



**ADDIS ABABA UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
FACULTY OF INFORMATICS  
DEPARTMENT OF INFORMATION SCIENCE**

**E-Learning in Ethiopian public TVET colleges**

**BY**

**ASFAW SEYOUM**



**JULY 2009  
ADDIS ABABA**

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**A THESIS SUBMITTED TO THE SCHOOL OF  
GRADUATE STUDIES OF ADDIS ABABA  
UNIVERSITY IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTERS  
OF SCIENCE IN INFORMATION SCIENCE**

**JULY 2009**

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**APPROVED BY: THE BOARD OF EXAMINERS**

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## **DEDICATION**

To my beloved foster father  
**Ato Wubshet Bekele**  
whose help and guardianship  
in my early education  
made me  
the man of today

## **ACKNOWLEDGEMENT**

I am grateful to express my deepest gratitude to my advisor Dr. Rahel Bekele for her unreserved assistance, encouragement and constructive comments throughout the study.

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## **Abstract**

The purpose of the study was to assess whether teachers of public TVET colleges have an appropriate ICT skills and use of E-Learning tools in their teaching-learning activity so as to supplement the TVET courses.

The thesis attempts to look into teachers' computer skills, experiences on the use of computers for academic, teaching and learning activities in addition to their views on the integration of E-Learning at college level.

The study conducted using self-administered questionnaires, interviews and informal discussions with teachers and administrators in five public TVET colleges namely Entoto, Misrak, NefasSilk, Tegnareid and General Wingate.

The results of the study generally revealed that: the existing ICT facility for teachers in Ethiopian public TVET Colleges is generally low; there is a need to facilitate the public TVET colleges to use computers and other ICT resources to support teaching; the public TVET College teachers' knowledge and skill in the use of computers in teaching-learning environment is low and in all the colleges, there is no E-Learning Program that help teachers to improve their ICT knowledge and way of teaching.

Finding indicated that the status of TVET colleges in the provision of ICT infrastructure and the culture of the TVET teachers' in utilizing the existing computers, connectivity, and digital contents in the actual teaching and learning of subject areas have to be developed.

In line with the above findings and conclusions, it was recommended that much emphasis have to be given by the concerned bodies in facilitating the public TVET colleges with ICT tools and up-grading teachers' ICT know-how in line with the quick changing technology through the use of E-Learning programs so as to produce digitally literate technology minded skilled manpower to support the educational development process in Ethiopia.

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## Definition of terms

**Data:** - Data is defined as a collection of raw facts that represent features, or details about people, objects, places, ideas or events (Lary Long, 1984).

**Information:** - Information is defined as a collection of meaningful facts and figures that can be used as a base for guidance and decision-making (Lary Long, 1984).

**ICT:** - ICT generally relates to those technologies that are used for accessing, gathering, manipulating and presenting or communicating information. The technologies could include hardware (e.g. computers and other devices); software applications; and connectivity (e.g. access to the Internet, local networking infrastructure, and videoconferencing) (Toomey, 2001).

**Digital Literacy:**- The ability to use digital technology, communication tools or networks to locate, evaluates, use and create information.

(<http://www.digitalstrategy.govt.nz>)

**E-learning:**-The term e-learning will be used in this document to refer to the incorporation of ICTs in any Training modality.

**Learning Management System (LMS):** LMS is software for delivering, tracking and managing training. LMSs range from systems for managing training records to software for distributing courses over the Internet and offering features for online collaboration.

**Technical and Vocational Education Training (TVET):** is a comprehensive term referring to the educational process when it involves in addition to general education the study of technologies and related science, and the acquisition of practical skills and knowledge relating to occupations in various sectors of economic and social life (UNESCO, 1978:17)

# CHAPTER ONE

## 1. Introduction

### 1.1 Background

The world economy is experiencing the effects of rapid globalization and liberalization as well as the impact of the emerging information age. The prediction is that this will bring about a new global economic order to be dominated by information and information age knowledge-based economies. Like other developing countries, Ethiopia is facing new challenges to her socio-economic development as a result of the emerging information age characterized by information and communication technologies (ICTs). The crucial role that ICTs can play in facilitating and accelerating socio-economic development has been recognized worldwide. Ethiopia, like other countries, is equally placed to take advantage of these technologies to facilitate her socio-economic development process (Ethiopian TVET strategy, 2006).

The Ethiopian Government recognizing the key role that ICTs play in transforming the educational system and making education accessible to the greater proportion of citizens is committed to modernizing the educational system using ICTs (ICT4D, [2006 – 2010]).

This is an important step to improve and expand access to quality education and training and make the educational system responsive to the changing needs and demands of the economy and society. The introduction of modern information and communication technologies (ICT) to TVET delivery is an important tool for enhancing access and quality to TVET and for developing life-long learning opportunities. The way of teaching also has to be changed. The teachers have to equip themselves with the knowledge of ICT and familiar with the Learning Management system to play their role in preparing a technology oriented trainee to build the new developed Ethiopia.

E-Learning gives an opportunity to some teachers to revise and revitalize their older materials. In one case, some of the materials may have been developed

long years ago. Times have moved on, both for the teacher and student, and the new technology opens up new ways of re-purposing the material into new and more interesting forms. It is revealed that for a lot of TVET teachers, digital literacy is an issue. TVET teachers are utilizing a number of audio-visual technologies to respond to this demand through animated Power Points, audio embedded in online materials and a much more prevalent use of video.

Learning Management System integration in education has many broader objectives. These vary from creating a good and talented workforce for the knowledge society, to promoting educational reforms, and modernizing (P. Ravina. & P. Ajith, 2008).

## **1.2 Digital Literacy and E-Learning**

It is commonly understood that having an ability to read and write has impacts considerably on a person's potential to communicate and learn. The ways a person read and write digitally have its own impact on that potential of the person. Being able to access the Internet; find, manage and edit digital information; join in communications; and otherwise engage with an online information and communications network, are arguably aspects of what could be called digital literacy ( Blackall L., 2005).

The beauty of digital technology is that it is able to be continually refined, without a great cost other than time. We will also find that TVET teachers want materials that suit their particular requirements, their students and their way of teaching. They will not be interested in large, ready made and intact courses. They want illustrations, animations, slides, digital handouts that they could insert into their teaching materials.

Learning Management System (LMS) is a high-level, strategic solution for planning, delivering, and managing all learning events within an organization, including online, virtual classroom, and instructor led courses (Gebremariam, 2004). Most LMSs are web-based to facilitate access to learning content and administration. Usually e-Learning systems have been understood as Learning

Management systems (LMS) which mainly focus on administrative aspects of learning and on content delivery and support the behavioristic drill and practice approach (Thomas, 2003).

The term e-learning will be used in this document to refer to the incorporation of ICTs in any Training modality. E-Learning gives an opportunity to some teachers to revise and revitalize their older materials. In one case, some of the materials may have been developed long years ago. Times have moved on, both for the teacher and student, and the new technology opens up new ways of re-purposing the material into new and more interesting forms. It is revealed that for a lot of TVET teachers, digital literacy is an issue. TVET teachers are utilizing a number of audio-visual technologies to respond to this demand through animated Power Points, audio embedded in online materials and a much more prevalent use of video.

E-learning and new information and communication technologies (ICTs) have become part of educational practice worldwide and also in the regional technical and vocational training community.

### **1.3 Statement of the Problem**

The introduction of ICTs into the learning process is fundamentally changing the educational delivery and support landscape in a number of countries in both the developed and developing world. Advances in electronic messaging and computer-mediated multimedia and presentation technologies are making a major impact on the development, provision and delivery of educational and training programs at all levels of the educational system in most countries of the world.

