outside the campus should be able to access it. I am not saying that bluntly because when you give access to outsiders your network…

Researcher: It will be vulnerable.

Participant [1]:Yes. So, most of the rules and regulations should be about the security like data protection and the one you mentioned... I forgot it. I think on security, rules and regulations play a major role. On other aspects, you should have a system that safely allows outsiders access.

Researcher: More of it relates to that and other accessibility rules like authentications…

Participant [1]:The authentication -I don’t understand why we were being given guest username and password. That means as you can understand from the name guest itself, when you are a guest you have limited access and privileges. Why isn’t there a student privilege?

Researcher: Again, sorry to ask, do you have a unique ID as a student.

Participant [1]:There is just one password and what the instructor does is he tells us to use a username and a password to access the contents. On the module, you sign in as a guest.

Researcher: Do you know why I am asking you this? If you have an ID number like 11, and if I create a username and password just for you, I can give you all the access for courses and assignments. You will be the one with access to the contents of the module and you will also be responsible for what happens on that account. Do you think that kind of thing can help?

Participant [1]:Yes. I was just saying it. I just don’t understand why they weren’t doing it the way you just mentioned. If you give a student a privilege with their own account and credentials, I don’t see any problem with that.

Researcher: You will have the privilege of the student, whatever the student can have.

Participant [1]:Yes.

Researcher: So, that can be part of the ethical rule and regulation.

Participant [1]:Yes. Just as you made me review the ethical rules, you can do that on the website.

Researcher: It means like you have to acknowledge when you use something and you should protect the system and you will be responsible for that and so and so on. You can use this privilege.

Participant [1]:Yes, that’s what I think.

Researcher: Is there anything more you would like to say on e-learning challenges in general?

Participant [1]:One big challenge that I forgot is the one that is on the side of the concerned bodies, the people who are responsible for the entire e-learning thing. It could be IT administrators, software developers, the scientific faculty director. I think the problem is on that area. If you work on that area, then it is up to students to use things like this. And trust me students have no problem using the module or the e-learning platform. I can safely say that we all acknowledge it, we all cherish it. We all want to use the e-learning module. I don't know if there is a way you can solve the problem going on in concerned bodies area. If you come and if you have the chance, and if you have the motivation and the courage, I think it will be nice to interview one of them. Can I ask you a question?

Participant [1]: Ok. Are you planning to do so?

Researcher: My study is only focusing on students. What I am planning is that I was planning to include instructors but I feel like the challenge is if I got the challenges from students, I can make this thing out of it from this I can make suggestions later on when I develop the framework. These are the challenges. That will be included in my framework because the students are the ones who will be really benefitting from e-learning. They are the ones who know the problems and the exact challenges. If I got this information from you, I will summarise the challenges and the gaps and later on if you fix this this this, e-learning will be implemented. And then later on, I will consult this with experts on e-learning. I will show them what I have found out about the challenges and my suggested solutions and I will ask them if they think my suggestions will work. Then, they might say anything. That's why I want to hear from students. If the e-learning system is good, they are the ones who benefit and if there is a problem, they are the ones who will see the challenges. If you ask the instructor, he will tell you yes there is a system and the students can use it. What I want to hear is what exactly students feel about the problem. To get the solution with they are the ones who make the solution. You prepare the framework and you tell them for this specific challenge you make this solution. They themselves want things to go right. They may not have this information. You tell them if you fix this, this thing will be fixed. You inform them with the framework and I think I can make a change. I was planning even to ask the instructors but I feel like they might not give me information like you guys. The instructor might not tell me if there is a problem. The problem is in general from the two of you that I spoke with, it the environment problem more. That's what I felt. It's

not even a technical problem. I hope if the managements get this kind of detailed information, they will make changes because the benefit is for all. So, they will make a change. They will say, is this the resource problem? What can we do next? They might say this. This is my belief because we are working for the same goal.

Participant [1]: Yes. I hope you succeed in your goals. And I hope you get honest, genuine and hardworking listeners that are willing to address this problem and implement your framework and good luck.

Researcher: Thank you so much. You are a good student and you have given me good information. Thank you so much.

Participant [2]

Ok, Participant [2] You have already filled out the consent form. I will start the question. You are number seven.

Researcher: Do you use e-learning?

Participant [2]: Actually, since there is not structured e-learning facility in our campus, I cannot say that I am using e-learning. But when I was second year student, there was a module site in our faculty or institute and we were using that facility. Now, however, I think the teachers are not using it. If the teachers are not posting anything, there is nothing for us to do with it. So, currently, I am not using e-learning. Personally, especially last year when I was an intern and I used international e-learning websites like Coursera. I registered for some courses and eagerly followed them taking the tests and the assignments.

Researcher: You seem to prefer Coursera and other international e-learning websites to the module learning management portal. That's what I understand.

Participant [2]: Yes.

Researcher: So, what makes it special? Why are you using Coursera instead of the module provided here?

Participant [2]: As I told you before, most of the teachers are not using the module. I don't know if they don't know how to use it or prefer not to use it. They don't post the lecture slides or any reference materials for us to use them. At this time, it is not functioning. So, the module is of no use at this moment. The other reason I am using Coursera is that it is fully functional and well-organised. The lectures are also short

and aided with videos showing experiments and they give you the slides. So, they are student friendly. Moreover, the courses have deadlines. For example, if you register for a course, you must complete it within a certain period like regular courses in a college. When registration is on we register for the course and every week the learning materials are categorised by topics. There are, for example, week one lectures, week one assignments, week one quiz. By the end of that week, you have to complete the lectures, assignments and quizzes. It is so much like the regular course we take here in this university.

Researcher: How can it relate with the courses you are taking here? Are the courses the same? You are taking Introduction to Computing here. Are you taking Introduction to Computing from Coursera?

Participant [2]: Actually, it is not exactly the same course but it is a course that supports the course I am taking here at the moment. The courses are not the same as the ones I am taking at this campus but they are somehow related to my field of study which is electrical engineering. Last month I signed up for a course about business model. We are taking an entrepreneurship course here and we are asked to prepare a business model. So, when I was searching Coursera I found the same course. I follow the videos and do the assignments.

Researcher: It helped you with the course you are taking here.

Participant [2]: Yes.

Researcher: The courses you are taking from Coursera are only for your personal updating but will not be considered in your performance in this university.

Participant [2]: They are not graded or added to my credentials here.

Researcher: But they will help you with the assignments you are required to do here.

Participant [2]: Yes. It helps you do assignments, builds your knowledge and adds to your experience.

Researcher: How can the university help you to be able to use the modules, the learning portal system provided here? What should the university do so that you will be motivated to use the module?

Participant [2]: The university should learn and understand the benefits first before providing the facility to students. The university community should understand and

believe in the importance of e-learning structure for students. And the next thing is if the university wanted to launch this programme, it can get a lot of assistance from other universities. The university can also gather students and ask them questions like you are doing now and with that the university can get an idea of how –

If the university gets feedback on the e-learning module, you can share with them what you saw on other e-learning sites.

Researcher: Yes.

Ok, what else? What features should be added on the existing module to make it more useful to students?

Participant [2]: The features that should be included are… currently all the teachers and their courses are not very interactive for students. The lecturers on the e-learning should not be these common lecturers that are lecturing us now. There should be very experienced lecturers, experienced in their field of study and in instructing students. Only such teachers should give the lectures on the module. Assignment should be given through that page. The programme is given according to the regular course schedule, so that cannot be an additional feature.

Researcher: You mean like the course supporting materials uploaded on the module should be prepared by experienced lecturers.

Participant [2]: Yes.

Researcher: What about technical features? You have already seen Coursera and what have you noticed that is on that site and which is missing from the module here? What is it about Coursera's features that makes it more appealing for students?

Participant [2]: When you register for a course on Coursera, the person who registers for the course and who does the quizzes should be the same. To make sure the same person is taking the courses and doing the quizzes, the use webcam to capture your image and they check that against the original image you submitted for registration. That kind of feature should be added to our module for the purpose of checking identity of students. If quizzes are being conducted on that page, there is high chance for students to search the web and to find answers to the quizzes and they can forward the answers for the quizzes to other students. So, they should know how to restrict students' use of other sites during quizzes.

Researcher: So, Coursera does that?

Participant [2]: Coursera doesn’t do that.

Researcher: Do they give quizzes on the module portal?

Participant [2]: Yes. You mean in our module? No, they don’t give quizzes.

But Coursera gives quizzes.

Yes.

Researcher: And they restrict your access to other sites while taking a quiz?

Participant [2]: Actually, they don’t. But the restriction should be included in our module.

Researcher: If the module supports quizzes and somebody is recognised by the webcam, they can control who is doing what. If this kind of feature is added to the portal of this module in this university, it means you will benefit.

Participant [2]: Yes. The internet connection also has to be of high speed so that sessions will not be interrupted due to disconnection or poor signal.

Researcher: When you use the module portal, are your required to have any skill?

Participant [2]: It doesn’t require that much technical skill. All it requires is the basics of using and browsing the internet. I remember that they have uploaded student manual on how to use the module. So, by reading the manual, any student can learn how to use the module.

Researcher: I heard there was a kind of guideline.

Participant [2]: Yes, there is even though I have not used it. There was a link that takes you to a page on how to use the portal.

Researcher: What do you use the portal for?

Participant [2]: I was benefitting by downloading lecture notes. Actually, it depends on the teacher. I remember that our C++ teacher posted a tutorial video on that page and we were downloading that video. And there was a forum even though I have not used it.

Researcher: I was about to ask you that question. Is there a discussion forum?

Participant [2]: It was not that much active but some students used it. There was a friend of mine who was to some extent using that forum.

Researcher: So, do you think if the university motivated that kind of discussion, the video tutorials and so on, will it be helpful?

Participant [2]: It will be very helpful.

Researcher: In general, I would like to know your opinion about e-learning first. Can you access the e-learning portal from anywhere? From your mobile phone for example?

Participant [2]: When we were introduced to the e-learning portal, we were eager to use it and benefit from it. But through time as we saw what was in it, we became less motivated.

Researcher: Why were you motivated at the beginning?

Participant [2]: Because it was education through the latest technology and most universities abroad were using it. This kind of portal is readily available and is giving much value to students. We thought that we would benefit a lot from it and we were very eager to use it at first.

Researcher: Why did you stop using it?

Participant [2]: As I told you before, not all teachers are using the module. And when I was a second year student, our C++ and Electronics teachers were using the portal.

Researcher: The system itself, why is it not making you use it?

Participant [2]: When you see other websites, they are very appealing and interactive. But this module is not very interactive. It is very old fashioned.

Researcher: In general, does the use of e-learning motivate you in your studies?

Participant [2]: Yes, it motivates because since the technology is rapidly growing it should be available for us to learn. But in our campus, the devices and the machines are not updated.

Researcher: You mean the ICT devices or all devices?

Participant [2]: Not the ICT but the instruments in our laboratory session. If there is no chance that we can see the new technological devices that are currently available in

the developed countries there is no means of knowing that and getting experience on how to use the equipment. If the module was readily available, the videos on how to use these devices would be uploaded to the module and we would get visual instruction on how to use.

Researcher: Using e-learning motivates you but if the instruments you are using in your department are not updated, at least you can get it from e-tutors of online simulation.

Participant [2]: Yes. And I remember when I was third-year student, Digital Signal Processing course, we downloaded some videos from YouTube. The lectures were given by the professor from MIT. He was the one who wrote the textbook for our course here. Getting that video was a big thing for us because the man knew everything about the course. Getting lectures from that kind of a man and from local teachers is not the same.

Researcher: You mean if the e-learning materials include this kind of materials they will be beneficial for you.

Participant [2]: Yes, very much.

Researcher: Do you encounter any challenge with the e-learning module? What type of challenges do you encounter?

Participant [2]: Yes. And the problems have to do with passwords. Most of the students forget their passwords and some courses are locked by teachers. In order to access the materials of that course, the teachers should give you the password to that course. By the end of a semester, I wanted to see what courses we were going to take in the next semester but I found that the courses were locked by the teachers.

Researcher: You mean the portal itself could not be accessed?

Participant [2]: Not the portal. You can access the portal by entering your own username and password. But some courses in the portal require you to enter a password.

Researcher: Is such information posted generally on the module or on the page for a particular course?

Participant [2]: The materials are categorised by courses. Some courses do not require passwords while others do. If I want materials on courses which I am not taking right

now, or if I want to see what courses I am going to take in the coming semester and gather the necessary materials during the summer, I cannot access the materials for that course because I don't know which teacher is giving that course. And if I don't know the teacher who is going to give that course, I cannot get the password for the course.

Researcher: Let me see if I understand you. You access the module with your username and password and see courses in different categories. But if you want to download a material for a course which you are not taking yet, you are expected to get the password for that course from the teacher who gives it or you cannot access it.

Participant [2]: Yes.

Researcher: You are saying it should be made accessible at any time.

Participant [2]: Yes, it should be accessible.

Researcher: This is kind of a privilege issue.

Participant [2]: Yes.

Researcher: You believe that as long as you are in the portal, you should be allowed to access everything made available there.

Participant [2]: Yes.

Researcher: What e-learning resources are there in your university?

Participant [2]: The e-learning materials are text and reference books. Lecture notes and power point slides are also posted. If the teacher is eager to share materials with students, he might post lecture videos from other universities.

Researcher: When I say resources, I mean computers and labs as well. What resources are available to you?

Participant [2]: We have a PC lab in our campus. But the PCs are not enough to accommodate the number of students who use them. There should be more PCs.

Researcher: Are the resources sufficient for students?

Participant [2]: No.

Researcher: Do the available resources pose challenges to students?

Participant [2]: Some of the PCs are not functional. The problem with some of the PCs might have been caused by students who don't use them with care. The PCs labs are in need of air conditioning.

Researcher: Are the available resources helpful to students?

Participant [2]: Yes, they are.

Researcher: How?

Participant [2]: That's obvious. They go there and read the materials and do their assignments using the various application soft wares.

Researcher: Does the university provide reliable internet connectivity?

Participant [2]: The internet is not reliable. The signal comes and goes every now and then. It becomes strong early in the morning and at midnight.

Researcher: Do you use your own laptop?

Participant [2]: Some students use the PCs in the lab. Actually, the lab PCs give 24 hours of service to students.

When a few students are using the internet, it works fast but when there are too many of them it slows down.

Researcher: Yes.

Researcher: Are the hardware and software components in the lab functional?

Participant [2]: Some of them are.

Researcher: Do you feel that that also is a challenge for e-learning?

Participant [2]: Yes, that's a challenge.

Researcher: Is there good wireless internet connectivity in your university?

Participant [2]: The wireless connection also has the same problem. When the network is congested, the wireless connection becomes slow.

Researcher: Is the bandwidth sufficient enough?

Participant [2]: It is not sufficient enough to accommodate all students.

Researcher: Is there video conferencing session for academic interaction?

Participant [2]: There is no video conference session for undergraduate students.

Researcher: Do you think it would be helpful to have video conference session?

Participant [2]: Yes, it would be helpful because you would get experiences from all over the world.

Researcher: But is the feature available?

Participant [2]: Yes. I see our teachers having video conferences. But it is conducted in a separate room.

Researcher: Is there any other e-learning feature which I have not mentioned?

Participant [2]: There are no additional features.

Researcher: Is there any support provided by the management for the use of e-learning?

Participant [2]: There is an office set up for this kind of purpose. The major purpose of this office is to give password to students.

Researcher: So, you cannot consider that as support?

Participant [2]: Yes.

Researcher: Are the e-learning facilities in your university regularly updated?

Participant [2]: By now they are completely outdated.

Researcher: Does your university provide any e-learning training to students?

Participant [2]: No, there has been no training as far as I remember. But some of our teachers have encouraged us to use the module.

Researcher: Would it be helpful if you were provided with training?

Participant [2]: Yes, that would be helpful to students. Students are not on the same level of knowledge and experience when it comes to using the module. There are some who have deep knowledge and refined skill as well as others who have no idea at all about using these resources. So, there should be training…

Participant [2]: That gives awareness and familiarises students with the system.

Researcher: Yes.

Researcher: What features make the e-learning site user-friendly or not user-friendly for students?

Participant [2]: First, the design of the page should be appealing. Some basic functions like updating profile picture…

Researcher: What do you say about this module? Is it user-friendly?

Participant [2]: It is not very user-friendly.

Researcher: What features should be added to make it more user-friendly?

Participant [2]: One is uploading resources. The interface, like the lay out and colour of graphics should be updated and made more appealing.

Researcher: Does the university have rules on the use of e-learning?

Participant [2]: I am not sure but I think I am not that sure.

Researcher: Do you think it would be useful to have rules?

Participant [2]: Yes. There should be rules and regulations.

Researcher: That rule might include, for example, if you were using a computer in the lab for a whole day and someone came along who wanted to do an assignment and you were allowed to use a computer only for two hours so that the other student could be accommodated, what do you think?

Participant [2]: Since the number of PCs does not match with the number of students, that should be helpful.

There are many kinds of situations like a peak time and like you said earlier students might abuse the computers. So, in such cases, if there are rules they will benefit students by restricting their use of the computers to academic purposes only. And that would be beneficial for everybody.

Researcher: Yes, it would be beneficial.

Researcher: Do you have anything you can tell me before we wind up the interview?

Participant [2]: I have a question. Is this research being done just for the purpose of doing a research or are you planning to try to make this e-learning system applicable in our country?

Researcher: Actually, that’s a good question. My focus is on students because they are the ones facing the problems if there are problems or reaping the benefits if the system is good. I will analyse this data and develop a framework. I will then consult e-

learning experts; they can be the ones who developed the e-learning website for your university. They can be the ones who will give me feedback on the framework. My plan is to present this framework to them. My topic is Framework for E-learning Implementation. I will show the experts what I have found out and ask them if it is helpful for implementing e-learning. They may either comment on it or use it. If one problem is resolved, that will be a small contribution. In the future more things will be online. So, at the same time to enhance e-learning courses, it will be helpful. The management will be encouraged with it. They will say, we didn't know this was the problem. Then, they will consider it and the benefit will be for all of us.

Participant [3]

Researcher: Do you use e-learning?

Participant [3]: Yes, I do. To some extent I use e-learning mostly to explore the contents of the courses I am taking. But I think e-learning is very useful because, unlike the traditional learning ways, we can access e-learning whenever we like from any place.

Researcher: You said you are using e-learning. How often do you use it? What do you use it for?

Participant [3]: I use it for downloading course materials but I don't know how often I use it. Sometimes, I may check it many times a day other times once a week. Sometimes I may not use the e-learning portal if I get the materials I want from another place.

Researcher: So, you might use it on a daily basis or once a week. What do you mean other places?

Participant [3]: I mean getting handouts from my teachers or reading materials in soft copy for example on flash drive. Sometimes, when there is no internet connection, I cannot use the e-learning portal.

Researcher: So, your answer to the question 'To what extent do you use e-learning?' is for downloading course materials.

Participant [3]: Yeah. You mean e-learning is the one in the college?

Researcher: Yes, I am referring to the module learning management system, it can be lab, it can be library. To what extent do you use it?

Participant [3]: Just as I have said. I take mostly the courses offered outside the college, for example, Coursera. There are many courses offered on that site and I take those which I don't know. Not the module here but another.

Researcher: What is this learning platform?

Participant [3]: It's Coursera, a free learning site. You can ask for financial aid and take their courses for free.

Researcher: Do you use that site to upgrade your technical skills?

Participant [3]: You can find lessons on any subject including those you are taking in college.

Researcher: So, it has electronic resources related to your studies.

Participant [3]: Exactly.

Researcher: Does it offer more than your university's module.

Participant [3]: Yes.

Researcher: Why do you have to use the other site? Can't you find everything you need on the module?

Participant [3]: No, that's not what I mean. There are lots of things which I don't know. So, I use Coursera to cover those things which I don't know.

Researcher: You go to other website to find more materials that are helpful for your studies.

Participant [3]: I use the other sites not only for my courses but also for personal knowledge. There are things you don't know and believe you should.

Researcher: Updating yourself in general is good. But the university has provided an e-learning management system. So, how much are you benefitting from the university's e-learning management system? What can the university do to make the module more helpful to you? What else do you get from the module besides downloading notes?

Participant [3]: There are tutorials and they are helpful. There are many files of good tutorials with instructions on how to use them.

Researcher: For which of the courses are you using the e-learning system?

Participant [3]: We have taken so many courses that I cannot name one.

Researcher: So, the system has helped you for the courses you have taken.

Participant [3]: Yes.

Researcher: And it would be good if the same was done for the other courses.

Participant [3]: Definitely yes. For the others you will be required to enter as a guest or if you don't want to enter as a guest, you will be denied access.

Researcher: That's an accessibility problem.

Participant [3]: Yes. If you try to enter as a guest, then it will inform you that you cannot enter as a guest and you need to have a username and a password.

Researcher: How do you get username and password?

Participant [3]: You create your own.

Researcher: So, there should be something to make that process easier.

Participant [3]: Yes.

Researcher: For all courses.

Participant [3]: Yes.

Researcher: Can you use the module for e-learning?

Participant [3]: I can use it to some extent.

Researcher: Why "to some extent"?

Participant [3]: It may have to do with the level of my motivation.

Researcher: What can motivate you more?

Participant [3]: That's a good question. There should be announcements. For example, I was a third-year student when I knew about it and that because our teachers told us about it. They told us that materials had been uploaded for us and that we could check any time and download whatever was available for us.

Researcher: So, the announcement is important for motivation.

Participant [3]: Yes.

Researcher: Do you require any special technical skill to use this site?

Participant [3]: Anyone who knows how to use a computer can easily use the e-learning management portal.

Researcher: So, one has to know at least how to use a computer.

Participant [3]: Yes. If we know how to use a computer, accessing this thing is so simple.

Researcher: In general, a person who uses computers can use the module.

Participant [3]: Yes, if we know how to use computers, we can access the site.

Researcher: How about someone without any special technical skill? Can such a person use the e-learning portal?

Participant [3]: How?

Researcher: As you said now, one has to know how to use computers before trying to access the e-learning module. That's one of the criteria. Does it require any special skill?

Participant [3]: you mean one who doesn't know anything about what to do with computers?

Researcher: No. I mean does it require a special skill besides the basics of using a computer?

Participant [3]:I don't think so. One doesn't know what to do with computers cannot use the e-learning portal whereas one who can use computers and surf the internet can use the e-learning portal.

Researcher: What do you use the site for?

Participant [3]:I think I addressed this question a few minutes ago, didn't I?

Researcher: My question here says, do you use it for instructor info or for course information, to see schedules or download materials, assignments, tutorials, audio and video?

Participant [3]:I have said it already and I will say it again. I use it to get course information, schedules, to see deadlines of assignments, and to download videos.

Researcher: Do you submit assignments through it?

Participant [3]:Only some of the assignments

Researcher: Are the tutorials uploaded on the site helpful for your courses?

Participant [3]:Yes, they are helpful.

Researcher: Do they upload supported materials with videos for you?

Participant [3]:Videos? They give us videos on flash drive or that's how I get videos. I don't know if they upload videos on the module.

Researcher: Are supporting materials not uploaded?

Participant [3]:They may be uploaded but I have not checked them.

Researcher: Do you use this site to discuss any course with other students?

Participant [3]:What do you mean?

Researcher: Do you discuss course-related issues with your friends on the site using the site as a discussion platform? It could also be with your instructors.

Participant [3]:Yes, it has a forum but to be honest, I haven't used it much. I have read about it somewhere.

Researcher: Why did you not want to use it?

Participant [3]:That's my own weakness.

Researcher: You were not much interested in it. For example, you have an assignment and you need help on how to go about doing it and which book to refer to and where to find that book. Do you not share that kind of information on the forum?

Participant [3]:Well, we do that quite often.

Researcher: On the forum?

Participant [3]:No, not on the forum but in person and we do it verbally. As I said, I use mostly the flash drive for sharing materials with others.

Researcher: What can the university do to make you use the e-learning system more often?

Participant [3]: As I told you before, it would be helpful if the teachers keep us posted on latest updates regularly. That would motivate us. Or they can post notices everywhere.

This is just about motivation.

The other things like the structure of the module are fine.

As a site it is usable.

Yes, it is. It is easy. It's not cumbersome.

Researcher: What's your feeling or opinion about e-learning? Can you access it anywhere?

Yes, you can access it as long as you are connected to the internet.

Researcher: In your opinion, you can access it from anywhere if you have internet connection.

Participant [3]: Yes, if I have internet connection, I can access it easily. But if there is no internet connection, then I cannot access the system.

Researcher: Does the use of e-learning motivate you in your studies?

Participant [3]: It does motivate me. The traditional way could sometimes be boring and you think of alternatives like the e-learning through which you get the lessons.

Researcher: So, it motivates you.

Participant [3]: Quite a lot.

Researcher: Do you find using e-learning difficult or easy in general?

Participant [3]: Are you asking about learning through the system or about accessing the system?

Researcher: Both.

Participant [3]: That's easy but sometimes you may not understand the courses you have downloaded. At such times, you may find it difficult and you need instructors' help.

The system may be helpful for downloading materials but learning and understanding still requires an instructor's help.

It may require help.

Researcher: Do you encounter any challenge with e-learning?

Participant [3]: I have answered that already.

884 Researcher: What kind of challenges are there? The challenges could be technical or
885 related to management or ethical and motivational.

886 Participant [3]: In fact, there is nothing that is not challenging. There are challenges,
887 of course.

888 Researcher: So, what type of challenges are there?

889 Participant [3]: Can I repeat what I said earlier?

890 Researcher: Sure.

891 Participant [3]: You need to follow the steps for acquiring username and password or
892 you cannot access the system. That's one challenge. The other challenge is internet
893 connection without which you cannot access the system and that's challenging.

894 Researcher: Researcher: Is internet access a challenge in the university? Some
895 places where there is satellite connection with very strong signals, internet connection
896 may not be a challenge. Username and password have to do with administration and
897 IT. So, in your opinion the main problems are accessibility, username and password,
898 and internet connection. Can you think of other challenges?

899 Participant [3]: When too many students are using the system, the network gets
900 congested and you cannot access it easily.

901 Researcher: Do you think the other students face the same challenge?

902 Participant [3]: I have heard some students complaining about registration due to
903 network congestion. This is also a challenge. You should be able to get registered
904 when you want to.

905 Researcher: Are there challenges also for other students? Are the challenges due to
906 lack of support?

907 Participant [3]: Yeah, as you say support is important. So, the lack of support may
908 cause lack of motivation.

909 Researcher: So, do you say that there are challenges or not?

910 Participant [3]: There is some challenge though not much.

911 Researcher: What e-learning resources are there in your university?

912 Participant [3]: By resources you mean server and…

Researcher: Researcher: Yes, and all others including computers

Participant [3]: There are many computers, more than enough. If you have no laptop, you can use the computers in the lab. There is also good connection unless it is congested by many students using it at once.

Researcher: So, you have enough resources for e-learning.

Participant [3]: Yes.

Researcher: Are they sufficient for students?

Participant [3]: Yes, I think so relatively.

Researcher: Do the available resources pose challenges to students?

Participant [3]: If you have no laptop and the computer provided by the university is occupied when you want to use it, that’s a challenge for a student.

Researcher: You mean for a student who doesn’t own a laptop.

Participant [3]: Yes.

Researcher: So, you have observed such incidents.

Participant [3]: Yes, but not very often. One student leaves the lab and another comes in.

Researcher: Do you say that the available resources are helpful?

Participant [3]: Yes.

Researcher: Does your university provide reliable internet connection?

Participant [3]: It is reliable, yeah.

Researcher: Have you been disconnect for a whole month or week?

Participant [3]: It is very reliable. We always had connection except for the two days of grade twelve national exam when it was shut down. It is reliable. The only problem is when it gets congested because of many students using it. And that is a problem of the bandwidth.

Researcher: So, the university is providing good internet connection.

Participant [3]: Yes.

Researcher: Are the hardware and software components in the lab functional?

Participant [3]: Yes they are.

Researcher: Is there good wireless internet connection?

Participant [3]: Yes.

Researcher: Our focus is in on e-learning. So, is the wireless internet connection good enough for the e-learning? Can we get good connection if we come with a laptop?

Participant [3]: It depends on the place on the campus. There are some places where you cannot access the wireless internet and others where there is good access.

Researcher: So, you are saying there is good wireless internet connection. Do you use video conferencing?

Participant [3]: No, we don't use but the doctors, our seniors, use it.

Researcher: You mean students?

Participant [3]: No, the teachers

Researcher: Is there video conference session for students so that you can discuss your course and share ideas?

Participant [3]: I have never used it.

Researcher: Do you think it would be helpful if video conferencing system were installed for students considering you are residents? Would it be good if the technology were made available?

Participant [3]: Technology is not bad though it may have its own drawback. It would be good to have it.

Researcher: Are there other e-learning features in your university besides the ones I have mentioned? Are they accessible?

Participant [3]: I have already mentioned one, for example online registration, and accessing your grades online, which is great.

Researcher: Do you access your grades from the e-learning system or the registrar system? Is there a different system?

Participant [3]: I think it is the registrar system. That's what I noticed.

Researcher: Is it within the e-learning system or totally a different site.

Participant [3]: I think they are integrated. There are subsections within the e-learning site and the registrar is one of them.

Researcher: Most probably it is the university's website.

Participant [3]: Yes, it is on the university's website.

Researcher: But the e-learning management system is a separate site.

Participant [3]: Yes. The all stand by themselves as sections but they are integrated. I haven't noticed details about these things.

Researcher: It's a system separate from the e-learning module, isn't it?

Participant [3]: Yes.

Researcher: Tell me about it.

Participant [3]: You can access that system and see your grades, which is good for you.

Researcher: And you believe it is beneficial.

Participant [3]: It is beneficial which is good.

Researcher: What do you use it for? To see grades?

Participant [3]: We see grades; we get registered.

Researcher: Is there any support provided by the management for the use of e-learning? Is the environment supportive of e-learning? Do they upgrade the e-learning module? Have you as a student seen new equipment being brought in to the lab? Have seen any activity related to upgrading the e-learning facility?

Participant [3]: Yes.

Researcher: Does your university provide any e-learning training for students?

Participant [3]: I think that kind of training was given though I haven't attended it.

Researcher: How good are those who took the training at using the e-learning portal? Has it helped them? How often is the training provided?

Participant [3]: I have no idea.

Researcher: When it comes to interface, what features make the e-learning site user-friendly or not user-friendly? You were talking about getting username and password

for accessing the portal. Who helps you with that? What is it about the site that makes it user-friendly or not user-friendly?

Participant [3]: We should be able to log in and access the portal. Once you are logged in, you will easily find everything you are looking for. There is nothing difficult about it.

Researcher: It is very user-friendly.

Participant [3]: Yeah.

Researcher: And you are saying it is accessible.

Participant [3]: Yeah.

Researcher: Researcher: Does your university have ethical rules and regulations on the use of e-learning?

Participant [3]: I have talked about it earlier. If you don't have username and password, you cannot access the portal which is one rule. You have to be a student of this university to access the portal. If you don't have username and password you cannot log in.

Researcher: I see and that is the importance. You believe there is a rule. And it is important that there is a rule because a person cannot access the e-learning portal without a username and password. What other rules should be added. You don't know all the rules or you cannot read them on a site.

Participant [3]: What do you mean?

Researcher: For example, if you want to know an organisation's policy, you find it on the website and download it and then you will know your rights duties. You don't know it like that?

Participant [3]: I don't know.

Researcher: You have mentioned username and password as an example. Just like that a student may spend a certain amount of time a computer so that others can get the chance to use that computer. Do you think such rules would be helpful? A student may sit on a computer and spend the whole on it while another who has no laptop is waiting for their turn. This one situation is just an example. What other rules should there be so that all students can benefit?

Participant [3]: Upgrading the facility, for example, bringing in more computers instead of telling one student to leave a computer for another can solve that problem.

Researcher: There should be rules also regarding data. For example, you should not be wrongly held accountable for some data that is deleted.

Participant [3]: As I said before, the username and password are essential. If you log in using your own username and password, it will be your own responsibility.

Researcher: That's on the e-learning module system. But anyone uses the computers in the lab for surfing the internet or other purposes. There may be data that you have saved on a computer and that is public.

Participant [3]: No, there is a personal username and password for every student that uses the computers in the lab.

Researcher: You mean for those who use e-learning?

Participant [3]: No, I mean for those who use the computers. Every student has their personal account on the computer. So, unless you share your username and password with others, there is no risk of losing your personal data. Or a person may log in as a guest where they will not find anybody's data.

Researcher: But you believe it would be beneficial to have more rules.

Participant [3]: Yes, but not including telling someone not to use a computer or to leave it for another student.

Researcher: What if there were rules on the use of flash drives for the purpose of protecting the system?

Participant [3]: That would be good to prevent spreading viruses.

Participant [4]

Researcher: Do you use e-learning?

Participant [4]: Yes, I use it. There was something they called module where books were uploaded and we used to download them from it. I think the domain has expired and needs to be renewed. I think they don't renew subscription to the site when it expires and then you can no longer access the site.

Researcher: So, when was the last time you used the system?

Participant [4]: I was a second year student when I was using it. I haven't used it after that.

Researcher: What is the reason you are not using it? It is because the system is unavailable?

Participant [4]: We were using the system because our teachers were uploading all the material we needed there. It was a well-organised site and found whatever we needed.

Researcher: How much do you use it on daily basis?

Participant [4]: When the teacher says that he has uploaded something for us, I go and download it.

Researcher: How many times a week?

Participant [4]: Once or twice

Researcher: Does it require any technical skill to use the module?

Participant [4]: A person who is able to use the internet can use the module.

Researcher: What do you use the portal for?

Participant [4]: I was using it to get course outline, course files and books. They were also posting videos.

Researcher: How about assignments?

Participant [4]: Assignments too and whatever the teacher wanted to give us uploaded there.

Researcher: Was he uploading assignments, course schedules, electronic resources like audio and video?

Participant [4]: Yes.

Researcher: Was there a discussion forum where you could talk about the course?

Participant [4]: No, it had no chat room.

Researcher: You didn't benefit from it.

Participant [4]: No, and I have never seen it.

Researcher: What's your opinion about e-learning? Can you access it from home or anywhere?

Participant [4]: Yes, but you need a good internet connection. I used to access it from Sidist Kilo. I have never used it from another place.

Researcher: In your opinion, would it be helpful if the e-learning portal could be accessed from anywhere?

Participant [4]: Yes, it would be very helpful.

Researcher: Do you find the e-learning system easy or difficult?

Participant [4]: It is very easy to use. When you need something, instead of asking somebody for it, you can directly find and download what you want.

Researcher: What were the challenges you encountered while using e-learning?

Participant [4]: There were not many challenges. You were required to sign in with an ID. Once you sign in with the ID, you can explore the portal.

Researcher: Is the ID peculiar to everybody or is it a common ID for all?

Participant [4]: It was my personal ID?

Researcher: So, were you given your own unique username and password?

Participant [4]: Yes. I think so unless I am confusing it with another system on which we register.

Researcher: Compared with the other system, which one is better?

Participant [4]: I think this one is better because it also has a chat room.

Researcher: Do you mean the registration system?

Participant [4]: It offers lots of information although not course-related materials.

Researcher: So, it is generally for registration and other administrative functions.

Participant [4]: Yes. You get all personal information on it including grade report. There are also groups which you may join and see what they are sharing.

Researcher: What you have known about e-learning has come through the e-learning portal when downloading assignments and submitting them, right?

Participant [4]: Yes.

Researcher: What challenges have you encountered in that area? For example, is it technical problem? Or is it shortage of resources? What are the challenges in your view?

Participant [4]: The first is that not many teachers uploaded materials on the system. Only a few teachers uploaded on it. The others gave materials to a class representative from whom we photocopied materials or shared them in other ways.

Researcher: What challenges have other students encountered in relation to e-learning? What have you heard from others?

Participant [4]: The site is very easy to use, therefore, there were not many challenges.

Researcher: So, you think the site was easy for you to use as well as for others.

Yes.

Researcher: Why do you say that it is easy? What makes it easy? Even if it is easy for you it may not be so for others.

Participant [4]: The moment you sign in, you will find a list of courses and all you have to do is select the course you want. And downloading also is not difficult.

Researcher: What e-learning resources are there in your university?

Participant [4]: You mean besides the module?

Yes. It could be resources made available on the module and computers, labs, and other electronic resources. It could be anything the supports the e-learning process.

Participant [4]: We have a library furnished with computers and very good internet access. We also use YouTube.

Researcher: You personally download videos from YouTube.

Participant [4]: Yes.

Researcher: So, you are using not only course material provided by the university but also by other sources.

Participant [4]: Yes. But the internet is not very good around here. We prefer Sidist Kilo to Amist Kilo where the internet is faster. We use the material from other sources more than those made available on the module.

Researcher: So, you are not benefitting much from the e-learning.

Participant [4]: We use the internet a lot for doing projects but accessing the internet on this campus is not easy.

Researcher: So, normally you use the e-learning module.

Participant [4]: Yes, but we don’t use it much.

Researcher: Why?

Participant [4]: And I haven’t seen many people using it.

Researcher: Why?

Participant [4]: I don’t know but I think not many people are aware of its availability. Our junior batches may not know about it at all. We knew about it and used it a little but the new batches may not know about it.

Researcher: Do you think it would be beneficial if teachers and students were motivated about using the module?

Participant [4]: I think it would very beneficial. Sometimes we need a file while sitting in class. We call somebody to upload or email the file to us. It would be easier to access the module and download the material form it.

Researcher: Do you think that the course offered through e-learning motivates you more than the other courses?

Participant [4]: I think so. If can get what you want when you want it and can download it quickly instead of asking someone for it and waiting until they give it to you, why not? The e-learning is more motivating to me.

Researcher: Are the e-learning resources sufficient for students?

Participant [4]: They are not sufficient but most students have their own laptop and use them. What we want more is a better access to the internet.