E-learning has been successfully incorporated in the educational system of the developed countries years before and there have been studies that show the positive contribution of technology in facilitating learning. For instance Scheffler and Logan (1999) conducted a study to identify technology related competencies that were important for teachers. The results of the study showed that making

In addition to this, the researcher believes that pressing issues relating to the role E-Learning plays in the teaching-learning process would be worth studying and could answer the following basic sub-questions:

1. Are TVET teachers in Ethiopia digital literate and have ICT know-how before they are assigned to various training program?
2. Do the Ethiopian TVET colleges provide a favorable environment to the teachers to implement E-Learning on their training program?
3. Are there needs and ways to supplement courses of TVET using E-Learning?
4. What are the benefits of E-Learning for TVET?
5. How does e-learning help to bridge theory and practice in TVET?

The research attempts to answer these questions so as to address the Objectives of the study.

## List of Acronyms

- A.A.U: Addis Ababa University
- BBS: Bulletin Board Systems
- CAI: Computer Aided Instructions
- EMPDE: Educational Material Production and Distribution Enterprise
- EICTDA: Ethiopian Information Communication Technology Development  
Agency
- IFIP: International Federation for Information Processing
- ICT: Information Communication Technology
- ICT4D: Information Communication Technology for Development
- LMS: Learning Management System
- MOE: Ministry Of Education
- SPSS: Statistical Package for Social Science
- TVET: Technical and vocational Education Training
- UNESCO: United Nations, Education Scientific and Cultural
- VTI: Vocational Training Institute

## 1.4 Objectives of the study

The Primary objective of this research work is to study the potential for implementation of E-Learning in Ethiopian public TVET colleges to address the TVET instructors' problems in the use of ICT and propose a theoretical and methodological framework.

The specific objectives of the study are to:

- Identify existing facilities, work culture and characteristics of public TVET colleges in Ethiopia.
- Assess existing problems related to under utilization of the ICT infrastructure in Addis Ababa public TVET colleges.
- Evaluate the experience and tendency of Ethiopian public TVET teachers to enhance their teaching practices using e-learning potentials.
- Assess possibilities to enhance and facilitate student-centered learning.
- Make initial assessment of what is available and what has been done so far and thereby design principles and methodology on the development of content of professional development programs in the use of ICT.

## 1.5 Significance of the study

This study was carried out in Addis Ababa public TVET colleges to address the question of what had been the impact of digital literacy and the potential of e-learning implementation in these colleges in the areas of learning and teaching. Thus it would assist to identify the digital literacy gap among TVET teachers in employing digital technology in their teaching practice in addition to recommending the means to narrow the gap. This information was used to solve the problems the TVET teachers encountered during their instruction. It would also show the direction to seek an appropriate ICT and multimedia tools in E-Learning that would create conducive environment to help trainers to present their lesson effectively by employing Learning Management System. The following main benefits would be expected from the research: The research would

- Add knowledge about the digital literacy background of TVET college teachers in Ethiopia.
- Create a favorable environment for the TVET college teachers to improve their ICT skills and understanding.
- Give an insight to the applicability of E-Learning in TVET Programs.

Indicate to the TVET curriculum designers and policy makers the shortcomings in the area of ICT that are not visible during TVET curriculum designing.

## 1.6 Scope and Limitation of the study

The scope of the study was focused on exploring the extent and the potential for implementation of E-Learning by TVET college teachers. Given the time and financial constraints faced by the researcher, only colleges offering TVET program were taken into consideration. Due to better degree of availability and appropriateness, the source of data collection for this study delimited only to Addis Ababa public TVET colleges.

## 1.7 Research Methodology

The main purpose of the study is to investigate the potential for implementation of E-Learning in Technical and Vocational Education Training. Accordingly, the descriptive survey method was employed due to the reason that it would help to disclose the current digital literacy status of teachers in the public TVET colleges.

### 1.7.1 Sources of data

Primary and secondary data source were used to get relevant data. Primary data was collected through questionnaires and interviews from different respondent.

Various reports and documents in TVET colleges reviewed to get important data such as the number of TVET colleges and teachers in Addis Ababa. In the secondary data literatures like, books, universal publications, online journals and documents that reflect the experience of Learning Management system in various countries and issues related to Technical and Vocational Education Training were consulted so as to serve as the base for the study. In addition to these, different colleges that are started e-learning technologies are visited.

### 1.7.2 Target population and sampling techniques

The population used to assess the extent of computer related skills; usage of computers in Teaching and Teachers' Views of Integrating Computers in Teaching is the set of teachers found in Addis Ababa public TVET colleges. The data was collected from all five public TVET colleges found in Addis Ababa. Those TVET teachers that were giving training in the area of information technology had not been included in the study due to the reason that they had ICT knowledge background and most of them were graduates of ICT related fields. All the five public TVET colleges found in Addis Ababa were selected with purposive sampling techniques as source of pertinent, adequate and reliable information for the study. The study was organized to survey five TVET Colleges A total of 250 questionnaires for teachers and 10 questionnaires for TVET Administrators were distributed to the selected TVET and a total of 213 (85%) from teachers and 10(100%) from administrators were collected.

### 1.7.3 Data collection techniques

In this research work, interviews, visits, and questionnaires were used as methods of data collection. Interview was designed to elicit relevant information from the respective administrators of the colleges.

In order to collect first hand information pertaining to the subjects of the study, questionnaires, interview questions and documentations were administered. Questionnaire was used for its appropriateness to secure data from many

#### 1.7.4 Methods of Data analysis

The following are the tools and procedures used to analyze and interpret the data:

- The data collected through questionnaires and interviews were classified into different categories of heading.
- The classified data were tabulated and recorded into quantified forms.
- Percentage, mean, variance and standard deviation were used in questions demanding quantity measurements. The data collected will be processed and analyzed using the Statistical package SPSS 15.0

#### 1.8 Organization of the report

The report is organized in five chapters. The first chapter includes an Introduction which contains Background of the Study, Statement of the problem, Justification for the study, Objectives of the study, Significance of the study, Scope and Limitations of the study, Research Methodology and procedures such as Sources of data, Target population, Sampling techniques, Data collection and Data Analysis.

The second chapter deals with the review of literature that provides detailed information related to the issue such as history, positive aspects, challenges, problems and best practices of TVET education in Ethiopia.

The third chapter deals with the definition, impact and integration model of ICT in Education and e-learning initiatives in Ethiopia. In addition to discussing the Theoretical and Methodological Frame work to integrate E-learning into TVET curricula.

The fourth chapter focused on Findings and discussions of results.

The last chapter (chapter five) provides design of E-Learning framework, conclusions of the Study and Recommendations.

## CHAPTER TWO

### 2. Technical and Vocational Education: An Overview

#### 2.1 Background

The history of vocational education is as old as a history of human being. So vocation might have started when man started to make his living by producing products in different ways. In the ancient times parents and adults have to teach children how to provide food, build a shelter and perform other jobs. As cited by Getahun(2008, p.17), the Evan(1971) waves theory classifies this human experience development into three vocational educational periods.

The first wave 1000 years ago, probably a women planting seeds and seen growing naturally might be their beginning of agriculture, which as clustered into village development.

The second wave is industrial revolution, which began in 18th century, and leads the high level of peasant culture and made transfer to city factories and become cause for the growth of high capital to bring 2nd world war.

The third wave is going on, based not on muscle but on mind, it is what we call it information technology. Information working as a power for every individual and society; may be the cause for the dynamic changes which has taken place and will be taking place in the future is man and social demand all over the world for greater freedom and to meet a special requirements of an individuals need.

After 20th century vocational education has developed in diversified field in every country. Citizen's participation for a better economical, development and high prosperity in industries, agriculture, tourism, information technology and cottage industries can not be expected without expanding technical and vocational education for all. World wide, terminology is a significant problem in the field of technical and vocational education. According to the work of Atchoarena and Andre(2002) as cited by Getahun(2008), the terms Technical and Vocational Education(TVE), Technical and Vocational Education and Training(TVET) and

Vocational and Technical Training (VTT) are often used to mean the same in different countries in concepts and definitions.

The second international congress on TVET in Seoul and the 30th session of the general conference of UNESCO in Paris in 1999, for instance, agreed to adopt the phrase: "Technical and Vocational Education and Training (TVET) have to designate the combined process of education and training and recognize the common objective of employment as their immediate goal." The congress further emphasized that TVET should be a multi-demand concern approach. TVET programs should also be designated as comprehensive and inclusive systems accommodating the needs of all learners and accessible to all.

In our country's condition (MOE, 2002) define Technical and Vocational Education and Training as it is designated to train and educate students in specific traditional and modern fields of vocational and technical skills for students who have completed grade 10 and show sufficient desire and inclination to be trained in the fields of their choice.

For the purpose of this study, student researcher accepted the definitions from Evans(1971) as Vocational Education is education designed to develop skills, abilities, understandings, attitudes, work habits and appreciation's encompassing knowledge and information needed by workers to enter and make progress in employment on useful and productive basis. It is an integral part of the total education program and contributes toward the development of good citizens by developing their physical, social, civic, cultural and economic competencies. This means shortly that vocational education is a training designed to teach the skills and knowledge needed for particular kinds of work.

The UNESCO(2001) revised recommendation concerning technical and vocational education also defines TVET as a comprehensive term referring of those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life.

## 2.2 History of TVET education in Ethiopia

Technical and Vocational Education Training (TVET) has a long history in Ethiopia which dated back to early 20th century. Prior to the 20th century the educational system was predominantly religious oriented to serve the manpower need of the church and the state. There was no significant sign of vocation training at that time (Bedru, 2007). During the regime of emperor Tewodros there has been a demand for foreign craftsmen to build artilleries and emperor Menelik II also brought some Swiss artisans to Ethiopia(Assefa,1993). As noted by (Bedru, 2007), Emperor Menelik II was the first to introduce modern education in Ethiopia particularly in Addis Ababa. The subjects offered were academic in general and language in particular in order to train administrators for government organization and to produce interpreters required for contacts with western countries. It is said that some TVET schools were established during the Italian Occupation(1935-1941).The schools were established in line with the Italian Colonialist ambitions. In 1941 soon after the restoration of the Ethiopian Government, schools continued to increase in number (Girma, 1990).

The government was faced with the need to reconstruct what was ruined during the war. For these reasons, it needed to educate people in many areas, including skill subjects. To fulfill the skilled manpower requirements for industrial and commercial sectors vocational and technical schools were established. According to Wanna (2000), Addis Ababa Technical school in 1942, Addis Ababa commercial school in 1943, Addis Ababa Building Trade school in 1940, Ambo Agricultural school in 1946, Jimma Agricultural school in 1944, W/ro Sehin comprehensive secondary school in 1963 and Bahir Dar Polytechnic school were established in 1964 respectively.

The development of technical and vocation education in Ethiopia is categorized by Wanna(1998) into three periods. These are:

### **(i). The period from 1940's-1960's**

During this period the country built six TVET institutions such as Addis Ababa Technical School, Addis Ababa Commercial School, Ambo and Jimma Agricultural School, Addis Ababa Building Trade School and Bahir Dar

Polytechnic School. This is a period, which introduced TVET schools to different part of the country for the first time.

**(ii). The period from 1960's-1980's**

The period mainly characterized by the expansion and introduction of comprehensive high schools. The purposes of the education system were to provide academic education to prepare young individuals for tertiary education and to provide technical and vocational education and training for the young people for the word of work.

**(iii). The period after 1980's**

This period mainly characterized by reorganization and consolidation of TVET schools. Unsuccessfulness of the reorganization of comprehensive secondary school led to take an alternative step to establish new technical and vocational trading centers and to provide options for the increasing number of school leavers.

## 2.3 Current status of TVET in Ethiopia

As the years passed the number of technical and vocational schools increased and the curriculum designed also changed and the new education and training policy came into practices.

Currently, important reform steps have been introduced after the adoption of the national TVET strategy of 2002 and the TVET proclamation of 2004. A review of objectives introduced was stated as:

*The overall objectives of the national TVET strategy is to create a competent, motivated, adaptable and innovative work force in Ethiopia contributing to poverty reduction and social and economic development through facilitating demand driven high quality technical and vocational education and training relevant to all sectors of the economy at all levels and to all people in need of skills development.*

A competitive global market requires technical and professional citizens trained in broad and specific occupational skills. Hence, Technical Vocational Education

and Training (TVET) may be seen as a center for the development of marketable and entrepreneurial skills as a means for development. It is with such consideration that Ethiopia put in place comprehensive human resources development program aimed at strengthening its capacity through TVET. Nowadays many TVET schools and Colleges were opened through out the country to fulfill the goal set by the strategy.

To meet this demand, Technical and Vocational Education and Training colleges have to be incorporated with digitally literate teachers that guide trainees on the highway of technology so as to prepare them perform functions required by the market and society. The Ethiopian educational system currently faces a number of challenges that need to be addressed within the context of the e-education implementation strategy to facilitate the process of the development, deployment and the exploitation of ICTs to facilitate teaching and learning within Ethiopian schools, universities and colleges.

## **3. ICT in Education (E-Learning)**

### **3.1 Introduction**

Because of the development of information and communications technologies, the nature of knowledge is changing, and that affects not only what we teach, but also how we teach. Learning is a dynamic course of action of developing knowledge. Various tools are used to make the process of teaching and learning effective. In keeping with advancement of technology, the tools have undergone modifications in sophistication. From simple chalk and black board, they have come a long way to computers with multimedia and digital technologies.

In most cases, E-learning is the name given to computer-enhanced learning. Computers play an important role in learning and teaching process.. The role of computers in supporting the cause of education varies greatly. Computers can be tools to solve problems, organize information, learning and teaching and prepare drill and practice. In addition to these computers are used to prepare tutorial software and guided discovery learning.

#### **3.1.1 E-Learning**

E-learning, like e-commerce, e-living and other similar terms are manifestations of the knowledge age facilitated by ICT tools and accompanied culture. The European e-learning Action Plan 2001 defines e-learning as the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration. The Commission on Technology and Adult Learning (2001) defines e-learning as instructional content or learning experiences delivered or enabled by electronic technology. In practice, it incorporates a wide variety of learning strategies and technologies.

Various authors on this topic have provided many definitions on e-learning. Below are a few notable ones:

1. E-Learning is instruction that is delivered electronically, in part or wholly – via a Web browser, through the Internet or an intranet, or through multimedia platforms such as CD-ROM or DVD (Hall, 1997).

2. E-Learning is a structured, purposeful use of electronic system or computer in support of the learning process (Allen, 2003).

3. E-learning is training delivered on a computer (including CD-ROM, Internet, or intranet) that is designed to support individual learning or organizational performance goals (Clark and Mayer, 2003).

4. Web-based training [an alternate term for e-learning] is the integration of instructional practices and Internet capabilities to direct a learner toward a specified level of proficiency in a specified competency (Conrad, 2000).