Researcher: Have the resources posed challenges to students? And what kind of challenges were they?

Participant [4]: When I was a fresh student, I used to go to the lab looking for a computer and it was not easy to get one. You had to come first to secure a computer because there were many who wanted computers. You could use computers during

lunch time or wait in a long line for your turn. The computers are too few and it was not easy to get them.

Researcher: You mean the computers were not enough considering the number of students.

Participant [4]: Yes. However, many students have their own laptop and they would rather be in the dormitories for using the internet than going to the lab.

Researcher: Researcher: But do you think the available resources are helpful.

Participant [4]: Yes, they are very helpful.

Researcher: Does your university provide reliable internet connection?

Participant [4]: No.

Researcher: You have said earlier that the internet connection is not very good. Are the hardware and software components in the lab functional?

Participant [4]: Only some of them are functional while most others are not.

Researcher: Is there video conferencing session?

Participant [4]: Yes, there is but we don’t participate in it.

Researcher: Why?

Participant [4]: I don’t know.

Researcher: Are there helpful sessions?

Participant [4]: I have never participated but I know the system is available.

Researcher: Is it not for undergraduates?

Participant [4]: Nobody has told us that we could use it.

Researcher: Are there e-learning features besides the ones we have mentioned so far?

Participant [4]: Like what?

Researcher: For example, we have mentioned video conferencing and social media. Are there in this university other ways of e-learning? I want you to name some features even if they are not accessible.

Participant [4]: As far as I am concerned even the university's website is not updated frequently.

Researcher: Have you ever seen old computers being replaced with new ones and software being upgraded in the lab?

No.

Researcher: Is there any support provided by the management for e-learning? Is there any support or motivation so you could use the lab and e-learning? Are the systems updated and monitored?

Participant [4]: There is a GS lab.

Researcher: What is GS?

Participant [4]: It means graduate students. There is a separate lab for us where we have internet access and can do our projects.

Researcher: Do you use e-learning for doing your projects?

Participant [4]: Yes.

Researcher: Like what?

Participant [4]: If you mean the module, we don't use it?

Researcher: What other source do you use then?

Participant [4]: We use Google. We find nothing else on the module besides power point slides. And doing projects from power point slides is difficult.

Researcher: I see. So, you use international websites.

Participant [4]: Yes.

Participant [4]: You haven't seen much support from management for the e-learning environment.

Our separate lab which we can use during fifth year is the only support.

Researcher: That means computers and internet connection.

Yes.

Researcher: Are the soft wares upgraded regularly?

Participant [4]: I think the upgrade them but I don't know about that.

Researcher: What features make the e-learning site user-friendly or not user-friendly?

Participant [4]: As I told you earlier, once you sign up, you can enter your username and password and access the module. That makes it easy to use. It takes you directly to the courses you want.

Researcher: Is there anything that makes it not user-friendly?

Participant [4]: The major reason most people are not using it is the lack of awareness. For example, the whole first year I didn't know that course material were uploaded and I started using it only during second year.

Researcher: What do you think should be done to make it user-friendly?

Participant [4]: If more teachers use it and tell students that they have uploaded materials for them I think more students will start using it.

Researcher: What should be done to make it more attractive to students?

Participant [4]: I think uploading files in full will make it attractive to students.

Researcher: What files, for examples?

Participant [4]: Uploading all the course files from the teacher and all his activities including assignments, projects and slides will make the site attractive.

Researcher: Are there ethical rules regarding the use of e-learning?

Participant [4]: Not that I know of.

Researcher: Do you think it would be helpful to have ethical rules about the use of e-learning?

Participant [4]: I think the teachers have accounts for uploading materials. I don't know if there are rules or not.

Researcher: I understand that. But if there were rules for the upgrading of computers, rules about the use of passwords, and rules for data protection, would that be helpful?

Participant [4]: Yes.

Researcher: What kind of rules would you suggest?

Participant [4]: I am not sure I understand the question.

Researcher: There may be a policy regarding the use of the lab and you may personally read the policy. The policy may stipulate your privileges and duties. For example, if there is a rule against the use of memory stick, then you will not use a memory stick. There may also be rules stating which wireless networks are allowed for students to access and therefore no student should be denied the right to use them. So, the rules would both benefit students and prevent damage to equipment or data and software. And if a student spends a whole day watching a movie on a lab computer while you are waiting for your turn to use that computer for doing an assignment, I think that wouldn't be fair. Do you think rules would be necessary to handle such issues?

Participant [4]: When it comes to the use of the lab computers, there are some who browse Facebook on the computers. And some students watch fun videos on YouTube. But there is no rule of time limit for such students. So, they leave the computers only when they are tired. I think it would be good to have rules against the use of social media.

Researcher: Do you think rules for the proper use of the equipment and resources in the lab would be beneficial for all?

Participant [4]: Yes, I think they would be beneficial.

Participant [5]

Researcher: Do you use e-learning?

Participant [5]: E-learning as using the digital libraries in our school and we have websites where our instructors could upload assignments and we can download and also after we did we can upload on that. I wouldn't say I have used it much but at a start-up level we use e-learning in this school.

Researcher: On average, how much time a day do you spend using e-learning? To what extent were you using the e-learning module management portal?

Participant [5]: I think when I was second year or third-year student, we used e-learning when it was starting. Our instructors uploaded assignments on the portal so we can download materials from it. I remember using it almost daily. I visited it daily and downloaded assignments. So, it was very useful. But after that the website has been

down for some time. There is a problem. It couldn't reload or something. I remember we used it extensively at some point but this time I don't think it is functional.

Researcher: Can you use this e-learning portal as much as you can?

Participant [5]: Yes, in that sense it is very easy to use. You just enter your username and password to enter it. So, I can use it.

Researcher: Do you require any special technical skill to use site/portal?

Participant [5]: No, I don't think so. You will be provided with a password, you have a username, so if you are someone who can read and understand the English language, its communication language is English. All you need is to be able to read and understand English.

Researcher: What about computer skills and internet?

Participant [5]: Internet is needed. You have to learn how to use browsers to browse the internet. So, a basic computer skill is enough.

Researcher: What do you use site/portal for? Do you use it for instructor info, schedules, assignment, electronic resources, video, or audio-supported e-tutorials?

Participant [5]: First, our instructors upload different assignments on the portal and also we can download materials and assignments. We are provided with links to other websites like MIT. We have links and click on those links and access other videos. So, it was very useful. Also, we can download apps.

Researcher: Application soft wares?

Participant [5]: Yeah, application soft wares.

Researcher: What about assignments?

Participant [5]: Assignments also.

Researcher: Are you sending assignments through the portal and receiving feedbacks?

Participant [5]: We have to submit the assignments in person to the instructor. We download the assignment and we email them to him.

Researcher: Have you ever been requested by the university to comment on this website?

Participant [5]: No.

Researcher: So, you are telling that you don't submit assignments through this website.

Participant [5]: No. We just have to email assignments or submit hard copy in person.

Researcher: What is your opinion about e-learning? Can you access it anywhere?

Participant [5]: It's not accessible outside. If you are in this compound, it is possible to access it though sometimes it doesn't work. In my opinion, it is not developed well. Just as an idea or initial practice it is good but it lacks a lot of features. So, you cannot access it from another place.

Researcher: Does the use of e-learning motivate you in your studies?

Participant [5]: Obviously, using e-learning simplifies things. The instructor just uploads materials and you can find any material on any subject. Ideally, you can materials categorised by subject and you can download soft wares too. If it were developed well, it could enhance the teaching and learning process. If it could be accessed from another place, they could develop it well and if it is structured well, I think it could make a lot of things easier.

Researcher: So, you are motivated.

Participant [5]: Yes, it motivates me a lot.

Researcher: Do you find e-learning use easy/difficult?

Participant [5]: I wouldn't say it is difficult. Sometimes, there is internet problem. But if you have internet, you can access it.

It is not something very sophisticated.

It is not.

Researcher: Do you encounter any challenges with e-learning? What type of challenges do you encounter?

Participant [5]: Our main problem is the infrastructure, the internet access. You cannot get internet connection whenever you want. So, as we were using the e-learning module the main problem was the internet. It can be down for a day or two. So, if you have internet, and also when you have internet there may be a problem of connection

with the server. It may be down too. I think it is more connected with the internet and the server; that's the main problem. But on the platform it is very simple. There is simplicity. It's not too sophisticated. It is not well developed.

Researcher: What features should be added so that you will benefit more from the module?

Participant [5]: I think it should be developed well. There shouldn't be an access problem. When you want to access something, you have to access it. You have to download it right away. And on the features may be the exchange of materials could have platform so students could exchange materials. It would be good also if you could upload assignments. Now you can download things but you cannot upload. If you could submit assignments and upload materials and exchange materials with other students, that could be very good. Also, it should be very reliable when you access it. There shouldn't be any problem.

Researcher: What resources are currently available in your university?

Participant [5]: Currently there is a digital library launched by the university but sometimes it works and other times it doesn't. There is the modular portal from which we can download assignments and materials. There is also a digital library but it has problems. It is not functioning well. You can seldom use it successfully.

Researcher: Is it because of the internet connection or the system itself?

Participant [5]: As a layman, I would say one of the problems is the internet but also there is a problem with website itself. Sometimes it says it couldn't access the server. The website management should do something about it. It should be managed, developed and structured well. It should be very reliable.

Researcher: Researcher: Are the resources sufficient for all students?

Participant [5]: The e-learning it has its own problems. In the lab you have to wait in a queue because there is nowhere to sit and use a computer. If you have a laptop, you may encounter a connection problem. There is Wi-Fi connection at some places on the premises but it is not functioning well. I think the users are too many and the load is too high on the network. You can connect your laptop to the internet but you cannot download or upload data. The speed is very low.

Researcher: So, the existing available resources are also creating challenge.

Participant [5]: Yeah.

Researcher: Are the available resources helpful to students?

Participant [5]: Yes.

Researcher: Does your university provide reliable internet connection?

Participant [5]: Yeah.

Researcher: Is the internet connection provided good?

Participant [5]: No.

Researcher: Are the hardware and software components in the computer labs functional?

Participant [5]: We have computers that are functional and a lot of computers that do not work.

Researcher: What do you think is the reason?

Participant [5]: The reason is poor management. The management is not good. I think they just launch it and start a new lab but after that the management is not there to check and replace things that need replacing. So, I think the management is a problem.

Researcher: Is there video conferencing session for academic discussion?

Participant [5]: Yes, there is. One thing that I see as a problem in this campus is that they start things and they launch things but there is no continuity. There is a video conference lab. We have classrooms which are set up for this purpose but some of the equipment are not there. So, it is not really functional. The just set it up but they don’t continue using it.

Researcher: But you think you will benefit if you could use video conferencing for sharing experiences from other universities.

Participant [5]: That’s very obvious. I really believe in that. For example, I have my brother in Arba-Minch University. In Arba-Minch University they have more infrastructure and they are more functional than this university. My brother can see his grades on his mobile. He can access the university portal and he can register online. But I have to come here and wait two or three weeks in line just to get registered and

see my grades. So, what I see here is if there is functionality in Arba-Minch University, why not here? So, there must be a way for communicating and for sharing experiences in one country. Even globally countries are sharing experiences and doing things but here. In Mekelle University there is something very nice. It doesn't seem as if they are in Ethiopia. But here a lot of things have to be done. I always ask why don't they get together and share experiences? So, this video conference is a way for communicating with people and a way for sharing experiences.

Researcher: But it is not accessible.

Participant [5]: Yeah. I don't think they have grasped the idea of communicating things and they are not ok on that. So, it is very disappointing to see there is something good in some universities but in our university as if we are on another planet there are a lot of problems.

Researcher: Is there something which I didn't cover but you feel like there are features you might benefit from or it is not accessible? Are there features which I didn't mention but you think that you are not benefitting from that feature? Or you might have benefitted from it. Is there something you can tell me?

Participant [5]: I don't think there much I can tell on that regard. You have covered most of it. So, I told you about the problems in the infrastructure. Some of them are not well developed. Things start but they don't continue. So, we have a lot of problems in this university.

Researcher: Is there any support provided for the use of e-learning? Creating a good environment or encouraging is some examples of support. Have you ever noticed any support provided for the use of e-learning?

Participant [5]: I haven't observed it.

Researcher: Are the e-learning facilities in your university regularly updated?

That's the problem. They just start it but they don't update it. For example, this online registration is part of e-learning.

Participant [5]: Yes, of course it is one of the e-learning system.

I think they have started it now but there are a lot of problems regarding that. In some universities there is successful experience regarding that. But they haven't brought it here. So, they have started with a lot of problems.

Researcher: What features make the e-learning site user-friendly or not user-friendly?

Participant [5]: I think the main problem is with being able to access it or not. If you couldn't access it, it is not user-friendly. So, it should be very easy to access. And it must be very helpful in a way of providing you with materials and things. So, for example to make it more user-friendly, you can develop apps that you can use on your mobile. It must be very easy for you to access that thing so that you can download and upload materials very easily. So, that can make it user-friendly. But if you cannot access it in the first place, you wouldn't know if this is friendly or not. In fact, you may not be in a position to visit it another time. You would use other sources. Most of the time, we use Google. We Google something and we use MIT websites and other websites to look for materials.

Researcher: What's MIT?

Participant [5]: MIT is Massachusetts Institute of Technology. They have a website with open-source videos. They have free videos. So, if the internet is good most of us download their videos.

Researcher: That means you are not much benefitting from this module.

Participant [5]: Yeah. We are just being pushed to use other resources.

Researcher: Because you don't feel it is user-friendly and accessible.

Participant [5]: Yeah.

Researcher: Does your university have rules on the use of e-learning?

Participant [5]: To my knowledge there are no regulations on this. First of all, what could you possible do to that? You have a username and password. You just log in see what you want. You can register for new comers. They do that. They just register online. They get things online. That even has problem and we have been using the portal where our teachers could upload things and see. The feature doesn't allow you to do anything. So, there is no need for rules. Actually, it is very simple; you have a password and username. You log in and click on the respective subject you need. You download what you want. You cannot upload anything. If there were a possibility for uploading, there would be a rule on what you are not allowed to upload. Even if there is a rule or not, the website doesn't allow you to do much. So, I haven't heard of any rules.

Researcher: You were saying that there is still a problem with logging in.

Participant [5]: I didn't check it recently but I don't think it is functional. Actually, the internet is down. If there is Wi-Fi, you can check it. But I don't think it is functional right now.

They are saying it is functional. Instructors only are using it.

Maybe it is because they haven't been using it but you can check the functionality.

Researcher: I was referring to rules for students, for the proper use of resources which can benefit all of us like for example you come to the lab and it is occupied, you cannot do anything and you go back. Instead of that just to have a kind of rule for students to use computer for this time and this time and this time, some general rules.

Participant [5]: Yeah, they have certain rules. You cannot talk in the lab. You cannot chat. And also, you cannot bring related materials to the lab like data cables or something. At some point they were saying you could not enter the lab carrying a laptop. It is not as a rule or regulation. They just write on the wall.

Researcher: Ok, it is not a formal kind of regulation.

Participant [5]: Don't do this don't do this don't do this. On the other hand, the students don't do much; they don't go out of the rule. They just have to listen to the guard. If he tells you not to enter, then you don't enter. The students are peaceful.

Researcher: I know. I understand but I feel like if there is rule there is rule. And I would like to ask you if there is rule what do you benefit from the rule. In whichever way like for your data protection, do you think it will be important to have rule or to have no rule.

Participant [5]: I think it would be important to have some rules and regulations on how you use the internet, on how you use the lab materials. So, you have to be careful when you use the materials and you shouldn't break something or try to steal something. You need to have some regulations on that. Also, you have to be careful when you access the websites. For example, as I told you there is not enough space for all the students. And the labs have to accommodate the students. So, there must be a rule where you can block YouTube or Facebook. Someone who visits these sites is wasting their own and others' time. There must be a way to block such users.

Researcher: Yes, rules for all students and instructors which accommodate everyone in the proper use of e-learning.

Only using it for educational purpose; for other interests you can go to other places.

Or use your personal laptop.

Participant [5]: Yeah.

Researcher: So, Participant [5], I have finished my questions. Is there anything you want to say.

Ok, I am so happy I have been part of this research. And I want you to continue strongly and I wish your research to contribute for environment

Researcher: Thank you so much.

Participant [6]

Researcher: Do you use e-learning?

Participant [6]: Yes, I use e-learning but not very frequently. Most of the time, internet connection fails and you cannot find what you are looking for. The service is not satisfying.

Researcher: Why is it not satisfying? How much have you been using it?

Participant [6]: It started when I was a third-year student. They told us about it and we started using it. But then, they locked it with a password. So, we had to go ask for the password when we wanted to access the e-learning portal. Some of the documents posted on the site were copyrighted and we could not download them. Only books were uploaded on it and there were not additional materials.

Researcher: Why are you not using it? How can we get you to be able to use it?

Participant [6]: There are many e-learning websites abroad like Coursera, Udacity where you find videos and PDF books. These sites are user-friendly because you don't need to hunt the teacher for password but you get your own password. You can access them any time you wish with your username and password. It would be good if we had our own individual username and password here on our university's e-learning site. The materials to be posted on the site should first be evaluated. They shouldn't be uploaded just because they are books.

Researcher: What is it that makes Coursera and Udacity user-friendly and what makes this university's site not user-friendly?

Participant [6]: To begin with, Coursera and Udavity have a pleasing appearance with good organisation. It is also full of lots of materials. But our university's site is not well-organised and you don't find the books you are looking for. The books are not arranged well; they are posted arbitrarily.

Researcher: How often do you use it? When do you use it? What do you use it for?

Participant [6]: I was using the module twice a week for a semester when it started. The teachers were posting the books on it and telling to access it from the module.

Researcher: On average, how much time a day do you spend using e-learning?

How many days a week do you use e-learning?

Can you use site/portal for e-learning?

Do you require any special technical skill to use site/portal?

Participant [6]: No, it doesn't take technical skills. Anyone with the basic ability to use computer or surf the internet can use the module.

Researcher: You have technical skills in computer. So, your knowledge is enough for using the module.

Participant [6]: Quite enough.

Researcher: What do you use site/portal for? Do you use it for instructor info, schedules, assignment, electronic resources, video, or audio-supported e-tutorials?

Participant [6]: I was using it basically for downloading textbooks, reference books and assignments.

Researcher: Do you use it for instructor info, schedules, assignment, electronic resources, video, or audio-supported e-tutorials?

Participant [6]: We use it for course documents and assignments. They were also posting exam and other schedules for us. But mostly we were using it for downloading course documents and assignments.

Researcher: Do you ever use the site/portal to discuss any course content with your fellow students?

Participant [6]: Once when we were taking C++ during third year, we used the portal for discussion. But we have never used it for discussion after that. The teacher had motivated us in those days to ask questions and hold discussions.

Researcher: And do you believe it was useful?

Participant [6]: Yes, it was useful.

Researcher: What is your opinion about e-learning? Can you access it anywhere?

Participant [6]: That was the most difficult part. We were able to access the module only from the labs in the Amist Kilo campus. It was too hard to access it from another location especially at the beginning. But later the coverage was expanding and we were able to access it even from Sidist Kilo. However, most of the time, it was not working.

Researcher: Does the use of e-learning motivate you in your studies?

Participant [6]: I believe it motivates me in my studies if it is used consistently. But we are no different from those who have no access to the module. We log on to the site just to get books and notes. I think it would be more interesting if it included discussion forums. As I told you earlier, we used discussion forum once but only for one course.

Researcher: So, you couldn't see the effect as it didn't have all the necessary functions.

Participant [6]: No.

Researcher: Do you find e-learning use easy/difficult?

Participant [6]: It's very easy to use. The only problem is that you cannot access it from another place.

Researcher: In your opinion, how can the module be improved so that it will be a better system?

Internationally well-known e-learning websites could be taken as a model and a system could be developed here that could compete with them.

Researcher: Why do you find e-learning use easy/difficult?

Do you encounter any challenges with e-learning? What type of challenges do you encounter?

Participant [6]: One of the greatest challenges was not being able to access the e-learning portal from where you are while the other challenge is getting the username and password for accessing the portal.

Researcher: Were you not provided with username and password?

Participant [6]: We were but then our usernames and passwords were blocked. Therefore, we resorted to taking the teachers' usernames and passwords.

Researcher: If no, why don't you have any challenges with e-learning?

Do you think your fellow students have challenges with e-learning?

Participant [6]: My friends have encountered the same problem as I have. The problem with not being able to access the portal from another location is that some students who are at the Sidist Kilo campus had to go to the Amist Kilo campus and that was a challenge.

Researcher: If yes, why do you think they have challenges with e-learning?

If no, why do you think they don't have challenges with e-learning?

What e-learning resources are there in your university?

Participant [6]: There are computers though not many and when exam days approach, too many students want to use the computers and there are not enough to go around for everybody. I don't see other problems except these.

Researcher: Are the resources sufficient for all students?

Participant [6]: No. As I just said, when we want to go use the computers any time we can use them, but when exams or project deadlines are approaching, too many students go into the lab. Those who have no laptop of their own have to go to the lab and they may find all the computers occupied. Now Wi-Fi is available in many places and those who have laptops can use the module over Wi-Fi.

Researcher: So, they need to have their own personal computers.

Participant [6]: Yes. But some time ago, it was not easy to access the internet even if you come with your own laptop because they had not yet installed Wi-Fi networks.

Researcher: Do the available resources pose challenges to students?

Participant [6]: Yes. For example, sometimes the computers in the lab breakdown and may stay long without being fixed. So, the computers are no use for students as long as they are not fixed.

Researcher: If yes, what type of challenges?

Why do you think students have any challenges with the available resources?

Are the available resources helpful to students?

Participant [6]: Yes, they are helpful as long as we use them properly.

Researcher: How are they helpful to students?

Why do students find the available resources helpful?

Does your university provide reliable internet connection?

Participant [6]: It is improving nowadays and is becoming more reliable than it was ever before.

Researcher: Is the internet connection provided good?

Participant [6]: Yes, currently the connection is very good except the blackout over the whole country which happens now and then. It's much better now than before.

Researcher: Are the hardware and software components in the computer labs functional?

Participant [6]: Most of them are functional but there are also some which are not.

Researcher: Is there good wireless internet connection in your university?

Participant [6]: Yes, there is but the speed is poor.

Researcher: So, you cannot say there is good internet connection.

Participant [6]: No.

Researcher: Is there video conferencing session?

Participant [6]: Probably for the teachers but for students there is none.

Researcher: Are there e-learning features other than the ones I have mentioned? You have been using other e-learning portals besides the one provided by the university.

Participant [6]: Like Coursera and Udacity?

Researcher: Yes. You have started using those other portals because the one provided by the university is not suitable for you.

Participant [6]: Yes.

Researcher: Does the e-learning portal provided here by the university have features which I am not aware of but you are?

Participant [6]: I have told you some of the features like uploading documents and assignment submission. Other features include posting videos by teachers in an organised way. Full length videos can be posted on the site for various courses. There are features also which I saw on other sites like peer-reviewed or graded assignments. The teacher gives you assignments and your peers grade the assignment after you do it.

Researcher: Are those features available on this university's e-learning portal?

Participant [6]: No, I saw them on other portals. I think those features should be added to the e-learning portal of this university.

Researcher: But I think that is just for the purpose of facilitating cooperation among students.

Participant [6]: Yes, it is like a discussion forum.

Researcher: Is there any support provided for the use of e-learning?

Participant [6]: *No answer.*

Researcher: Are the e-learning facilities in your university regularly updated?

Participant [6]: As I have told you, I have never seen the facilities updated or upgraded. Only documents may be updated when new assignments are uploaded. Otherwise, I haven't seen much updating of facilities.

Researcher: Do you think it would be helpful if the facilities were regularly updated?

Participant [6]: Yes.

Researcher: Does your university provide any e-learning training for students?

Participant [6]: There has never been a training in which I participated.

Researcher: So, there has been no training?

Participant [6]: No.

Researcher: If they do, how often is the training provided?

What features make the e-learning site user-friendly or not user-friendly? What features do you think should be added to the module to make it more user-friendly to students?

Participant [6]: First of all, the website takes too long to load and it will take even longer when videos are uploaded on it. The layout design of the website is not attractive compared with others.

Researcher: Do you mean that if videos were uploaded, they would not be easy to download?

Participant [6]: Yes. It takes time to play videos.

Researcher: Do you therefore suggest that lighter versions or small sized videos should be uploaded?

Participant [6]: Yes.

Researcher: That is to make it easily accessible.

Participant [6]: Yes.

Researcher: So, you suggest the layout design be competitive and attractive.

Participant [6]: Yes. The others have very beautiful style sheet. Ours cannot compare with theirs.

Researcher: And as you also said the other sites are easily accessible.

Participant [6]: Yes, and you can play their videos even on poor internet connection.

Researcher: Even if the internet bandwidth is not big?

Participant [6]: Yes, even if the bandwidth is not big you can see their videos. But here it is not easy. You cannot load the videos unless the internet is on high-speed connection. It’s difficult to play the videos let alone download them.

Researcher: Researcher: Is it accessible to students? If yes, how accessible is it? If not, why is it not accessible?

Does your university have rules on the use of e-learning?

Participant [6]: I am not aware of any officially declared rule.

Researcher: Are there unofficial rules?

Participant [6]: Yes, there are some rules about guarding our usernames and passwords. They were giving us that kind of warning when we first signed up for our account. Otherwise, there are no rules.

Researcher: Would it be helpful to have rules on the use of e-learning?

Participant [6]: Yes. The sites I was telling you about have rules and the rules are the first thing you encounter when you log on to the site. They tell you what you can do and what you cannot do.

Researcher: For example?

Participant [6]:For example, there is what they call “honour code” on Coursera. It includes rules against cheating and how to behave while sitting an online exam. There are rules also on participation with explanation of benefits.

Researcher: Does the website you told me about help you in your studies? Is it related to the particular courses you are taking? You sound like you take the topics and outlines from the university’s module and use the other sites for help with your assignments.

Participant [6]: Yes. You can also participate with other people on those other websites. They also supply me with the necessary materials.

Researcher: So, the other site offers tutorials on the course you are taking.

Participant [6]: Yes.

Researcher: Is it open, free software?

Participant [6]: Yes, it is a free software. Some courses require payment but I can apply for financial assistance. If they approve of my request, I go ahead and take the course.

Researcher: Is the financial aid also provided online?

Participant [6]: Yes.

Researcher: If that system is adopted here, will you encourage it?

Participant [6]: Yes. I think that will be very good. It covers social science courses besides the natural.

Researcher: Are there exams? What is the benefit if you perform well?

Participant [6]: You get knowledge and you will also be issued a certificate.

Researcher: Does it have any impact on your lessons here?

Participant [6]: Yes.

Researcher: So, where does the module come into the picture? How much is it helping you?

Participant [6]: I had been using the module before I came to know these other sites. I had no other option. I downloaded assignments from it. But once I knew about those other sites, I have never used the module. The only purpose we use the module is for downloading assignments.

Researcher: You use it only for downloading assignments and not for submitting your works.

Participant [6]: That's right.

Participant [7]

Researcher: Do you use e-learning?

Participant [7]: No. We were using it at one time when we were third-year students for one course only.

Researcher: Ok, so you have used it only once when you were third year.

Participant [7]: Third year

Researcher: So, you have used this learning management system portal called module, right?

Participant [7]: Yes. It wasn't clear that much. We don't even know the purpose. The teacher came in and said, "module, e-learning". We didn't know what it was. We were confused. That's it.

Researcher: If you were asked about to what extent you used e-learning, what would you say?

Participant [7]: *No answer.*

Researcher: How can we get you to use e-learning as a university student? What can be done to make you be able to use e-learning?

Participant [7]: The first thing is internet connection should be facilitated and awareness should be created among both teachers and students. I don't think that even teachers have that much information about e-learning, its purpose, advantages and disadvantages. I don't think they are aware of it either. So, awareness is the basic thing.

Researcher: You have used the system once and from your observation do you say that you require any special technical skill to use this e-learning management portal?

Participant [7]: It doesn't require special skill but basic knowledge like how to use email, basic skills of Word, Excel and etc.

Researcher: How about internet surfing?

Participant [7]: Yeah, if you can manage your laptop well, that's enough.

Researcher: So, when you were using e-learning, what were you using it for?

Participant [7]: I was always checking my emails to find out when we would have an exam or an assignment. At such times I would check my account. Otherwise, I wouldn't.

Researcher: How does it help you with your final exam?

Participant [7]: Some useful materials would be uploaded there and the teacher would give us some information about the exam. Sharing materials by a flash drive with your friends is much simpler than finding internet connection and downloading from the system.

Researcher: So, have you ever used the e-learning portal for assignments, course schedules, audio and video lectures?

Participant [7]: I used it, no, no video, assignment submission yes.

And course documents, information about your instructor, assignment schedules?

Assignment schedules.

Researcher: You have used it for assignment schedules.

Participant [7]: Yeah.

Researcher: Have you ever used the portal for discussions?

Participant [7]: Never.

Researcher: But do you say that it will helpful? What do you suggest?

Participant [7]: Yeah. There is our platform and we frequently have meetings. We discuss online. So, that is pretty nice. You know, if you are not contacting in person, it's perfect but we don't have.

Researcher: But what portal are you using…

Participant [7]: It's different from the module.

Researcher: For students?

Participant [7]: Yeah, it is for social activity rather than academic thing.

Researcher: It's like social media?

Participant [7]: No. There is an activity that students are doing. So, don't have time to meet each other, so we are always meeting online through different social networks.

Researcher: You suggest it will be good it this…

Participant [7]: In academic theme? Yeah, very helpful.

Researcher: In your opinion, what do you feel about e-learning generally? Have you ever been able to access this portal from outside campus, like from your home, laptop or somewhere in the country?

Participant [7]: Yes, from my home, yeah. I just see if an assignment is given or not while I was learning that course.

Researcher: You were able to access the system from home?

Participant [7]: Yeah.

Researcher: You mean it is accessible outside this compound?

Participant [7]: Yeah.

Researcher: So, you have taken many courses face-to-face and only one course with e-learning. Does the use of e-learning motivate you in your studies?

Participant [7]: We don't observe it in our day-to-day life.

Researcher: But do you think from other courses…

Participant [7]: If it is our trend, that will be best but that is not. It took too much time, you know, just to adapt it and...

To adapt the system.

To adapt the system, it took a long period of time.

Researcher: Instead of having face-to-face classes, if you take e-learning related course, will you be more motivated?

Participant [7]: I hope so, I personally hope so. You know it is becoming boring and boring lectures class are long. Up to seventy to hundred students are in one class so it will be more interesting and interactive.

Researcher: Researcher: But what you are saying is as long as you are taking one course for students one course doesn't motivate much. But if you are taking more courses, you will adapt with the system and be more into the e-learning system.

Participant [7]: Yeah.

Researcher: So, in general, from that one course, is the use of e-learning easy or difficult?

Participant [7]: It is easy, it makes it easy. I couldn't even thoroughly say I learned e-learning. It is not totally practical, you know. Just somehow there was an idea of learning by e-learning that time. We didn't thoroughly use e-learning but partially we have that. Theoretically, it is interesting.

Researcher: When you were using e-learning for that course via this e-learningsystem, did you encounter any challenge?

Participant [7]: Yeah, basically, obviously, the internet connection, yeah internet connection was the challenge.

Researcher: Ok, like if you say yes, what type of challenge was it? How do you categorise that challenge? You said like internet challenge is a technical problem. What other challenges did you encounter?

Participant [7]: The teacher himself didn't even take it practically the e-learning system but he tried his best to introduce the e-learning system. But he even

Researcher: Ok. So, were other fellow students at that time feeling the same as you? Have you ever observed that other students in your class at that time were also having that kind of feeling?

Participant [7]: Yeah, it is almost the same. Except for the internet connection problem, everything else was good.

Researcher: The internet connection problem is already noticed by all of you.

Participant [7]: Yeah.

Researcher: All students might say that.

Participant [7]: Yeah, even those who have Wi-Fi in the dorms say the Wi-Fi is weak. We wait too long to just download something.

Researcher: What e-learning resources are there in your university?

Participant [7]: Come again.

Researcher: What e-learning resources are there in your university?

Books

Researcher: Yes, it can be electronic books. It can be even equipment like computer and laptops. Whatever the university already provided for the purpose of e-learning.

Participant [7]: There are desktop computers in the library. I saw in Kennedy, Sidist Kilo and here at Amist Kilo. There are desktop computers but I never used them.

Researcher: Why?

Participant [7]: Because I have my own laptop, I feel comfortable with my own laptop, so I never went there.

Researcher: Because you have your own laptop

Participant [7]: Yeah.

Researcher: Do you think these resources are sufficient for students? You have your own laptop. If you had no laptop, do you think the resources would be sufficient?

Participant [7]: I don’t think so because I don’t think there is someone to take care of those computers. They talk and install something on that desktop, then no one cares about that desktop. It needs follow-up or something. The desktops damage or something, I don’t think they do something.

Researcher: It poses a problem, you mean like it is a challenge for students.

Participant [7]: Yeah, for those who don’t have a laptop.

Researcher: So, when we come to technical problems, does your university provide reliable internet connection?

Participant [7]: No.

Researcher: Is the internet connection provided good?

Participant [7]: No. In its ranking good but not excellent or very good. It is good. It is fair.

Researcher: Do you think the available resources are helpful for e-learning?

Participant [7]: For e-learning?

Researcher: Yes.

Participant [7]: No, I don't think so.

Researcher: So, like you said earlier, it doesn't have good wireless internet connection. Is there any video conference session for academic purposes?

Participant [7]: No, I never used.

Researcher: Is there any feature that you know but which I didn't mention in relation to the e-learning system?

Participant [7]: About e-learning?

Researcher: Any kind of technical feature used inside this university for the purpose of e-learning like video conference or other.

Participant [7]: Yeah, I always say as an institute it is not only needed you know co-curricular activities should be involved in my opinion. Those co-curricular activities should be included because of – let me speak in Amharic – education is not just about classroom lessons, there are co-curricular activities which the institute has not recognised well. Attending lectures is all a student needs to grow. There are many people who have come from different backgrounds to the university. Discussion with these people, knowing their background, coming up with new ideas, and talking about social issues are not common practices. Since people are getting used to the internet, it would be good if these things were introduced to e-learning and social issues like charity or voluntarism were incorporated it would be very good. The usual thing is that you would take about four courses which are all delivered in class and are boring.

Researcher: What if they were presented on video?

Participant [7]: That would be nice.

Researcher: Is there any support provided by management for the use of e-learning? Are the e-learning facilities in your university regularly updated?

Participant [7]: There has been no support. For example, a training should have been organised before we started using e-learning. It would be good if a training were provided and the computers were updated.

Researcher: Does your university provide any training on e-learning for students? And you believe it would be useful?

Participant [7]: Very much. Awareness is very crucial.

Researcher: Do you get technical support? If you were offered training on how to access the system and informed of every update to the system, do you think you would benefit from that?

Participant [7]: We acquire skills not only through formal education. If a man who has never used email hears about its functions and advantages, is likely to go and sign up for an email account. So, such a man will learn by himself how to sign up for an email account. So, if they create awareness, then the people will go the extra mile on their own.

Researcher: What features make the e-learning site user-friendly?

Participant [7]: Not user-friendly definitely.

Researcher: How do you think it can be improved?

Participant [7]: It was not very interesting. It could be improved with the addition of pictures. As I told you, the teacher started it by himself. And we don't know much about it. He was trying hard. He had little awareness like us. Therefore, the e-learning system was not attractive but we went in and out and practised it a little just because our survival in college depended on it.

Researcher: Otherwise, it was not user-friendly.

Participant [7]: No, it wasn't.

Researcher: You mean it wasn't accessible.

Participant [7]: Yes.

Researcher: Is it accessible to students in the features?

Participant [7]: In the feature, no.

Researcher: When you see the features on the portal, are they accessible to students?

Participant [7]: We just do what we are told to do. They tell us where to find the assignment on the system and we go get it. We don't know anything else. It was not user-friendly.

Researcher: Does your university have rules on the use of e-learning?

Participant [7]: There aren't any.

Researcher: Do you think it would be helpful to have rules?

Participant [7]: Yes.

Researcher: What rules for example would it be helpful to have?

Participant [7]: For example, they give us username and password from registrar so we can see our grades. We lose our IDs at any time but if there were rules and restrictions, it would be included in the system.

Researcher: If the module or the e-learning portal had rules, do you think it would be helpful?

Participant [7]: Yes, it would be helpful to have rules that guide for example when there is good internet connection a student should at least check their account once a week or once a month. If a student doesn't check the portal at least once a month, then he is not learning at all.

Researcher: A student might miss materials posted on the portal.

Participant [7]: Yes, he might miss materials posted on the portal. So, a student has to check the portal at least once a week or once a month when the connection is good. It would be good to have such rules so that students would be forced to check the portal once a week at least.

Researcher: Do you have anything you wish to say?

Participant [7]: No, thank you.

Participant [8]

Researcher: Do you use e-learning?

Participant [8]: Yeah, with one course and that is Public Administration.

Researcher: How often do you use it? And are you using it on a daily basis?

Participant [8]: I am not using it daily but I am using it weekly.

Researcher: Why is that? Is it not necessary to use it daily?

Participant [8]: It is only one course and I am not even using it properly because of time and because it is only one course. If all courses were given online, I would pay more attention. And when I use it I only do the quizzes. I see the videos and do the quizzes. The e-learning is very good but most of us don't have patience to see the video. If all courses were provided through e-learning we would pay attention. We do only the quiz because they know whether we did it or not.

Researcher: Do you not read the supportive materials that are uploaded there?

Participant [8]: No, we don't. We read them only for doing the quiz. But before exam we are very busy doing many assignments. And the uploaded material takes time to listen or watch so most of us skip it.

Researcher: Is the online material different from the course you take in class?

Participant [8]: It is related. There is a reader which is very long and boring. There is also power point. But on the e-learning, the materials are concise and can be used along with the power point. I use a camera for taking pictures of the slides. The video tutor puts the most important points of his lecture shortly on power point slides and I take photos of the slides to save the notes.

Researcher: So, you get a reader and many power point slides in class. After taking those you play the online video and from it you take photos of short notes on slides.

Participant [8]: Yes. There is also explanation on the video and I can play it over and over until I understand. It would be interesting if all courses were presented through the e-learning. One teacher is different from another in competence, teaching methods and approach. But the teachers we find on the e-learning are very competent and come well prepared. Thirdly, even people who have never touched a computer have started using it because of the e-learning. They are getting exposure to technology.

Researcher: So, are you saying that you are able to use the e-learning management portal?

Participant [8]: Yes.

Researcher: Does it require technical skills to use the e-learning?

Participant [8]: No, it is not very complicated. Training for a day or two is enough to enable one to use it.

Researcher: What kind of skill does it require?

Participant [8]: One has to know how to surf the internet and how to enter username and password. After that it is very simple. It is just about clicking the forward and backward buttons. Moreover, one has to understand English. That's all it takes.

Researcher: What do you find in the portal?

Participant [8]: At the beginning of the course there is a reader and you can play the video only after you have gone through the reader. The lecturer on the video introduces himself and then process to the lecture. There are many videos in one chapter. After the videos there is a quiz. When you have done the quizzes, you may go to the next chapter. You can also give comments, feedbacks and ask questions.

Researcher: Are the questions for the teacher or for students?

Participant [8]: Anybody may see the questions. The teacher may see them or students. Students may answer that question. I can also see questions posted by other students. If I know the answer to that question, then I will go ahead and answer it.

Researcher: Are the feedbacks regarding only the course or are they also about the portal?

Participant [8]: They are of two kinds. There is room for comments on the technology and there is also space for comments and questions on the subject.

Researcher: And you believe that is beneficial.

Participant [8]: Yes, it is beneficial.

Researcher: What's your feeling or opinion about e-learning?

Participant [8]: It is good. I have positive feelings toward e-learning. You can learn lots of things using e-learning. You can earn a certificate on a field of your choice. It

provides the opportunity to learn from home without wasting time by going back and forth between home and university. Besides, the lessons are well-organised and presented by very competent people. Another advantage is that it is suitable to everybody's need and you can take it at your own pace. In class, the lessons could be too fast for the slow learner or boring to the fast learner.

Researcher: Can you access the e-learning portal from anywhere outside the university premises? For example, can you access it on your phone?

Participant [8]: I haven't tried to access it from outside the university.

Researcher: Why have you not tried it?

Participant [8]: Mainly because I live here but I think it could also be accessed from outside the university premises. All you need is internet connection.

Researcher: In general, would you say that using e-learning is difficult or easy?

Participant [8]: It is easy.

Researcher: Why do you say it is easy?

Participant [8]: Because it doesn't require technical knowledge and as I told you earlier, even people who have never touched a computer are using e-learning and they have completed the course. Therefore, it is not difficult. Even farmers in the country are using the internet let alone a master's student. We just log into our account on the portal and take the lessons.

Researcher: What are the challenges to using the e-learning portal?

Participant [8]: One of the challenges is awareness. There are some who think e-learning is additional burden imposed on them.

Researcher: Why do they think so?

Participant [8]: It is a problem of attitude. They don't know that it is for their own good. Some don't read the lessons but try to do the quizzes while others even take the answers to the quizzes from those who have done them before. So, a student simply copies the answers from another without bothering to learn the lesson. Or one student may do the quizzes for others on different computers. Public Administration is a very simple course but many students are not reading the lessons and they perform poorly at the exam. Many are not paying attention.

Researcher: What can the university do to change the motivation of students toward e-learning?

Participant [8]: I think all courses should be supported by e-learning instead of just one course. There may be tough courses and nobody is likely to say that they are taking just one course and be rid of e-learning. If all courses are given with e-learning, students will be convinced that they will need to pay attention. There are some who still question the importance of taking courses through an online system like the module.

Researcher: So, students' attitude on e-learning is what needs to change. I think if at least three or four courses are supported by e-learning, students are likely to get used to e-learning and accustomed to using it.

Participant [8]: Yes.

Researcher: What e-learning resources are there in the university? What electronic sources are there?

Participant [8]: Internet access is what makes Civil Service College better than other colleges, even better than Addis Ababa University. There is a twenty-four hour internet access in the dormitories. In addition, there are computers in every building which is good for students. Most students who don't have their own laptop can use the computers in the labs and in the library.

Researcher: Do you think these resources are sufficient?

Participant [8]: No, they are not sufficient but a good beginning nonetheless.

Researcher: What are the challenges related to resources?

Participant [8]: To begin with, the resources are not sufficient. If most students don't come with their own laptop, the computers here will not be enough for all. The strength of internet signal is also different from one building to another. In some buildings the signal is very strong while in others it is totally down. So, they have to go to the library or go to another building.

Researcher: Does the university provide reliable internet connection?

Participant [8]: The internet access is good enough.

Researcher: Are the hardware and software components functional?

I haven’t used the lab because I have my own laptop.

Researcher: Is there video conferencing session for you to share with other universities?

Participant [8]: We have the facility.

Researcher: Would you say it would be good to have video conferencing sessions with other universities?

Participant [8]: Yes, that would be very good for sharing experiences. We would have discussions on very important topics. There is a club in our department. I am a member of the club along with Asmelash and the others. One of the things that the club does is invite guest lecturers. If there were video conferencing, we could meet the guest lecturers through it instead of having them come all the way to this college.

Researcher: I understand you have the facility for video conferencing.

Participant [8]: Yes. And it is not easy to get guest lecturers to come here.

Researcher: Does the management encourage e-learning? Does it support the system by upgrading the facility and motivating students to use it? Is e-learning promoted here?

Participant [8]: The teachers actively monitor every student checking who is using e-learning and who is not and I appreciate that.

Researcher: How do they do that?

Participant [8]: The system keeps the teacher posted on who is doing what and have far everybody has progressed through the course. As for the lab, I have gone there only for the orientation given at the beginning and the orientation was very good.

Researcher: Has the university ever given training to students on the e-learning?

Participant [8]: It provides orientation at the beginning and continuous support to students who find it still challenging after the orientation. The technicians are always on standby to offer support to anyone who needs it. They are sensitive on this regard but students as well as the whole university still need a change of attitude toward e-learning.

Researcher: And you believe the training should be given again and again.

Participant [8]: Yes.

Researcher: How is the interface of the e-learning portal? Is it user-friendly, attractive or not?

Participant [8]: It would look more attractive if some images were uploaded with it. The tutorials come with only audio files. The plasmas in high schools are interesting because they offer both sound and video. They are attractive for students. If the same thing were done with the e-learning portal, it would be more interesting for students.

Researcher: The tutorials on the module offer audio without video?

Participant [8]: Yes, it is only audio.

Researcher: It would be more helpful if lectures were accompanied with video. For example, a student from the engineering faculty of the Addis Ababa University said that if a lesson about machines were combined with videos of machine parts, it would great help the student to relate the images with what they had learned from the text books or handouts.

Participant [8]: Yes. There are for example students who are learning about housing. These would find videos very helpful. Over eighty percent of our attention is attracted to sight. So, if the contents on the system were accompanied with graphics and images, it would be more attractive.

Researcher: Are there rules and regulations on the use of the e-learning system?

Participant [8]: Yes, there are regulations. For example, I cannot proceed to the next chapter before doing the quiz for the current chapter. I cannot take the quiz before listening to the audios first. The system doesn’t allow that.

Researcher: Is that set down as a rule for you or is it just the system that blocks you from proceeding to another chapter before finishing one?

Participant [8]: It is the system.

Researcher: Ok, are there not rules for the protection of data and equipment? In addition, if a student is in need of a computer urgently and goes to the lab but finds that the computer is occupied by another who is browsing Facebook, is there not a rule to deal with such situations? I don’t mean rules that impose on students but are supportive to them. Would it be beneficial to have rules?

Participant [8]: I think it would be important to have rules. I think also that it would be a good idea to have all students enter the lab for e-learning. For example, if three hours have been allocated for e-learning, it would be good to use one hour for discussion among students, one hours to have all students in the lab using the computers together at the same time instead of everybody accessing the system from where they want. This way everybody will get used to the rules from time to time.

Researcher: So, you are saying, the college has established the e-learning system and you use it. All the contents have been uploaded on the system but you don't use them in the lab.

Participant [8]: No, we don't. It would be very good to have all students together enter the lab and use the computers to access the e-learning system at the same time. This will allow many students to learn to use the system.

Researcher: There may be a student who spends the whole semester without ever logging in to the system.

Participant [8]: Yes, there is. Monitor attendance in the lab can help keep some students from taking the quizzes without learning the lessons. There are discussion sessions but most of us attend the discussion sessions and participate in them without reading the materials and without preparing ourselves. But if the teacher gives us discussion questions which require studying the notes uploaded on the system and tells us to come prepared for discussion, that would motivate most of us to use the portal.

Researcher: So, you and the teacher don't meet in the lab even if it is always open.

Participant [8]: No, we don't. We do assignments and submit them through our own email. We don't use the e-learning system for submitting assignments.

Researcher: So, you are saying that the system is still not well-known and needs to be promoted.

Participant [8]: Yes. It needs to be promoted. It is a new technology and a good one.

Researcher: We are done with this interview. Is there anything more you want to say?

Participant [8]: No.

Participant [9]

Researcher: Do you use e-learning?

Participant [9]: The answer is yes.

Researcher: How often do you use it?

Participant [9]: We are taking e-learning in the BA programme. The course is very interesting, so I was using e-learning daily. The course had six chapters and even after we finished it I was using it whenever the internet connection was good. There are video lectures and quizzes. You take the quiz and if you don't pass, you will do it again. Even after you pass the quiz and finish it, you have the opportunity to revisit the questions you have done wrong. You must score above 70 to go on to the next chapter.

Researcher: So, you can do it again and again until the course if finished and you have sat for the final exam.

Participant [9]: Yes.

Researcher: Do you think you know very well how to use the e-learning portal?

Participant [9]: Yes. I have had no difficulty using it so far.

Researcher: Do you think using e-learning requires technical knowledge?

Participant [9]: When you begin to use it the first time, you need some knowledge and the centre has given us a half-day orientation. Then we knew how to use it and have been using it from inside our dorms. We don't need to come here unless we encounter a problem with the system itself.

Researcher: Talking of technical knowledge, what does a person need to know so that they can use the e-learning system?

Participant [9]: Anybody with a basic knowledge of using a computer can create an account and use the e-learning module. Anyone who knows how to create an email account and browse the internet can use the e-learning system.

Researcher: So, all a person needs to know is how to operate common applications like Microsoft Office and the internet.

Participant [9]: Yes. Anybody who knows how to use these applications can access the e-learning portal.

Researcher: And since you have all that technical knowledge you have no problem using the e-learning portal.

Participant [9]: Yes.

Researcher: What exactly do you find when you open the portal? What are the features you find there? For example, do you find course information, schedules, assignments, electronic resources like audio and video tutorials? What do you find?

Participant [9]: When you open, first it tells you which batch of students you belong to, and then which department within the batch, and which course in the department you are taking. Then it shows you the contents of the course. It tells you what to do first or where to begin. It also tells you what you have accomplished and what you can do next. You will see video lectures followed by quizzes.

Researcher: But this is for one course.

Participant [9]: Yes, for Public Administration.

Researcher: Have you ever used this portal for discussion about assignments or other course-related activities with fellow students?

We have never done that.

Researcher: But do you have the access?

Participant [9]: Yes, we have the access but only for PA, Public Administration. Everybody has a laptop and does his work individually.

Researcher: Is there not a forum on which you can share and discuss?

Participant [9]: There is a forum where we can exchange ideas, ask questions, and receive answers. We have the access to do all of these.

Researcher: Then, why are you not using it?

Participant [9]: I have had some questions which I asked and they were answered for me through the forum but that is not very frequent.

Researcher: And do you believe it is useful?

Participant [9]: Yes, it is very useful.

Researcher: What are you feelings and opinion about e-learning?

Participant [9]: I feel it should be expanded. We are taking other courses now and e-learning is our fifth course. The teacher supports us in class and the additional tutorial we get through e-learning is very helpful. It gives you the opportunity to repeat lessons and revise them as often as you want. It would be good if the e-learning were applied to other courses too.

Researcher: Are you saying that the courses you taking through e-learning motivate you more than those you take face-to-face in the class?

Participant [9]: There are two things that make e-learning special: you can both see and hear. Some people understand more readily when they see while others understand when they hear. If the lesson is presented as an audio file those who are more inclined to seeing are going to miss the lesson. But on the video, you can both hear explanations and see subtitles and diagrams. Therefore, I believe it is very helpful.

Researcher: Have you ever tried to access the e-learning portal outside the campus grounds? Does it work outside the university premises?

Participant [9]: They say it works outside too but I haven't tried it. They have said it is accessible wherever internet access is available.

Researcher: Do you think using e-learning is difficult or easy?

Participant [9]: It is very easy. In the first semester when we were not taking e-learning, we thought it was too difficult. But now that we are taking it in the second semester, we haven't encountered any difficulty with it.

Researcher: You say it is easy. Do you it is easy for you personally?

Participant [9]: I don't know if it is difficult for others but as far as I am concerned, I have found it very easy to use. There is nothing new about it. You use it just the way you use your email account. Moreover, it has many appealing features like audio and video. You can also go back to the chapters you have already finished.

Researcher: Have you ever faced challenges while using the e-learning module?

Participant [9]: There was a question which I had answered correctly but the system said I was wrong. I have brought that issue to their attention. I have faced no other challenge except this one. You will wonder what you have done wrong because the video lecture, as well as the hard copy reading material, confirms you are right.

Researcher: So, presentation of the course is blended: it comes both in hard copy and videos.

Participant [9]: Yes. We have both hard copy and soft copy through the e-learning portal.

Researcher: But they system says your answer is wrong while it is right.

Participant [9]: Participant [9]: Participant [9]: Yes.

Researcher: So, these problems should be fixed.

Participant [9]: I have left a comment regarding this problem so that they can fix it.

Researcher: Does the system accommodate feedbacks?

Participant [9]: Yes. You can write comments and they write you back. It has room for comments at the end of every course.

Researcher: You can leave comments on the system.

Participant [9]: You can comment on anything, you can comment on the course or you can leave suggestions.

Researcher: Can you comment on the connection problem or the system's problems?

Participant [9]: Yes.

Researcher: A technician will look into the problem.

Participant [9]: Yes.

Researcher: And other students can see it too.

Participant [9]: Yes.

Researcher: And you believe that is useful.

Participant [9]: Yes, it is.

Researcher: Have you heard from other students about problems on the system for example when you are together in the lab?

Participant [9]: In my opinion, the system has no problem. There could be problems with the users though.

Researcher: What do you mean problems with the users?

Participant [9]: We all started at the same time but some have finished the chapters while others are still in chapter two or three. It requires follow-up and students have to work on it frequently. You have to sit on for a long time and there are some students who get tired of spending time on it. When we ask some of our friends why they have not finished the chapters yet, they said they found them too long.

Researcher: Can you not download it to work on it offline?

Participant [9]: We can download it but it takes too much time. The courses are long and take time. It would be good if the courses were made shorter.

Researcher: Are there challenges related to e-learning? They might have to do with management or others.

Participant [9]: One of the challenges is internet disconnection due to power failure. As a result, the Wi-Fi network near our dormitory goes on and off every now and then with the power. You sit down to listen to a lecture but you are suddenly interrupted due to power failure. Fortunately, the technicians are on standby and they fix problems whenever they arise. For example, if your password fails, you contact them and they quickly reset it for you.

Researcher: What kind of electronic resources are available for you on the system?

Participant [9]: Will you rephrase that question?

Researcher: By electronic materials I mean library articles, computers and other resources that support e-learning like servers and anything that facilitates e-learning – what is available in the university?

Participant [9]: There are computer labs where you can use computers. There are other labs in classrooms and on the ground floor of dormitories. So, even if you don’t have your own laptop, you can use the computers in the university’s labs. Wi-Fi network is available in the dormitories so that you don’t have to go to the labs for connection.

Researcher: So, are you saying that the resources are adequate for students?

Participant [9]: Yes.

Researcher: What challenges do students face with the resources? The resources are available but they might pose some challenges to students. What are those challenges?

Participant [9]: I have not seen any challenge?

Researcher: Does the university provide reliable internet connection?

Participant [9]: We can use the internet every time we want to. There is no internet connection problem. The only exception was during the nationwide internet blackout during the grade 12 national exam last month.

Researcher: So, you are saying there is good internet connection.

Participant [9]: Yes.

Researcher: Are the hardware and software components in the lab functional?

Participant [9]: Most of the time I use my own laptop but whenever I go to the lab I find all the computers functioning well.

Researcher: Is the wireless internet connection good?

Participant [9]: Yes. And it is very fast.

Researcher: Have you ever used video conferencing sessions? Have you used it for sharing experiences with universities abroad?

Participant [9]: No.

Researcher: Do you think it would be helpful?

Participant [9]: Yes, it would be very helpful.

Researcher: How would it be useful?

Participant [9]: It would be useful to meet other people, share ideas with them, ask questions and receive answers without going anywhere. We were using it at work place.

Researcher: Does the system have features other than the ones I have mentioned? Is there a special technology that supports e-learning?

Participant [9]: It has no other features besides the ones we enumerated earlier. The university has provided the access and it is up to students to use or not to use it. Wi-Fi networks are available around classrooms, dormitory and lab.

Researcher: Even if there are no challenges around e-learning, what more do you think should be done about it?

Participant [9]: As I told you before, we are doing it in relation to one course only. It would be good to apply e-learning to all other courses.

Researcher: So, you believe this university or its management encourages e-learning.

Participant [9]: Yes.

Researcher: Are the equipment, the software and materials updated regularly?

Participant [9]: Yes.

Researcher: Are they upgraded?

Participant [9]: Yes, they are upgraded and they are fast.

Researcher: Does the institute organise training on e-learning for students?

Participant [9]: Training is given to new students at the beginning of every semester or year. Even in the library here, you can use the system for locating books. So, we have taken training as new students and additional training in our department.

Researcher: Is there a follow-up to the training?

Participant [9]: Yes, there is.

Researcher: What do you think of the portal's interface? Is it user-friendly or not?

Participant [9]: Yes, it is easy and user-friendly. It is so appealing to the user.

Researcher: How do you think it can be improved?

Participant [9]: They system is very good the way it is now. I don't know how it can be made better. But if there is anything new that can be added, we welcome it.

Researcher: Are there rules and regulations on the use of the e-learning system? Are there ethical issues related to the use of e-learning and rules which users must abide by?

Participant [9]: you rephrase the question?

Researcher: Are there policies regarding how long you can use a computer in the lab? Or are there rules concerning the use of memory sticks? Are there rules on how to use

the lab during critical times like exam week or when there are assignments that must be completed urgently? Are there such rules that you are aware of?

Participant [9]: For example, the library is open twenty-four hours during exams. Other times the library is open during day time and only some hours at night. Not only the library but the computer lab also is open twenty-four hours during exams. There are no restrictions about the use of memory sticks or other devices.

Researcher: Are there not rules that concern the mutual benefit of both the university and students, like rules for the proper use of lab equipment? This is not a question about rules that hinder free use of resources rather than promote them; not a mere list of dos and don’ts. The rules may also apply to data protection. For example, if you damage an application or hardware on the computer like the CD-ROM and go your way, the next student who comes to that computer cannot use it properly. So, are there not regulations for the protection of devices and equipment and for the benefit of students?

By the way, there are rules and regulation posted near the door of the lab. Most of the students are mature people and besides the technicians are always around and they will Participant [9]: be watching everybody.

Researcher: So, there are no serious problems.

Participant [9]: There are no serious problems.

Researcher: But do you think there should be rules or not?

Participant [9]: There are rules and you can see them when you walk into the lab. The rules clearly tell you what you can and cannot do in the lab. For example, what is your purpose when you go into the lab? And the rules tell you that you should not use the lab for other purposes.

Researcher: So, you believe the rules are useful.

Participant [9]: Yes, they are.

Researcher: Do you have anything you would like to say in general?

Participant [9]: I wish e-learning would be expanded throughout the country. I haven’t tried it outside the university premises as I have told you but I believe it is accessible

from anywhere. I can access Publish Administration lectures uploaded on the system wherever there is internet access.

Researcher: Do you submit assignments through the system?

Participant [9]: We submit assignments through email. We submit both hard copy and soft copy.

Researcher: What if exams were administered through the system? Would that be good?

Participant [9]: If it were not for unexpected power blackout, we could take exams on the system. Sometimes, we may be attending class with the notes on soft copy but when a power failure happens, we turn to hard copy.

Participant [10]

Researcher: We can start our interview now in Amharic or in English.

Participant [10]: Do you use e-learning.

Participant [10]: Yeah. I have used e-learning during this semester.

Researcher: How often do you use it and what for?

Participant [10]: I used e-learning twice a week and for two hours each time. That means I spent four hours a week on e-learning.

Researcher: What do you use it for?

Participant [10]: The purpose of e-learning is to get knowledge. So, I just turn on my computer and play the audio or video teachings uploaded on the e-learning platform. And I test my understanding by doing to quizzes at the end of each session. If I make a passing mark, above 70 out of hundred, on the quizzes, it allows me to go on to the next chapter. If I score under 70, it orders me to take the lesson again.

Researcher: Are there videos on the e-learning portal or only audios?

Participant [10]: There are no videos, only audios.

Researcher: Can you say that you can use this e-learning portal?

Participant [10]: Yeah, I can use it easily because when we were introduced to this type of learning, we were given a short training for one day. Based on that training I

am able to manipulate the portal and I can use it easily. Therefore, when it comes to using the portal, there is not much difficulty.

Researcher: Do you require any special technical skill to use this e-learning portal?

Participant [10]: There is no need for a sophisticated knowledge or a long term training to use the e-learning portal. Just the basic knowledge of how to use a computer is enough to use the e-learning module. All you have to do is just turn on your computer and launch the internet browser. Then you enter your username and password. And finally, follow instructions to find what you are looking for. It's very simple. For the first few days, it might be somehow difficult to operate. After a week or two, it gets easier and easier.

Researcher: What do you use the e-learning portal for? To check instructor information, course information, schedules, assignment deadlines, videos? What serviced do you get from the portal?

Participant [10]: We are using it for studying the courses we are taking. For example, this semester we are taking the course, Public Administration. We get information from the e-learning portal on what Public Administration means from the beginning to the last chapter. We have covered about six chapters in this course. With the help of the e-learning, I have more knowledge on this course. Regarding the other points you have mentioned, they are not emphasised here but the instructors emphasise on the subject matter and the contents of the subjects.

Researcher: Only course-related interaction, you mean?

Participant [10]: Yeah.

Researcher: So, you don't get the other materials like schedules, instructor information…?

Participant [10]: There are course outlines, modules, videos, audios.

Researcher: How about assignments?

Participant [10]: Actually, we don't do assignments online. The instructors give us assignments in person in class. They give us the titles and then we search for information and submit the assignment to them. After that we present our findings in class. We submit our works in hardcopy and the instructor marks them.

Researcher: But do you think it would help if you could do assignments online? Is there a possibility of doing so?

Participant [10]: Yes, it can be helpful because it is a practice again of doing assignments differently from the way we used to do them. It helps to save time and get more information. Both online and in class interactions can be helpful. I cannot suggest that online education is helpful.

Researcher: Do you ever use the portal to discuss any course content with other students?

Participant [10]: Personally, I didn't do so.

But there is…

The opportunity is there, the link is there but I didn't do it.

Researcher: You were not motivated to do it?

Participant [10]: Well, it is not even directly related to that. The course we have taken is too broad. We have taken 35 credit hours in five subjects in the department. The time has prevented me from doing that. It is interesting but because of shortage of time, I couldn't do it.

Researcher: What is your opinion or feeling about e-learning?

Participant [10]: E-learning is good in that it familiarises us with technology helps us get the information we need easily. It enhances our understanding with the help of audio lectures. When you listen to a lecture without interruption, you can concentrate on it. For example, I engage in this kind of activity in my dormitory without disturbing anybody and nobody disturbing me. Therefore, I can concentrate on what I am listening to and take notes. If I can't understand it, I can rewind it and hear it again until I can understand it well. Once I am sure I have learned the lessons and understood them, I can go on to the next lesson. But some of the problems are slow internet connection or total disconnection. At such times, you cannot do anything. Otherwise, it is ok.

Researcher: Can you access the e-learning portal anywhere outside the university premises?

Participant [10]: No.

Researcher: Did you ever try?

Participant [10]: I haven't succeeded in accessing it in other places. E—learning should be accessible wherever there is internet connection. Internet access is not available in other universities.

But if there is internet connection in other places, can you access the e-learning portal?

Yes, if the situation is arranged. Just because you have internet access doesn't mean you will be able to use the e-learning portal. That programme should be introduced with internet access. In some universities, even if internet access is available, the e-learning system might not have been introduced. So, in the area where internet access is available, the e-learning programme should be introduced and it will be very good.

Researcher: You are using it from your dorm and from the lab. But have you ever tried it outside this compound?

Participant [10]: Yes.

Researcher: Did it work?

Participant [10]: No.

Researcher: Even if internet connection is available in that area? While you are using your cell phone for Wi-Fi or mobile data connection, have you ever tried to access the e-learning portal?

No, I haven't, because out of this campus, if you try to open our internet, it is not available except by using our mobile data. So, I have never tried it.

Researcher: You said it is not difficult for you to access e-learning. Why is it not difficult?

Participant [10]: I see it from two perspectives. The first one is using technology which by itself is not that much complicated. If there is short-term training, it doesn't require sophisticated skill. So, with a short-term training for everybody, using the technology will not be difficult for anyone. The other one is from the perspective of using the e-learning system. Getting knowledge through the use of this technology is not difficult for me or for anybody. I can get any information through that portal because I know how to use it.

Researcher: Because you have enough technical skill

Participant [10]: I mean, just for the purpose of using that e-learning module, I have enough knowledge but I can't say that I have more knowledge about technology. But I mean that based in the training I have received, I know how to use this portal. I don't need long term training to use the e-learning module. I don't have to be a computer science graduate to use the portal. The training I have received is enough. That is why I said it is easy.

Researcher: Do you encounter any challenge with e-learning?

Participant [10]: I encountered some problem while using the e-learning module. As I said earlier, internet is disconnected most of the time in the campus. Even when there is internet connection, the centre where e-learning is managed gets disconnected. There may be internet connection around our dormitory. However, we cannot get connected with the centre. That means, while internet connection is available, the portal may not be active. This is a recurrent problem. The other problem is that the passing mark is 70 and above. When students score 70, they don't pass and the system has to be fixed manually by a technician so that the student who made 70 can pass. Otherwise, the student will have to do the tests again and score 80 or 90 so that the system can automatically recognise the grade as a passing mark.

Researcher: What kind of e-learning resources are available in the university?

Participant [10]: We get soft copy of reading materials on the computers. Some of the materials are in the form of power point slides and we read them. We also get audio lectures which we can use as help before or after reading text materials on the same topic.

Researcher: Is the audio lecture from a record of your instructor's speech in class?

Participant [10]: The voice on the audio lecture is that of another instructor.

Researcher: A foreigner?

Participant [10]: No, not a foreigner but an Ethiopian lecturer.

Researcher: In English?

Participant [10]: Yes, it is in English. Our instructor provides guide in the class. He gives us discussion points in class and we discuss them in groups. After we discuss them, the instructor summarises them for us.

Researcher: Do you think it would better to have a video lecture?

Participant [10]: Yes, I believe video would make the learning experience better as you have to see some practical demonstrations. We learn more by seeing in addition to what we learn by hearing and reading. The quizzes can be taken over and over if a student's first performance is not good enough. But a student may misuse this privilege and just keep trying over and over without studying. Such a student is more intent on passing the quiz than learning the lesson. The lessons presented in class may be wide and the evaluation is done once only. That means there is almost no evaluation by the instructor except one assignment or two and the test. The difference is that with the online module, you are evaluated frequently.

Researcher: What you are saying is that in class you have one final exam while the continuous assessment is online. Are you saying that is not helpful?

Participant [10]: It is helpful somehow.

Researcher: Are you insisting there should be continuous assessment in the physical class?

Participant [10]: I am saying it would be helpful to have continuous evaluation in class too. The quizzes in the e-learning system are not used for determining if a student passes or fails. If it were used for that purpose, every student would participate in it.

Researcher: So, a student may attend class, read hard copy materials and pass the exam without ever using the e-learning system.

Participant [10]: Yes, that's right. A student may read the material, for example containing six chapters, and take the exam and pass it. There are quizzes on the e-learning system for every chapter so by taking them a student passes from one chapter to the next. If a student fails the quiz for one chapter, he or she cannot start studying the next chapter.

Researcher: Suppose a student fails a quiz for a chapter online, is he not allowed to go on to the next chapter in the physical class?

Participant [10]: No, failure online doesn't affect a student's status in class. Such student will simply be denied access to the next chapter online.

Researcher: So, the motivation for taking the online classes and quizzes is not very strong as results online do not matter in the actual class.

Participant [10]: That's true.

Researcher: Will you not face questions drawn from the lessons posted online?

All the materials posted on the e-learning system are available in hard copy. The materials are the same.

Researcher: Or a student can have another student do the online quiz for him and he will pass it. Wouldn't it be good to have all students sit in the lab for the online quiz under a teacher's supervision so that everyone will do the quiz on their own?

Participant [10]: That would be very good.

Researcher: In that kind of a situation, a student learns to use technology and at the same time prepares himself for the class tests.

Participant [10]: Yes. In that process a student develops the necessary skills to use the technology without being forced to learn.

Researcher: What are the available resources?

Participant [10]: Soft copies of hard copy materials are available online.

Researcher: Are the computers in the lab enough?

Participant [10]: Most of us use our own computers and there are some computers in the lab.

Researcher: Are the computers in the lab sufficient?

Participant [10]: No, they are not enough. Some of them break down. I cannot say there are enough computers because they don't match with the number of students. If it were not for many students who bring their own laptops, the computers in the lab would not have been useful for anybody. There are not more than ten to fifteen computers in a lab under one block. The students are too many while the computers are too few and therefore they are not enough.

Researcher: So, this might make taking the e-learning difficult.

Participant [10]: Yes.

Researcher: Are students comfortable using the e-learning system or do they find it challenging? What kind of challenges do they face?

Participant [10]: E-learning is a new experience for me and for most other students. They were at first confused about how to go about using it but once they began to use it they no longer believed it was challenging. I haven't seen any student being challenged with the use of e-learning.

Researcher: Are you more motivated by the e-learning system than the actual face-to-face class?

Participant [10]: No, it doesn't motivate me more than the face-to-face class. Considering the problems attending the e-learning system currently, the face-to-face class is much preferable. But if the problems were dealt with and removed, e-learning would be more interesting than it is at the moment. If the problems with the internet and other technical issues are magnified with the number of courses, then e-learning would not be very appealing. Without continuous assessment of how much a student has learned, it is not easy to evaluate learning with just one final exam at the end of a semester. And a student can score high result at such an exam just by spending a whole semester on the reading material. I can attend class for six months and take just one quiz by the end of the sixth month. That is not the proper evaluation to determine whether I should pass or not. The assessment is continuous in the face-to-face class. I can see myself in every chapter. If such practice were incorporated in e-learning, it would be more attractive.

Researcher: In the face-to-face class exams and assignments are quickly corrected and students have chance to see their level of performance and understanding. But when it comes to online learning, a student may think he can take the test once at the end of a semester and whatever his performance it will not affect his status in class. Is that what you are saying?

Participant [10]: Yes and doesn't motivate students. However, if it had impact, since the presentation of lessons is supported by technology, it would be more motivating than the other. It is because of the current gaps that it is not so motivating in its current condition.

Researcher: So, one's performance on the e-learning platform doesn't impact grades in the actual class. And this may prompt some students to think that it is no use to do the e-learning.

Participant [10]: If performance on the online quiz mattered in actual grades, e-learning would be more motivating. When the instructor is teaching, he uses very simple, understandable language on the audio and one can hear the audio over and over. It is the same in class but there is interaction in the class. Moreover, there is the reading material in addition to the audio. We even learn how some words should be pronounced and that helps us.

Researcher: But do you gain more knowledge through the e-learning?

Participant [10]: Yes, you can gain more knowledge though you don't get marks.

Researcher: The reason it failed to motivate you is because it was not graded.

Participant [10]: Yes.

Researcher: When it comes to technological issues, do you think that the internet connection provided by the university is reliable? Is it stable and consistent?

Participant [10]: No, it is not stable.

It is intermittent.

Yes, most of the time and owing to the frequent power failure which also affects internet connection.

Researcher: Are the hardware and software components in the lab functional?

Participant [10]: The computers are functional but their number is too small.

Researcher: So, you are saying that they are functional except they are too few. And they could serve well if they were upgraded.

Participant [10]: Yes.

Researcher: How good is the wireless internet connection?

Participant [10]: It is good but the signal gets weak as you move away from the access point. So, we go out and gather at the spot where the signal is the strongest.

Researcher: It would be good if the coverage were wider.

Participant [10]: Yes.

Researcher: Have you ever used video conferencing sessions for discussion, experience sharing and other purposes?

Participant [10]: No, we haven't.

Researcher: Do you think it would be good if you could use video conferencing sessions?

Participant [10]: Yes, we could learn from one another.

Researcher: Would it be helpful if a lecturer from another place lectured you through video conferencing?

Participant [10]: Yes, that would be good because we would be exposed to experiences from other places.

Researcher: The following is a question about your e-learning management environment. Do they motivate and encourage you to take e-learning? Do they regularly upgrade facilities?

Participant [10]: There is just a little but not much. We were trained and when we run into trouble, we consult them. They improve the materials. There is noticeable improvement on the materials from last year.

Researcher: The courses are the same but their materials have been upgraded.

Participant [10]: Yes. The instructor has a means of telling who has used the material and who has not. He comes with a list of names to class and tells us where each of us is on the course. He complements those who are on schedule and encourages those who are lagging behind to catch up.

Researcher: Is the interface of the e-learning portal user-friendly?

Participant [10]: It always looks the same but they have tried to make it attractive.

Researcher: What can they do to make it more appealing?

Participant [10]: They have set a photo of Addis Ababa as a background image but there are other things they can do to make it still more attractive.

Researcher: Are there rules and regulations on the use of e-learning that you are aware of?

Researcher: There are rules on passing from one course to another.

Participant [10]: Yes, I am aware of that.

Researcher: You can’t go on to another course before finishing the one you have started. There are set durations for every course and you cannot finish as many chapters as you want on your own pace. If a two week period has been assigned for a chapter, you cannot go on to the next until those two weeks are expired. So, if you finish chapter one in two days, then you will have to wait some days before you can start chapter two.

The system stops you.

Participant [10]: Yes.

Researcher: Are there rules on the use of memory sticks or how long a student can use a computer in the lab?

Participant [10]: I am not aware of such rules and mostly I use my own laptop. We were not given rules on what to use or what not to use.

Researcher: Suppose a student goes into the lab during exam week and spends the whole day on Facebook while another comes along looking for material to help him prepare for the exam. There has to be some restrictions on the use of the lab for entertainment and fun while some are waiting to get a computer.

Participant [10]: Such rules would be very useful because we have seen what you described happening in the lab. Sometimes, we go to the lab when we want to do a project in group. Some people may use a computer for a long time on irrelevant activity like browsing Facebook. If there were rules as you said they could deal with situations like this. There are a lot of free resources on the internet which many people want to access. But when someone holds a computer for many hours just for fun, they are wasting the time of those who want the computer for a more worthy purpose.

Researcher: I have finished my questions. Do you have comments?

Participant [10]: It is good to upgrade the e-learning system with the help of a study. The current situation is suitable for the use of technology and its relevance is unquestionable. Face-to-face learning is more expensive than e-learning and costs more time. But where internet connection is available, the e-learning is better in many ways. I believe the use of e-learning should be encouraged and expanded. And if the existing e-learning is upgraded it will be helpful in building many people’s knowledge, skills, and attitude.

Participant [11]

Researcher: Do you use e-learning?

Participant [11]: Yes.

Researcher: How often do you use it?

Participant [11]:I use it at least twice a week.

Researcher: And what do you use it for?

Participant [11]:I use it for academic purpose.

Researcher: When you say for academic purpose, you mean for courses, assignments or exam?

Participant [11]: We have a course, Ethiopian Public Administration prepared by the university. It has two parts: modular and e-learning. The e-learning part is offered by the university which I follow from the notes and videos all the way to the quizzes.

Researcher: Do you require any special technical skill to use site/portal?

Participant [11]: Yes, at the beginning it wasn't easy till we got used to it. It requires IT knowledge. We used to ask for the technicians help at the beginning. It requires some computer literacy and knowing how to use the internet.

Researcher: What do you have to know so that you can successfully access and use the e-learning portal?

Participant [11]: You need to know how to access the internet and after that there are steps to finding the videos. Going through these necessary steps takes some IT knowledge.

Researcher: What do you use site/portal for? Do you use it for instructor info, schedules, assignment, electronic resources, video, or audio-supported e-tutorials?

Participant [11]: It contains the contents of our lesson. It has six chapters each with introduction and notes. Following the notes, you find video lecture of what we learned in class followed by quiz. You must score 70 on the quiz or it will not let you pass to the next chapter. Therefore, I read very well before taking the quiz. If you miss an answer, you can go back to the quiz till you score a 100.

Researcher: So, you get the classroom lectures as videos online?

Participant [11]: Yes. The lessons we take face-to-face in class with the use of power point. That's just to guide us along the way. The e-learning is more helpful. Personally, when I don't understand a certain point during classroom lecture, I go to the online video. There are two advantages to watching the video: first you see with your eyes and hear with your ears. That's why it is better than the reading material and the classroom lectures. I would rather watch the videos than read the notes. For example, I just sat for exam today but I had studied at all; I merely watched the lecture videos.