The term E-Learning has been used to describe many teaching practices that incorporate technology. According to (CERI, 2005) the Organization of Economic Co-Operation and Development survey of online learning in 122 Commonwealth universities in 12 countries refers to E-Learning as "the use of information and communications technologies to enhance and support learning." These technologies may include, but are not limited to, the Internet, videoconferencing, e-mail, adaptive hypermedia, specialist disciplinary software, learning management systems, and simulations. Information and communications technologies may be incorporated as part of instruction in many ways. E-Learning encompasses each of the following three categories of practice.

(i). Traditional courses supplemented by technology. In this category of e-learning, information and communications technologies are implemented for administrative reasons and/or to enrich the course. For example, course notes, syllabi, and grades may be placed on the Web. The instructor may use e-mail and online discussion groups and provide online links to external resources. However, there is little or no reduction of face-to-face class time.

(ii). Blended learning. In this instance the instructor uses information and communications technologies to replace part of face-to-face in-class instruction. For example, students may be required to participate in technology-enabled activities such as online discussions or project collaborations as part of their course work. They might participate in simulations or participate in virtual classes using videoconferencing. Blended learning may be used for several reasons that include one or more of the following: enriching and elaborating upon lectures, shifting presentation functions to the online environment so that class time may be used for other purposes, using the same set of classrooms to support a greater number of courses, and increasing access to courses for students unable to attend all lectures.

(iii). Fully online. At this end of the e-learning continuum, learning resources and activities are situated on the Web. Supplementary resources such as texts and print packages may be used, but most if not all instruction and communication with the instructor and among the students takes place online (Pirani, 2004).

E-Learning is used interchangeably in a wide variety of contexts. In companies, it refers to the strategies that use the company network to deliver training courses to employees. In the United States, it is defined as a planned teaching/learning experience that uses a wide spectrum of technologies, mainly Internet or computer-based, to reach learners. Lately in most Universities, E-Learning is used to define a specific mode to attend a course or programs of study where the students rarely, if ever, attend face-to-face for on-campus access to educational facilities, because they study online.

E-learning offers a new range of skills which are essential for every discipline at every level and for life and work, enabling people to contribute and benefit fully as citizens. As learners make use of digital environments they acquire and practice a wide range of e-oriented skills, such as information literacy, online collaboration – all important life skills (Gerry, 2003).

As (Wall, 2004) described that E-Learning is the term currently used to describe anything that involves learning through an online environment. Other terms used include online learning and flexible learning. E-Learning can involve using the

WWW as an information source through to using a range of software and resources for the learning task. Originally, E-Learning was an implementation of the business world for training purposes and so it developed to meet a procedural and sequenced learning path. E-Learning, at its best, uses collaborative technologies such as email, bulletin boards, virtual whiteboards and discussion lists. It also involves self-discipline, the ability to determine and set learning and individual goals as well as the ability to work when and where appropriate for the learner.

E-Learning is not the same as individualized instruction. Individualized instruction requires a structured task designed for a specific learner. The learner in this instance has had a goal set for him with associated tasks to meet the goal, usually in a learning sequence and on his own. It has a range of activities that the learner can choose from in order to meet his learning goal. These activities will include collaboration and cooperative learning.

A good E-Learning strategy includes prior training for students in using collaborative technologies as well as discussion in an online environment, time management strategies for students and an understanding of the processes involved in the learning tasks. Reflective practice on the learning process is also important. Teachers need to understand and be developed in their skills to be managers of learning rather than just teaching. A teacher in an e-learning environment will at times have to be a teacher that make sure students have the necessary tools, resources and skills, consult students on their learning objectives, and encourage them to contribute to a learning community.

E-learning must be interactive and entertaining, which can mean more work from a teachers perspective as students would be learning at all times and require more individualized responses.

According to Sirohi (2007) many technologies can, and are, used in e-Learning. Some of them are:

Screen casts; ePortfolios; Palm pilots; MP3 Players; the use of web-based teaching materials; hypermedia in general; multimedia CD-ROMs; web sites; discussion boards; collaborative software; e-mail; blogs; wiki; text chat; computer

aided assessment; educational animation; simulations; games; learning management software; electronic voting systems

Most E-Learning situations use combination of the above techniques. In all these expressions we understood that e-learning umbrellas the digital technologies in the learning process and more related with ICT.

### 3.1.2 History of E-Learning

The development of the E-learning revolution arose from a number of other 'educational revolutions'. Four such revolutions cited by Billings and Moursund (1988) are:

- the invention of reading & writing
- the emergence of the profession of teacher/scholar
- the development of moveable type (print technology)
- the development of electronic technology

When discussing the 'beginnings' of E-learning it is important to note that valid tools of E-learning include now somewhat overlooked technologies such as calculators, VCRs, radio and bulletin board systems (or BBS). All of these developments have contributed to ideas concerning the uses of the E-learning systems.

Computer Assisted Learning projects first began in the late 1950's and yielded research that suggested computers were a valuable addition to traditional instruction/education.

PLATO (Programmed Logic for Automatic Teaching Operations), developed in 1960 at the University of Illinois at Urbana-Champaign is the first general purpose e-learning system. The first CAI (Computer Aided Instructions) system of Math for K-6 was then written by Science Research Council. Wicat systems developed authoring tool using Pascal to develop learning contents. The first complete CAI classroom for K-6 students was set up at Waterford elementary school in Utah using the Wicat systems. The first public CAI classroom was

implemented in Singapore by Ball systems with Wicat system. From this design, the entire computer learning centers globally evolved. These are the forerunners of e-learning (Sirohi, 2007).

The discourse of early electronic education centred on teaching students to use computer-programming languages like BASIC. The realisation that learning a computer language was diverting valuable time away from conventional subject matter caused a paradigm shift in the 1980s and the current trend of application packages began.

It is difficult to exactly determine the real beginning of e-learning. But some consider that the idea itself started with distance learning with the start of postal and mail services hundreds of years ago (Kimberly, C. H, Kuanchin, C. and David, Y., 2004), others consider that the real technological start was during the Second World War in the 40s when the U.S. distributed army films to several countries for training purposes (The Passage to E-Learning? n.d.). Many researchers and authors, however, have indicated that the beginning and evolution of E-learning was based on the evolutions of other technologies such as Radio, T.V, VCRs, etc ( Williams, M. et al., 1999).

See the figure below which is adapted from (Williams, M. et al., 1999,p.4)