Researcher: So, you find all kinds of resources like notes, videos, and lectures?

Participant [11]: Yes, it has everything we need.

Researcher: Is there a discussion forum where you and other fellow students share thoughts?

Participant [11]: Yes, there is. I haven't used it much but there is. I was using it at the beginning but students are not going at the same pace with the lessons on the e-learning portal. Only few students have finished the chapters while most are lagging far behind. Some of them simply do the quizzes without studying the lessons so that they can quickly finish all the chapters. They don't listen to the lectures but that is not the right thing to do. They just want to play the videos. When you play the first video then you are allowed the play the second and so forth. So, they go through the videos without reading the notes and take the quiz. Then they pass the quiz with the minimum passing mark and move on to the next chapter. I think it would be for their own good if they listen to the lessons. But as for me, not only do I watch the video online but also I download it for future use.

Researcher: So, you are telling me that there was a discussion forum on the system.

Participant [11]: Yes there was. I have used it myself for some time.

Researcher: And you were able to talk with other students?

Participant [11]: Yes, but the other students were not using it much.

Researcher: If you post a message on the forum today, will the other students see it days later and respond to it or do you engage in live chat?

Participant [11]: No, it is not live chat. You post a question or an idea and some students respond when they find it.

Researcher: But it would have been very helpful if you could post concerns about assignments and somebody could respond to it instantly.

Participant [11]: Yes.

Researcher: It could be about the course or about reference books.

Participant [11]: Yeah, that's right. If all students were alert and responded quickly, that would have been very good.

Researcher: But why do you think they are not alert and don't respond instantly? Do they lack the motivation or what is the problem?

Participant [11]: Students have seen that exam questions are not sourced from the notes and quizzes on the modules but from other sources. Therefore, most students think that the e-learning portal is not of much use to them.

Researcher: What I understand now is that the quiz on the module may expand your knowledge but your performance on the quiz will not be recorded for you.

Participant [11]: That's right. And it has videos which are helpful but the questions on the quiz may not be same as the questions we face in class exam. The exams are also different from what we know commonly. For example, a multiple choice question may come with four choices and all may be the correct answer. But we are used to choosing one correct answer from among four choices.

Researcher: But the quizzes help you prepare for class exam.

Participant [11]: Yes, they help. I didn't say they don't help. It's just that the exams are not a copy paste of the quizzes from the module.

Researcher: So, that discourages other students.

Participant [11]: Yes.

Researcher: But you have benefitted from the videos.

Participant [11]: Yes, I have. And I believe that I should improve my command of English. Therefore, I have saved the videos on my hard drive for future use.

Researcher: So, what's your opinion or feeling about e-learning?

Participant [11]: I am very positive. I like it very much and I would welcome any improvement. Some of the lectures are too fast for me and I wish they could be just a little slower.

Researcher: Can you see the lecturers or do you just hear their voices?

Participant [11]: We don't see videos. We only hear their recorded voices and they speak too fast. So, while playing the audio, I pause it often to take notes.

Researcher: So, you suggest lecturers speak a little more slowly when being recorded.

Participant [11]: Yes.

Researcher: What if exams are administered online? What do you think?

Participant [11]: That would be very good.

Researcher: Why is it so good?

Participant [11]: It can prevent cheating through text messaging and short notes on slips of paper. But on the module, you have no chance of cheating.

Researcher: Because you take it live?

Participant [11]: Yes. It would be very nice and boosts your self-confidence.

Researcher: You can also see your results then and there.

Participant [11]: Yes.

Researcher: Therefore, it can motivate you more.

Participant [11]: Yes.

Researcher: You are taking Public Administration Online. Does the e-learning motivate you more than the other courses which you take face-to-face?

Participant [11]: Yes, because some of our teachers are Indians and we cannot hear their English. Besides, there is one teacher who doesn't teach well but assumes we understand everything. If all courses were offered through e-learning, there would be uniformity and with lecture videos some shortcomings of teachers can be overcome. There was a course taught by a certain doctors who showed but only few times a month and I have learned nothing from that course. There are teachers who don't use most of their time properly and the e-learning system can make up for the times they

don’t show up in class. So, if the videos are available, it doesn’t matter if the teacher shows up or not.

Researcher: You will listen to a recorded lecture.

Participant [11]: Yes. It will be very good if lecture videos are uploaded for all courses.

Researcher: So, I am given to understand that you are using the portal frequently. Do you think using it is easy or difficult?

Participant [11]: Sometimes, at night you may fall asleep while listen to a lecture; therefore, you should find some way of keeping yourself awake. It happens to me usually about midnight. So, when I begin to feel drowsy, I pause and take a break. There is no other problem. The internet problem has nothing to do with the portal itself but with Tele.

Researcher: Are you able to access the e-learning management portal from other places outside the college or do you access it only here?

Participant [11]: No, you can’t access it and that’s why I save the videos. It works only here. I haven’t been to other places where internet is available and I have no access to the internet at home.

Researcher: But you have tried it at home and it didn’t work.

Participant [11]: I have no access to the internet at home. That’s why I make copies of materials while I am using the module.

Researcher: So that you can access the materials offline

Participant [11]: Yes. I can use them at home. I have saved all the materials I need and I think I am the only one who has done so. I can review the lessons when I am at home at the weekends. I don’t know if the e-learning module can be accessed outside the college since I have no internet access when I am away from campus.

Researcher: Are there challenges related to the use of the e-learning portal? Have you faced any?

Participant [11]: I haven’t faced any problems. As long as there is internet connection on campus, there is no problem. The only problem is the internet which is common for the whole country.

Researcher: So, the only problem you associate with e-learning is the problem of internet connection.

Participant [11]: Yes. It is only the connection.

Researcher: Do other students find using e-learning a challenge?

Participant [11]: Yes, there are some for whom it is challenging. There are some of my friends who regularly report problems with the portal. I think it is a computer skills problem.

Researcher: What e-learning resources are there in your university?

Participant [11]: How do I know?

Researcher: For example, are there electronic sources in the library, or computers in the lab or any other sources that you are familiar with on this campus?

Participant [11]: I have seen big computers in the class but I don't know what other resources they have got. I haven't seen the lab.

Researcher: You use your own laptop.

Participant [11]: I use my own laptop but there are students who don't own a laptop but most of us have got one. There are about twenty-four of us and those who haven't got a laptop account for less than ten per cent of us. Some use laptops provided by their workplace but I use my own.

Researcher: And you can connect wirelessly.

Participant [11]: Yes. A student joining this college needs to have a laptop. Every student needs a laptop.

Researcher: Are there sufficient resources here?

Participant [11]: How do I know?

Researcher: For example, you may go to the lab and use the computers there.

Participant [11]: There are enough resources in the lab. You mean the university's computer lab?

Researcher: Yes.

Participant [11]: It's quite enough. I have never seen anyone going there and not finding seats. Most students use their own laptop; therefore, the computers in the lab

are enough for those who don't have their own laptop. But if all students used the lab, the computers would not be enough.

Researcher: But if more courses are given through e-learning, then the computers would not be enough.

Participant [11]: Well, if many courses were given through e-learning, the computers would not be enough. We are taking five subjects in one semester and if we take all through e-learning, we will need twice as many computers and more human power.

Researcher: Does the university provide reliable internet connection?

Participant [11]: It's good.

Researcher: How about the wireless connection?

Participant [11]: The wireless is also good.

Researcher: I was wondering about the one in the lab.

Participant [11]: I don't use the lab because there is wireless network in the dormitory and my laptop can access that.

Researcher: Is the wireless network near the dorm good?

Participant [11]: Yes, it's very good.

Researcher: Do you have a video conference session? And do you use it for sharing among students?

Participant [11]: I haven't used video conferencing but I know how to use it. Sometimes, we make video calls with friends.

Researcher: But is it available on the system?

Participant [11]: I don't know if it is part of the university's service but I have learned how to use it.

Researcher: Do you think if live lectures and experience sharing were held through video conference with universities abroad? Would that be helpful to students here?

Participant [11]: Yes, it would be very good. There are differences between teachers. One teacher could be better than another. It can also help to have fewer foreign teachers. When they come here they are paid a lot and we don't know whose money is going into their salary. If the video conferencing goes into regular use, it would be

possible to teach good lessons with fewer teachers. More students could be reached by one teacher. Once a lecturer is videotaped, he can reach thousands of people. There is big difference among teachers and if the video conference is used regularly, the differences can be minimised. The teacher in class will only facilitate the conference.

Researcher: So, the teacher will do the facilitation in collaboration with IT department and e-learning department.

Participant [11]: Yes, and that would make the learning process easier. The implementation will be difficult only for the first time.

Researcher: Would it be good if an international expert on a subject is videotaped and transmitted live to you?

Participant [11]: That's what I am saying. That would be fantastic. Even among Ethiopians, one teacher is better than another.

Researcher: And on the management side, have you ever seen the lab or the wireless network being upgraded?

Participant [11]: We only know about the wireless network around the dormitory. We have no means of knowing what goes on in the university.

Researcher: Have you not seen wireless network being installed for you?

Participant [11]: It had been installed before I joined the university but I have seen technicians fixing it when it breaks down. We tell the proctors when power failure happens. At such times the connection would go off too. We report that and they fix it. That's all I have seen.

Researcher: So, you are saying that the e-learning environment is supported.

Participant [11]: Yes, but first we have to report problems. We don't know who fixes the problems but all we have to do is inform the proctors. We saw no problems recently.

Researcher: Does the management support the e-learning environment to make sure it is always in operation?

Participant [11]: I don't know much about management but I guess it supports; otherwise, we would not have such a well-functioning e-learning system.

Researcher: Would you be glad if all courses were also supported by e-learning like the one course that is currently supported?

Participant [11]: Yes. It will also be very good for the coming generation.

The face-to-face class can go on as it is but blended with e-learning it can be better.

The e-learning is better than the face-to-face teaching. I have performed well in one course without the teacher teaching me anything in class. The e-learning can also make up for a teacher on a sick leave or absent for some other reason. I wish all subjects were taught through the e-learning system.

Researcher: Has the institution ever given training on the use of the e-learning system?

Participant [11]: They gave us once. It was Yared who trained us and I have found the training very helpful. And after that training, I have become even a better user of the internet. He has taught us how to sign up for an email account and helped some of us create our email address besides showing us how to use the university's e-learning portal.

Researcher: Were there follow-up training sessions?

Participant [11]: No. It was given only once. But whenever we need help, they support us.

Researcher: How is the interface? Is it user-friendly or not?

Yesterday, I was taking the online quiz. You click on the "submit answers" button and it takes several minutes. I think that's has to do with the connection problem. This may waste time and irritate some people. Sometimes it has delayed more than thirty seconds.

Researcher: So, you suggest it would be good to make it faster by getting rid of some of the heavy graphics.

Participant [11]: It's very slow and takes time to load and that may discourage some users.

Researcher: Is the interface easy to understand and use? Can you easily locate the items you want on the interface? Is the layout simple and attractive?

Participant [11]: Yes, it is attractive. The problem with some students is that they just don't know where to click. For example, I am taking Public Administration and I click on the link for Public Administration. When I click on a list of courses, the list appears and I select the course I am taking. This may take some time. But there are still some students who don't know how to do this. If they were given a simple written instruction on paper that would perhaps be of some help to them.

Researcher: Does the university have rules and regulations regarding the use of e-learning? There could be different rules for the protection of resources and fair use and share among students.

Participant [11]: No, there is no rule. I haven't seen any. A student goes into the lab and may stay there the whole day. I have been only a few times to the computer lab and I am not aware of any rules.

Researcher: Do you think it would be helpful to have rules?

Participant [11]: It would be good to have them. As the number of students is increasing, rules on the use of the lab would be necessary. I haven't seen the facilitators asking those who have been in the lab for many hours to leave so that others could take their turn to use the computers. I was in the Addis Ababa University main campus and we were allowed to use certain books from the library only for some hours. Some punishment would be imposed on you if you didn't return those books in time. There may be some students who use a computer in the lab just for fun. So, it would be good to have rules and regulations. I have seen some wasting time on Facebook. There should be rules on how long a student can stay on a computer.

Researcher: How about at critical times…

Participant [11]: Yes, at critical times like when you are preparing proposal for senior essay, many students may want to use the lab. Rules are important for proper use of the lab at such times.

Researcher: I brought up critical times as an example. I think there may be other reasons that make rules necessary.

Participant [11]: Of course, there are.

Researcher: There should be rules for the mutual benefit of students and the institute.

Participant [11]: Yes.

Researcher: I have finished my questions. Thank you.

Participant [12]

Researcher: Do you use e-learning?

Participant [12]: We use e-learning but not very often. We started using it at the beginning but we had issues with how we used it. The university had tried to give us some training on the use of e-learning but we didn't know very well. It was a half-day training and we didn't get adequate knowledge though it. Therefore, whenever we encountered a problem, we appealed to the technicians for help. We had lots of problems with e-learning and I don't think we are getting as much as we ought to get from it. They have tried everything in their power to help us but I believe they also have a shortage of human power.

Researcher: There are courses offered through the e-learning portal. Are you using e-learning for those courses?

Participant [12]: Yes.

Researcher: How many courses are there?

Participant [12]: There is a course known as Public Administration which has videos on the portal. We use the e-learning portal for that course but as I was saying before, we are not using it well because of knowledge gap on how to use the e-learning portal. Not only Public Administration but also there are other courses for which we use the internet but due to lack of knowledge we are not doing as much as we ought to. Sometimes, we are so ashamed of asking repeatedly for help that we avoid it altogether. There are technicians working in the university's lab whom we approach for help. Sometimes, they give us just a little help and promise more another time but it is hard to get hold of them afterwards. Sometimes they are not happy to help. We have faced a lot of challenges due to the fact that we come from various regions of the country where we had had no chance to practice surfing the web or in some cases even using a computer.

Researcher: What can the university do so that you can use e-learning perfectly?

Participant [12]: The university needs to have enough human power in the lab so that we can get help whenever we need it. There is a problem of materials and equipment

in the lab. Some of the computers have broken down and have not been fixed. I believe we will benefit if the computers are fixed.

Researcher: You are telling me that shortage of assistants that can show you how to go about using the e-learning management system.

Participant [12]: That's right.

Researcher: You are also saying there are problems related to resources.

Participant [12]: Yes.

Researcher: How often have you been using the e-learning portal to get the materials posted for the course?

Participant [12]: About the beginning of the first semester, I was so confused about the use of e-learning that I hardly used it but in the second semester they gave us some training and when we began to take Public Administration and that was when I started using it with a little more confidence. An hour or two of training should be offered at least for an hour or two a week if not daily to help students like me.

Researcher: You have become a little more familiar with the system after receiving some training. So, do you now check the system at least once a day, or once a week? How often do you check it?

Participant [12]: We have assignments most of the time for which we need to use the computer or internet connection. I turn on my own laptop spending on it at least thirty minutes to one hour a day. That may not be enough but when there are assignments, I spend about three to four hours on my laptop.

Researcher: Do you believe that you can use the portal?

Participant [12]: There are problems which I face while using the portal because of gaps in technical knowledge. As a result, we don't use it as much as we ought to. Sometimes, when I don't know what to do, I go for help to those who know better. I still don't know very well how to use the e-learning portal.

Researcher: Does the use of the e-learning management system require any special skill?

As far as I am concerned, yes it requires a lot of technical skills. Those who have the skills are benefitting a lot while those who don't know much are not benefitting as they

should. Participant [12]: We are worried about how we are going to process data using SPSS when we do research.

Researcher: So, students who know how to use computers can successfully use the e-learning platform.

Participant [12]: So, the requirement is only knowing how to operate a computer or surf the internet.

So, when you were using the portal of this module, what were you using it for? Were you using it for assignments or schedules or what were you using that website for?

Researcher: What exactly where you using?

Participant [12]: It's a tutorial like YouTube video containing audio and video together and it helps you to facilitate that specific course.

Researcher: Ok, you mean if they provide the material manually or with a flash disk, you cannot use the electronic resources. Did you ever use this site or portal to discuss any course content with your fellow students as in a discussion forum?

You were using it for discussion about assignments for that course. And was it helpful?

I would like to know your feelings about e-learning. Can you access it anywhere? Can you access it from cafés or from cell phone? What is your opinion about its accessibility? Is it accessible anywhere?

Do you think the use of e-learning has motivated you in your studies? Was it motivating you in your studies or does it have no difference from other courses?

Do you find the use of e-learning easy or difficult in general?

What specifically makes it easy for you? What are the things that make it easy for you? This might help other students.

Now we come to challenges. Did you encounter any challenge while using e-learning?

Do you all use one username and password?

Participant [12]: It is like common things that you get in the system.

Researcher: So, if your assignment is marked and sent to this assignment system, can it be private?

In general, you said there were challenges. What kind of were they?

What do you mean when you say the authentication issue? Is it not easy to get it or it is not working?

Do you think your fellow students might also have encountered challenges with e-learning?

Participant [12]: I have checked it with the developers in the IT department.

Researcher: What e-learning resources are there in your university?

And in general, can you tell me about resources like availability of computers and related equipment?

Yes. What resources do you have in the labs or libraries?

Is it video conferencing?

Is it broadcast from other countries or from here?

Of Addis Ababa University?

You mentioned international universities. Are they coming here?

Oh, now I get it. It’s like a new kind of knowledge sharing.

You have heard about it and know about it. But is it accessible?

But benefitting from this system is not for you.

But do you think if that were applicable for all –

Do the available resources pose and challenge to students?

Do you think these resources are helpful? How can the university make them more useful for students? What should the university do?

Does the university provide reliable internet connection?

Are the hardware and software components in the computer lab functional?

What do you think is the problem? Is it a monitoring problem or…?

Is there good wireless internet connection in your university?

All in all, it can be the strength of the signal or the bandwidth. Is it fast or does it have a wide area coverage like you said? Is it useful for you? Can you say there good wireless internet connection?

You have your own username and password, right?

But, can we say that there is wireless internet for students?

So, this is a barrier to facilitating e-learning.

Is the video conferencing session for academic discussion? Have you ever used video conferencing kind of sessions?

Participant [12]: No.

Researcher: Do you think it would be helpful if there was one which you could share with international students and local students as you said?

Participant [12]: Yes, it would be very helpful. Most of us prefer learning interactively. So, that is one of providing that interactive feature of e-learning is through video conferencing or video lecturing.

Researcher: Is there any support provided for the use of e-learning?

Participant [12]: From the motivation or awareness point of view, there hasn't been that much support. I found out about the e-learning module from my instructors. That's how most of my friends learned about it.

Researcher: Are the e-learning facilities in your university regularly updated?

Participant [12]: I don't think so because the two or three courses that I have used on e-learning are a year or a semester apart. And all the pages I used for C++ are the same as the pages I used for Introduction to Control Engineering. Even the contents are not removed, they are not updated when the course is finished. You may even get some of the contents that you had been using two or three years ago.

Researcher: Are software upgraded?

Participant [12]: No. They used to upload soft wares.

Researcher: They used to give you free software?

Participant [12]: Participant [12]: Yes, like Logis Visual Studio, C++, Logism for logic, Digital Logic Design. They upload these soft wares in order for us to download and use them.

Researcher: So, in general, you are saying in e-learning facilities in your university are not regularly updated?

Participant [12]: No, they are not.

Researcher: Does your university provide e-learning training for students?

Participant [12]: No.

Researcher: Do you think it would benefit students if it were provided?

Participant [12]: Yes, it would benefit students regarding motivation and awareness.

Researcher: To give them technical skills and make them more comfortable with the system?

Participant [12]: Yes. All it takes is three or four days of sessions in the auditorium which accommodates about four hundred students. You can train an entire batch in three or four days.

Researcher: Do you know any ethical challenges? Does your university have rules on the use of the e-learning system?

Participant [12]: No, I don't think so.

Researcher: If they develop a rule for the use of the e-learning system, do you think that will be important for e-learning? For example, if there was a limit for the length of time one student is allowed to stay on a PC, would that be helpful?

Participant [12]: Yes. I think rules are important and rules can benefit the e-learning process. Rules on ways of accessing the modules are important but I don't think they will be that much effective and comfortable for students because you don't know how long one student wants to use the e-learning module. Students use the PC or their laptop or the internet connection for many purposes besides e-learning. So, the timing thing is not going to work but another solution that I would suggest is bringing additional resources. There are plenty of rooms that are vacant. They are not used for anything. So, you can use those rooms and the funds from the government for additional resources to accommodate greater number of students into the service. So, additional resources could be solution. And about the rules and regulations…

Researcher: What kind of rules do you think would be helpful?

Participant [12]: I believe rules are important but to be honest, I don't think they play a major role in promoting the e-learning process. Nothing comes to mind that indicates that rules will be effective solutions.

Researcher: My question was to explore if there were rules. If there are rules, what are the challenges of those ethical rules?

Participant [12]: I can't answer that question with a yes or no because I don't know them. So, the answer should be I don't know.

Researcher: Yes, normally I am asking you anyway that if we suggest to have ethical rules and regulations for e-learning, what can be as an input from your side? If you think that rules are important for e-learning…

Participant [12]: They are important but…

There are rules for e-resources like you can copy this and you can download this. There are many rules.

The rules regarding accessibility, it shouldn't be just students of the campus that can have access to the resources but others from outside the campus should be allowed to access the resources. But other people outside the campus should be able to access it. I am not saying that bluntly because when you give access to outsiders your network…

It will be vulnerable.

Researcher: Yes. So, most of the rules and regulations should be about the security like data protection and the one you mentioned... I forgot it. I think on security, rules and regulations play a major role. On other aspects, you should have a system that safely allows outsiders access.

Researcher: More of it relates to that and other accessibility rules like authentications…

The authentication -I don't understand why we were being given guest username and password. That means as you can understand from the name guest itself, when you are a guest you have limited access and privileges. Why isn't there a student privilege?

Again, sorry to ask, do you have a unique ID as a student.

Participant [12]: There is just one password and what the instructor does is he tells us to use a username and a password to access the contents. On the module, you sign in as a guest.

Researcher: Do you know why I am asking you this? If you have an ID number like 11, and if I create a username and password just for you, I can give you all the access for courses and assignments. You will be the one with access to the contents of the module and you will also be responsible for what happens on that account. Do you think that kind of thing can help?

Participant [12]: Yes. I was just saying it. I just don't understand why they weren't doing it the way you just mentioned. If you give a student a privilege with their own account and credentials, I don't see any problem with that.

Researcher: You will have the privilege of the student, whatever the student can have.

Participant [12]: Yes.

Researcher: So, that can be part of the ethical rule and regulation.

Participant [12]: Yes. Just as you made me review the ethical rules, you can do that on the website.

Researcher: It means like you have to acknowledge when you use something and you should protect the system and you will be responsible for that and so and so on. You can use this privilege.

Participant [12]: Yes, that's what I think.

Researcher: Is there anything more you would like to say on e-learning challenges in general?

Participant [12]: One big challenge that I forgot is the one that is on the side of the concerned bodies, the people who are responsible for the entire e-learning thing. It could be IT administrators, software developers, the scientific faculty director. I think the problem is on that area. If you work on that area, then it is up to students to use things like this. And trust me students have no problem using the module or the e-learning platform. I can safely say that we all acknowledge it, we all cherish it. We all want to use the e-learning module. I don't know if there is a way you can solve the problem going on in concerned bodies area. If you come and if you have the chance, and if you have the motivation and the courage, I think it will be nice to interview one of them. Can I ask you a question?

Researcher: Ok.

Participant [12]: Are you planning to do so?

Researcher: My study is only focusing on students. What I am planning is that I was planning to include instructors but I feel like the challenge is if I got the challenges from students, I can make this thing out of it from this I can make suggestions later on when I develop the framework. These are the challenges. That will be included in my framework because the students are the ones who will be really benefitting from e-learning. They are the ones who know the problems and the exact challenges. If I got this information from you, I will summarise the challenges and the gaps and later on if you fix this this this, e-learning will be implemented. And then later on, I will consult this with experts on e-learning. I will show them what I have found out about the challenges and my suggested solutions and I will ask them if they think my suggestions will work. Then, they might say anything. That's why I want to hear from students. If the e-learning system is good, they are the ones who benefit and if there is a problem, they are the ones who will see the challenges. If you ask the instructor, he will tell you yes there is a system and the students can use it. What I want to hear is what exactly students feel about the problem. To get the solution with they are the ones who make the solution. You prepare the framework and you tell them for this specific challenge you make this solution. They themselves want things to go right. They may not have this information. You tell them if you fix this, this thing will be fixed. You inform them with the framework and I think I can make a change. I was planning even to ask the instructors but I feel like they might not give me information like you guys. The instructor might not tell me if there is a problem. The problem is in general from the two of you that I spoke with, it the environment problem more. That's what I felt. It's not even a technical problem. I hope if the managements get this kind of detailed information, they will make changes because the benefit is for all. So, they will make a change. They will say, is this the resource problem? What can we do next? They might say this. This is my belief because we are working for the same goal.

Participant [12]: Yes. I hope you succeed in your goals. And I hope you get honest, genuine and hardworking listeners that are willing to address this problem and implement your framework and good luck.

Researcher: Thank you so much. You are a good student and you have given me good information. Thank you so much.

Participant [13]

Researcher: Do you use e-learning?

Participant [13]: Definitely.

Researcher: How often do you use it?

Participant [13]: So many times, I cannot count the number but I use it so many times.

Researcher: Do you use it often like on a daily basis?

Participant [13]: Mostly three times a week.

Researcher: What do you use it for?

Participant [13]: I used even for video lecture with taking notes by stopping it.

Researcher: So, you are using the e-learning for your course. Which course is that?

Public Administration

Participant [13]: Can you see the videos and audios at the same time or is it only audio?

I use the audio and the video at the same time.

Researcher: What I want to say is does the electronic lecture come with audio only or both audio and video?

Participant [13]: It comes with both. But when there are important notes that you need to take it also gives you subtitles and you write those. There is audible explanation and video. It comes with both.

Researcher: So, it has power point.

Participant [13]: Yes, there is power point. The speech or the video is accompanied by power point and it continues while you are looking at the power point.

Researcher: So, you use the learning system by accessing your university's portal. You take courses, watch videos and listen to audios. So, that's how you use the e-learning system.

Participant [13]: Yes.

Researcher: Ok. Do you say that you can use the portal very well? Can you operate it? Can you manage it?

Participant [13]: It is released by the centre and when the centre releases it, we can use it but there has to be Wi-Fi connection. You cannot use it without Wi-Fi or internet. Some people download the materials but we mostly use it online.

Researcher: But you know how to manage the system.

Participant [13]: No problem with that because they have given us orientation at the beginning.

Researcher: Does it require a special technical skill to use the system?

Participant [13]: Yes it does because to begin with e-learning is a new thing. Logging in with your own username and password and finding the subject you want require technical knowledge.

Researcher: What kind of technical skill for example?

Participant [13]: It is basic computer skills and the course offered by the university on how to use the e-learning system. You have to enter the portal and find your own course and you have to know how to do that.

Researcher: So, you have to know how to log in to your account, what buttons to press and what links to click. You have to know all these.

Participant [13]: Yes. You need all these skills.

Researcher: What exactly should a person know to access the e-learning portal?

Participant [13]: First you have to find the university's e-learning website. Secondly you must know the code of the subject you are taking. And you must connect with the centre.

Researcher: Which application (for example Word Excel) do you have to know how to use?

Participant [13]: You must know how to use the internet.

Researcher: What are the services made available in the site? Are there only course materials? Or is there also electronic tutorial? Can you find instructor information, documents, and schedules?

Participant [13]: There are schedules which the teachers have told us about at the beginning. The materials are prepared in two ways. They give hard copy of the notes

and then we get the rest of the lesson on power point. You need to read the hard copy first because they speak too fast.

Researcher: Who?

Participant [13]: The online tutorial is very fast. You have to pause the videos to take notes. So, we use the hardcopy and video tutorials together.

Researcher: Is there a discussion forum on the portal through which you can share ideas and feedbacks with teachers and students?

Participant [13]: There is a space for comments at the end of every chapter.

Researcher: When you finish what?

When you are done listening to an audio or watching a video tutorial, they ask you for comment.

Researcher: Is it about the teaching-learning process? Is it about whether or not you have benefitted from the e-learning system?

Participant [13]: It's just about your views on the presentation of the lessons. Assignments are mostly given in class. The instructor gives us the assignment in person.

Researcher: In hardcopy?

Participant [13]: Yes. If you have questions on the assignment, you can ask the instructor.

Researcher: Online?

Participant [13]: No, in person, but you present your questions to the teacher of the subject, not to the centre. So, we contact the instructor if we have questions or need discussions.

Researcher: But once you take the course and quiz online and submit feedbacks when you are done, who is going to see your comments and feedbacks?

Participant [13]: Yared sees it.

Researcher: You mean the centre?

Participant [13]: Yes. There is Yared and there is also Bitweded. I submit my comments mostly to Bitweded and he responds quickly.

Researcher: You give feedback if you encounter technical problems such as marking of quizzes on the system.

Participant [13]: Yes, and we also contact them directly.

Researcher: So, you exchange feedbacks similar to the teaching-learning process in class.

Participant [13]: Yes.

Researcher: You can ask questions related to the subject face-to-face too.

Participant [13]: Yes.

Researcher: Generally, what are your feelings and opinion on e-learning?

Participant [13]: This is a new experience. It can be difficult at the beginning till you get used to it. But once you get used to the technology, it will not take you long. The lessons are very well prepared and the presentation is attractive but we are taking only one course through e-learning. If all subjects were taught through the portal there would be the same standard. The online tutorials are sometimes so fast that you can hardly catch up with them.

Researcher: What should be done about them?

Participant [13]: There should be support in class.

Researcher: Do you mean support for the online class?

Participant [13]: Yes, it would be good if the teachers summarised the online tutorials in class. There could be something you missed while taking the tutorial online. It would be good to have a summary of all the tutorials when we are in class.

Researcher: You are saying it would be good to discuss in class the materials you have found online.

Participant [13]: Yes. It would be nice to have it in a condensed form in class. But it is online one subject.

Researcher: What's so good about giving all courses online?

Participant [13]: The people who present the lessons online are very competent. They prepare themselves very well on the material. You find there things you have not seen in the notes. The way you see things and the way they see them are different. It would

even be better if there was a laboratory for demonstration. There are Ethiopian instructors and there are Indian instructors. What the Ethiopian teaches you is very different from what the Indian teaches you. The Indian may download and teach you while the Ethiopian prepares himself and teaches you. There is a difference of competence and therefore it is good to have the online learning system.

Researcher: To have the same standard for all?

Participant [13]: Yes.

Researcher: The courses are prepared and uploaded by Ethiopian instructors, right? It is a standard, well prepared course and all may benefit from it.

Participant [13]: Yes.

Researcher: Is the portal accessible outside the university premises?

Participant [13]: We haven't tried that. You may not get it. And unless you are a student of this university, you will not be able to access it.

Researcher: Suppose a student is somewhere outside the university premises and wonders if an assignment is posted and wants to check it. Can he do it if his mobile is connected to Wi-Fi?

Participant [13]: I think it is restricted.

Researcher: It may be. But would it be helpful if it were accessible from anywhere?

Participant [13]: That would be very good. You can learn from anywhere.

And you may not have to come here to do assignments.

You may not have to come here to do assignments.

Participant [13]: Yes.

Researcher: Is the e-learning easy or difficult?

Participant [13]: We started it only with Public Administration and I think it is not difficult.
Participant [13]: The presenters of the tutorial both speak and write and, therefore, it is easy to follow them. The difference of e-learning from plasma is that you don't see the presenter but their voice and see the subtitles. You don't see the presenter.

Researcher: Would it be helpful to see a video of the presenter? For example, if the tutor is showing you an object or some equipment while explaining its function wouldn't

it be enough to see the object and only listen to the explanation of the tutor without seeing his face.

Participant [13]: That would be enough.

Researcher: Does the introduction of e-learning motivate you more in your studies?

Participant [13]: We are more accustomed to attending face-to-face classes. We took the e-learning in the first semester and most people were not listening to the teaching on the video.

Researcher: Why?

Participant [13]: Some people had no time and sometimes the Wi-Fi was down. So, most people saw the videos toward the end of the semester when exam was approaching. You listen to every unit and do the exam at the end of it.

Researcher: But your performance on the online quiz does not affect your grades.

Participant [13]: No, it doesn't. But you have to score at least over 70 or you will have to take it again.

Researcher: Suppose you don't do the chapter again and you don't score above 70 on the quiz. Will your teacher say you cannot take the class test unless you complete the online chapters and quizzes?

Participant [13]: Yes. The teachers follow us up. They know where each of us because they get reports on how we are progressing. Our students are more comfortable with the face-to-face class.

Researcher: Why is that?

Participant [13]: That is because the e-learning is a new experience. Moreover, we don't have much time due to the many assignments which we have to do. Otherwise, it is very nice when you listen to it.

Researcher: So, as a material it has no problem. But people are not accustomed to it yet and it is only one course that is offered online.

Participant [13]: That may be the reason. Otherwise, it is a very attractive medium.

Researcher: Though your performance on the online quizzes does not affect your grades, the instructor will still follow you up.

Participant [13]: Yes.

Researcher: What are the challenges related to e-learning?

Participant [13]: The main challenge is internet access and without it you cannot listen to tutorials. Besides, not everybody has a laptop and that also is a challenge. There should be access to the internet and it needs follow-up.

Researcher: What kind of follow-up?

Participant [13]: The student needs a follow-up to take the online lessons.

Researcher: So that's the way a student is motivated.

Participant [13]: Yes. A student should take all the lessons and the quizzes and to do so he needs a strict follow-up. If you stick to the textbook only and neglect the e-learning portal, there will be some important point which you will miss. For example, there is the Qatar change model on the portal which you don't find in the book.

Researcher: It's only available online.

Participant [13]: Yes. Last time those who did not follow the online tutorials didn't perform well on the class exam. They might have done the quiz but they probably had not watched the videos.

Researcher: So, the school should not only upload materials but also follow-up students.

Participant [13]: Yes. Another challenge that comes to mind is the fact that you don't take any mid-exam until at the end of the semester you take only the final exam. If you take a mid-exam you will be able to anticipate the kind of test you will encounter on the final exam and that would be helpful.

Participant [13]: The online portal has quizzes at the end of every chapter. So, I think the instructor believes that the online continuous assessment helps students to have an idea how well prepared they are for the final exam.

Researcher: Yes.

Participant [13]: As I have heard from you and others, most students don't read the online materials but only take the quiz just so that they can go on to the next chapters. And the reason they aren't motivated to take the online lessons seriously is because

their actual grade is not affected by their performance on the quizzes. So, they need motivation.

Researcher: They would be motivated if there were mid-exam.

Participant [13]: If every student used it consistently, the online lesson and quiz would help them prepare for final exam.

The problem is that some people may take answers from those who did the quiz the previous year and never bother themselves to prepare.

Researcher: So, there should be a controlling mechanism.

Participant [13]: Yes. We go three times a week to the lab for e-learning and it would be to have somebody watch students while there are doing online quiz.

Yes, because the course is once uploaded on the system and then it is in your hands. There should be assessment and there is no one to do it. But your instructor somehow follows you up.

Yes. He sees the report. The system informs the instructor on how many chapters every student has taken.

Researcher: So that's how the instructor knows how far students have progressed through the chapters of the online course.

Participant [13]: Yes.

Researcher: Had it not been so he would still have to check with everyone face-to-face.

Participant [13]: Yes.

Researcher: A mechanism should therefore be created to motivate students to work diligently on the online chapters.

Participant [13]: Yes.

Researcher: Are there other challenges before we go on questions related to resources?

Participant [13]: No, that's all.

Researcher: What electronic resources are available in this university?

Participant [13]: There is a lab for every department and there are computers. There are computers also at the centre and there are labs near the dormitory. There is Wi-Fi nearby every dormitory and that's what makes this university different from others.

Researcher: Are there e-learning resources?

Participant [13]: There is no other e-learning resource except the module.

Researcher: What about in the library?

Participant [13]: You must get connected here first before you go to the library.

Researcher: Is the e-learning management portal the main resource for e-learning?

Participant [13]: Yes.

Researcher: So, all you've got is the material for this one course uploaded on the portal.

Participant [13]: Yes.

Researcher: What other electronic resources are there?

Participant [13]: There are other resources just for downloading e-books.

That means just other websites you find through Google.

Yes.

Researcher: So, what you call e-learning resources are the videos you find on the module.

Participant [13]: Yes, the videos and the university also has various websites.

Researcher: For example?

Participant [13]: There are websites from which you download books but can be accessed only from within the university only.

Researcher: Is that a library site?

Participant [13]: Yes. The university has library sites and many good books which it gets by communicating with other universities. But you can find these books only on the university's website and only within the campus.

Researcher: There are two things here: one is the university's e-learning management portal where you take a course while the other is a separate website on which the

university uploads various books for you. How do you access this other website? Do you have username and password for it?

Participant [13]: Yes, we have another username and password for accessing the other site.

Researcher: Then you download books, journals and other supporting materials from it.

Participant [13]: Yes, we do.

Researcher: Are the resources sufficient for students?

Participant [13]: I have been to Sidist Kilo University and compared with the resources there, what we have here is sufficient. There is Wi-Fi network nearby the dormitories and we use them although they were primarily meant for the disabled.

Researcher: Is there special service for the visually impaired?

Participant [13]: No, not JAWS, that is found in a special school for the visually impaired but here the setup of the lab is made suitable for the disabled.

Researcher: Do the computers have special features intended to support the disabled?

Participant [13]: No, all are just common computers.

But they are suitable for those who have problems on the legs or hands.

Yes, and all in all this university is better equipped than others.

Researcher: Is there problem with the available materials?

Participant [13]: Yes, sometimes they break down. For example, one day the projector failed and other times a power failure occurs.

Researcher: Do you use projectors for all courses?

Participant [13]: Yes.

Researcher: So, when a projector fails, do they replace it quickly?

Participant [13]: Yes.

Researcher: Have classes ever been cancelled because of a projector failure?

Participant [13]: No, but people are becoming increasingly dependent on the projector. Sometimes, if the projector totally fails and no replacement is found for it, the class may be cancelled. Assignments are also downloaded and I think it is making us lazier.

Researcher: Where do you download assignments from?

Participant [13]: From various websites

Researcher: You download the answers?

Participant [13]: That's how you do assignments nowadays. You will only modify a little what you copy from the internet. You don't browse through books in the library as we used to do before.

Researcher: That also has become a challenge.

Participant [13]: Yes.

Researcher: It brings about knowledge gap.

Participant [13]: Definitely, it does. As a teacher if I come well prepared, I can deliver the lesson properly but if I come unprepared I can blame it on the projector or the power failure.

Researcher: Does the university provide reliable internet connection?

Participant [13]: The only problem is power failure. The library has a standby generator but in the dormitory and other classes power failure is a problem. Otherwise, the internet service provided by the university is reliable.

Researcher: Are the hardware and software components in the lab functional?

Participant [13]: There is still nothing wrong with the lab.

Researcher: How about the wireless connection? Is the signal strong enough for e-learning?

Participant [13]: It is most of the time very good. Only sometimes the signal becomes too weak.

Researcher: Do you have video conference sessions? Do you share experiences or receive lectures from professors in other universities?

Participant [13]: We have never done that.

Researcher: Do you think it would be helpful to have it?

Participant [13]: Yes, of course. As long as it gives us more knowledge and since you don't easily find these international professors whenever you please, it will be fine to hear from them through video conferencing. You will get something better from them. Some teachers are better than others.

Researcher: Are there other features of e-learning besides the ones I have mentioned? They might be accessible or not accessible but are there other features?

Participant [13]: There are no other features that I am aware of. Sometimes, we invite guest lecturers but regarding technology there is no other feature.

Researcher: Is the environment supportive of e-learning? Are the equipment upgraded regularly?

Participant [13]: We are taking only one subject as a trial. If all subjects were included, we could say that it is supportive. They are saying it will be expanded to other subjects but for the time being it is still limited to one subject. Public Administration is too broad and it will be good to include other subjects.

Researcher: Why is Public Administration too broad?

Participant [13]: I don't know but the power point alone is over six hundred slides. It is too vast.

Researcher: So, the environment is not very supportive. If it were, other courses would be included.

Participant [13]: Yes.

Researcher: Does the institution provide training on the use of e-learning for students?

When you are first year student, you will take a half-day training on e-learning in your respective department. They teach you very well before you begin to use it.

Researcher: Is there follow-up to the training? Would it be good to have follow-up?

Participant [13]: Yes.

Researcher: Is the interface of the portal user-friendly or not?

Participant [13]: Yes, for the course it is good. And the coordinators are very helpful men and they also make you interested in using the module.

Researcher: Are there rules and regulations for the use of e-learning?

Participant [13]: What I see as rule and regulation is the fact that you have to score above 70 on the quiz. And unless you complete the chapters and do the quizzes, you cannot take the class exam.

Researcher: I mean are there rules specifically about the use of e-learning and the computer labs?

Participant [13]: There is no other rule except the one I just told you about.

Researcher: Not some imposing rules but rules that are beneficial for students and teachers.

Participant [13]: I would be happy if there were such rules. I think also that it would be good if videos for one chapter only are uploaded at a time so that a student will not be tempted to view videos for more than a chapter at a time.

Researcher: The system should monitor whether a student has watched a video or not. What rules should there be for the labs to manage them especially during critical times like when an exam is approaching? Suppose one student is browsing Facebook while another urgently needs to download assignment. Shouldn't there be rules for such situations?

Participant [13]: That's right. There should rules for that kind of situation.

Researcher: Do you have other comments?

Participant [13]: I wish you success in your research.

Participant [14]

Researcher: Do you use e-learning?

Participant [14]: Yes.

Researcher: How often do you use e-learning? When do you use it? What do you use it for?

Participant [14]: Actually, I use e-learning for the course of PA, Public Administration, only. And we have six chapters and those chapters are categorised based on the instructor's lecture and video lecture. Using this e-learning is mandatory for final exam. So, in line with the lecture that I receive from my instructor, I try to use the e-learning.

After I get some theoretical know how from the instructor and interact also to use the video lecture. Then, finally I try to interrelate what exists in the lecture of the instructor and the contents of the e-learning.

Researcher: So, how often do you use the e-learning portal?

Participant [14]: Actually, in my experience, I tried to use it just I have programmes within a week. As I tried to mention early, I use it in line with the lecture of the instructor. We do have a day in a week for lecturing theoretical part. Then, after I come back from the lecture, I try to use e-learning mostly two days a week.

Researcher: Can you use this e-learning management portal? Are you comfortable using it?

Participant [14]: For me, it is not a problem.

Researcher: Does it require any special technical skill to use the e-learning system?

Participant [14]: Actually, before I directly tried to use it, we were given an orientation and a password. Finally, using the password we created or was given us by the centre, we tried to access it. So, still I don’t face any sort of problem.

Researcher: So, you say that it doesn’t require any technical skill to operate, check and send assignments.

Participant [14]: In the introductory phase it is mandatory because it is a new system for us. But after you take the orientation it is possible to use. This is my personal opinion. But if you face problems, you can come back to the person in the centre and they will help you.

Researcher: What do you use the portal for? Do you use it for instructor information or, quiz, or audio video?

Participant [14]: In PA we use it for tutorials. There are lectures already uploaded there and it is the same as the lecture we receive in the classroom. So, this is for PA. We use it for tutorials.

Researcher: So, do you get electronic resources like video, audio-supported related materials?

Participant [14]: Yes, there is video.

Researcher: Do you submit assignments with it?

Participant [14]: No, actually we are talking about the e-learning, especially for PA. But for the other courses we use in case the instructor is interested to submit assignments online, we use such facilities. But especially with respect to Public Administration, I use this e-learning for attending or following the lecture uploaded as videos. There are some videos with sound already uploaded.

Researcher: So, does it have any kind of discussion portal?

Participant [14]: No, there is no discussion actually. Everything is fixed there. There are some guideline questions before you proceed to the theoretical aspect, there are some questions and then before you proceed to the details of the content, the instructor video lecture raises important questions. And they inform me at the end of this chapter, you can assess yourself to see if you can answer the questions.

Researcher: O, you mean it is a kind of link on that specific e-learning portal? Is it a kind of feedback?

Participant [14]: Actually, it is pre and post questioner.

Researcher: What is the pre-questioner?

Participant [14]: The pre-questioner is mainly focused on mostly the expectation from the e-learning. And mostly the post question deals with how you find the course.

Researcher: Ok, you mean that this course asks you before you start, what is your expectation from e-learning courses; and it is not about the course but about the e-learning system.

Participant [14]: They system plus the course, for example, before you directly proceed to a topic, some instructors ask, What do you think is the reason for conducting this course? What do you expect at the end of this course? For example, in case of attending the course of PA, I can expect something. At the end of this course as a learner I must have this kind of knowledge or theoretical know how respecting the course. So, the post assessment is mainly the feedback both on the system and how the course was designed and improvement needed to adjust even for the system.

Researcher: So, what I understood from you is that there is no discussion forum for students to discuss the system, to discuss the assignments online.

Participant [14]: These are all fixed with the video. Videos are already uploaded there and we have our passwords and usernames and if you try to follow the video, personally, you can.

Researcher: Otherwise, there is no direct way of discussion among students online.

Participant [14]: No, there isn't.

Researcher: But do you think it would be helpful to have such kind of discussion forum?

If it is possible and there is opportunity to add that kind of a feature it is better. Because if you face some kind of difficulties, you can ask your instructor directly or your classmates.

Researcher: So, in general what is your opinion about e-learning?

Participant [14]: For me e-learning is a very interesting and helpful technology for students. For example, with respect to this specific course, sometimes the methods of instruction vary among instructors. So, after you get some know how from the instructor, there is such kind of opportunity to follow or to attend this help you to understand things in a better way.

Researcher: So, can you access this e-learning portal from anywhere like your cell phone or your home?

Participant [14]: No, this is restricted to this compound.

Researcher: But what do you suggest if you can access it from home or anywhere, do you think it would be beneficial?

Participant [14]: No question, this is important. For example, if you go somewhere else, if you get this kind of opportunity, you can use it without any limit. It saves time.

Researcher: So, in general, do you find e-learning easy or difficult?

Participant [14]: It depends. For me it is not as such difficult.

Researcher: Why do you say that?

Participant [14]: Because to use this technique it needs some… to begin with, when a system is introduced, the advantages that come from it are well thought of. So, first

before we use that system, we were told about its purpose and how to use it. So, when I follow the instruction that I was given I didn't find it so difficult.

Researcher: Did you face challenges when you were using this e-learning system?

Participant [14]: Sometimes, there is a connection problem or electric power problem. If there is some restricted time, we record that. There is a generator but this year for some weeks the internet was blocked in relation with the grade twelve national exams. And you cannot use the system without access to the internet.

Researcher: Do other students have the same feeling?

Participant [14]: What I have just said is personally about me. However, past experience matters in using this system. For example, if you have the knowhow on using some online sources you will also find it easy to use the system.

Researcher: By technical skills you mean how to use the internet.

Participant [14]: Yes, that is about how to access the internet and one-time orientation may not be sufficient. Some students come repeatedly with some problems.

Researcher: What resources are there available on the e-learning portal?

Participant [14]: There are instructions and orientation on the use of e-learning. And there is Wi-Fi for every block of dormitory. So, anyone who has a laptop can access the portal.

Researcher: If there is Wi-Fi internet connection, can a student access the portal from a dorm?

Participant [14]: Yes.

Researcher: So, you don't necessarily have the use the computers in the lab?

Participant [14]: No, not for this specific course.

Researcher: What other resources are there besides Wi-Fi?

Participant [14]: There are labs and computers. If I don't have a laptop, I have to go to the lab. There are about three or four rooms of labs and they are always open.

Researcher: Do you think the computers, the Wi-Fi and the other resources are sufficient for students?

Participant [14]: There is Wi-Fi for every dormitory. But when it comes to labs, the university is offering e-learning courses in various semesters. If all groups or departments take e-learning courses in one semester, maybe not every student has a computer. About half of the students have taken e-learning course in the first semester and half are taking now.

Researcher: So, you don’t see that as a challenge.

Participant [14]: No.

Researcher: Does your university provide reliable internet connection?

Participant [14]: Yes.

Researcher: It is very reliable.

Participant [14]: And it is very fast.

Researcher: Are the hardware and software components in the lab functional?

Participant [14]: I don’t go to the lab very often. I use a laptop.

Researcher: Is there a video conferencing system? Do you use it?

Participant [14]: You mean live video conference?

Researcher: Yes.

Participant [14]: No. The system is not supported by live videos. Some guest lecturers come but there is no live video.

Researcher: Are there features that you are aware of but which I have not mentioned?

Participant [14]: Whenever we talk about e-learning, I can only talk about Public Administration. That is the only course for which we are using the e-learning system. We get some online materials from our teachers and we also submit soft copies of assignments.

Researcher: Do you think it would be helpful if other courses were also offered on the e-learning portal?

Participant [14]: It is better.

Researcher: Is the e-learning system supported by management?

Participant [14]: Specially on this course, there is class presentation of a portion of the course. First we are told about the purpose of the e-learning facility and there is a follow-up, for example, on who is where. There is not only listening but also assessment. There is online exam. You can pass to the next chapter only when you score 74 and above. It has six chapters.

Researcher: You mean it has six chapters online.

Participant [14]: Both online and in class there are exams or assessment at the end of every chapter. And in order to proceed to the next chapter, you must score 74 and above.

Researcher: Do you believe the online exam is helpful?

Participant [14]: Yes, very much.

Researcher: Why?

Participant [14]: This is performance evaluation. It is for the purpose of self-assessment. For example, if I fail the online exam, I can go back to it and see my mistakes and learn from them. There are unlimited chances for doing so. But we still take exams in class in the university and some of the questions we encountered online may reappear in the class tests.

Researcher: But you will not fail in class because of your online performance. It is only self-assessment.

Participant [14]: It is assessment. If I score 60, I will be required to see the video again and try the test a second time. If I perform well, I go to the next chapter.

Researcher: So, it makes you revise the online lessons until you perform well and this will have impact on your grades because you cannot pass from one chapter to the next unless you complete it and perform well on the test.

Participant [14]: Yes, that is the implication but we also hear that if you don’t complete the online chapters, you may not be allowed to sit for exam. The coordinator informs the instructor on where in the chapters every student is. Students are encouraged to complete all the chapters. The courses are the same except that in class the presentation is live and physical while online it is a video. So, what you learn in class you reinforce online.

Researcher: But in reality, you will not be forbidden to sit for exam. Suppose a student gets tired of using the system and doesn't complete the six chapters?

Participant [14]: I don't have exact information. There is a rumour that such a student may be forbidden to sit for exam but I don't know how far it is true.

Researcher: But it motivates students to work on the course.

Participant [14]: Yes. The rumour that you may not be allowed to take exam drives everybody into working hard.

Researcher: You have told me that there is orientation offered by the university before you start using the e-learning system.

Participant [14]: As soon as we meet the instructor in class, he tells us about e-learning and a day is set aside for us on which we go into the lab and receive instruction on the purpose of e-learning and how to create password.

Researcher: And if you encounter problems, there are technicians that can help you.

Participant [14]: Yes, they come with laptops.

Researcher: Is there occasional follow-up training to help you upgrade your e-learning skills?

Participant [14]: I haven't seen anything more than the initial orientation.

Researcher: Do you think it would be helpful if there was more training?

Participant [14]: Yes, that would be helpful and there is no question about it.

Researcher: Is the interface of the portal user-friendly? What should be done about it if it is not user-friendly?

Participant [14]: It is very easy to use. It is not easy to speak for everybody but the procedure is available. There are various departments, course and chapters in their own category. There are videos also and instructions on how and where to download them. All the steps are made as clear as possible.

Researcher: So, the system is user-friendly. Does your university have rules for the use of e-learning? Are there rules on the proper use of the lab or data protection?

Participant [14]: What I have observed is that when you are for example clicking the wrong link online you are blocked. You can speak to administrators if you have to and

if there have been mistakes they can be corrected. But since I don't use the lab, (the computers are meant for people to use them) there are instructions about properly managing them.

Researcher: The computers should be used properly for the benefit of all students. It would be good if there were rules on how to use them properly.

Participant [14]: Yes, and we have seen some rules online. There are also rules posted on the walls of the lab. If there were more rules, it would make the college more effective and prevent waste of resources.

Participant [15]

Researcher: OK, thank you. You have filled the consent form. Now we shall proceed to the questionnaire. The question is in English, but we can talk, mixing Amharic and English as it suits you. The first question will be:

Do you use e-learning?

Participant [15]: Yes. But I use e-learning to take various courses, various online courses such as Era, Edeks and on things like that, the campus's current portal but not the previous type, though not the module type, I use e-learning.

Researcher: Do you think you use e-learning properly? Here in this campus, with you?

Participant [15]: I don't think I use properly.

Researcher: What could be the reason? The reason that e-learning couldn't be used properly?

Participant [15]: The reason is, first not all the students have the awareness about e-learning. That is one. And secondly, teachers seldom use it. Although the department of ICT prepared it, yet teachers, courses, books, for there aren't such, like forum discussion, the student doesn't have the initiative. When it began some time ago, some students use. But many students, for their friends never heard, and for many friends do not use, they do not have the initiative. I mean to go in and use.

Researcher: What course of action will make it attractive? I mean, the problem that prevents them properly from using it, the thing that you mentioned earlier, for example, like forum discussions, like courses and materials were there, should students be

motivated as you told me, what is it? I mean what is this problem and besides what course of action will make it possible to use it better?

Participant [15]: In order to use more, first, teachers should push. The teachers themselves should also use it. Because, if the teacher uses, the thing that a teacher wants there, to the question that they the students raise, if he kind of gives answer and stuff, they might enter thereon for the sake of exam. The question that has been answered will appear on exam. If the answer to an assignment is put there, it means the student will enter to see that. So, this might be the way that it will become a habit. This is one. So first teachers must use. If teachers use properly, for example, a certain teacher uses, a certain teacher doesn't use. That is the problem there is. The student enter for a certain course, and when that course is over, he doesn't. But if all the teachers were made to use, and when teachers use, if only they could come up with a means by which they will force students to enter. For example, it could be by putting the answer to an assignment thereupon. By putting there on the forum things that can be of help for final exam, including that in the discussion and stuff, it is possible to attract the students.

Researcher: How long … how often do you use it, I mean do you use it in a week. Or do you use it daily, this portal?

Participant [15]: When you say portal now, is it the module or?

Researcher: The module!

Or

Yes, the module!

Does it mean the previous one?

Researcher: Yes, the one that is called module

Participant [15]: I hadn't used it much then. To start with, I used it when I came to ICT lab. I hadn't a PC, I mean my own, at that time. And, very, there is this course C++, it was that teacher who would put everything thereupon. Whether there was forum or discussion it was him who conducts it. It is him who answers when students ask. That kind of thing, and it is once a week at most, I mean that I enter.And I hadn't used much. And the other, one teacher, with him. Outside of that even books and stuff even were

put on electronics. We would enter there on the module to download a book. That is to say for two courses. There is nothing else.

Now you, this portal, I mean as a student, I have focused on this that is called module, on this portal that is called module, do you say, «I can use e-learning properly, the site properly». «As a site, this site I can use it properly» can you use the site portal for e-learning, do you say?

Participant [15]: Does it mean in terms of knowledge?

Researcher: Yes, in terms of knowledge

Participant [15]: Properly. There isn't anything difficult about it. Compared to others, the existing module, in comparison, is similar to other websites on which we see online courses on other websites. There is nothing difficult about the thing to access.

Researcher: Do you say it might require any special technical skill to access the site portal? To you and to your friends individually, do you have anything to say that this portal requires a little special to access it properly?

Participant [15]: There is no such special skill that it requires. But if a person has basic understanding of a computer, that thing he can use it directly by logging in with his IPRS

Researcher: What is IPRS?

Participant [15]: It is just either by IPRS or ….

Researcher: I see

Participant [15]: By logging in with his IPRS, by logging in directly through his user name, just like he uses any other social networks, he can do the same on that too.

Researcher: So, if he can access a computer, can he also access this one?

He can.

Researcher: Ok! The other thing, a while ago, you have just mentioned a little for me, on that portal, on the site what kind of accesses are available? Services are available? It can be like instructors information, course document, it can be schedule, and it can be an assignment, it can be video or audio resources. So, does it include these things? If there is anything additional, what are they? What is it?

Participant [15]: What I remember is the thing that they were using currently on the module. First, there were things like discussions. There are books. I don't remember staff like video. I don't think there are, I mean things like video. The other thing is stuff like assignments, they were put thereupon, assignments. There is nothing much to it.

Researcher: Sending assignments or?

Participant [15]: No, given assignments

Researcher: Then having downloaded …

Participant [15]: Then having downloaded, the student...

Researcher: The other thing, have you ever used this site or portal, for any discussion, course content with fellow students?

Participant [15]: I, as I have told you, didn't participate much. I just, having seen comments or having downloaded assignments, having downloaded books, I left. Because it is, was in the ICT lab that I used it.

Researcher: Ok! What was your reason?

Participant [15]: I hadn't much access, I mean to internet. My dorm is here at sadist kilo. I came to ICT lab here and I used, I mean entering lab. At that time, I hadn't a lab top. That was the … that made me more … …

Researcher: Ok! Now, in general, what opinion do you have or feeling about E-learning, in general

Participant [15]: Concerning the module or?

Researcher: Not the module, just e-learning, e-learning itself, for example, if I tell you this question in English, this English question. What is your opinion about e-learning? Can you access it anywhere, meaning what kind opinion and feeling do you have when you think of e-learning, I mean have you ever accessed the module outside this campus?

Participant [15]: At Sidist Kilo, outside of Amist Kilo, at sadist Kilo.

Researcher: Is it possible? Necessarily, locally is it not working only here?

Participant [15]: The previous module was up and running at sadist Kilo. I think it is up and running at Addis Ababa campuses. Nothing much. For example, stuff like current

portal, what he told you earlier, is working only at Amist Kilo. The portal at Amist Kilo is not working at Sidist Kilo.

Researcher: Is it the new one?

Participant [15]: The new one

Researcher: The one that has been released recently?

Participant [15]: Currently it is not working from sidist Kilo. Sometime ago it was working from sidist Kilo. But now it is working only at Amist Kilo

Researcher: I mean, is it by quitting the module that they switched to the other portal or is it because it is better. Why is that?

Participant [15]: This one has got many features. Even this portal, I mean the new one, when a student comes to register, it informs stuff like dorm number and, however they are not using it currently

Researcher: Does it have anything course-related, on line assignments, discussions, and tutorial?

Participant [15]: No, there is no such thing.

Researcher: Ok! That is more of administration type, this that you've called «new portal»

But you, in general, I think this portal is basic for your education, if it worked, if you used it properly, meaning if the system were active. So, you, in general, be it this portal or other sites that you use, what kind of feeling do you have as a student?

Participant [15]: It is not clear for me

Researcher: I mean is it good or how do you…?

Participant [15]: Very much. E-learning is very good. Even now when we are working on thesis project, we use it to do such things. Device was put on three years ago. It is new and we couldn't find solid reference in it. But when we joined such thing as forums there are discussions. «I have encountered this type of problem, how can I solve it and stuff, » it is by looking at answers given to that that we did much of, beginning from first semester, our project. So, it is very helpful, obviously.

Researcher: Ok! This is not the forum of the university, but it is a global one that is available online?

Participant [15]: One that is globally available, but not of our campus.

Researcher: So, you are saying electronic support is important?

Participant [15]: Very much, yes.

Researcher: Does it motivate you, in general, learning with e-learning? Supposing that you take a course with e-learning and again, you take it with e-learning supported module and kind of blended, you take it in the classroom, face-to-face, does learning with e-learning motivate you?

Participant [15]: Yes, it does. Learning long hours doesn't interest me much. Some forty minutes, at most an hour, more than that I cannot sit focused in the classroom. So, it is more on connection that I want to … many of the thing. Even, instead of opening a book, I prefer to refer there, if there is connection.

Researcher: So, it means that it motivates you more. But in general, when you use, do you say it is easy or difficult?

Participant [15]: I think it depends on the resource we are looking for. Otherwise, I don't think there is anything difficult about it. Sometimes, if the things that we are looking for are far in the deep, we may not find them. As I told you earlier, when we looked for globally on forums, we wouldn't always find quickly, I mean what we're looking for.

Researcher: Why is that it can't be accessed quickly?

Participant [15]: We can't find it quickly because we never met those with similar problems. For it hasn't been used much, and those who questioned people with similar challenges, those who were answered, such things, it is by looking back at many forums and stuff. Had it not been for such things, it is simple.

Researcher: Ok. Why did you say it is simple? What of it makes it simple?

Participant [15]: You mean accessing it or using it

Researcher: In general, using it

Participant [15]: Yes

Researcher: Now, when we proceed to the challenge, do you encounter any challenge with e-learning? What is there in this campus? For there is challenge whenever there is anything, what is that you consider a challenge? Whether you use the portal or this that you call the new portal or you use internet, you use computer, in this campus of yours, whenever you use anything in learning system or in resource what kind of challenge have you encountered

Participant [15]: In relation to the module, first, for I don't have my own PC, it could be my personal challenge, I can't access it whenever I want to. Again, the ICT labs are filled and occupied quickly. Again, if a student occupies them- the PCS, he never gets up quickly and stuff. It hasn't any time… what … so that too is a challenge. Secondly, even if you have your own PC, though it is nationwide, there is a problem with connection. In our campus, connection is erratic and stuff. There is this kind of thing. Next to that this Wi-Fi, there is no socket in its access points. Your PC, if it doesn't last long, it means that you cannot sit and access it for a long time. Meaning both the e-learning and other things. So, either there will be this thing, access point, but there is no socket at that access point. These too are one challenges, problems. I couldn't see any other.

Researcher: Ok! The other is, also fellow students similar to this one when you observe, what do hear from them of what the challenge is? Meaning, whether, while you are in the lab or of skill, what kind of problem have they encountered while using e-learning. A while ago, just as you said of the socket and such stuff, what kind of problem have you seen them encountering?

Participant [15]: First, when students with no PC go to the lab, the lab is occupied. There is this kind of thing. Or else, if they necessarily want to use, they have to sleep in the day time and go there at night. For all is occupied. So, there is a lack of PC access as well. I mean compared to the number of students. And consequently, if it is required that students use e-learning a lot, there must be enough, the student or of himself or otherwise, there must be PC'S available in the campus. The other is, as I've told you the question of socket is a major issue. There are access points. To learn e-learning, Wi-Fi points, but there is no socket. Either a student has to go by switching his lab top with his friends lap with a long lasting battery and stuff. That is to say in order to sit there and use. There are such things.

Researcher: Is that because it is not available in your respective dorms

Participant [15]: It is not available in respective dorms, no

Researcher: And these days, for there is no Wi-Fi, you have to sit somewhere and use

Participant [15]: Yes

Researcher: Ok! Now you have covered many of the things. Ok when we proceed to resource and support, just now we have been talking about challenges earlier. When we proceed to on e-learning to the resource what e-learning resources are available in this campus? Things that you say can be taken as resource?

Participant [15]: What do you mean by «as resource»?

Researcher: I mean electronic resource, for example, it could be digital library, it could be materials or else it could be labs as you've said earlier, it could be video conference, what resource is available, here in your university?

Participant [15]: Here in our campus, there is only lab. There is an ICT lab. It can be a resource for e-learning. That you said video conference, there isn't such a thing. At a department level, for schools and such things, there is – the video conference. What I know now is in the electrical department. But other than this, at student level, there aren't such things. Digital libraries, actually, they are available both in here and there at Sidist Kilo library. For I don't use them more, it is just in the digital library, the books there in, in order for students to access them, that is to say also to down load them from the computer.

Researcher: Do they scan and upload it for the student to access it?

Participant [15]: Yes, I think it is working only in there

Researcher: In the library?

Participant [15]: In the library, yes

Researcher: Have you just said to me that the video conference is for staffs, not for students?

Participant [15]: Yes, there is video conference, and it is for staffs, at department level

Researcher: Ok! Earlier, you have already answered it. Is it sufficient, the computers, and it is just no, they aren't

Participant [15]: No

Researcher: These available resources, those that are available even now, are you saying they posed a challenge on the student, because it is that there may not be a socket, and the available ones too are not enough. Is that not?

Participant [15]: Yes.

Researcher: Or do you have anything additional to tell me?

Participant [15]: Yes. What I raised for you earlier is, access points, Wi-Fi access points, there aren't socket. Even if you go to ICT lab, there is a PC that is not working. Either the socket is not working or the internet cable is not working. Consistently, some kind of maintenance even is not provided. And from the available PC'S, the one that is not working even is too many. This is not something that you say simple ---- PCs that are out of service. Normally, while the PC switches on, they might have a problem with the internet connection

Researcher: Ok, the other thing is, but the available resources, you have told me that they are with many problems. But are they helpful. Are they helping but a little?

Participant [15]: Yes, obviously, yes

Researcher: They are helpful?

Participant [15]: They are helpful

Researcher: If you have said helpful, what of it is that you you've said helpful? I mean what of it is that you are saying the resource helped the student to some extent?

First, at least in order for the student to use e-learning, it will…them to some extent. The other thing the student, whatever he wants, from connection, using e-learning, for any problems, it could be for assignments given or it could be a project, etc. he can use them. That means to get an answer or a solution. So, first even with the available resources, when we began last year even, module, some students were using it. So, it will make them know a few things about e-learning, about module. And it makes them know what they got from e-learning and with other courses given worldwide. I mean even when we look at it merely from understanding level.

Researcher: Its availability itself

Participant [15]: Merely its availability itself

The resource itself, the available resource itself, did it help them a little? Ok! Does your university have a reliable internet connection?

It doesn't have a reliable one. Just the student, if you badly need connection, currently, at a certain time, after 12 pm at a certain place, for example, here there isn't of course. Towards Amisit Kilo, it is even harder. We use connection at Sidist Kilo. At 12 pm towards Mandela, around Mandela, It is just there that there is very fast, reliable, and strong connection after 12 o'clock. If a student wants to, it is there that he can find, at night, in the middle of the night when the number of students decreases and that kind of stuff, I mean. So, there is no reliable connection.

Researcher: There is no. Are the hardware and software in the lab functional? Earlier

Related to ICT? Is that not? You mean computer and that stuff?

Participant [15]: Yes. I mean currently there are hardware and software computers. Is that not?

Yes

Researcher: But, are they maintained in good manner, for this is now a technological question, do you find them maintained in good manner. You have answered it to some extent and how is it generally? Looking at it now the available computers, the computers in the lab, do you think they can be if good use?

Participant [15]: No, they can't. First, number wise, I have told you, it is a few. Compared to the number of students, the available ICT labs and available PC'S are a few. Even so, in addition, from among them, there are that out of service, PCS with technical problems and stuff like that. Such software problems and stuff. And the other is one of the students locks up the PC'S and stuff like that so that It unless with his own password, no one will get access and stuff like that. There are this type of ….

Researcher: Does it mean, he is not supervised?

Participant [15]: Many times, it is not. What I am actually telling you is of the time then when I would go. At the moment I do not ….. to ICT labs that much

Researcher: Is that because you use a laptop?

Participant [15]: But even if you go to ICT lab and check, you will see many PC'S that are out of service. The majority is as many as the functional ones, I mean their number. They are with many problems, I mean the PC'S

Researcher: So, the idea that whether management is doing making supervision is very minimal?

Participant [15]: Yes, they are in in a very bad need of maintenance

Researcher: What about the wireless? Is the connection good?

Participant [15]: Yes it is so but it is not very good. First, on this Samsung building, there are two places A and B, where it is available. In here. Around here, many of those that were B are currently terminated -- The Wi-Fi, or the student cannot access, they require a password and staff. Many of them are around department, or WI-FI in some locations require a password. That means that they are not for students to use.

Researcher: May be that is not intended for students

Participant [15]: Yes it is intended for staff

Researcher: Ok earlier we had raised about video conference. Is there no video conference connection. There is not, but if there is, do you think that would be helpful?

Participant [15]: In terms of what?

Researcher: May be through experience sharing, for example, from a certain country to this, that gives some kind of briefing for a subject, or from a different university or with you, if this is coordinated by students, do you think it will be helpful – video conferencing?

Yes. I think it will be helpful at this level. First, the e-learning, with this module and related things, before the student was made to actively participate, such things, their benefit may not be more ….So, by making the student cooperative, initiating them on the other thing, that one is better. Because video conference is one type of e-learning. Yes? Student to student, with various … by which he globally access. So it is useful. It is obvious. But still, it is better for the student to come to this after having initiate and using the other one.

Researcher: First there has to be work on the e-learning, on the portal?

Participant [15]: Yes

Researcher: Ok the other is anything that I don't know, that we haven't mentioned from the Wi-Fi, computer, video conference, or anything else from what you told me earlier. What is the new portal called?

Participant [15]: Portal AAU IT 24 Portal

Researcher: Ok, and outside of them, is there any other kind of thing with a different feature?

Participant [15]: Portal

Researcher: Yes. Another, I mean it is also kind of portal t or

Participant [15]: The campus's

Researcher: Yes, in the campus or E -learning

Participant [15]: That I know of there isn't. Maybe there is also what Nati has told you. Yes? They ICT'S use by just kind of creating on Google and stuff by themselves. May be in relation to that there might be such a thing in ICT and software department, but there isn't in electrical. In other departments you won't find.

Researcher: Ok, the other is management related question. How is the management? Does it support the e-learning? In your observation as a student?

Participant [15]: I don't think it supports. I mean the ICT'S have kind of complaints. Those guys in the management are not so focused. For example, if, when a demand to purchase PC is raised, when that kind of thing is raised, they will kind of say «what we have is enough» I mean that is what is mostly there in the admin. So, there is a problem in the administration. To some extent, I mean. In terms of provision, in terms of providing maintenance service, there are such gaps in the management. Even this weakness could be the department of ICT itself. Because whenever there are PC'S that are out of order, there are maintenance service providers in the campus. There is a maintenance section. So that section, that thing, when a socket stops working, if it could maintain that socket, leaving alone the strength of the Wi-Fi connection, even with the available material, that would be one thing to secure a reliable connection.

Researcher: Does this mean the e-learning facility is regularly updated by the university or how is it?

Participant [15]: 'It is updated means'?

Researcher: As you have just said, are the soft wares updated in the lab or when the computers are changed, for you have now stayed five years here, when the computers are changed, isn't there new ones? When ICT resources are brought in, what have you seen?

Participant [15]: As far as I know, they are not. Even if you plug in your flash in their PC, they are highly infected with virus – the PC'S and that stuff. When you plug it in your PC, if you have anti-virus that provides good protection, the flash is highly infected with virus. So, first there are all sorts of students who come and plug in flash and stuff. So, from different PC, from different places, different things for the PC, unwanted soft wares and stuff. There they ….. So highly ICT labs are highly… infected with virus and such things.

Researcher: This too is related and kind of institutional. Does the university provide training for the student? The e-learning properly, I mean when that portal called module, module came, and when you are told to use it, did they give you kind of training? How to use, or on the way, or courses that encourage you to use the e-learning, it could be as a subject or when you were fresh, anyway were there any such things, trainings?

Participant [15]: No there aren't such things.

Therefore, «how often» cannot be answered for it is not there

Researcher: When we ask interface wise, what features, the e-learning more friendly, now when you use this module, you told me earlier, you said to me 'not that much'. Is that not? Earlier you told me that it was not attractive. So, what course of action do you think will make it more user-friendly? Do you think it is user-friendly at the moment? That to begin with…

Participant [15]: Which one?

Researcher: This one?

Participant [15]: Portal, the one that is available currently?

Researcher: Yes. Do you think the portal module is user-friendly both in appearance and for work?

Participant [15]: I don't know. It is hard for me to say so. For example, what I use it for is to register for a course at the beginning of the semester, I mean. There is nothing

more in it. At the beginning I register for a course, marks and stuff, those that are uploaded on that. Grade point is uploaded on that, I go online to see that. So, I don't use it much

Researcher: Ok, but now- is it level friendly when you see it? Is it accessible? Is the interface good? Is it easy for the student? Is it downloaded fast or how can you put it?

Yes that is good. The user interface is fine

Researcher: Is it accessible to the student?

Participant [15]: When you say accessible in terms of what?

Researcher: I mean, first when you start up with the available internet, can it start easily or again when you see the interface some kind of, for example it says the user name somewhere here, the password somewhere there, but not somehow complicated. And being friendly for you in a way that you can understand, and is its accessibility good? That is the question

Participant [15]: Yes that way it is good. Related to the connection I have told you. It is working at Amisit Kilo. It is not working at Sidist Kilo. Now currently it is not working at Sidist Kilo I mean the portal at Amisit Kilo. There are such things with it.

Researcher: What could be the reason?

Participant [15]: I don't know

Researcher: Could it be connection?

Participant [15]: But now for you have said earlier that the portal was not that attractive, what could make it more attractive? On your website, on the portal, what? The user interface, it is just the user interface that you see on any website, is that not? Where you can access, what you do, where it is and such things, when you access it, whether it is easy. What addition do you recommend?

Participant [15]: Yes, as I've just told you, when I said to you that it is not that attractive what I mean is that the user interface is interesting, but for what purpose is the student using that? To register for a course, then to see his results, then in between, he has registered, having attended class for the entire semester, finally will he see the results. For example, mid-exam results and stuff are not uploaded on that. Finally, they are uploaded last.

Researcher: Researcher: It is the module that we are talking about?

Participant [15]: Not the module, I mean portal

Researcher: Ok, the new portal?

Participant [15]: The new portal. So, there is a gap in between for the portal is kind of administration. In between a student never comes in. It is to register and to see results that he goes online currently.

Researcher: Ok, but while you were using portal, but at the time when you were using this module portal, what course of action on that portal would have motivated you to use your courses, assignments with it?

Participant [15]: It is as I said to you earlier. Here too I will tell you the same thing. Teachers do not use it. First it is only the teacher that gave us a course named C++ that uses it. Even this year fifth year students had started using the module. I mean fifth year students. That teacher had gone abroad to learn. When he returned he will use the portal again. And stuff like course material, he had uploaded for them thereon. Saying «get it from there» and such things he had initiated again. So just the first thing, had teachers been using it, all student would have used it.

Researcher: So, is this not a problem of interface? Is the interface friendly?

Participant [15]: It is friendly. I just, in relation to this, it is a similar feature. The student just enters his ID, there is the password given to him, with that he logs in and stuff like that. It is that way he logged in…

Researcher: Ok, so are you saying the feature is good?

Participant [15]: The feature, yes. It is not that different. When you look at this one, a bit the graphical user interface has got something interesting. Similarly, this websites, their lay out

Yes

Researcher: That kind of things, I mean. With the other one this one is slightly better though it is not used much. I mean the currently available portal in view of the module.

Researcher: Is it the new one that is more interesting? The newly made?

Participant [15]: Yes. Places and stuff where someone who … graphical user interface use to put … I mean the graphic designs

Researcher: I got it. So, what you are saying to me is more than what is called module, the newly made portal has got a more interesting interface?

Participant [15]: Yes

Researcher: Are you saying to me that it is short content wise? The reason is, when you register, you register, then you see grades, done?