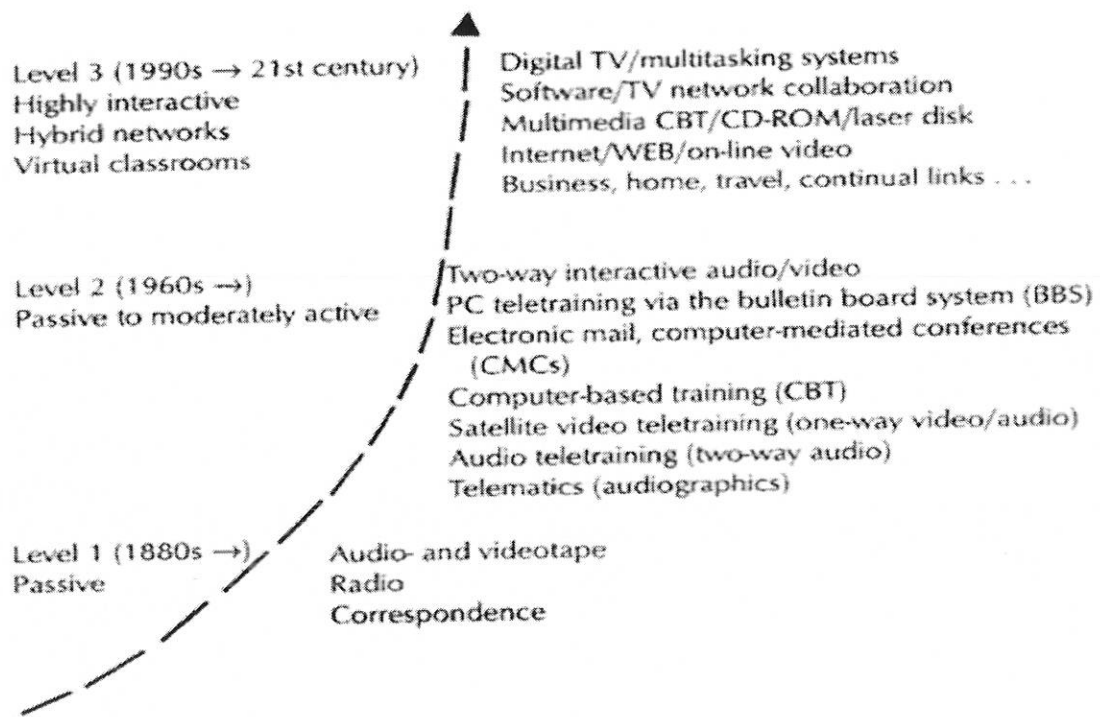


Fig3.1: The evolution of E-Learning following a chronological order. ( source: Williams, M. et al.,1999,p.4)

In figure1 above, the evolution of E-Learning from level one to some point in level three was considered to be as a pre-history by Cross, J.(2004). The two scholars Downes S. and Cross J. have agreed that the real emergence of e-learning was with the advancement of network technologies (e.g. internet) in the late 90s. At that time, the learning process was conducted through new media such as virtual learning environment systems and Learning Management Systems (Akeroyd, J., 2005).

Although these systems had offered great flexibility and provided many potential benefits that can make e-learning more successful than the traditional learning, they had serious issues in terms of interaction and communication support.

## 3.2 E-Learning types

E-learning is a flexible term used to describing a means of teaching through technology. According to Matt Comerchero(2006) in the ebook “ e-learning concepts and technique” introduces e-learning as a means of education that incorporates self-motivation, communication, efficiency, and technology. And he categorized the different types of e-learning based on:

- Means of communication
- Schedule
- E-learning class structure
- Technologies used

### **Means of Communication**

There are several different means for individuals to communicate with each other and their instructor. E-Learning can be conducted solely through on-line applications. In other cases, if distance is not a factor, some face-to-face communication can be included to create blended E-Learning. Blended E-Learning includes elements of web interaction and in-person interaction. Technology broadens the definition of face-to-face as there can be the use of two way video, and two way audio. Introducing these elements of participation create a blended E-Learning experience.

### **Schedule**

E-learning can either be Synchronous or Asynchronous. Synchronous means that real-time communication is implemented, such as video conferencing, teleconferencing, and on-line chat programs. Asynchronous indicates that other means of communication are utilized that do not require real time responses. Examples of asynchronous E-Learning include; e-mail, list serves, threaded discussions, blogs, and on-line forums.

## **E-Learning Class Structure**

E-learning class structure addresses how the instruction is administered. E-Learning can be self-paced, instructor-led, or self-study with an expert. Self-paced instruction is administered by giving the learner the materials she needs to complete the training/instruction. Instructor-led training affords the learner a guide to implement the instruction. Self-study with an expert is a combination of self-paced and instructor-led. As in self-paced, the learner is responsible for staying on task and on schedule, however as in instructor-led, there is interaction with an authority figure that checks the learners' progress.

## **Technology**

Technology used to implement instruction is not limited to web-based materials. E-learning can be achieved by utilizing any form of technology that sustains information yielding media. Video/Audio tape, aside from being an obsolete technology is a viable means to implement instruction. More current technology aids the learning experience because there are more means to convey the information. Technology is the most variable element in e-learning. The more advanced the technology becomes, the more options there are to further e-learning. The creation of the Internet subsequently created e-learning, as dial-up connections were replaced by cable modems, speed and bandwidth increased; correlatively the quality of on-line instruction improved because computers were able to support the media. As speed increases and devices become smaller and more mobile; training will become more flexible and further boost the growth and popularity of e-learning.

The topics mentioned previously are not mutually exclusive; they can be used in any combination to create the best instruction possible. Given e-learning's conceptual versatility and advancing technology, e-learning currently has increasingly limitless potential.

### 3.3 Benefits and drawbacks of E-Learning

The vast movement towards e-learning is clearly motivated by the many benefits it offers. However much e-learning is praised and innovated, computers will never completely eliminate human instructors and other forms of educational delivery. What is important is to know exactly what e-learning advantages exist and when these outweigh the limitations of the medium.

#### 3.3.1 Benefits of E-Learning

E-Learning is beneficial to education, corporations and to all types of learners. It is affordable, saves time, and produces measurable results. E-Learning is more cost effective than traditional learning because less time and money is spent traveling. Since E-Learning can be done in any geographic location and there are no travel expenses, this type of learning is much less costly than doing learning at a traditional institute.

Flexibility is a major benefit of E-Learning. E-learning has the advantage of taking class anytime anywhere. Education is available when and where it is needed. E-Learning can be done at the office, at home, on the road, at any time. E-Learning also has measurable assessments which can be created so the both the instructors and students will know what the students have learned, when they've completed courses, and how they have performed.

Students like E-Learning because it accommodates different types of learning styles. They have the advantage of learning at their own pace. Students can also learn through a variety of activities that apply to many different learning styles learners have. Learners can fit E-Learning into their busy schedule. If they hold a job, they can still be working with E-Learning. If the learner needs to do the learning at their available time they can do it.

E-Learning encourages students to peruse through information by using hyperlinks and sites on the worldwide Web. Students are able to find information relevant to their personal situations and interest. E-Learning allows students to

select learning materials that meet their level of knowledge, interest and what they need to know to perform more effectively in an activity. E-Learning is more focused on the learner and it is more interesting for the learner because it is information that they want to learn. E-Learning is flexible and can be customized to meet the individual needs of the learners.

It also helps students develop knowledge of the Internet. This knowledge will help learners throughout their careers. E-Learning encourages students to take personal responsibility for their own learning. When learners succeed, it builds self-knowledge and self-confidence in them. Learners enjoy having the opportunity to learn at their own pace, on their own time, and have it less costly.

### 3.3.2 Drawbacks of E-Learning

When we come to see the drawbacks of E-Learning, One disadvantage of e-learning is that learners need to have access to a computer as well as the Internet. They also need to have computer skills with programs such as word processing, Internet browsers, and e-mail. Without these skills and software it is not possible for the student to succeed in E-Learning. E-learners need to be very comfortable using a computer. Slow Internet connections or older computers may make accessing course materials difficult. This may cause the learners to get frustrated and give up. Another disadvantage of e-learning is managing computer files and online learning software. For learners with beginner-level computer skills it can sometimes seem complex to keep their computer files organized. Without good computer organizational skills learners may lose or misplace reports causing them to be late in submitting assignments. Some of the students also may have trouble installing software that is required for the class.