Participant [15]: Content wise too it is not that little. Even this module was working only at Amisit Kilo. I mean if I am not mistaken. In other campuses and stuff there is no one who uses. That is to say the previous module. But this one over all it is functional in all Addis Ababa campuses. In addition to a course, many things linked to registrar such as cost sharing, it has got many things. Totally it is not yet finished, I mean the …

Researcher: But, I see now when I compare it to what you are telling me, this one inclines more of towards … to the work of administration than to e-learning. Now it is not a course, it is not materials. What they upload for you there is not exam. What they upload for you is, as you said earlier or it is not assignment that they upload for you. It is all about አለዎት 'what is available', 'where you register' is that not? It is like that that it comprises. So may be if the module is amended that way and is more upgraded, you are saying the interface too will be good!

Ok, so our next question will be, our last question, it is an ethical point of view. From your experience, does this university has rule to use e-learning? It can be what you have just said, it could be the portal, and it could also be the module. Does it have its own rules? I mean for the student, starting from computer lab to those that you access, up to portal usage they could be general agreements, do you say there is?

Participant [15]: As to agreement, nothing, it is as I told you earlier. Even a student can use as long as he wants to. There is no limit to it. Just if there were rule for this, another student also can address. The longer a person stays, having gained what he is looking for, he will watch other videos. Even in connection to this, sometimes unnecessary things on face book and u tube this especially it could be as a rule. There are notices put up saying «watching is not allowed, using face book is not allowed, and watching such things as porn in the lab is not allowed. » This by itself is one rule. We can see this. So, it is possible to say there is.

Researcher: Do they put up?

Participant [15]: Yes. There is. Like «using social networks is not allowed. » Even to prevent them from accessing social networks, the admin is blocked by ICT

Researcher: In the lab?

Participant [15]: That is to say in the lab. Up to a certain time and stuff, so is for You Tube. Actually, it is functional. Such stuffs like face book is blocked by admin. This by itself is rule.

Researcher: And do you say it is good if such kind of rules are more and more added?

Participant [15]: Yes, because this is a learning, just the ICT lab is a classroom, students, that support them in their learning or otherwise so long as it is purposely prepared so that students can use e-learning, by using social network or watching unnecessary videos, others time, in view of the available computer access too, students should not dominate others.

Researcher: Ok, I have finished my question. Anything that you will add generally, do you have anything to say like 'the e-learning can grow if this done. As a summary, currently there are these difficulties that require focus and if this is done it can improve more'?

Participant [15]: From what I have said to you earlier, let me tell you those that are more…. First for the e-learning to advance and all students begin to use it, if only all teachers use it. If only all are enforced. Second there is a connection problem. At the moment we for stuffs like project, it is connection that all the student suffers from. There is just properly no connection at Amisit Kilo. It is kind of erratic. It is never stable, I mean connection. Then first, a student, at admin level if there is a need for the e-learning to be used properly, there must be some kind of stronger connection, I mean in the campus. There must be many Wi-Fi access for the student. And teachers at admin level and staff levels must use that while one teacher have used it but another teacher is not using it means that the student enter only for the other teacher. Then when that course is completed, that course, it means that they won't enter. The existing problems now were that. Again, when that teacher shows up, again they began to access the module. And when he departed, when his course is completed, there is no more of it. Therefore, with the campus's approval at department level if only all the departments be made to use it. That way it is possible to better improve, I mean the e-learning.

Researcher: OK, I am done. Thank you! Ok, thank you!

Participant [16]

Researcher: Ok good afternoon. We will start our interview. Let's continue our interview with your comfortable language whether it is English or Amharic. The questions are prepared with English. No matter what I will translate that. Ok, I will start with the first question.

Do you use e-learning in Arba-minch University Institute of Technology University?

Participant [16]: Only for major courses.

Researcher: Ok, when you say major courses if you elaborate it?

Participant [16]: Like programming more it related courses like programming.

Researcher: Ok, if you use e- learning how often do you use E- learning?

Participant [16]: Twice in semester for two courses at most

Researcher: Ok, when do you use it?

Participant [16]: Mostly after the normal classes. Mostly at night when lab is accessible and internet is accessible

Researcher: Ok, so what do you use it for like you said you are taking for some courses you are using if for some courses what do you use it for when you are using it?

Participant [16]: For downloading course materials, for submitting assignments, even handouts are released on e-learning websites'

Researcher: Ok, so on average how much time on a daily basis do you use E – learning

Participant [16]: Two hours mostly.

Researcher: Two hours on a daily basis which means like in a week time?

Participant [16]: Yeah, five days per week.

Researcher: Ok, can you use site portal for e-learning like the portal that you are using which I know is module portal for courses. Can you use that site that portal?

Participant [16]: Module... Our campus has its own website. Its own portal for E-learning so we don't necessarily use module

Researcher: But there is module

Participant [16]: Yes

Researcher: You don’t use it at all?

Participant [16]: Yeah, we didn’t use it. But we have own e- learning website

Researcher: Ok did you...You get it for e-learning

Participant [16]: Yeah

Researcher: What is the name of that website?

Participant [16]: E-learning. Mu.ed

Researcher: Ok, so can you use that website?

Participant [16]: Yeah

Researcher: What?

Participant [16]: The problem is it is only accessible within the campus its own internet

Researcher: Ok! Ok! Ok! So, do you require any technical skill to use this portal that you are using?

Participant [16]: No not at all just basic knowledge of computer

Will be enough

Yeah

Researcher: Ok! Ok! So, what do you use it for this portal like you said you are using it for e-learning so what do you use it for exactly?

Participant [16]: As I said for dedicated courses like programming, to download course materials to submit assignments even we take exam for some courses

Researcher: Ok, so you submit assignments you take exam on it and you use download electronic materials. Do you download video, audio related supported electronic materials?

Participant [16]: Yeah video lectures. We download video lectures.

Researcher: Ok! Ok! So, do you ever use this portal for to discuss any course contents with your fellow students or lecturer?

Participant [16]: No student to student. I think it is impossible with our current ---. But student to teacher yes we can feed back to the teacher

Researcher: So, you use this university's website for any feedback only with instructors?

Participant [16]: Yeah

Researcher: So why do you think you are not using it with your fellow students

Participant [16]: No, it is not available in ---- website

Researcher: Ok, will it be do you think it will be helpful if there is this kind of discussion forum for fellow students?

Participant [16]: Yeah if it is somehow monitored

Researcher: Ok when you say monitored?

Participant [16]: May be when there is no internet available they may be use it for their own chat purpose I don't know

Researcher: Ok! Their own chat purpose. So, you mean like you need it to be only dedicated for academic purpose?

Participant [16]: Yeah, it has to be administered by

Monitored

Yeah

Ok to support academic contents

Researcher: Ok, so I need to know your opinion about but I proceed to this one why don't you use this module portal

Participant [16]: I think it is not necessary to use it if we have enough e-learning website in our campus

Researcher: But if it has been using before having you ever tried it?

Participant [16]: I tried it we can edit courses, add our own modules but I think it is not necessary for our case, in our case

Researcher: Because you feel like this one is much better the new website?

Participant [16]: Yeah, it is more documented

Researcher: Ok it is more resourceful?

Participant [16]: Yeah,

Researcher: So, the module one is no one is using it currently?

Participant [16]: In our case, yeah

Researcher: Ok, in your opinion, do you think e-learning is you can access it anywhere like actually you have been mentioning earlier that you cannot access this intra net without the compound of your campus but in your opinion or feeling what do you say about e-learning in general?

Participant [16]: E-learning, I think it is good especially for our department, if it is more accessible to all students with the same account it will be more usable

Researcher: What does it you mean the same account?

Participant [16]: We use different accounts for different websites in our campus for student management website different account, for email account it is all different

Researcher: Ok, when you say same account as what you mean like for email you have different account for portal you have different account?

Participant [16]: Yeah, with in the same school the same website but different accounts may be if it is the same more students will use it

Researcher: Now I got your point you mean like when you enter to that portal you will get the access of internet, the access of library, the access of everything in one place

Participant [16]: Yeah

Researcher: Ok with one login?

Participant [16]: Yeah

Researcher: Ok does the use of e-learning motivate you in your studies?

Participant [16]: Yeah it motivates me

Researcher: Like what?

Participant [16]: It saves more time, I think

Researcher: Ok, when you say that you can submit your assignments easily?

Participant [16]: Yeah easily

Researcher: Ok, do you find e-learning usage of E- learning difficult?

Participant [16]: No, I don’t think so

Researcher: Why?

Participant [16]: Because I think it requires basic knowledge just downloading stuffs and uploading

Researcher: Ok! Ok! so now I come to like what are the e-learning challenges, normally when there is something obviously there will be problem. Most of the time whenever you use anything still it has its own advantage and disadvantages and challenges and difficulties. So, what do you say about e-learning? E-learning challenges? Do you encounter any challenge with e-learning?

Participant [16]: Yeah, the main challenge is within Arba-Minch there is a power problem with the power down the server also gets down, so we can’t access the server at that moment

Researcher: You can’t access it most of the time?

Participant [16]: Yeah

Researcher: Ok so do you think your fellow students also feel like just like you like have you ever noticed when they complain about e-learning challenges

At least my friends feel the same

Researcher: Ok, because of power and because of connection, server and so on?

Participant [16]: Yeah

Researcher: Ok, what e-learning resources do you have in your university

Participant [16]: Like what?

Researcher: E-learning resources I mean, it can be electronic resources. It can be hardware software whatever you use it for E- learning resources?

Participant [16]: I think only the computers

Researcher: Ok, there is only computers?

Participant [16]: Yeah

Researcher: No other like video conferences or any Wi-Fi?

Participant [16]: Video conferences are available, but it is not for E- learning purpose.

Researcher: Ok is it for what purpose?

Participant [16]: For other like communication, they used it for only academic stuff.

Researcher: Oh! Like stuff for academic stuff?

Participant [16]: Staff members only

Researcher: But do you think if there is any video conferencing sessions?

Participant [16]: It helps for online examination if it is available

Researcher: Ok, so do you think the available resources are sufficient?

Participant [16]: No, I don’t think so

Researcher: Like what if you explain that?

As you said if there is video conferencing it will be helpful for online examination

Participant [16]:Oh!

Even there is no attendance system available online examination may be it is not more secure

Researcher: Because of what?

Participant [16]:It is the problem of developers, I think.

Researcher: Oh! the site itself

Participant [16]:Yeah

Researcher: The site itself is having a problem you mean. The site itself is having a problem yeah?

Participant [16]:Yeah

Researcher: What kind of problem like you said E-learning system does not, it is not secure you mean

Participant [16]:Yeah the timer

You mean?

Researcher: They use the JavaScript timer they use. So, it can be even if you refresh the page it will restart again

Researcher: Oh! So, whenever you are taking live like exam it will give you if you start again it will not counting any time it will start again it will give another one hour something like that

Participant [16]: Yeah most of the time.

Researcher: Monitoring is the problem?

Participant [16]: Yeah

Researcher: So, you are saying even the existing e-learning system is not good enough for exam

Participant [16]: Yeah

Researcher: So why you think that if it is video conferencing it will be more?

Participant [16]: Because the examiner can actually see you when you take the exam. And it is also helpful if you respond it by your –

Researcher: So, like I said as a resource you all you have computers?

Participant [16]: Yeah

Researcher: What about Wi-Fi?

Participant [16]: Wi-Fi is also available

Also available, yeah!

Yeah

Researcher: Ok so now you are saying existing also e-learning resources are still a challenge for you?

Participant [16]: Yeah

Researcher: Ok! So, what do you think students have any challenge with the available resources why do you think why do you think they have the problem with the existing..?

Participant [16]: As I said something related with the developers or may be it is related to the academic staff

Researcher: Why you said academic staff like?

Participant [16]: May be the lectures. May be they don’t know how to use the system. Even some lectures don’t want to use e-learning at all

Researcher: Oh! they are not motivated to use e-learning?

Participant [16]: Yeah

Researcher: The lecturers themselves?

Participant [16]: Yeah the lectures yeah

Researcher: But what do you suspect like is it knowledge gap or is it I don’t know why is that?

Participant [16]: Because most students don’t like to use E- learning so they just come to class and use the normal..

Researcher: Oh, students also are not motivated to use e-learning?

Participant [16]: Yeah some students

Researcher: Some students ok, but do you think the existing resources are helpful?

Participant [16]: Yeah helpful

Researcher: Like what?

Participant [16]: The normal stuff like uploading, downloading materials, and course materials like handouts they are helpful

Researcher: They are helpful?

Participant [16]: Yeah

Researcher: When you say helpful, like it will help for what increasing your skill or for exam or for what?

Participant [16]: It is helpful for sharing time. When share materials it saves a lot of time.

Researcher: Ok! If you are sharing it with like material hard copy it will take time, but this one you get it right away?

Participant [16]: Yeah

Researcher: Ok! Does your university provide good internet connection?

Participant [16]: Yeah, it is good.

Researcher: You can say that?

Participant [16]: Yeah

Researcher: Ok! Is the internet connection how about the hardware and software components in the lab? Are they functional?

Participant [16]: Yeah they are --

Researcher: Most of them are functional?

Participant [16]: Yeah, functional.

Researcher: Computers?

Participant [16]: Yeah

Researcher: Ok! is there good wireless internet connection?

Participant [16]: The wireless sometimes gets down I don't know for some reason but it is good

Researcher: Ok! like we discuss earlier video conference session you said there is no video conference session but it is helpful if there is yeah

Participant [16]: Yeah

Researcher: Ok! Is there any support from your management to support and encourage e-learning?

Participant [16]: I don't know.

Researcher: You don't know ok, I mean like do the e-learning facilities in your university regularly updated?

Participant [16]: They update the website but…

Researcher: Resources?

Participant [16]: The resources I don't know.

Researcher: You didn't see any…?

Participant [16]: They only update the website. Maybe they motivate the lecturers but I don't think they motivate us.

Researcher: Ok! Ok! but you think it is helpful if they motivate the students to use e-learning

Participant [16]: Yeah

Researcher: Ok, do you does your university provide any e-learning training for the students?

Participant [16]: The website serve us some documentation but there is no training

Researcher: Ok, what is the kind of documentation is there help?

Participant [16]: Yeah, online help educational and other.

Researcher: Will it help to use or manipulate the e-learning?

Participant [16]: Yeah, some frequently asked questions.

(Cars horn.. Sorry …. It is bothering)

Researcher: So, you are saying there is no any training formally but you said there is a kind of help but that help will guide you how to use that e-learning portal?

Participant [16]: Yeah, frequently asked questions they will be answered on that site. On the document.

Researcher: Oh! On the content?

Participant [16]: Yeah

Researcher: What kind of frequently asked questions?

Participant [16]: May be how to upload a document. How to download

Researcher: Oh! Ok! Ok! Ok! So, it is helpful?

Participant [16]: Yeah!

Researcher: Ok, interface wise do you think this interface of your website the one you said the university website will it be … is it user- friendly?

Participant [16]: Yeah, on the web. But when you come to mobile I think it is not good.

Researcher: Is it because of what?

Participant [16]: Developer, the web site.

Ok, the PH is not properly developed kind of

For mobile applications

For mobile applications

Researcher: So, you think if that website is developed for mobile applications it will be more interesting more interesting

Researcher: Ok is it accessible to students

Participant [16]: Yeah accessible.

Researcher: But can you access it from home

Participant [16]: No, you can't.

Researcher: If it is not accessible you mean like why it is not accessible?

Participant [16]: Because it uses a local server

Only intranet

Ok

Researcher: But will it be better if it is accessible in everywhere?

Participant [16]: Yeah, from internet.

Researcher: Yes, so does your university have rules on this is our last questions will have rules for e-learning?

Participant [16]: What kind of rules?

Researcher: Like for e-learning it is a proper rule that you already aware about how to use the lab, how to use the e-resources copy rights whatever it relates with the e-learning services?

Participant [16]: In the labs there are rules, but to others the websites itself it has its own security measures

Researcher: Ok! Ok! So why do you think the rules are do you think first of all do you think if there is rules do you think it is important?

Participant [16]: Yeah.

Researcher: Why do you think that?

Participant [16]: May be some users may use it for abuse purpose.

Researcher: Ok! Abuse like what?

Participant [16]: May be in the lab they may use social network sets most of the time.

Researcher: Ok! If there are rules and regulations which is already known by the students if the university developed you think the resources can be manipulated, I mean cannot be manipulated.

Participant [16]: Yeah.

Researcher: Good! so is there anything else that you would like to add for me or comments or anything. Actually, I have finished all my questions. Ok, thank you so much. Thank you

Participant [17]

Researcher: Ok! Participant [17]:thank you for making yourself available for the interview. Now I shall proceed to the questions. The first question, here even if the question is English, you will elaborate it for me in Amharic.

Do you use E- learning?

Do you use E- learning? How often do you use E- learning?

Participant [17]: E- learning. First, while we were fresh, a course was given to us. Then while we were third year, a course was given to us. But, what I saw between the two is we use it. Once in a while, we also submit assignment with it, that is to say the online system. Teachers send questions for us. That much we use it. Though not much, by and large we use it.

Researcher: Why is that you do not use it properly?

Participant [17]: I mean, the system is very troublesome. For example, when it is online, access is hardly gotten. Of course, there is Wi-Fi and stuff. Even so, there are many problems with it. For example, when it is online, if the exam is online, teachers cannot include workout and staff, I mean it is only choice and true false. And this, the student will cheat and… for us it is very easy, I mean the system. Besides you can work form a handout. The system hasn't anything that can be made on or off. You can work searching online if the invigilator is leisure faire. So, it has got such problems. It might be for this that the majority of teachers do not use it.

Researcher: OK! Because it is not highly organised and it is not the kind of system that supervises it.

Participant [17]: No. just normally, it only … the question for you. And I think it is because of such problems that we do not use them oftentimes.

Researcher: Ok! Is there no supervisor while you sit for exam?

Participant [17]: There is normally. But for it is a student, students are equal. It is with the technology that your working system got…

Researcher: Of course! But what if they allow only the exam, shutting the other system.

Participant [17]: That would be great. And it has advantages. By the way this thing, its advantages, it reduces time cost. Think of it. If there is fifty or so students in a class, it is fifty or so papers that go to waste. But if this is online, there is nothing that you waste. I mean it highly reduces cost, time too. If the time is thirty minutes, when it is thirty minutes, it will shuts down by itself, I mean the system will stop. And the other benefit is you will not run around with a teacher. You will not be saying check this for me or do that for me. Normally it is there and then that it checks and puts for you. It has these advantages. It has disadvantages too

Researcher: Ok

Participant [17]: And the disadvantage, above all, let’s say, for example if you misspell a letter, you are wrong. This is very tough. I mean a student is required to know a concept, and if he understands that, knows that, whether he misspells a word or not is no big deal.

Researcher: For written exam, you mean?

Participant [17]: Yes, with one spelling, you will get the whole wrong. For example, if it is out of five that means you will lose five, with one spelling.

Researcher: OK! I mean ok! Ok! What else?

Participant [17]: The other..

Researcher: Ok, now what you think will be good, you’ve loved the system, but the controlling getting a bit stronger, and the system too, I mean considering a few things, for it shows you your results right away. With a slight mistake, when it is manual a person considers it. But a system never overlooks.

Participant [17]: Yes. That the system, that is. Any ways these are its strengths.

Researcher: By googling the problem side by side, it is possible to find something, a result?

Participant [17]: Yes, and above all, what is interesting is that you just never get into an argument with a teacher. I mean there are some teachers, who harm you with marks that is not yours. With them you never make contact. You will see it there online. This is just its best advantage, I mean above all the other.

Researcher: Ok what do you think makes the system better?

Participant [17]: What I think is, the system normally, for example why don't we take the exam in our dorms? Of course, this thing you can take it at any time. Why not with our phones, for example, just as my address appears normally as I go online, for example, being here you can know your dorm. Cafe and such stuff, you know where you have your meals. I mean because this is the campus's normal website. Just like that for you to just take exam in your dorm.

Researcher: But who can supervise that?

Participant [17]: That! The department! I mean if there is communication with the department, if such things are made simple, I think that would be great.

Researcher: But what if the students, being in the dorm, discuss each other, refer and answer it?

Participant [17]: Yes, that too will be a problem, but

Researcher: But when you see it as a system. What is that you consider as a system problem?

Participant [17] As a system, if light is gone, it is done. I mean just while working, for example, there is the teacher's admin. Yes? That supervises that of the students online.

Researcher: Ok

Participant [17]: That if that is gone, it just means it is gone. It means that your grade too is gone

Researcher: I see. I mean isn't there a system with which the teacher himself can control? Does it mean if it is gone it is gone? Back up?

Participant [17]: No, it hasn't such a thing. That is boring very.

Researcher: Ok! Ok! Now how often do you normally use this system? This system called E- learning, for your online learning, at what interval like, once a week? How much do you use? Do you use daily? Or how is it?

Participant [17]: That depends on the teacher. When teachers upload assignments for us we'll use it. But normally, while taking this course e- commerce, we had twice a week or so class and that means we were using it. It is online that we attend everything. Things that we see, handout and stuff we see it there online. All the system is online. The exams too are online. It just means we were using it. That is at least twice a week. That much we were using it

Researcher: OK, now do you think you can use this portal? I mean can you use it? 'This portal for E- learning I can use it. 'Do you just think so about yourself?

Participant [17]: You mean always

Researcher: I mean just to use this system there is no problem with me I can use it with no difficulty. I can access it. Do you say so?

Participant [17]: Possible. I can use it. But there are a few things lacking, as I told you earlier. As long as those systems are fixed, it means that just anybody can use it

Researcher: Have you just said to me the system of the exam?

Participant [17]: Yes. The examination system has to be considered before anything else. For example, I'll go online having read only for choice and true false. I mean, it means that I know not any workout. So only if those things are fixed. Of course, though difficult, taking workout online, fixing those things are added, I think that would be great.

Researcher: Ok, and what is more this system, do you think it will require special kind of technical skill. To access the portal, do you think it requires some kind of technical skill in ICT? Do you have to know technology?

Participant [17]: What do you mean! That is a must. You must know technology. But the degree varies. For example, even to start up, it is when you know some technology that you start up that thing.

Yes.

The question, just normal. It is a desktop that appears before you. It is you who start up everything. So, you have to know even how to type. That is what I mean. This means understanding technology.

Researcher: Ok, what things for example?

For example, how is the question coming to you? I mean is it by excel that you read the question or by word? How are you reading it? You have to know these things.

Researcher: So, what about applications?

Participant [17]: Yes. This is included in the lesson. Such things means knowing the applications. I mean you have to be modern with the times. And that is in order to do such things.

Researcher: Ok. So now this that is called module, your e-learning portal or what you call the portal which is at Arba-Minch University, what is it? What things are in it? For example, a few systems, here and now when I mention I, it contains course information, it contains course document, it contains schedule, it contains assignment, video materials can be uploaded with it. What does it contain inside?

Participant [17]: You mean the Arba-Minch's?

The Arba-Minch's normally you type your ID. These things that you said are available. As you type your ID a word that reads grade appears to you.

Researcher: Ok

Participant [17]: In addition to grade «dorm» will appear for you. Next to dorm information about the courses, if you wish to know and other. Also, I saw about teachers, I mean teachers doing their masters, you will fill out their form, I mean for example, if there is a teacher Bikila, about him information will appear to you. Is he good or not?

Kind of feedback?

Yes. That way for him to do his masters that will benefit him. I mean it is by students that it is assigned. You are given to fill out forms. Is that not in some places?

Researcher: Is it a questionnaire?

Participant [17]: Yes, kind of

For example, as he is learning, doing his masters, will it be released for you on it?

Yes, for example how did you find Bikila? ‘Is he good, or mediocre? It is like that.

Researcher: That means kind of feedback that tells how good a teacher is. Kind of evaluation?

Participant [17]: Yes. Kind of evaluation that appears there on the system for you

Researcher: To secure his masters, I mean is that to have questionnaire filled for him?

Participant [17]: Yes, kind of that

Researcher: That is the intention! Or is it just ‘evaluate your teacher’?

Participant [17]: Like that, it might be evaluation. I mean, I think that thing is done on the students’ side. There are that kind of things.

Ok, you are right. It is good to have a platform for feedback!

Yes, that is great. Very

Researcher: Ok, is that in addition to the assignments, the discussion forum etc.?

Participant [17]: Yes

Researcher: Yes. What about…, does it have kind of discussion portal?

For discussion stuff?

Participant [17]: Yeah

Researcher: That it doesn’t

Participant [17]: Ok

If it had that thing, it would be very great

Researcher: Why?

Participant [17]: That means we will get information easily. I mean, we will get something from our seniors. Now while we were fresh, we suffered a lot. Had this system been there, it would have simplified that thing.

Researcher: Ok! In your opinion, in your view, is e-learning accessible? How do you describe it?

Participant [17]: Just by comparison, as we see it now, I think it is a good start. I mean as it just a beginning.

Researcher: What about … now you, this course that is given through E- learning and another course that is given through a different medium, does the course given on e-learning motivate you more?

Participant [17]: Very

Researcher: Why?

Participant [17]: Very. You are near to many things. There, necessarily, as you touch, you will learn a lot. First you will learn how the system works. And second just you will never argue with a teacher, this thing I mean. The other is just you will save your time. For example, an exam, if it is on paper, it takes too much time. For example, if an hour is given, you will continue for an hour and half or so. Of course, this is an advantage to a student. It is not a disadvantage. But if it is on that one there, you will learn to manage time. You won't suffer outside too

Researcher: When the course is online, for your time as well?

Participant [17]: Yes. It means that you will give time. Necessarily in order not to run out of it, you will work fast. But if this is on paper, you will implore the teacher

Researcher: So, it motives you more?

Participant [17]: Yes. It will make you very fast. That means you will keep up with technology.

Researcher: Ok! Ok! What is that you say difficult? Now you've told me that using E-learning motivates you, but do you find E- learning use difficult? I mean, sometimes there are things that become difficult for you. What is that you notice as difficult?

Participant [17]: Now, I mean when the light is out and stuff, you will be appointed for another day and such stuff. This thing, of course there is a generator inside campus. It is not enough for the whole campus, I mean the generator. A few places. And when that happens, you will lose a lot.

Researcher: For this reason, you are saying it is difficult?

Participant [17]: Yes.

Researcher: OK. Now as we proceed to the challenges, now you, E- learning, earlier we discussed it a lot of course, but any challenge, you specifically, in order to use E-learning, be it in lab, as you are taking a course, as you were engaged practically, did you encounter anything difficult?

Participant [17]: So far I …

Researcher: What about the students? What do they say? The rest of them?

Students, many of them complain?

Why?

Participant [17]: I think, I mean, of course we are students of information. I think it is because we are behind the technology that many students complain. Besides this spelling that I told you about, that thing makes them very much angry. I mean they get wrong while knowing it. Considering this...

Researcher: What about skill, from a skills point of view I mean one that grumbles, one who says ‘how to access oh this thing…’and stuff?

Participant [17]: There are very many of them. There are even those who say «why did they make this»

Researcher: How?

Participant [17]: I mean just things are difficult in appearance sight. I mean it is not because its usage is that difficult, but we take time to understand things, I mean the majority of us. From this stand point, they just complain.

Researcher: By technology, does it mean the knowledge, confidence and such things to access it easily?

Participant [17]: Yes, I mean a computer for us seems alien to us. And we feel uneasy about it. It is because of that and not because it is difficult.

Researcher: Ok the other is, the other is resources. what resources are there, with you?

Resource means?

Researcher: Such as computer, what do you have? With you in your university things that you consider as E- learning or materials, it could be E- learning materials, what resource is there with you, electronic resource?

Participant [17]: Computer. There is computer. And normally we were using it to learn English, I mean after listening, with head phone I mean the E -learning that you answer it. There was this kind of system,

Researcher: How, how, what..?

Participant [17]: That means you listen to the question with headphone, which means listening. After listening I mean there is this kind of system

Researcher: Oh, is that exam?

Participant [17]: Yes the exams. That is what we took. While fresh, I mean

Researcher: Ok what is in the computer with headphone?

Participant [17]: Ok

After you listen that way, you speak then it will record you

Participant [17]: Oh

In addition to that you type. Also, you circle the answers. Normally it is like that. Any how we managed it.

Researcher: Oh! So, do you think the available resource is enough for the university, for the children, for all?

Participant [17]: How come! No, it isn’t

Researcher: What addition do you think is good?

Participant [17]: I mean though I can’t be specific just any addition of modern things would be great. I mean that can solve those problems.

Researcher: Ok, the other is the technology, are the soft wares in the lab being updated. The computers, being functionally controlled, is there any maintenance work for them?

Participant [17]: Yes, they are updated. The applications I mean. Students, however, for we use beyond what is permitted for us, we will make them busy, I mean ourselves.

Researcher: I see, I see

Participant [17]: I mean we do not do what they order us to

Researcher: Why?

Participant [17]: A student always go his own way as he is but young!

Researcher: Ok! Ok!

Participant [17]: And we do not listen. It is but for this reason, otherwise they update them, they do lots of things

Researcher: Ok, what about wireless connection, how is the internet?

Participant [17]: It is great.

Researcher: Can it be considered a good one?

Participant [17]: Yes, it is good

Researcher: Have you ever had a video conference session?

Participant [17]: Video? I

Researcher: Have you ever seen..?

Participant [17]: There is. But I never took part.

Researcher: If there is, do you think it is helpful?

Participant [17]: Why not. It is very helpful

Researcher: Why?

Participant [17]: (Laughing) you just will broaden your understanding. You will improve many things

Researcher: Ok, has the management ever given you any training so that you use E-learning?

Participant [17]: No, there is no such access

Researcher: If there were training?

Participant [17]: For us to learn so, there is no such thing. Everything is a surprise. It is just «you will learn E- learning, you will learn it» it is just that.

Researcher: Otherwise, there is no such thing as training, ‘the system works this way’ kind of orientation?

Participant [17]: Normally the teacher gives. I mean that is his class. For him it is because it is his duty. But the campus, I don’t know whether it is because a teacher is available. There is no such thing that has ever been organised.

Researcher: But do you think he is qualified enough. Do you think all individuals, while using this system, free from confusion or update themselves by taking training in doing so?

All the students!

Researcher: Yes, are they given training?

Participant [17]: Training normally is from what the teacher talks.

Other than that

Other than that, there is nothing given us

Training is not given for the sake of E -learning

No, there is nothing like it given normally. it is only that for they are to use the system they are practicing on us. it is not for us to practice, I mean just like what you are doing just like you are asking me just like that they too are in order to use the system they are practicing it on us;

Researcher: I see

Participant [17]: Otherwise, it is not normally for us to practice and understand it. It means that it is only for their own benefit that they are doing this!

Researcher: Ok, what about the interface design, is it good?

Participant [17]: Yes, it is very nice

Researcher: I mean do you think it is user-friendly as you see it?Is it a very attractive user- friendly type?

Participant [17]: It is just nice.

Researcher: Ok, now what the last question will be on ethical issues. Earlier you mentioned it a little, does it have any rule and regulation that you know. This system, I mean for example, ‘you use computers at this time, it is like this, do not touch this thing, do not plug in a flash disk kinds of rules, does the E- learning have it?

Participant [17]: It has

Researcher: Have you ever got it? Has the rule been given to you?

Participant [17]: We have never been given, normally as the teacher invigilates for example, as I told you he says, ‘you cannot use internet’, he says ‘normally you are given from this time to that time, just do not plug in flash and stuff’ I mean you cannot carry anything into the exam. You go in bare hands. Yet we of course do. Of course, I am disclosing a secret, we do!

Researcher: A system supervising that, kind of more like a rule

Participant [17]: There is no.

Researcher: ‘If you do this, this will happen to you!, If this is so it is this! Isn’t there such a thing

Participant [17]: Verbally, verbally there is! You are told that you will be disqualified

Verbally

Yes, like that other wise

Researcher: Haven’t you ever seen that implemented?

Participant [17]: Normally system what I am telling you now is just more than anything else, for example while using internet to answer the first question, you’ll do it by searching. In doing so if only the system could just make you wrong, or if only there were kind of alarm system when you use something else

Or if it be blocked

Just had it such a thing, it would be great!

The rule you mean?

Researcher: Yes

Would it be good if there were formal, functioning rule?

Participant [17]: If there were one, that would be great! Instead of a verbal… I mean telling

Researcher: Ok, Participant [17] thank you very much.

Than you

Participant [17]: Ok, thank you.

Participant [18]

Researcher: Thank you very much for coming to participate in the interview. I shall begin the questions.

Do you use E- learning?

Participant [18]:Yes, I do

Researcher: Ok, how much do you use?

Participant [18]:It is not that much, but I use

Researcher: Like weekly, monthly, how much do you use?

Participant [18]:There is nothing specified. I mean sometimes as we search for PDF, for it is uploaded there, in order to download what has been uploaded, we go online. Now, in this semester, we took the test for E- commerce with it. But it is very hard. I mean the distance between the computers is very close and for the size of the lab is not that much, and for there are many computers at close quarters, the student sitting here might see the student next to him easily. And … at random is a bit difficult, we seldom use that. And E- commerce is our very first exam itself. It is for this that we used it otherwise do not use it much.

Researcher: You used it for two courses?

Participant [18]:For one course, it is for one course that we used it so far. But I think there is still one course for which we use it. Otherwise so far we used it to take exam for one course. And some of the things instead of e-mailing, it makes the job easier for us because if they upload it once, by entering our user name and password we can download it easily

Researcher: The other…, do you think you can use the E- learning properly?

Participant [18]:That is very easy. I don't know about others. I think it has… other E-learnings but ours, for it belongs to the school, to the university, it was made easy and even it is easy to take course, the quiz with it.

Researcher: How did you find it easy?

Participant [18]:Normally there is nothing difficult about it. First we our study is connected to a computer. We are required to know such things. But that is not the case. We just normally read. The answer is given in a box as a, b, c, d. It is just either

by pressing click or there is a next button or here is it that reads second question, you press that. If there were the ….. Internet, it was easy to show.

Researcher: Ok, Ok, do you think this is a portal that requires knowledge what knowledge does it require, technological?

Participant [18]:Nothing! In case for someone else who doesn't know, but if a bit of guide is given him, easily….

Researcher: Ok what is in it? This system that you use? Now I, for example thought for example it might contain information, inside it course documents, schedules, assignments, electronic resource video resource and such things and what is it that it contains?

Participant [18]:Whatever we need we can upload on it but what we use... is, as I told you earlier, they upload PDF'S for us and we go and download whatever we need. The course I told you about, E- commerce, this course instead of e-mailing the guy via our individual email, it kind of saves time.

Researcher: So, now does it contain the services I have just mentioned for you such as video materials, assignments and stuff?

Participant [18]:There could be. Since I used internet, electronic that could be available. It is possible to upload anything, but what I use is the PDF. Speaking of the things which I didn't see hundred percent ….

Researcher: Ok, the other is in your opinion, how do you describe E- learning? Is it accessible? Is it good? How do you put it?

Participant [18]:Normally ours is not complete E- learning, the university's e-learning, first our university use intranet. It is not internet. I mean the internet… it is working with internet too. It is accessible. But it is also working with intranet. If it is working with intranet, but I am not sure whether the E- learning is working with internet.

Researcher: You mean like, that service, can you access the university's e-learning on your phone from home or anywhere?

Participant [18]:Yes, it is accessible

Researcher: The system is available everywhere?

Participant [18]:Yes, it is accessible. But sometimes they shut it off. It when they upgrade it they shut it off. And sometimes when we are to take exam, it is shut off. Because freeing the teacher until he control the students and stuff, it is shut off. Except for in such circumstances, it is accessible everywhere.

Researcher: Ok, what is that you think is difficult in using E -learning then?

Participant [18]:We live in Ethiopia, right? It is power. Light, but for it is campus there is a generator. What else is there?

Researcher: Does the generator recovers it?

Ours? The campus's?

Participant [18]:yes

Our lab has been skipped by the generator. If it were not for that case the campus has not any difficulty with regards to generator.

Researcher: Ok, so as E- learning what kind of problem do you think you have encountered? As a difficulty?

Participant [18]:Cheating is a bit hard. It is hard to control.

Researcher: When it is online?

Participant [18]:Yes, because the computer is put at close quarters like this can you see. It means you saw it. That is hard. Otherwise, there is nothing difficult.

Researcher: What do other students say about the E- learning? Is it good or bad or difficult? Or has it a problem? What do they say from your observation?

Participant [18]:They don't say anything.

Researcher: Are they comfortable?

Participant [18]:I guess all have agreed. For sure I cannot tell you with complete assurance. But we normally since it is simple. There is this face book, right?

Researcher: Yes

Participant [18]:It is just like that you access it. There is your user name you enter it, there is pass word you enter it. It is right before your eyes.

Researcher: The other is resource. What resource is available there with you? Just like computer, lab, and wireless, what E- learning resources do you have?

Participant [18]:There is lab. Inside the lab there are computers. What else is there?

Electronic resources, materials, you mentioned a while ago

Participant [18]:It is wired. You use wired. There are wires. And by using the cable we access it.

Researcher: Have you got wireless?

Participant [18]:There is wireless too, but we use by the wired በዋየርድ ነው የምንጠቀመው

Researcher: Is it inside the lab?

Participant [18]:Because our lab is nice, yes

Researcher: What has made it beautiful, that you say is good?

Participant [18]:First the speed is high. Even here in Addis there is nothing like it. This itself is the qualities of the university.

Researcher: I see

Participant [18]:And wireless, if you have observed it, is subject to termination. Sometimes it is limited. Sometimes it is disabled, for those in that department manage it as they wish to. But this one it is managed just once. Once what is to be blocked is blocked, it is engineered. Finished

Researcher: Therefore, you are saying these resources are therefore helpful?

Participant [18]:Very much

Researcher: What addition do you think is good? In addition to that which is available?

On what is available, embellishing the … I mean making the interface attractive

Researcher: You have come to that question before me. We will come to that. Ok, for example what the interface?

Participant [18]:This one is not that attractive, the interface. I mean since it is for education, of course, this kind of thing, you might say, is not that … but the more attractive the interface is, since attractiveness is the goal when it was first designed, it makes people to access it properly.

Researcher: When you say others, what for example?

Participant [18]:By others I mean to get more people into the E- learning, the other, for example what I can I say there is a thing that a person is attracted to, right? I mean if it is E- learning all the time, it is a learning tool right? If only there are other things too with which he relaxes.

Researcher: I mean to keep people interested?

Participant [18]:To keep them interested. It is the same with the interface too. If the interface is attractive, people can come to use it

Researcher: While talking about technology, you said that your internet was reliable. Was it of course good?

Participant [18]:Yes, didn't you go?

Researcher: No, I didn't

Participant [18]:You could have seen it. I guess it is better than the other university.

Researcher: Ok, what about the wireless? The hardware the software, the lab how is it? do they update it? Is it functional?

Participant [18]:Are we not students of it too? I do not ask for much of their help. If there is anything that we want we will update it by ourselves. Of course, they block us. The admin too is locked. But there is a reason for the admin to be locked -- there are things that are uploaded. And since there are things unwanted to upload as well, it is locked. But with permission and such things, you can upload. The other, both the software and hardware as it is…

Researcher: Is there maintenance for it? Do they control, maintain and stuff?

Participant [18]:Yes. Those who sit there, they maintain, it is not us, but them. They say there is maintenance. But since the computer is new, it doesn't require much.

Researcher: I see! Is that new?

Participant [18]:It is new.

Researcher: The other point is, how is the management? Now, for example, do they frequently give you training for e-learning or have you ever been given even once?

Participant [18]:It is as I have told you. There is nothing that requires a training as such. To begin with those of us who are using it are a computer science …

Researcher: By the way, I shifted to you because I had heard that your computer science… are the only ones who were using it. But is any other depa…

Participant [18]:It is. But if another department wants to use, no one stood in the way. Any person can.

Researcher: So, are you saying the training is not necessary? Doesn't it require some kind of orientation, some kind of guideline?

Participant [18]:As such big? It doesn't require.

Researcher: But a little?

Participant [18]:A little orientation, a simple one

Researcher: Was there ever?

Participant [18]:During exam

Researcher: I see

Participant [18]:Since we never took exam, and since it is exam and you panic, 'as you do this, this will happen.' Even that you know a little. There are some who are slower at computer.

Researcher: There is such a thing too! The other is the interface, you told me earlier, is it attractive or?

Participant [18]:It is as I told you. It is not that much. It is not awful! But it is possible to make it more attractive

Researcher: For example, what makes it …, what I am asking you now…

Participant [18]:Even the colour is not that much...

Researcher: What about its accessibility?

Participant [18]:Its accessibility is as I told you. That one is very nice. As to its accessibility, I don't have much … it is nice. The interface too.. Is nice. But more attractive, you know kind of attractive

Participant [18]:Yes

Kind of that

Researcher: You suggest so?

Participant [18]:Yes

Researcher: Is there ethical matter that you know of so far? Anything that is set for the use of e-learning for example, ‘use the lab at such time, time limit for users, use internet this way, don’t do this etc.’ kind of rules and regulations, E- learning, do you have them there with you?

Participant [18]:I haven’t seen with E- learning. The policy, since it has to be, is written. But the E- learning, the policy is at Arba-Minch sight. I haven’t seen on the E- learning

Researcher: Ok, but there it is?

Participant [18]:There is but on the site that policy.

Researcher: ‘If you do this, you will get punished for it or you can ask for your rights, you can say do this for me.’ Or is there such a thing

Participant [18]:For …. The rule is written. I haven’t noticed.

Researcher: Yes, but is it beneficial? Its very existence?

Participant [18]:Only if we use it that it is beneficial. Who listens?

Participant [18]:Yet if that is advocated, that you are told to use, if you are ordered to read this kind of things from the site?

What you have just said.

Researcher: But if it works after this, the rule too, your benefit too, for example now let’s say that you do not own a laptop and you are in the lab. Then one student, using social media, is sitting since morning. But you need to practice. It could be exam or it could be something else. You want to practice something. If you can’t get it, if there is some kind of thing or during exam time, if there is a certain kind of specific rule and regulation, do you think it will help?

Participant [18]:Yes. That will help. That is helpful if there is!

Researcher: It is not a kind that burdens the student but something that works for all?

Participant [18]:If there is one that would be nice. Completely first just you know it makes you to use the computer friendly. Since there is nothing difficult with it, if there is, there is nothing harmful about it.

Researcher: Do you have anything to add for me?

Participant [18]:I don’t know. Even I who learned it …

Researcher: Ok, thank you very much.

Ok!

Participant [19]

Researcher: Ok, thank you for coming. We shall begin the interview. To begin with the first question

Do you use E- learning?

Participant [19]:Yes, we had used it. We used it for exam. To download PDF’s and we also upload assignments. We have used assignments. And sometimes to read also. Many times chapters, units and stuff, at every chapter they upload on that for us. Some students upload on that.

Researcher: Ok, now you, how many times do you use it a week. And how many times a day you access it?

Participant [19]:We do not use it daily. The course we were taking, the course that we were taking through E -learning was one course. It was E- commerce that we were taking. That course we use it once a week and we use once a week. It is when we take exam that we use it many times. And we were using it to download a chapter.

Researcher: Ok, do you think that you can use this portal the E- learning properly?

Participant [19]:Yes, I mean it is better than the others. If we are to use it, it is very nice

Researcher: What do you mean by ‘than the others’?

Participant [19]:It is very easy to use. It is very easy to use. When we take exam, for example now, I mean there could be cheating and such things, but it is just simple. It is nice.

Researcher: Is it accessible?

Participant [19]:It is accessible. It is very simple

Researcher: Now to use this E- learning, do you think it requires technical knowledge? To use the portal?

Participant [19]:No, it doesn't require that much, if you are at that level. It is simple for a student of IT. You can use it just as you use face book.

Researcher: So, it doesn't require some kind of technical knowledge

Participant [19]:It doesn't.

Researcher: Ok, what is inside it? I mean this E- learning, the portal contains some kind of course information, schedule, assignment, video material, E resource many things, right?

Participant [19]:Yes, it has got many things.

Researcher: So, what does yours specifically contain?

Participant [19]:Do you mean the one we used?

Researcher: Yes

Participant [19]:Specifically, we used it for, first, we took exam with it, not once but three times. Second we used it for learning… during our freshman year we used it for learning English language, I mean on E- learning. We had taken exam with it- English. And we had also downloaded books with it. With it we had downloaded from there PDF'S that teachers upload for us and read. I mean chapters. By chapter they would upload there for us and we used it downloading with it. Also we as we completed assignments instead of sending via E- mail, we hand in on e-learning. We have our own password and with it we hand in.

Researcher: So, now you, what about... Does it have like discussion portal for students?

Participant [19]:Like discussion, we never used it

Researcher: But does the system has it?

Participant [19]:No, it hasn't

Researcher: Do you say it is good if it has?

Participant [19]:If it had it, it would be nice.

Researcher: For example, if it contains what? I mean what can it avail you to have this discussion?

Participant [19]:You exchange information. I mean discussion is good all the time. So at that time we exchange information

Researcher: I see

Participant [19]:Also, during exam, for example, even classroom assignment if it is given to you via E- learning, it is nice.

Researcher: Ok, do you think the administration of exam by E- learning made the matter easy?

Participant [19]:That the exam is on E- learning made it easy. But in the same way it is also easy to cheat. That means, for example, with the person beside you, you can do exactly the same. You can also go back. If it is some fifteen questions, you do the first question and then move on the second question. So you can click next and go back to the first. Going back to the first, for example if he has finished first, the man next to me, it shows him the whole result then and there. All the answer and the correct and the wrong ones, it shows him. It may not show the answer but for example in multiple choice, there is choice, right?

Participant [19]:That choice, after he has done it, after it has been checked for him, if I see it and see that he is wrong, I can get, at least equivalent. So, I can correct and do that. That might have an effect. But that too can be fixed.

Researcher: On the system, kind of strong or setting the labs, the computers far apart from each other

Participant [19]:If you could set them apart, that is very nice. That is just…

Researcher: And If only the system be controlled?

Participant [19]:If the system be controlled, yes.

Researcher: In your opinion, what do you say of e-learning? Is it accessible?

Participant [19]:That is very good.

Researcher: How?

Participant [19]:It just makes things easy. First it is with our field of study. With our field of study, it made it very easy. To those of us who can work, it is good with our studies.

Researcher: Is it because your field of study is technology?

Participant [19]:Since it is technology, it is very easy.

Researcher: But what exactly made it easy. Time or what made it easy?

Participant [19]:It is easy, very easy to use. That too is one of its uses. It is just that.

Researcher: So, what is it then that you say difficult about E- learning? What is it?

Participant [19]:Difficult about E- learning, for example now we, for example as I see it on the exam, there is supply type on the exam, right? Supply type asks us to complete blanks. That is what it can ask us. And that 'Fill in the blank' may not read spelling errors and stuff. So, it is the teacher that will see that again. «I will see to the spelling error and check it for you» he said then to us. That can be a problem. And it includes multiple choice, true false and stuff mostly. That is bad, I mean it should include supply type. For me…

Researcher: I see! A little bit with that?

Participant [19]:It becomes easy, it becomes easy very

Researcher: Ok what about exam, exam specific, I mean will it make the exam exclusive?

Participant [19]:It makes it exclusive. We just took fill in the blanks. If it be hard, it is fill the blank. Even with that «if you have any spelling error I will see to that and correct it» the teacher said to us as he taught us

Researcher: Ok, since there is a problem of language too?

Participant [19]:A problem of language too, yes

The whole thing there in language

While checking for you, I mean, there might be a problem of language. That is common to any student and it never detects that. Unless the teacher go online again and see every student's.. Unless he sees that... And for the teacher that in turn is …

Researcher: Even if you expressed your ideas, the language may not be right?

Participant [19]:Yes

Researcher: Yes the other is other than this what other difficulty is there with E-learning or things that other fellow students raise?

Participant [19]:Security there might be a slight problem

Researcher: What?

Participant [19]:I mean anybody, if they happen to know my password, can use it. You give password, if they know the password, anybody can log in and take even my exam. Anybody, for me if I tell my friend to take the exam in my stead, he can just go, type my password as Participant [19], entering my password can take the exam

Researcher: So, security too…?

Participant [19]:There is a problem of security with it.

There must be some kind of …….. That makes …. Itself

Participant [19]:For example, there is a teacher going around, right? Who controls us? Beside him photograph

Researcher: Exactly!

Participant [19]:Or if only there is something!

Researcher: Ok in the system you mean?

Participant [19]:In the system. That would be very nice. That will make it simple.

Researcher: Ok, that he is himself?

Participant [19]:Yes

Researcher: Very good. Do you have anything else to add on challenge?

Participant [19]:On challenge another no.

Researcher: Ok, what resource is there with you such as computer lab, or what do we call it - the wireless system, video conference etc. what system is there with you that can help as E- learning resource or E- learning resource or if you call it support, what things are there?

Participant [19]:Other than e-learning?

Researcher: No, No on the e-learning?

Participant [19]:Other than video?

Researcher: Yes, no, the resources?

Participant [19]:The one that we made use of, I, of course didn't see a video. I just heard it as you are talking now. I didn't see. What I saw, and made use of I use it for exam. We download PDF with it. Books we find many. That helped us a great deal.

Researcher: Ok it is this, E- resources

Participant [19]:There are books on it in abundance. Yes I mean if the teachers upload properly, there is no need to go to the library. Then and there we can download, with our phones too we can download and use.

Researcher: Ok, does this portal work on your phone?

Participant [19]:No, it doesn't. It is there in the campus

Researcher: It is intranet, but do you think it will be nice if it works everywhere?

Participant [19]:If it does, that is great. I mean it is not working except for exam.

Researcher: So that wherever you are you can download and read?

Participant [19]:Yes you can read here if you have the ID and …

Researcher: Since there is the user name and password?

Participant [19]:If you have the user name and password.

Researcher: Ok! The other, looking at the technology how is the internet with you? Is it reliable?

Participant [19]:Yes, internet is great. The internet even … the PC might be a bit lacking but lab what, now as we take exam half of us went to another lab and the rest of us took it in our lab.

Participant [19]:I see. I mean it is … equipment might be scarce. It may not be sufficient to all

It may not be enough. It is not enough. For example, it was not enough in our class. Then we took the exam, taking another lab from another students.

Researcher: Ok, what about the hardware and the software. Is it maintained? Is it updated?

Participant [19]:Yes it is maintained. The hardware and the software are maintained.

Researcher: Have you ever had video conference sessions?

Participant [19]:Never

Researcher: Would it be nice if there is? Do you think?

Participant [19]:If there is one, that would be great!

Researcher: For example, what if there is this video conference session, how much do you think it will help?

Participant [19]:That will make it easy. First, I mean, it will make the work, what you are leaning easy for you. When it is on video, everything is easy to understand. Since we are watching it, we will understand something.

Researcher: Ok, the other, the management, I mean do they facilitate E- learning trainings for you as a university? Do they give you E- learning updates?

Participant [19]:They don’t give us. Now it is only us who are taking the E- learning. I mean I have never heard of engineering students and stuff. They never use. Totally they don’t know it, even its name. The name E- learning, they don’t know it. We ourselves have known it this year. We have known it now. We took an English course with it, but it was only for a day or two that we entered and took English exam with it. We took exam about English then we got out. That is all. We took it now in the second semester for the course E- commerce and came to know properly about E- learning.

Researcher: So, no training has been provided for you so far?

Participant [19]:No!

Researcher: But is it not good if such kinds of trainings that update you are provided?

If provided, that is good. I mean also to engineering students, not only for us.

Participant [19]:Yes, for others, for all to make use of it.

For all to make use of it, that is very nice. If we make use of the security properly. I mean as I told you if cheating and stuff is avoided, even if examination is given via it that is just very nice.

Researcher: Why are you saying, «it is good»?

Participant [19]:The more it is by internet is the better because first, cheating will be minimised. Instead of taking exam on paper, if you invigilate by setting the computer far apart, I don’t think anyone will cheat

Researcher: Ok, cost wise too?

Participant [19]:The cost itself is too high. First the thing that you copy. It easier if you download a PDF and read. And a teacher is not supposed to email to all. What is required of him is just to upload it on e-learning. He uploads and we download. Whether we need hard copy or soft copy, we can get it copied and use. On paper too if we want to.

Researcher: It reduces cost for the university?

Participant [19]:For the university, I think it highly reduces cost, I mean on exam.

Researcher: The other is how do you see the interface? The interface that is currently available, is it accessible, is it good or how do you describe it?

Participant [19]:Yes the interface is nice. The interface is nice. As we work, it is very nice.

Researcher: Is it accessible? Is it user- friendly?

Participant [19]:Yes

Researcher: Don’t you suggest anything that should be added to be removed from the interface?

Participant [19]:No, the interface is nice.

Researcher: The other, as we raise ethical issue, there is an ethical issue. Is there any rule and regulation to use the e-learning? For example, are there laws, policies such as for the usage of lab, of the internet and stuff?

Participant [19]:No, we were not given. Such a thing, I mean it is only on exam as I told you that they focused and worked us. And during examination I, him, start, I mean he is the one releasing it. It is after we sat for exam, took our places that he released on us, that he released the exam. After that, standing up, he would tell us the rules saying, «Like this and like that, you submit on completion and stuff» other additional things, he doesn’t tell us.

Researcher: Either the resources or anything, either the E- learning or electronics by which that you make use of all, isn’t there any regulation that you can name?

Participant [19]:No, there isn’t

Researcher: Do you suggest that it is good, if there is?

Participant [19]:If there is one, it is nice, yes.

Researcher: Why?

Participant [19]:Because it is good when there is rule for it. I mean, I think it is good for use when there is rule for it.

Researcher: Anything else as a challenge, or anything forgotten, or this much we would use this one …. What else do you have to add?

Ok

Participant [19]:There were students, I think, who clicked submit by mistake and…

Researcher: In what ways, do you think, these kinds of things should be made right?

I don't know.

Researcher: Ok! Ok! Other additional challenge?

Participant [19]:Other no, there isn't any other. The rest is fine.

Researcher: Ok Participant [19], thank you very much.

Ok!

Participant [20]

Researcher: Ok good afternoon Participant [20]. I shall begin the questions for you

Do you use e-learning?

Participant [20]: Yes, I have begun using it now, that is to say this year.

Researcher: How, for example is it daily, weekly, how much do you use E- learning?

When there are such staff as quizzes and tests and when we are given assignments and staff, to download soft copies since teachers uploads for us, I mean. For such things I use.

Participant [20]: Ok, Ok this, the E -learning portal that you use, do you say thus « I can use it properly, it is accessible»

Yes I mean from all teachers, there is one teacher who use it for us. It is in E commerce, juniors E commerce lessons that so far we know e-learning.

Researcher: Why did you say so?

Participant [20]: While taking quiz and staff, you check your results on it and go. It checks it for you by itself. You do not wait. The teacher himself it saves him his time for it checks by itself, I mean the staff. So, it is interesting and also you can download soft copies from it and use

Researcher: Ok

Participant [20]: For the teacher too, in terms of cost instead of wasting lots of paper students can download from thereon and use, even instead of copying exam, duplicating, taking the exam thereon is very nice

Researcher: Ok! Ok! but while using this e-learning, do you think it requires special skill?

Participant [20]: Yes, very much. Because even from the students side, there are many who do not know how to use it. And since it has got time, let's say, for example, if twenty minutes is given unless you are able to finish with that twenty minutes, it will time out.

Researcher: So therefore, if he has the technical skill he can be faster and finish on time or staff?

Participant [20]: Yes, if you have the skill, then that is very nice. So that is great.

Researcher: So, it requires some kind of technical skill?

Participant [20]: Yes it requires. Not anybody can come and use it. I mean if he can't, if you do not know how to use it, many things, once we were given an assignment and staff. If you don't know how to hand in with that … the assignment immediately on time… even with an assignment you have to check all the time by going there because the way you learn when an assignment is given is thereon the teacher uploading it. And assignments there are a few student without him knowing an assignment was given and there is time allotted, it never accepts beyond that time. That means he never hands in his assignment. So, if you do not check on and staff all these things, you cannot hand in assignments

It requires some skill, knowing, checking on it every time looking

Yes, it requires to frequent checking.

Researcher: And to check that you have to know some technical skill?

Participant [20]: Yes, you have to

Researcher: Ok, does that mean till you connect to the system

Participant [20]: Yes

He who can’t do so may remain seated idle!

Participant [20]: Yes since it has a username, password, you have to remember your password. Otherwise, if you don’t know your password it will not work for you.

Researcher: Ok the portal you are using now, what does it contain? If, for example, I if I give you samples such as course information, schedules, assignments, electronic resources, video materials. What is that you specifically say is inside it?

Participant [20]: There are staffs. When you first enter or what. All of the department are there. I didn’t see them using but it says electrical engineering, civil engineering. Yet I have never seen them using e-learning. It is we who use the most.

Researcher: What could be the reason?

Participant [20]: I mean I don’t think anything is given to them with that.

The fact that it is not given, the awareness

Yes. To begin with they don’t know e-learning. They themselves. But thereon are all courses. Currently with us, we too, I have told you that it is only one teacher who is using it. When you log in the courses are there, the chapters are there, what you want to read is there, assignments are there. And at all times there is this lab stuff, it is just there that it… The stuff. I mean there is this thing.

Researcher: Ok does it have kind of discussion portal with which you discus kind of feedback

Participant [20]: Feedback?

Researcher: Yes, kind of discussion say with a fellow student, if you have concern about the assignment, the course or something, does it have kind of chatting portal by which you discuss, also meeting the instructor, this and that.

Participant [20]: I didn’t see. I never made use of it.

Researcher: But do you say it is good if it has

Participant [20]: Yes

Researcher: How is it?

Participant [20]: Because the teacher gives the assignment there. You may not know what it is. What is expected of you is to do and submit. But you can never meet the teacher for anything. You just won't find him. On top of that «it is uploaded» even we «I gave you an assignment. Have you seen it? » and staff that is what he says to us and that is when it is due in two days' time.

Researcher: What created this problem? What do you think caused the lack of experience?

Participant [20]: It is the student. Since they started using recently, you always check say on QSMS and staff. But on internet, on e-learning it is not customary. The checking and staff is not customary it is always when something is given, when you take quizzes and staff that you check.

Researcher: So, so that itself requires kind of a reminder?

Participant [20]: Yes, that would be nice if it has

Researcher: That is until you be on track with the system

Participant [20]: Yes, yes

Researcher: And it is forgotten. There is even a time when it is overdue without you seeing it.

Participant [20]: Yes, as it is not customary.

Researcher: Or the teacher has to tell you to check on the system?

Participant [20]: Pardon?

Researcher: «On the system check it. I have done this» he has to say earlier.

Participant [20]: Yes, that would be nice

Researcher: What prevents you from checking continuously? Is it the awareness only or the system?

Participant [20]: Just it may be our laziness the system is up and running.

Researcher: I see

Participant [20]: Where ever you are it is working but I think it is because we lacked the habit

Researcher: Now, can you access it from home or anywhere?

Yes, I, we are currently using it on our phone, I mean mostly

Researcher: Ok

Participant [20]: We were even told to present an assignment but we hadn't thought that it was to be presented and so submitted it on e-learning. So, we presented by downloading the document from thereon.

Researcher: Ok

Participant [20]: It won't be forgotten.

Researcher: I see, is it because the assignment is thereon?

Participant [20]: Yes, the document is kept thereon. The teacher thereon is what you have sent him. Since it is there you can read it anytime. Besides you have got to carry around soft copies on flash and staff. That is when you need to read somewhere. But now if you use on your phone, there are the chapters that is up to the end. The teacher uploads you can go online thereon and read, if you want to

Researcher: You just download from your phone and read wherever you are at home or anywhere?

Participant [20]: You read, that is very nice.

Researcher: Ok now you in your opinion is it accessible, is it good? What do you say of E- learning?

Participant [20]: E- Learning, for me, has suited me perfectly. It is nice. Especially on quiz and staff, as we take exam it is just kind of, if you understand the usage, it is just kind of fast. You will finish fast and get out. There is no labouring away over paper. It is just kind of thing that you use with enjoyment.

Researcher: Ok, therefore from another course, this one motivates you?

Participant [20]: Yes it interests me very much

Researcher: Other, just manually, face-to-face

Participant [20]: Yes instead of manual, as for me if we take all courses this way. I mean we were saying if only we take all quizzes that way and the final be given us this way.

Researcher: Ok now your reason is the time?

Participant [20]: The time no, it is only because I saw it in another student. I mean they get scared. And there are some of them who, without even reading it, choose the choices and leave, lest the system time out. Also, this thing, also I mean it has shortcomings too. This thing, I mean let's say spelling staff, as we take blank space and staff type, if you misspell one, just one it will never check it. It will make you wrong and staff. And you will set all this right by going to the teacher and staff.

Researcher: Oh! Ok, Ok

Participant [20]: That thing

Researcher: Hasn't it any spelling checker on it?

Participant [20]: No, and spelling error is just… just a spelling say if «a» is to be put in and you miss «a» it will make you wrong.

Researcher: The whole question?

Participant [20]: Yes, it will make the whole thing wrong and this is very …. For the student.

Researcher: It can be discouraging?

Participant [20]: Yes, knowing the answer you might …

Thus, if such things as the spelling checker and staff are available with the system…

Yes that would be nice because the student already knows the thing but he misspelled it and it is possible that you misspell while typing. So that thing, if only getting all wrong for a spelling is not there.

Researcher: So, that is what you say difficult on e-learning?

Participant [20]: It is but that, the rest is excellent

Researcher: Ok so now do you encounter specifically for yourself, personally any challenge about e-learning. «If I use this thing it is just…» I don't know whether you say everything is perfect, but the thing that you take as a challenge?

Participant [20]: The challenge is, for example it is on quiz that we used it and after the time and staff is fixed, having been told that we are to have exam, and there may not be power. And if there is no connection, since it is on internet, if there isn't and staff, you may not take that thing. Now this are challenges. That is because you can't do anything. Also, as I told you spelling and staff, for a student the time too. Of course, the time is the teacher's problem because if he gave more time, you could use that time to do.

Researcher: Ok does it mean the time setting?

Participant [20]: Yes

Researcher: What about the other students? Do they have a similar view like you, as you observe the challenge?

Participant [20]: Yes, it is from what they talk that I am telling you because what they have experienced is the time …before, before I finished it had timed out and such staff. There is just kind of panic till they are used to it. And even while knowing it, there are students who get out without doing the question.

Researcher: If such things are set right for people not to hate it and to make use of it properly, it support the students?

Participant [20]: Yes it can. It is a very nice system.

Researcher: The other, when we pass to resource and support, what resources, what e-learning resources are there? Here with you in addition to computer what e-learning, it could be material, items such as I mean video conference, such as wireless. What resources do you have?

Participant [20]: Meaning?

Researcher: That you take us electronics, I mean what resources are there that may be helpful to e-learning?

Participant [20]: Ok, resource that I think might be helpful to E-learning, here in our campus

Computer and what is it, wireless…

Yes, our lab of course is very suitable for e-learning?

Researcher: Ok, what has made it suitable?

Researcher: What?

What has made it suitable?

Participant [20]: For us to use that thing, the sitting arrangement and staff was nicely … because on exam and staff, as we sit you might … I mean I think cheating will be minimised.

Researcher: Why?

Participant [20]: Because when it is on paper instead of that, it is easy to do from a person, but on e-learning since it is online, everyone does his own and at least I don't think it is suitable to see and staff from another person.

Researcher: I see, I see are you saying thus that the lab, its setting, system, installation, the structure too, yours is good?

Participant [20]: Yes. It is good.

Researcher: From the point of view of connection

Participant [20]: It is from connection point of view. If there is no connection in the interim it might give you a bit of a hard time. So far, however, we have never had a difficulty.

Researcher: Ok, do you think the available resource is sufficient? I mean the computers, the other staffs, can it be enough to all persons, to all students? Of course, we know that it can't be enough, but do you think it is relatively sufficient?

Participant [20]: I don't think it is sufficient because even we split into two classes, divided as such to take the exam and as we split, the teacher would go there to release the exam and staff upon which time many things would occur in the interim. It requires a different invigilator and staff … and besides he has to check whether lab is occupied or not. It is just after so many checking that you take that thing because

Researcher: Is it because of insufficient resource?

Participant [20]: Yes, it is insufficient. Since it is insufficient, we will occupy two, three lab to take exam. And while we are there taking exam, that means that another person who wants to use will sit outside.

Researcher: Is it because the resource is not enough?

Participant [20]: Yes, because it is not enough.

Researcher: What about your wireless internet, is it good?

Participant [20]: Yes

Researcher: Are you saying it is enough to just access for the e-learning?

Participant [20]: Yes. That is enough.

Researcher: The other, ok have you ever used this that is called video conference system?

Participant [20]: We never know video conference

Researcher: But if it exists, do you say it is good. If there is kind of face-to-face experience sharing from one university to the other and if lecturers are invited, if a video conference becomes available?

Participant [20]: If it becomes available, I think it is nice. We have never made use of it.

Researcher: Ok, Ok the other does it have features or uses or any different that can be for e-learning that I never mentioned but that you say exists?

Participant [20]: There isn't those that cab be for e-learning. But, for example there is this course telecom. We take it… via a video. I mean the teacher, being there, records his own voice. On top of that you see a soft copy. I mean what does that help you for! While sitting in our dorm, this time we may not need to go to class. Or otherwise, while in class you will forget what he has taught there. But now you can listen to it over and over again as it suits you. So, the man's … we took it that way up to the final.

Researcher: Ok, he has kept what he recorded in the form of both voice and image?

Participant [20]: Yes, he recorded and kept it in images and staff. There are also videos, it is by reading them. And since from what he talks also appears in the exam, you will listen to him properly. You just listen to it over and over again without your interest. What another teacher explained, except for that you wrote down, you may not remember it, I mean the thing that he talks. But this one, you can just know everything word by word.

Researcher: Having taught, it means like blended. Having taught in class, he again captures that in another form on video and keep that online for you?

Participant [20]: Yes, he does

Researcher: Does it mean like a reference?

Participant [20]: Yes, taking from thereon we read. That is very nice.

That means it is a good feature for E-learning lessons

Yes, if it includes video that would be very nice. It won't be forgotten.

Researcher: Ok, Ok the other do they give you training, the management? E-learning system of course you are IT students, but to the others as well, as you observe, are there trainings in the university to use e-learning? Is there any training in such forms as a little computer skill training or e-learning system training, internet browsing?

Participant [20]: No, it is just the student by himself

Researcher: By making his own effort?

Participant [20]: He who is in the know. Yes it is by making an effort. As we first entered, and as the teacher said to us «it is on e-learning that we meet after this and staff» you will just see. Then you will be given a password and staff. You change that and use your own. But for a person who doesn't know, he will come and say, «show me» and staff, but there is nothing given by the campus

Researcher: But if given, you say that it is good

Participant [20]: Yes, if given because even all teachers. I think he doesn't use the system because the student doesn't know it. When you go to other departments such as information technology and computer science and staff, they use it. But the other departments do not use it. Why? Because they don't have much እንትን with computer

Researcher: Ok, know how? That is to say because they have the awareness about «how can we use the skill?

Participant [20]: Yes.

Researcher: Ok the other is the system. This things in the lab I mean, the maintenance inside your lab, is the software and staff upgraded, from what you have observed? Is there control, supervision all the time?

Participant [20]: Yes I think it is controlled because I often see when our lab assistant checking it and staff. Such unwanted things, he tells us not to delete files. He also tells not to upload unwanted things thereon. So, I think he always checks it.

Researcher: Ok, what about the interface? The one that you are using now, the e-learning's interface, is it user-friendly when you observe it. Do you say it is good?

Participant [20]: Yes because there is nothing confusing about it. You just log in, then you enter your user name, you enter your password, then it will guide you itself I mean as you read it. I mean I don't think the person with the ability will find it difficult.

So, the interface is just easy, accessible. It is usable.

Participant [20]: Ok, ok, this guy, ok ethical. I'm now coming to the last question and do you think there is some kind of ethical rule and regulation?

Researcher: To use e-learning?

Do you have kind of rule?

Participant [20]: Now for example what I think a rule, what I think a rule is that lets say I told you that we take quiz and staff, right? Then after taking the exam, the e-learning will tell you score. But you cannot see your score thereon the reason is, since it checks and put it for you, if you know the correct and wrong ones, your friend next to you can correct his wrong answer and can ….

Researcher: I see, ok

Participant [20]: You cannot see that. Since you cannot see your score, this alone can be taken as one rule because while another person taking exam …. I mean afterwards you can see your score for it is kept for you. Everything that you take on e-learning, including your tests, you can see. But thereon while another person is taking a test just because you are done, you cannot say « I can check» and do so and leave. Because as you look at your right and wrong answers, the person next to you, noticing his mistakes, can correct and staff.

Researcher: Does not the system give the result right away?

Participant [20]: It does give a result. The system. This is not the problem of the system. You just taking that the system gives results, when the person beside you is not yet done. I, to see a result finish and staff, unless you just finish and go. But

otherwise, after I click finish, if I command to see my result, my score, for the system displays on the side the ticks and cross marks, it, I mean the person next to you might got wrong there, so it is certain that he will see my right and correct. So, you can come and see it after they have finished

Researcher: Oh, so they set some time gap for it?

Participant [20]: Yes

Researcher: So, you cannot see it right away. You can see it later on. Until the exam is finalised, they do not release it the exam, I mean the grade

Participant [20]: This gap… they do release it! This, I think this is a problem in itself. You, say at any time, say I have finished in two minutes, then if I will just go and say «I am finished show me my score» it will grade it and show me. But just because it has graded and showed me, the persons beside me might take a long while to go out, they might copy from me and correct.

Researcher: I see

Participant [20]: But what must be done is just the time is there. If only it is not allowed to see early.

Just as the exam is completed as is done in other exams

Researcher: Yes, good if that is so. Otherwise, the one who finishes and that who doesn't can do see at the same time. But only if he won't!

They can exchange messages too

He can

Researcher: So, this is a weakness. But if rules did exist, you are saying, concerning the e-learning, whether it is exam related, or making discourse …… anything for that matter, be it the usage of lab or anything it is good if rules are there?

Good if rules are there, yes, that is good.

Researcher: But, are there some you know of?

Participant [20]: I don't think that rules exist now

Researcher: Ok have you got another thing to add for me? That you say «This thing is what I have forgotten. It is good if considered as a challenge» or if there is anything

that you may say there is a thing that I have forgotten though using it. On my part I have finished my questions.

Participant [20]: I don't have anything to add. But e-learning, but everything I mean suits me very much. And I would be glad if we can take all courses with it. Because instead of going to the teacher pleading with him saying «give us soft copy, give us hard copy» if he has put it there himself for you, just nothing is needed. If you have seen on email and staff I mean I think this one easier than email and staff. A person, forgetting his password and staff, checking it on email staff is not customary. That is to say unless you have work. But if all courses were available there, if we took all exam with it, I think that is nice. That makes the thing easy for us.

Researcher: Yes, but could you elaborate on that a bit for me? On what basis is that you just come to love it thus …..

Participant [20]: No, it is just… I mean soft copies and staff, as you look at the time itself, I mean say a certain course, and it could be that we have been taught three chapters and staff. Either the teacher doesn't prepare a soft copy or it takes him too much time to prepare a hard copy and staff. But if he already put it thereon, you can read, even so early.

Researcher: Ok, just like you said, though it is simple for you, for others, what is the biggest challenge that you generally observe?

Participant [20]: That you call challenge is just not getting used to the system

Researcher: Ok is it lack of skill?

Participant [20]: Yes, lack of skill

Researcher: Not adapting oneself

Participant [20]: Yes, and panicking. Yes because you didn't adapt yourself to it. As the clock ticks there, you will say «oh God, it will time out » forgetting the answer you know and stuff. Again, there is spelling. Just a person who hasn't … much with keyboard, he will just make a mistake and stuff. If it were not for that, I think it is very nice to anyone who is familiar with it.

Researcher: Ok. Thank you very much. I have finished my questions.

APPENDIX VI: QUANTITATIVE SURVEY INSTRUMENT

Dear Students,

Thank you so much for your willingness to complete this questionnaire. This research is being conducted by a student of University of South Africa (UNISA) in order to comply with the requirement of her studies for the degree, Doctor of Philosophy in Computer Science. Your participation in this study is strictly confidential. To guarantee the anonymity of your response, you should NOT write your name in the questionnaire. The questionnaire involves two major parts. The first part poses questions concerning your social and demographic background. The second part comprises two types of expected responses. On the one hand, I would like to identify to what **extent** e-learning is being used by the Ethiopian higher learning institution students. On the other hand, I need to know what **challenges** students experience when using e-learning. Kindly respond frankly and accurately. Should you face any difficulty in completing this questionnaire, please call me (Mrs. Simret Solomon Mulugeta) on +251911152237.

1. Gender:□ Male □ Female
2) Age: □ 17 - 28 □ 29 - 35 □ 36 - 45□46 - 55 □ 56 and above
3) Name of your university you are studying _____
4) Field of study _____
5) Qualification you are currently studying: □ A. Bachelor's Degree □ B. Master's Degree
6) Level of study: □ A. 1st year □ B. 2nd year □ C. 3rd year □ D. 4th year□ E. 5th year
7) Currently in which programme are you enrolled (please choose the respective number from the list below and write in the

blank space provided here? _____.

1= Regular 2=Evening 3=weekends 4=summer

8. Which mode of e-learning System are you using in your institution (please choose one of the e-learning mode listed)

below and write the number in the blank space provided here? _____.

1= Face-to-face with modes t2= Modest online 3= significantly online 4= Web-dependent

1. **Face-to-face with modest** online presence (e.g. simple online courses with documents to download, lecture notes).

2. **Modest online** is present (e.g. simple online courses with documents to download, lecture notes, links to external- resources).

3. **Significantly online** (e.g. the online course integrates interactive components, such as online discussions, assessment tools).

4. **Web-dependent** (e.g. key interactive elements of the programme are online, such as online discussions, assessment tools and collaborative with online assignment submission, downloading electronic study material and email communication).

5. **Completely online**

9. How often are you using the existing e-Learning system?(please choose the respective number from the list below and write in the blank space provided here?) _____.

1=Daily 2= weekly 3= every 2 or 3 weeks 4= very rarely 5=never

10. For how many course you are using e-learning system (please write the amount of courses provided through e-learning system in the given blank space here)? _____

11) Please use the scale below to respond on the items that are listed below.