E-Learning also requires just as much time for attending class and completing assignments as any traditional classroom course. This means that students have to be highly motivated and responsible because all the work they do is on their own. Learners with low motivation or bad study habits may fall behind. Another disadvantage of e-learning is that without the routine structures of a traditional

Table 3.1 Some of the benefits and the drawbacks of E-Learning vs traditional learning. (Source Zhang, D. et al., 2004, p.76)

	<b>Traditional classroom Learning</b>	<b>E-Learning</b>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Immediate feedback</li> <li>• Being familiar to both instructors and students</li> <li>• Motivating students</li> <li>• Cultivation of a social community</li> </ul>	<ul style="list-style-type: none"> <li>• Learners-centered and self-paced</li> <li>• Time and location flexibility</li> <li>• Cost-effective for learners</li> <li>• Potentially available to global audience</li> <li>• Unlimited access to knowledge</li> <li>• Archival capability for knowledge reuse and sharing</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Instructor-centered</li> <li>• Time and location constraints</li> <li>• More expensive to deliver</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of immediate feedback in asynchronous e-learning</li> <li>• Increased preparation time for the instructor</li> <li>• Not comfortable to some people</li> <li>• Potentially more frustration, anxiety, and confusion</li> </ul>

### 3.4 ICT and e-learning environment

In order to fit into the new economic order, it is necessary for developing countries to develop a society and culture that places a high value on education and training. Thus ICT-based technology like E-Learning has great potential to supplement traditional learning.

This is so because ICT-enhanced learning can provide new opportunities to explore high-level cognitive activities such as autonomy, creativity, problem solving and team work while providing teachers with the means to take into account individual needs of students, especially while using web-based technology.

The European Centre for the Development of Vocational Training (CEDEFOP) has defined E-Learning since 2000 as learning based on Information and Communications Technology (ICT). E-Learning implies more than the acquisition of competencies in the IT field; it has more to do with multiple formats and hybrid methods, the use of software, Internet, CD-ROMs, online learning forms as well as electronic or interactive media. E-Learning itself does not describe a specific learning strategy, learning concept or a particular method of learning, but rather refers to the support of learning processes through electronic media. The media used may assist the self-directed acquisition of information, support communication or provide didactically structured learning modules. Online learning may be best suited to exploit the potential of E-Learning, however it is not the exclusive design function for E-Learning.

E-Learning has increased on importance as people realize that the use of technology can improve the learning process. E-Learning has changed the teaching approach from "teacher-centered" to student-centered" where students are expected to be interactive and independent learners.

According to Sirohi(2007) scope of E-Learning extends widely encompassing several areas like academic, corporate, service etc. Today E-Learning industry comprises millions of dollars. Whatever be the area, creating an effective e-

learning environment plays a very important role. It involves institutional administrative, academic and student service), Pedagogical (goals/objectives, content, design approach, organization, methods and strategies), technological (infrastructure planning, hardware and software), interface design (page and site design, content design, and usability testing), evaluation (assessment of learners instruction evaluation and usability testing), management (maintenance of learning environment and distribution of information) and ethical (social and cultural issues, geographical diversity, learner diversity, information accessibility, etiquette and legal).

Characteristics of a good meaningful e-learning system are:

- ✓ Easy accessibility
- ✓ Well-designed
- ✓ Learner-centered
- ✓ Affordable
- ✓ Flexible

A well planned, designed, developed and implemented system will be a successful system providing for a fostered and supported learning.

### 3.5 Current status of E-Learning

ICT has become an important enabler to facilitate open education and distance learning at broader communities. E-learning ensures access to information about education, training and lifelong learning through the use of multimedia technologies. The recent growing trend of e-learning is mostly benefiting the developed countries due to some predominant facilities like infrastructure, technology, relevant content and responsive learner community. The beauty of e-learning is anyone can avail himself of the service i.e. learning/teaching aid from anywhere, as there is no geographic barrier among the learners. So, a global participation can be ensured through the system. Internet has made the process much easier and comfortable.

Traditional education has shifted towards new methods of teaching and learning through the proliferation of Information and Communication Technologies (ICT).

The continuous advances in technology enable the realization of a more distributed structure of knowledge transfer. This becomes critically important for developing countries that lack the resources and infrastructure for implementing cutting-edge education practices. The two main themes of technology in education for developing countries focus either on aspects of technological support for traditional methods and localized processes, or on the investigation of how such technologies may assist distance learning (Noorminshah, et al., 2004).

The e-learning scenario in developing countries is still a new era for the learner communities. Due to reverse economic and social conditions of developed countries, countries like Ethiopia could not yet establish a reliable e-learning system or institution. Few initiatives like the Addis Ababa University Informatics Faculty e-learning site development can be observed. The e-learning site is used to help students understand the course contents prehand and share their opinions by participating on discussions. This will strength the attempt to create the e-learning community.

Simultaneously, the local communities of developing countries can obtain the e-learning facilities from their existing locations. But the majority of the local communities are out of the facility. There are few major issues like national strategy, connectivity, accreditation, acceptability, quality of the learning materials, and relevant contents that have to be considered for any E-Learning program (Md Shahid Uddin Akbar, 2005).

Simultaneously, setting priority of the learning systems, developing countries like Ethiopia are based on traditional learning mechanism and the market for E-Learning has not yet become an important agenda for the government to address. Another critical concern raised on the e-learning activities is the cost perspective. Learners of the developing countries have financial constraints to participate in the program that is costly for them and they have limited scopes to get the learning facilities as it relates with high tech equipment, in many cases. So, for the developing countries we need to reframe the E-Learning mechanism to reach the communities.

reported that none of their pupils use computers for learning and/or for access to the Internet and limited access to computers by teachers in the Ethiopian School System.

The introduction of new technologies like E-Learning into Ethiopia education system will itself create many challenges, including financing, skills, capacity and many others. Though the goal of introducing E-Learning system is to reach to all communities of the society but in reality only the privileged community of the society will benefit from such learning mechanism due to the existing national strategy, infrastructure & social condition.

ICT is the emerging sector in Ethiopia. The government has declared it as thrust sector and the overall education sector is in the priority list of the government. However, these two sectors have lot to develop in terms of reach, quality and contribution to the development process.

In fact, though the challenges facing Ethiopia are significant, the challenges of old, low and uneven education participation, poor quality education, low per capita incomes, and a rapidly growing population have been joined by new and more daunting challenges, including globalization, poor economy, and rapidly advancing technology. The size of this challenge is clear. In the area of introducing E-Learning in Ethiopia, some initiatives are already in action. One of the broad objectives of the Ethiopia ICT policy is to transform Ethiopia into a knowledge and information-based society and economy.

In consideration of the recent growth in the ICT sector, the opportunities are now promising to introduce e-learning programs in Ethiopia at broader aspect.

To bring the e-learning benefits to the people of developing countries like Ethiopia, some important issues to be addressed and the key role of the players are identified by Md Shahid Uddin Akbar( 2005) as follows:-

- (i). National strategy and plan for e-learning where government has to play the lead role in partnership with academician;
- (ii). Ensuring access to the local communities i.e. development of ICT infrastructure, both government and private sector have to contribute in the process;

conference on ICT for development and education entitled “e-learning Africa” held in Addis Ababa on 24-26 may 2006. Those faculty teachers that have zeal and interest to practice E-Learning in their teaching activities have designed an E-Learning site using an open source content management software MOODLE and tried their best to enhance and support the courses given by them. In the E-Learning site, course outlines, assignments and discussions will be entertained to students. The site needs user name and login password. Assignments and quizzes can be posted by teachers and evaluated electronically by the users. The E-Learning site is using an IP address that can be accessed within the AAU campuses. In Sept.2008/2009 the E-Learning site has got its own URL <http://fotel.aau.edu.et> and can be accessed anywhere. Although the E-Learning is not fully functional by all the teaching staffs, some of the teachers are using it to assist the teaching-learning environment parallel to the existing system. The opportunities observed here was that it minimizes the cost needed in paper works. The challenges were that not all teachers use the system and have the devotion to prepare assignments and check the response. Beside the time needed to prepare those online assignments has decreased the interest of some of the teachers to use the system.

### 3.7.2 Ethiopian Civil Service College

The Ethiopian Civil Service College is using the digital technology to facilitate the E-Learning capability through out the Ethiopia regions encompassed by the WoredaNet program. The Ethiopian Civil Service College Development Learning Center (ECSC-DLC) was officially established in 2000 E.C.

The Development Learning center at the college uses distance learning technologies such as VSAT based interactive video conferencing, WoredaNet(DistrictNet) video conferencing and E-Learning technologies. It organizes and implements various training programs that can enhance the efficiency and effectiveness of the public sector in Ethiopia. So far the center has been offering a range of different distance learning courses, seminars and dialogues to more than 6000 participants through interactive videoconferencing

and web technologies. According to the information obtained from the Development Learning Center director, training coordinator and IT specialist the services at the center consists of:

- ✓ Interactive WoredaNet Videoconferencing Technology
- ✓ E-Learning facility
- ✓ Interactive VSAT Based Videoconferencing Technology
- ✓ Multi-Media facility
- ✓ High-Speed Internet connection with VSAT Technology

The Center director Ato Belay expressed the emergence of the WoredaNet program beside available infrastructure and the readiness and cooperativeness of regional and Woreda administrators as an opportunities to implement e-learning. Regarding the challenges to implement e-learning, the main challenge was the shortage of high calibered expert in the field of e-learning. The e-learning platform is developed using an open source package called MOODLE. Due to the customizability nature of the package, the center has a plan to customize the e-learning site into local languages.

The e-learning room is equipped with 40 computers with high speed internet connection for conducting e-learning programs, various face to face and online computer trainings. Short-term training programs in procurement, Human Resource Management and computer basics will be offered to public institutions at federal and regional levels. Any one can access the site using the URL <http://www.ecsc.edu.et>.

The center has also a videoconferencing room that accommodate 40 participants and an additional class for conducting videoconference lectures, dialogues and panel discussions with regional capitals and Woredas in Ethiopia. Short-term trainings are offered to public institutions at federal and regional level. Multidisciplinary capacity enhancement courses, seminars and dialogues geared to development & the fight against poverty have been received from allover 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.

### 3.7.3 ICT Development Office (ICTDO) at AAU

The establishment of ICT Development Office helped the effort to expand its use in all areas of Addis Ababa University activities, including teaching-learning, research, community service, and administration and other support processes. The services currently available are fewer than what is desirable. There are a number of essential services being delivered. The main ones are:

- ✓ Domain Name System
- ✓ Dynamic Host Configuration Protocol Service (DHCP)
- ✓ Proxy Service
- ✓ Web Services
- ✓ Mail Services
- ✓ E-Learning
- ✓ Tele-Medicine and Tele-Education
- ✓ Register Automation

According to the ICTDO brochure, 18 Video conferencing facilities have been installed along with a video conferencing monitoring and control unit. Regarding E-Learning three pilot projects where E-Learning is being used in delivering course material and other teaching-learning activities are undergoing using an open source package platform called MOODLE.

### 3.7.4 The Department of Information Science at AAU

The Department of Information Science is one of the Higher Learning Institutions that took the initiatives of developing E-Learning program. The E-Learning Program is developed by using an open source program MOODLE. The E-Learning program is functional and is used by the teaching staffs of the department to support and supplement the courses given by the department in parallel with the traditional teaching practice. The students are benefited by the program because the program helps them to have a pre-knowledge about the courses given in addition to assessing the assignments.

### 3.8 The role of teachers in E-Learning environment

The E-Learning environment is characterized by the ubiquitous access to digital information along with communication tools that provide another layer of access to 'dynamic information'- the sharing of information and creation of knowledge when communities of practice are established. The new technologies provide the learner with an amazing range of choices that they can do things with, rather than simply memorize and learn. One can browse the world's learning supermarket for the most suitable and appealing resources. In order to be a discerning learner one needs to be armed with the necessary skills.

A key competency is simply 'problem definition' which defines what kind of information is needed, from where it is accessed and how to process the information as well as its presentation and management (Gerry, 2003).

There was a need to redefine the role of teachers and teaching in the process of E-Learning. Consistent with this view, Barajas in "Is the role of the teachers as the Knowledge authority in danger in an ICT-learning setting" infers that the role of the teacher as the 'knowledge authority' or as the transmitter of information is in danger when access to a wealth of resources is available to individual learners. Access to abundance of information diminishes the role of the teacher as the 'all-knowing' figure. In the 'e-world' the role of the teacher becomes one of a learning guide who is there to facilitate (<http://www.elearningeuropa.onfo>).

In addition to the above view, Barajas provides us with the following teacher roles in an e-learning environment:

**Teacher as learner in the classroom** – teachers are accepting that students might do better in special fields and are more ready to learn with and from them.

**Teacher as tutor** – the tutor's role is not just the subject expert who facilitates learning, the tutor facilitates communication, and is a coach, consultant, referee, assessor and help line, the tutor as a guide and monitor, bringing parties together as manager, provider or broker.

**Teacher as collaborator with students** – in ICT based activities the teachers tend to participate as peers together with the students.

**Teacher as developer** – teacher develops learning materials mainly in electronic format.

**Teacher as researcher** – teacher is researcher of own educational experiences as a way to reflect and internalize the innovations promoted in the class room.

**Teacher as lifelong trainee** – ICT literacy is the first step in the professional development of teachers.

**Teacher as a member of a team of teachers** – in distributed E-Learning environment teachers are 'members of a team of teachers'.

In sum, the position of the teacher has shifted from the 'one in charge' to a partner in the development of students. In many aspects the teacher and student roles become interdependent. As one takes on a specific role, the other takes on a complementary role. Nevertheless to be effective practitioners in this new environment, teachers will need to be adaptive, flexible and willing to be lifelong learners themselves. Teachers have to be properly equipped in digital literacy knowledge and skill in order to be effective operators in the knowledge age.

### 3.9 The role of E-Learning in TVET education

The emergences of digital technologies pave the way for the emergence of E-Learning. Nowadays E-Learning is playing a great role in the education sector. E-Learning offers a new range of skills which are essential for every discipline at every level and for life and work, enabling people to contribute and benefit fully as citizens. As learners make use of digital environments they acquire and practice a wide range of e-oriented skills, such as information literacy, online collaboration – all important life skills.

The European Centre for the Development of Vocational Training (CEDEFOP) has defined E-Learning since 2000 as learning based on Information and Communications Technology (ICT). E-Learning implies more than the acquisition of competencies in the IT field; it has more to do with multiple formats and hybrid

methods, the use of software, Internet, CD-ROMs, online learning forms as well as electronic or interactive media.

E-Learning and new information and communication technologies (ICTs) have become part of educational practice worldwide and also in the regional technical and vocational training community. Concerns for innovation and for offering the appropriate response to changes in the labour and education world have been a constant action-taking pattern of VTIs. Therefore, it is not surprising that there has been a strong commitment to introduce ICTs in teaching-learning processes during the last decades. It seems to be quite appropriate, therefore, to look back on what has been done and think about the future; about how to proceed and where to go.

### 3.10 Defining the Integration of E-Learning

Successful integration of E-Learning will enable TVETs offer more classes to their trainee, make learning more flexible to meet individual needs and help TVETs meet the requirements of skilled man power with digital technology mind. The integration of Computer Assisted Learning is defined by Miller(1997) as using the power and ability of the computer to assist learning in every subject area. The integration of Computer Assisted Learning is neither computer literacy nor computer awareness. It means using the computer where it is the best medium to support the learning goal (Anderson,1997). It involves a different kind of teaching and whole-school awareness. According to (IFIP, 1993) International Federation for Information Processing takes into account the following factors for the integration of technology in schools.