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

ITEMS	1	2	3	4	5
Institutional					
1. E-learning is a necessary tool for the teaching and learning process in your institution					
2. Your institution provides the required facilities to assist e-learning					
3. The institution/instructors encourages to use e-learning in your course					
4. Culturally, there is positive attitudes on e-learning and IT in your institution/instructors					
5. The institute provides regular orientation for new admitted students about the use of the exiting e-learning system					
6. The institution aware students about the e-learning system					
Technological Facility					

7. All hardware and software components in the labs are functional					
8. There are computer labs with required updated applications					
9. I have the necessary ICT devices (i.e. tablets, mobile and laptop) that facilitate the e-learning courses that I am taking					
10. The computer labs in the institution I am studying are easily accessible					
11. The institution has a backup generator in cases when there is power interruption					
12. There is a good wireless internet connectivity					
13. There is proper network infrastructure for e-learning					
14. There is sufficient internet connection in the labs to facilitate e-learning					
15. There are enough computers in the labs to facilitate e-learning					
16. The e-learning system can be accessed smoothly from anywhere in the campus					
17. In the institution that I am enrolled at, the e-learning system is accessible anytime from any destination					
18. There is reliable internet connection to access, download and view text, audio and video e-learning material					
19. There is videoconferencing facility in the institution for the e-learning purpose					
Functionality					
20. The e-learning system provides uploading, downloading and accessing academic and related documents					
21. The e-learning system has instant messaging (SMS) for announcements and newly updated resources					
22. There is a discussion forum for courses related issues to share views and opinions among students					
23. There is a discussion forum for courses related issues to share views and opinions with your instructor					
24. The e-learning system allows different user changes (such as, colour of the interface, setting of the fonts, background etc) as per your preference					
25. The e-learning system provides assessment and evaluation mechanism (i.e. continues assessment like mid-exam, final exam etc)					
26. The e-learning system provides online assignment submission					
27. The e-learning system provides online exam correction and result					
28. The e-learning system provides feedback system to the students to evaluate the use of e-learning system in your institution					
Features					
29. The e-learning system is user-friendly and enables students to access it smoothly					
30. The e-learning system can be modified (i.e. you can start, play and pause the audio or video resources)					
31. The e-learning system is easy to use					
32. The e-learning system Web portal interface is easily adaptable (that I can always manage to make use of its services)					
33. The e-learning system is available all the time					
34. online exams through the existing e-learning system is reliable as during the power and internet interruption it will continue from where it has stopped.					
35. Assignment submissions through the existing e-learning system is reliable as during the power and internet interruption it will continue from where it has stopped.					
36. Confidentiality of data are secured/protected					
37. Online exams can securely conducted					
38. The e-learning system is secured from unauthorised user (i.e., the unique user name and password are used by each and every student to access the e-learning services)					
E-learning Resources					
39. There is text type e-learning resources available like handouts, lecture notes, worksheets, course outline and others course-related (i.e. PDF, word, excel or any other format)					
40. The e-learning resource material supports image/picture/GIF/JPG					
41. There is video and audio-supported resources in your e-learning system (i.e. multimedia resources)					
42. Your e-learning system has software resources to download and use					
43. There is additional resources in your e-learning system (i.e. books, articles and journal)					
44. The e-learning resources are locally developed and uploaded on the e-learning by your institution					

45. The e-learning resources are developed and shared by other institutions					
46. The e-learning sources are mostly downloaded from international sources					
Policy					
47. There are proper rules and regulations on the use of electronic resources in your institution					
48. There are proper rules and regulations on the use of e-learning facilities (i.e. duration of computer use in the lab, session limitation of the e-learning system) in your institution					
49. Students know their roles and responsibilities in e-learning environment					
50. The e-learning policy documents (rules and regulation) are available on your institutions website or any other accessible location					
System Management					
51. There is specific unit (i.e. ICT department, Instructor or any other assigned person) to support for the accessibility of user account (user name and password) in your institution					
52. Your e-learning system supports resources management (upload, access and download)					
53. The ICT facilities in the institution are up-to-date					
54. Technical support is provided in the computer labs					
55. There is ICT help desk for support and maintenance for the e-learning system					
56. There is online help facility in the e-learning system					
57. The lab computers are regularly maintained					
58. Technological skills training is provided for students to make use of e-learning					
59. There is administrative (management) support in the implementation of e-learning					
60. There is orientation, guidelines and tutorial on the use of e-learning system and services					
Pedagogical/ Instructional					
61. The existing e-learning system resources are self-managed which allows to access, operate, change and update					
62. The e-learning system is organised from student point of view to start, pause, save or close sessions					
63. The e-learning system supports all the learning and teaching process (course delivery, assessment and evaluation, feedback etc.)					
64. There is a reliable monitoring and evaluation e-learning system (such as, completion of topics, frequency of access to the e-learning system and assignment submission on due dates)					
65. It is a student to decide the study method during e-learning session					
66. In the existing e-learning system the students efficiency are considered on the pace of the teaching and learning process (such as, duration of online exam and online assignment submission)					
67. Students' preference and capacity are considered in the process of the e-learning session					
Learner Readiness					
68. You prefer e-learning courses than traditional face- to-face teaching and learning system					
69. You prefer face-to-face teaching and learning system with a support of e-learning					
70. You prefer e-learning with a support of face-to-face teaching and learning system					
71. You have the basic computer skills to use the existing e-learning system (i.e., using application like word, excel, PDF, audio/video documents and browsing internet)					
72. You have the access to ICT devices (e.g., laptop, desktop, tablet, mobile...) to attend e-learning sessions					

12) Please feel free to give any other comments and suggestions

APPENDIX VII: PILOT TEST RELIABILITY TEST FROM STUDENT'S RESPONSES ON SCALE ITEMS

Reliability
Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	50	94.3
	Excluded[a]	3	5.7
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.829	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
Inst_1	16.66	16.147	.570	.808
Inst_2	17.08	16.565	.537	.814
Inst_3	17.28	14.655	.746	.771
Inst_4	17.06	14.711	.652	.790
Inst_5	17.54	16.009	.473	.830
Inst_6	17.28	15.144	.639	.793

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
20.58	21.636	4.651	6

Reliability
Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	43	81.1
	Excluded[a]	10	18.9
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.915	13

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
TechF_1	39.37	80.620	.730	.904
TechF_2	39.09	86.086	.529	.913
TechF_3	39.09	85.705	.611	.909
TechF_4	39.07	86.066	.604	.910

TechF_5	39.12	83.486	.641	.908
TechF_6	39.30	81.025	.819	.901
TechF_7	39.00	82.810	.680	.907
TechF_8	39.07	83.685	.640	.908
TechF_9	39.09	83.039	.634	.909
TechF_10	39.02	86.547	.570	.911
TechF_11	38.95	86.426	.573	.911
TechF_12	39.16	84.711	.613	.909
TechF_13	39.40	81.530	.691	.906

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
42.40	97.864	9.893	13

Reliability
Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	43	81.1
	Excluded[a]	10	18.9
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.914	9

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
Func_1	28.00	35.190	.658	.907
Func_2	28.21	32.979	.761	.900
Func_3	28.12	35.581	.676	.906
Func_4	28.16	35.044	.685	.905
Func_5	28.21	34.312	.759	.900
Func_6	27.98	35.595	.737	.902
Func_7	27.93	36.638	.691	.905
Func_8	28.09	35.896	.646	.908
Func_9	28.33	35.034	.704	.904

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
31.63	44.001	6.633	9

```
RELIABILITY
/VARIABLES=Feat_1 Feat_2 Feat_3 Feat_4 Feat_5 Feat_6 Feat_7 Feat_8 Feat_9 Feat_10
/SCALE('ALL VARIABLES') ALL
/MODEL=ALPHA
/STATISTICS=SCALE
/SUMMARY=TOTAL.
```

Reliability
Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	43	81.1
	Excluded[a]	10	18.9
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.887	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
Feat_1	32.40	34.245	.557	.881
Feat_2	32.53	34.540	.577	.879
Feat_3	32.23	36.754	.535	.881
Feat_4	32.56	32.443	.761	.865
Feat_5	32.49	34.589	.572	.879
Feat_6	32.60	33.197	.652	.873
Feat_7	32.49	36.399	.512	.883
Feat_8	32.26	34.862	.719	.870
Feat_9	32.23	34.087	.698	.870
Feat_10	32.21	34.931	.667	.873

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
36.00	42.190	6.495	10

```
RELIABILITY
/VARIABLES=ELReas_1 ELReas_2 ELReas_3 ELReas_4 ELReas_5 ELReas_6 ELReas_7 ELReas_8
/SCALE('ALL VARIABLES') ALL
/MODEL=ALPHA
/STATISTICS=SCALE
/SUMMARY=TOTAL.
```

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	44	83.0
	Excluded[a]	9	17.0
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.853	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
ELReas_1	24.75	22.145	.427	.857
ELReas_2	24.77	21.761	.678	.829
ELReas_3	24.84	20.695	.616	.833
ELReas_4	24.77	20.598	.612	.834
ELReas_5	24.75	20.750	.683	.825
ELReas_6	24.80	21.329	.600	.835
ELReas_7	24.91	20.968	.647	.830
ELReas_8	24.95	21.347	.538	.843

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
28.36	27.121	5.208	8

Reliability
Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	45	84.9
	Excluded[a]	8	15.1
	Total	53	100.0

a. List wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.849	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
Policy_1	10.51	5.483	.729	.798
Policy_2	10.42	6.068	.799	.760
Policy_3	10.42	6.749	.624	.835
Policy_4	10.11	7.510	.648	.832

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
13.82	10.922	3.305	4

Reliability
Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	41	77.4
	Excluded[a]	12	22.6
	Total	53	100.0

.2 List wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.912	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
SysMgmt_1	31.66	45.330	.663	.905
SysMgmt_2	31.68	45.772	.628	.907
SysMgmt_3	31.61	46.844	.648	.906
SysMgmt_4	31.61	44.844	.684	.903
SysMgmt_5	31.61	44.994	.672	.904
SysMgmt_6	31.71	43.112	.762	.898
SysMgmt_7	31.73	44.451	.737	.900
SysMgmt_8	31.59	45.949	.680	.904
SysMgmt_9	31.63	46.288	.698	.903
SysMgmt_10	31.71	44.662	.643	.906

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
35.17	55.295	7.436	10

Reliability
Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	43	81.1
	Excluded[a]	10	18.9
	Total	53	100.0

a. List wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.847	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
PedaInst_1	20.86	14.647	.461	.855
PedaInst_2	20.65	15.566	.511	.839
PedaInst_3	20.70	15.121	.646	.821
PedaInst_4	20.74	15.052	.626	.824
PedaInst_5	20.86	13.694	.731	.806
PedaInst_6	20.74	14.433	.649	.819
PedaInst_7	20.84	14.663	.673	.817

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
24.23	19.564	4.423	7

Reliability
Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	47	88.7
	Excluded[a]	6	11.3
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.749	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
LearnerR_1	14.74	9.020	.311	.789
LearnerR_2	14.53	7.820	.793	.611
LearnerR_3	14.43	7.989	.712	.637
LearnerR_4	14.32	7.961	.606	.669
LearnerR_5	14.40	9.681	.279	.787

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
18.11	12.488	3.534	5

APPENDIX VIII: PATTERN MATRIX

TESTING THE RELIABILITY OF THE VALID FACTORS

RELIABILITY
Scale: F1

Case Processing Summary

		N	%
Cases	Valid	411	99.5
	Excluded[a]	2	.5
	Total	413	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.941	13

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
[58. Technological skills training is provided for students to make use of e-learning.] System Management	39.73	108.410	.783	.934
[54. Technical support is provided in the computer labs.] System Management	39.52	111.479	.717	.937
[59. There is administrative (management) support in the implementation of e-learning.] System Management	39.66	109.514	.755	.935
[67. Students' preference and capacity are considered in the process of the e-learning session.] Pedagogical/ Instructional	39.70	111.043	.718	.937
[57. The lab computers are regularly maintained.] System Management	39.76	111.332	.738	.936
[53. The ICT facilities in the institution are up-to-date.] System Management	39.60	110.134	.769	.935
[52. Your e-learning system supports resources management (upload, access and download).] System Management	39.43	112.271	.694	.937
[60. There is orientation, guidelines and tutorial on the use of e-learning system and services.] System Management	39.48	110.333	.709	.937

[56. There is online help facility in the e-learning system.] System Management	39.80	110.781	.733	.936
[65. It is a student to decide the study method during e-learning session.] Pedagogical/ Instructional	39.74	112.321	.654	.939
[55. There is ICT help desk for support and maintenance for the e-learning system.] System Management	39.55	111.892	.699	.937
[66. In the existing e-learning system the students efficiency are considered on the pace of the teaching and learning process (such as, duration of online exam and online assignment submission).] Pedagogical/ Instructional	39.73	112.517	.674	.938
[50. The e-learning policy documents (rules and regulation) are available on your institutions website or any other accessible location.] Policy	39.68	110.797	.705	.937

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
42.95	129.619	11.385	13

```
RELIABILITY
 /VARIABLES=TechF1 TechF13_Tech12 TechF1TechF13_Tech13 TechF1 TechF13_TechF18
Inst1Inst6_Inst6
  Inst1Inst6_Inst5 TechF1TechF13_Tech8 TechF1TechF13_Tech7 TechF1TechF13_Tech14
TechF1TechF13_TechF16
  TechF1TechF13_Tech15 TechF1TechF13_Tech10 TechF1TechF13_Tech9 Inst1Inst6_Inst2
  TechF1TechF13_TechF17 Inst1Inst6_Inst3
 /SCALE('F2') ALL
 /MODEL=ALPHA
 /STATISTICS=SCALE
 /SUMMARY=TOTAL.
```

Reliability

Scale: F2

Case Processing Summary

		N	%
Cases	Valid	411	99.5
	Excluded[a]	2	.5
	Total	413	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.934	15

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
TechF1TechF13_Tech12	47.09	141.163	.735	.928
TechF1TechF13_Tech13	47.17	143.397	.730	.928
TechF1TechF13_TechF18	47.15	141.115	.766	.927
Inst1Inst6_Inst6	47.16	142.091	.706	.928
Inst1Inst6_Inst5	47.09	141.510	.695	.929
TechF1TechF13_Tech8	47.20	144.500	.671	.929
TechF1TechF13_Tech7	47.53	143.689	.679	.929
TechF1TechF13_Tech14	47.11	143.379	.704	.929
TechF1TechF13_TechF16	47.35	142.936	.696	.929
TechF1TechF13_Tech15	47.28	145.589	.656	.930
TechF1TechF13_Tech10	47.18	144.465	.657	.930
TechF1TechF13_Tech9	47.06	147.231	.540	.933
Inst1Inst6_Inst2	47.07	145.475	.660	.930
TechF1TechF13_TechF17	47.41	145.520	.626	.931
Inst1Inst6_Inst3	47.26	147.406	.556	.933

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
50.58	164.488	12.825	15

```
RELIABILITY
 /VARIABLES=LearnerR1LearnerR5_Learner71                    LearnerR1LearnerR5_Learner70
LearnerR1LearnerR5_Learner72
  Inst1Inst6_Inst1 LearnerR1LearnerR5_Learner69
 /SCALE('F3') ALL
 /MODEL=ALPHA
 /STATISTICS=SCALE
 /SUMMARY=TOTAL.
```

Reliability

Scale: F3

Case Processing Summary

		N	%
Cases	Valid	412	99.8
	Excluded[a]	1	.2
	Total	413	100.0

a. List wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.833	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
LearnerR1LearnerR5_Learner71	14.89	12.489	.732	.772

LearnerR1LearnerR5_Learner70	15.04	13.071	.641	.798
LearnerR1LearnerR5_Learner72	14.97	12.488	.670	.789
Inst1Inst6_Inst1	14.74	13.994	.495	.838
LearnerR1LearnerR5_Learner69	14.99	13.216	.637	.799

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
18.66	19.578	4.425	5

```
RELIABILITY
 /VARIABLES=ELReas1ELReas8_ELReas40                    ELReas1ELReas8_ELReas39
ELReas1ELReas8_ELReas41
  Func1Func9_Func20 ELReas1ELReas8_ELReas42 ELReas1ELReas8_ELReas43
 /SCALE('F4') ALL
 /MODEL=ALPHA
 /STATISTICS=SCALE
 /SUMMARY=TOTAL.
```

Reliability

Scale: F4

Case Processing Summary

		N	%
Cases	Valid	412	99.8
	Excluded[a]	1	.2
	Total	413	100.0

a. List wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.878	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
ELReas1ELReas8_ELReas40	17.76	19.578	.746	.846
ELReas1ELReas8_ELReas39	17.59	19.683	.709	.852
ELReas1ELReas8_ELReas41	17.69	19.369	.746	.846
Func1Func9_Func20	17.63	20.890	.603	.870
ELReas1ELReas8_ELReas42	17.76	20.078	.661	.860
ELReas1ELReas8_ELReas43	17.74	20.591	.635	.864

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
21.24	28.156	5.306	6

```
RELIABILITY
 /VARIABLES=Feat1Feat10_Feat32 Feat1Feat10_Feat33 Feat1Feat10_Feat31 Feat1Feat10_Feat29
  Feat1Feat10_Feat30 Feat1Feat10_Feat36 Feat1Feat10_Feat34 Feat1Feat10_Feat38
 /SCALE('F5') ALL
 /MODEL=ALPHA
 /STATISTICS=SCALE
```

/SUMMARY=TOTAL.

Reliability

Scale: F5

Case Processing Summary

		N	%
Cases	Valid	412	99.8
	Excluded[a]	1	.2
	Total	413	100.0

a. List wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.901	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
Feat1Feat10_Feat32	23.51	39.954	.771	.881
Feat1Feat10_Feat33	23.66	40.042	.702	.887
Feat1Feat10_Feat31	23.35	39.435	.748	.883
Feat1Feat10_Feat29	23.46	39.490	.747	.883
Feat1Feat10_Feat30	23.51	40.148	.704	.887
Feat1Feat10_Feat36	23.41	40.875	.674	.889
Feat1Feat10_Feat34	23.92	41.623	.566	.900
Feat1Feat10_Feat38	23.34	40.917	.605	.896

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
26.88	51.915	7.205	8

RELIABILITY
/VARIABLES=Func1Func9_Func26 Func1Func9_Func27 Func1Func9_Func28 Func1Func9_Func25
Feat1Feat10_Feat37
/SCALE('F6') ALL
/MODEL=ALPHA
/STATISTICS=SCALE
/SUMMARY=TOTAL.

Reliability

Scale: F6

Case Processing Summary

		N	%
Cases	Valid	413	100.0
	Excluded[a]	0	.0
	Total	413	100.0

a. List wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.852	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
Func1Func9_Func26	12.91	15.948	.625	.831
Func1Func9_Func27	12.97	14.824	.727	.803
Func1Func9_Func28	13.02	15.150	.706	.809
Func1Func9_Func25	12.93	15.058	.697	.812
Feat1Feat10_Feat37	12.92	16.286	.561	.847

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
16.18	23.282	4.825	5

```
RELIABILITY
 /VARIABLES=Func1Func9_Func21 Func1Func9_Func22 Func1Func9_Func23
 /SCALE('F6') ALL
 /MODEL=ALPHA
 /STATISTICS=SCALE
 /SUMMARY=TOTAL.
```

Reliability

Scale: F7

Case Processing Summary

		N	%
Cases	Valid	413	100.0
	Excluded[a]	0	.0
	Total	413	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.824	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
Func1Func9_Func21	6.30	4.759	.595	.841
Func1Func9_Func22	6.30	4.307	.757	.679
Func1Func9_Func23	6.42	4.458	.693	.744

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
9.51	9.323	3.053	3

```
RELIABILITY
 /VARIABLES=Policy1Policy4_Policy48 Policy1Policy4_Policy49
 /SCALE('F6') ALL
 /MODEL=ALPHA
 /STATISTICS=SCALE
 /SUMMARY=TOTAL.
```

Reliability

Scale: F8

Case Processing Summary

		N	%
Cases	Valid	413	100.0
	Excluded[a]	0	.0
	Total	413	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's alpha	N of Items
.823	2

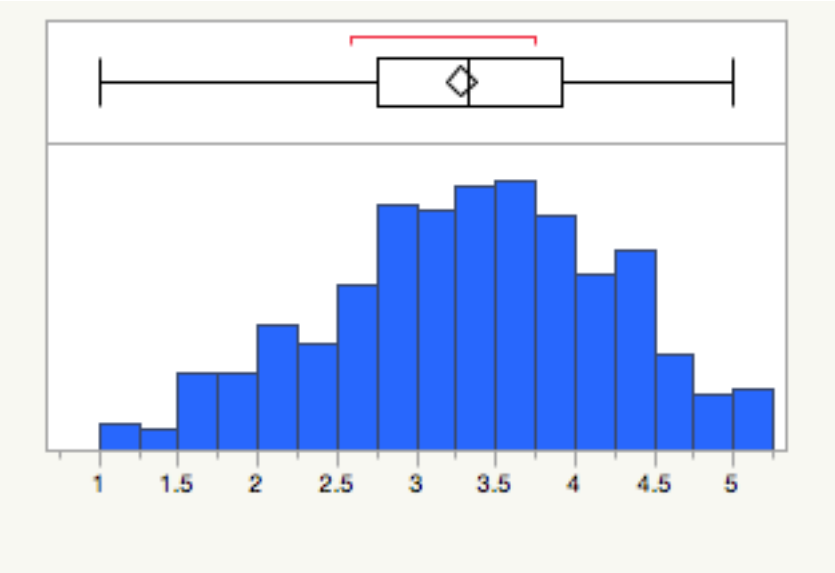
Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
Policy1Policy4_Policy48	3.30	1.399	.699	.
Policy1Policy4_Policy49	3.29	1.290	.699	.

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
6.59	4.568	2.137	2

E-learning Management System



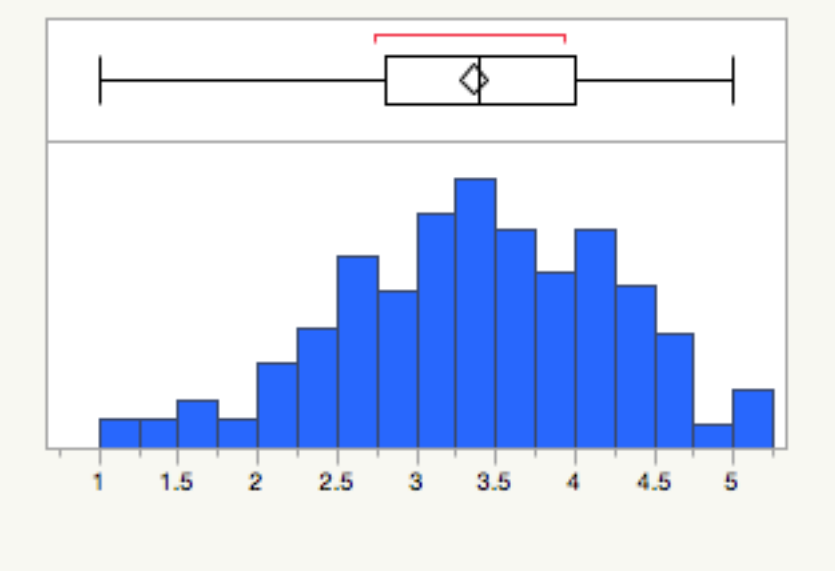
Quantiles

100.0%	maximum	5
99.5%		5
97.5%		4.9708333333
90.0%		4.4166666667
75.0%	quartile	3.9166666667
50.0%	median	3.3333333333
25.0%	quartile	2.75
10.0%		2.0833333333
2.5%		1.5
0.5%		1
0.0%	minimum	1

Summary Statistics

Mean	3.2851456
Std Dev	0.8811451
Std Err Mean	0.0433583
Upper 95% Mean	3.3703768
Lower 95% Mean	3.1999145
N	413
Skewness	-0.242324
Kurtosis	-0.409022

Technological infrastructure and Facilities



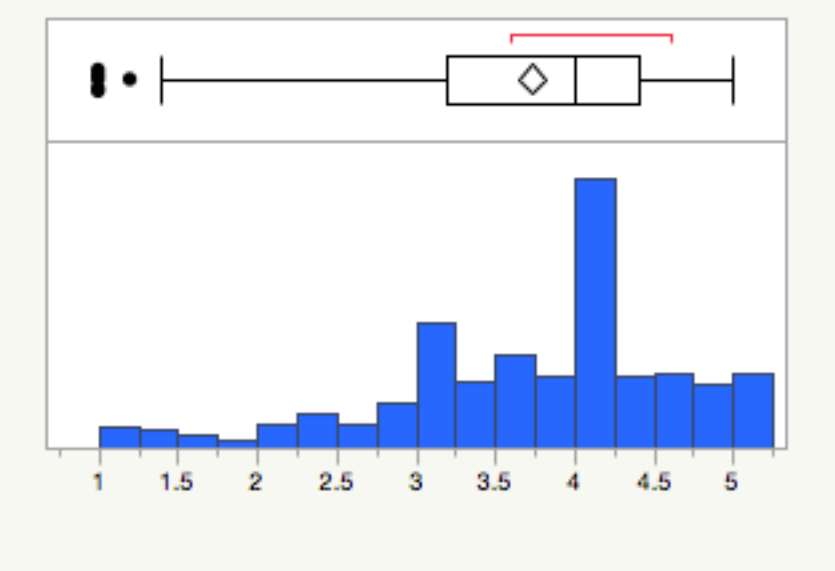
Quantiles

100.0%	maximum	5
99.5%		5
97.5%		5
90.0%		4.44
75.0%	quartile	4
50.0%	median	3.4
25.0%	quartile	2.8
10.0%		2.2666666667
2.5%		1.49
0.5%		1
0.0%	minimum	1

Summary Statistics

Mean	3.3668511
Std Dev	0.8566724
Std Err Mean	0.0421541
Upper 95% Mean	3.4497151
Lower 95% Mean	3.2839872
N	413
Skewness	-0.311505
Kurtosis	-0.266694

Learner Readiness



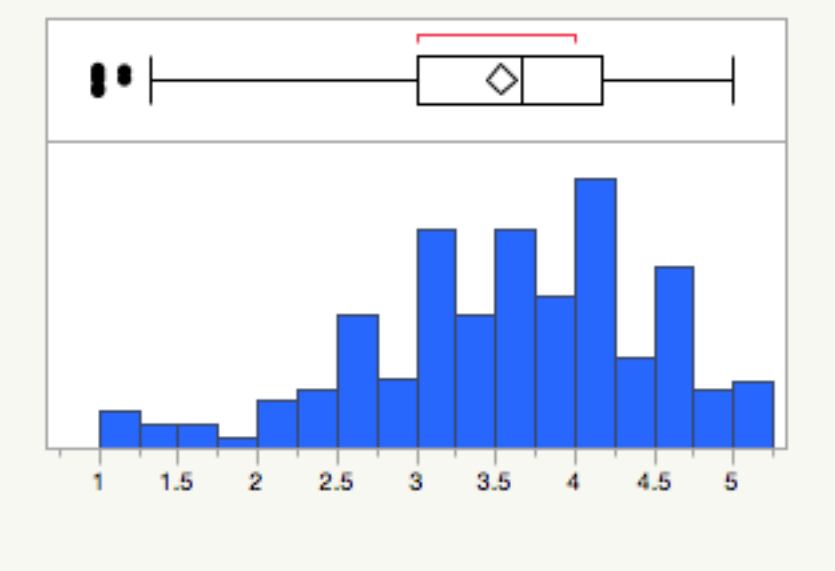
Quantiles

100.0%	maximum	5
99.5%		5
97.5%		5
90.0%		4.8
75.0%	quartile	4.4
50.0%	median	4
25.0%	quartile	3.2
10.0%		2.6
2.5%		1.4
0.5%		1
0.0%	minimum	1

Summary Statistics

Mean	3.733414
Std Dev	0.8846848
Std Err Mean	0.0435325
Upper 95% Mean	3.8189875
Lower 95% Mean	3.6478405
N	413
Skewness	-0.902514
Kurtosis	0.7127239

E-learning Resources Accessibility



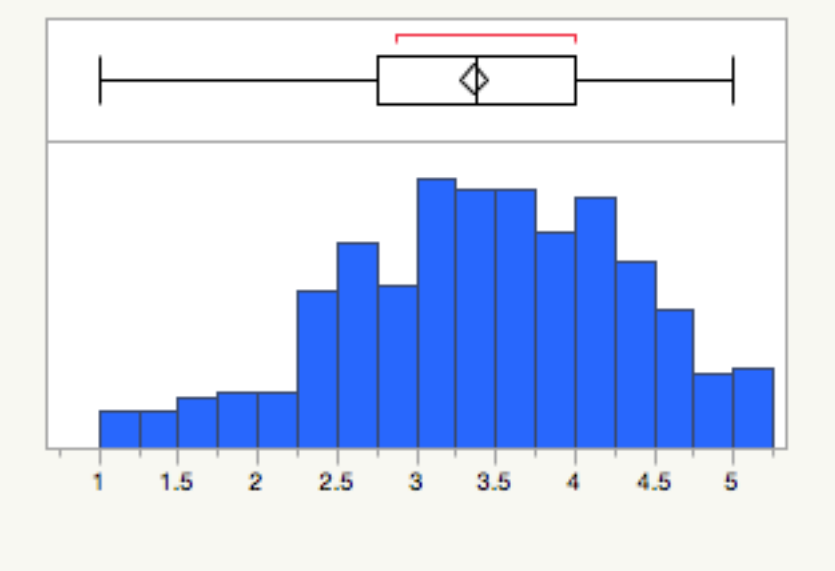
Quantiles

100.0%	maximum	5
99.5%		5
97.5%		5
90.0%		4.6666666667
75.0%	quartile	4.1666666667
50.0%	median	3.6666666667
25.0%	quartile	3
10.0%		2.3333333333
2.5%		1.3333333333
0.5%		1
0.0%	minimum	1

Summary Statistics

Mean	3.5379338
Std Dev	0.8836968
Std Err Mean	0.0434839
Upper 95% Mean	3.6234117
Lower 95% Mean	3.4524559
N	413
Skewness	-0.610278
Kurtosis	0.1819248

E-learning System Features



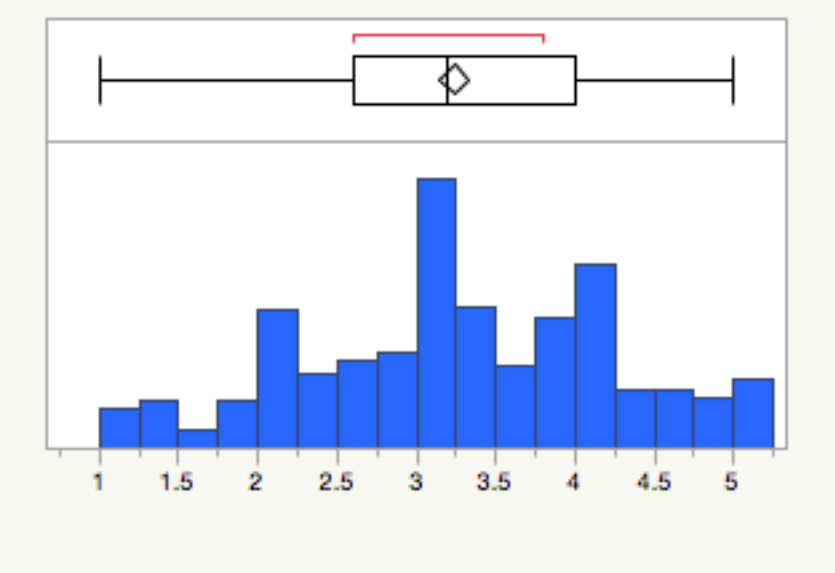
Quantiles

100.0%	maximum	5
99.5%		5
97.5%		5
90.0%		4.5
75.0%	quartile	4
50.0%	median	3.375
25.0%	quartile	2.75
10.0%		2.25
2.5%		1.25
0.5%		1
0.0%	minimum	1

Summary Statistics

Mean	3.3576473
Std Dev	0.9009772
Std Err Mean	0.0443342
Upper 95% Mean	3.4447967
Lower 95% Mean	3.2704979
N	413
Skewness	-0.345141
Kurtosis	-0.293543

E-learning Services



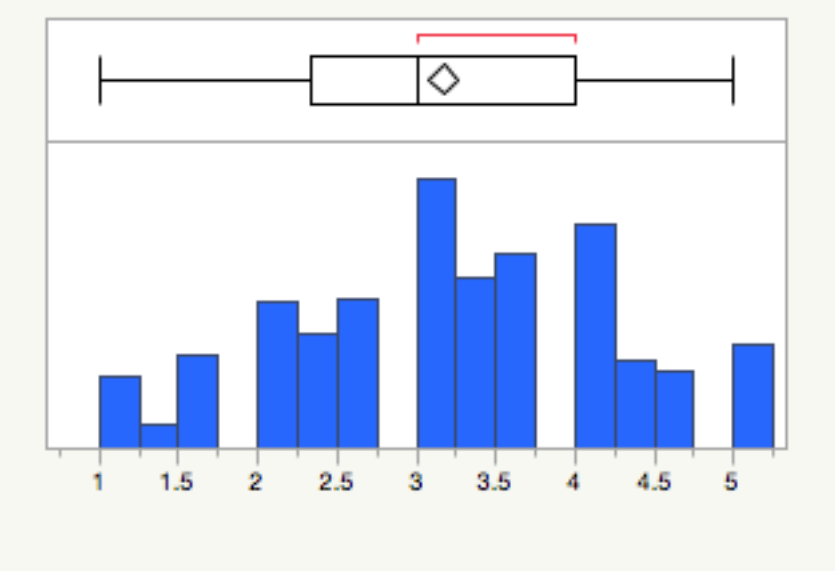
Quantiles

100.0%	maximum	5
99.5%		5
97.5%		5
90.0%		4.6
75.0%	quartile	4
50.0%	median	3.2
25.0%	quartile	2.6
10.0%		2
2.5%		1.27
0.5%		1
0.0%	minimum	1

Summary Statistics

Mean	3.2368039
Std Dev	0.96502
Std Err Mean	0.0474855
Upper 95% Mean	3.330148
Lower 95% Mean	3.1434597
N	413
Skewness	-0.176687
Kurtosis	-0.505753

E-learning Communication



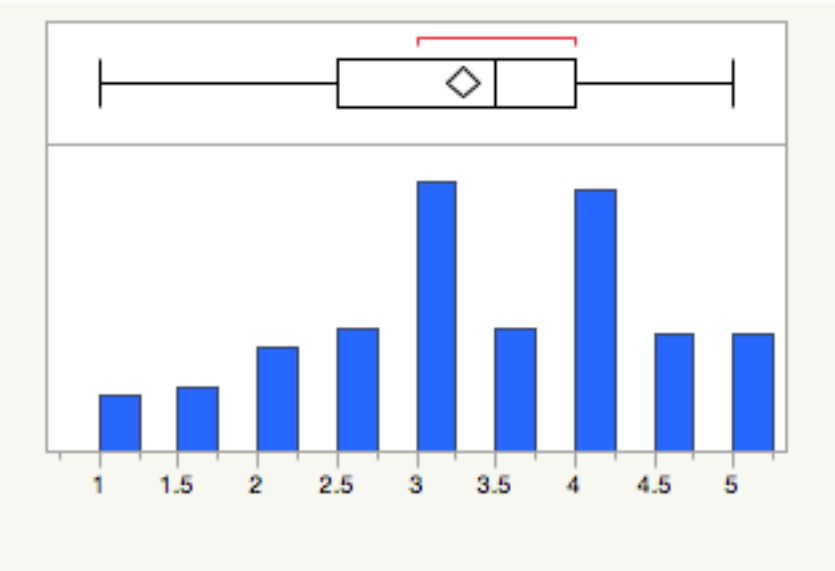
Quantiles

100.0%	maximum	5
99.5%		5
97.5%		5
90.0%		4.6666666667
75.0%	quartile	4
50.0%	median	3
25.0%	quartile	2.3333333333
10.0%		1.6666666667
2.5%		1
0.5%		1
0.0%	minimum	1

Summary Statistics

Mean	3.1702986
Std Dev	1.0178028
Std Err Mean	0.0500828
Upper 95% Mean	3.2687483
Lower 95% Mean	3.0718489
N	413
Skewness	-0.169246
Kurtosis	-0.577476

E-learning Policy



Quantiles

100.0%	maximum	5
99.5%		5
97.5%		5
90.0%		4.5
75.0%	quartile	4
50.0%	median	3.5
25.0%	quartile	2.5
10.0%		2
2.5%		1
0.5%		1
0.0%	minimum	1

Summary Statistics

Mean	3.2953995
Std Dev	1.0685955
Std Err Mean	0.0525821
Upper 95% Mean	3.3987623
Lower 95% Mean	3.1920368
N	413
Skewness	-0.291462
Kurtosis	-0.62947

APPENDIX IX: CONFERENCE PAPERS

- Mulugeta, SS & Buckley S.2015. Theoretical perspective: E-learning challenges and proposed framework in developing countries. Beyond development. Time for a new ICT4D paradigm? Proceedings of the 9th Idia Conference, (Pp. 368-377). Nungwi, Zanzibar. ISBN: 978-0-620-68395-1376.
- Brown, M., Nic Giolla Mhichil, M., Beirne, E. & Costello, E. (Eds.) (2020). Proceedings of the 2019 ICDE World Conference on Online Learning, Volume 2, Dublin City University, Dublin. http://dx.doi.org/10.5281/zenodo.3804256. ISBN: 978-1-911669-11-1.

APPENDIX X: LANGUAGE EDITING LETTER

Blue Diamonds Professional Editing Services (Pty) Ltd

Polishing your brilliance

Tel: 031 916 1420

Fax: 086 627 7756 Email: jaybee@telkomsa.net

Website: www.jaybe9.wixsite.com/bluediamondsediting

20 January 2021

Declaration of professional edit

A FRAMEWORK FOR A STUDENT-CENTRED E-LEARNING SYSTEM IN HIGHER EDUCATION INSTITUTIONS IN ETHIOPIA

by

SIMRET SOLOMON MULUGETA

I declare that I have edited and proofread this thesis. My involvement was restricted to language usage and spelling, completeness and consistency and referencing style. I did no structural re-writing of the content.

I am qualified to have done such editing, being in possession of a Bachelor's degree with a major in English, having taught English to matriculation, and having a Certificate in Copy Editing from the University of Cape Town. I have edited more than 200 Masters and Doctoral theses, as well as articles, books and reports.

As the copy editor, I am not responsible for detecting, or removing, passages in the document that closely resemble other texts and could thus be viewed as plagiarism. I am not accountable for any changes made to this document by the author or any other party subsequent to the date of this declaration.

Sincerely,

UNISA: D. Ed. Education Management
University of Cape Town: Certificate in Copy Editing
University of Cape Town: Certificate in Corporate Coaching

Professional EDITORS Guild

Jacqui Baumgardt
Full Member

Membership number: BAU001
Membership year: March 2020 to February 2021

084 487 9285
jaybee@telkomsa.net
https://jaybe9.wixsite.com/bluediamondsediting

www.editors.org.za

Member: Prolingua