- Hardware provision and maintenance
- Support by technical staff
- Development and provision of complementary materials
- Equity access for all students
- Software development and provision
- Training teachers in new skills
- Internal school organization
- Reforming the curricula through subject matter reevaluation

➤ Funding

Miller (1997) also noted that if one accepts that integration represents the means to combine the above factors and combining to build one larger unit, all stakeholders in the education must reach agreement on the organization and setting of the goal.

In order to integrate technology, schools have to exploit technology for the betterment of their students and themselves and computers form part of that technology.

### 3.11 Instructional Design Models for E-Learning

At the root of Instructional Design Models there is a systematic process that Instructional Designers should follow in order to achieve the creation of efficient and effective instruction. Or more simply put, Instructional Design (ID) "is a framework for learning" (Siemens, 2002). This framework asks the Instructional Designer to assess the desired outcomes of the learning and begin to apply an ID model that is most appropriate to assist in achievement of these desired outcomes. Despite some ID models being quite generic in nature, they are incredibly popular and capable because they present a very effective, yet general, model to build various types of instruction to meet different objectives in learning.

Below we will see a variety of popular models listed. These items do not attempt to outline the specifics of any Instructional Design model, but rather serve to convey the variety and possible application of these models to our specific instructional task. As we may notice, or soon come to learn, most of these models can be modified to meet our specific needs. Their systematic frameworks allow us to borrow from their strengths and make use of several models to meet our differing needs. Some of these are:

- ✓ ADDIE (Assess-Design-Develop-Implement-Evaluate) model
- ✓ Algo-Heuristic model
- ✓ Dick and Carey Model
- ✓ Robert Gagné's Instructional Design Model

not investing a large amount of time and money. More emphasis can then be placed on the evaluations of the prototypes to help ensure good sound instructional content. Rapid E-Learning take into consideration the following elements. These are: development timeframe, budget for development and the type of development team. Rapid E-Learning is one of the tools of E-Learning beside traditional and Strategic E-Learning.

Rapid E-Learning has the following features:

- Responds to an urgent training need (i.e. product launch or competitive situation)
- Developed in less than 3 weeks
- Creates training that has little long-term usefulness
- Has a small budget
- Makes use of authoring tools (i.e. PowerPoint)
- Is developed with internal staffing (1-3 professionals)
- Is developed by subject matter experts by template tools

According to Bersin (2005), we consider the Use of Rapid E-Learning and a possible delivery method for the instruction in the following situations.

- To Generate Awareness:
  - Read and Listen
- To Recall Information:
  - Read, listen, discuss, and answer multiple-choice questions
- To Apply Knowledge to Specific Situations:
  - Read, listen, discuss, case study or simulation-based practice
- To Master the Knowledge and Become an Expert:
  - Strategies from applying knowledge and practical experiences and testing

Rapid E-Learning is not always the instruction design model to answer our training needs. It is always important to assess the needs of our organization and then design the instructions to meet those needs; this includes the method of developing the instruction.

### 3.12.2.1 Rapid E-Learning and the Models for Delivery

Rapid E-Learning asks us to contemplate two models of delivery for training that may be used: self-paced (asynchronous) or live training (synchronous). Before choosing the right model of delivery for our objectives, it is very important to understand the needs of our organization as well as the needs of our learners.

According to De Vries & Bersin(2004) Self-Paced (asynchronous) and Live (synchronous) have the following characteristics:

Self-Paced (asynchronous) E-Learning delivery model

- ✓ Difficult for learners to schedule (set a specific time) a session.
- ✓ Learners work via the home or non-standard hours.
- ✓ Subject matter expert is not able to teach at a specific time.
- ✓ Internet connectivity and speeds are issues.
- ✓ Learner's prerequisite skills vary.

Live (synchronous) E-Learning delivery model

- ✓ Traditional-like classroom structure is appealing to learners.
- ✓ Perception of subject matter expert/instructor is quite high.
- ✓ Synthesis of information is viable with learner discussions.
- ✓ Learners may be new to E-Learning.

Rapid E-Learning, as an instructional design model, borrows from the proven and systematic approach of instructional design and the ADDIE model. It allows organizations with certain needs to develop E-Learning at a much faster pace while minimizing the investment of capital to accomplish the tasks.

Due to the features constituted by those different e-learning design models the researcher is in behave of using some of the features of the user-centered and rapid E-Learning design models in combination to design the E-learning model for the implementation E-Learning in Ethiopian TVETs.

By utilizing E-Learning effectively, TVET colleges' ability to transfer knowledge and expertise to society can be enhanced. Also it is possible to predict the future of learning in order to meet the needs of the changing world through continuous e-Learning activities. Before designing the models for integration of E-Learning, problem that may happen with E-Learning environment have to be understood.

Integration of high technology with multimedia tools must be emphasized because E-Learning relies heavily on technologies. Also, collaboration with government, private organizations and other universities is important to overcome the high cost involved in developing E-Learning. It is also needed to provide experienced personnel with technical skill needed to implement E-Learning. So, we could say that E-Learning is a good solution to conventional learning as it is able to solve most of the problems that exist in conventional learning. However, E-Learning has its own disadvantages and problems that need to be solved before it can be implemented successfully. So there are still many aspects that must be considered before E-Learning can replace conventional learning.

## CHAPTER FOUR

### 4. Findings and Discussion

#### 4.1 Findings

This chapter deals with the presentation, interpretation and analysis of data gathered from the TVET colleges' teachers and administrators. The data obtained through questionnaires, interviews and document analysis were analyzed and interpreted in view of the basic questions raised in chapter one. Out of 250 questionnaires distributed to teachers 213 were filled and returned and out of 10 questionnaires distributed to administrators 10 were filled and returned. Out of the returned 213 questionnaires filled by the teachers 204 were used for the analysis. Above 75% of the questionnaire distributed to the teachers were filled and returned. Based on the responses obtained from the respondents, the analysis and interpretation of the data was presented.

##### 4.1.1 General Characteristics of Respondents

The Business teachers 64% and Industrial Technology teachers (56%) constituted the major parts of the respondents. Most of the teachers (76%) were degree holders. Out of the ten TVET administrators who filled the ten questionnaires distributed, five have degree and the other have Masters degree.

73.1% of the teachers have teaching experience of five years and above. All the TVET administrators have a teaching experience of more than fifteen years.

The tables below indicate the numbers of questionnaires distributed and returned, the number of departments involved, the educational qualification of the respondents and their teaching experience.

Table 4.1 the numbers of questionnaires distributed and returned

	TVET Colleges	Teachers			Administrators		
		Distributed	Returned	Percentile	Distributed	Returned	Percentile
1.	Entoto	50	46 (92%)	22.5%	2	2	100%
2.	Misrak	50	39 (78%)	19.1%	2	2	100%
3.	NefasSilk	50	42 (84%)	20.6%	2	2	100%
4.	Tegbareid	50	39 (78%)	19.1%	2	2	100%
5.	Wingate	50	38 (76%)	18.6%	2	2	100%
Total		250	204 (82%)	100%	10	10	100%

Table 4.2 Departments responded to the questionnaires

Departments	Frequency	Percent
Business	64	31.4%
Construction	22	10.8%
Industrial	56	27.5%
Home Science	21	10.3%
Common Course	41	20.1%
Total	204	100%

Table 4.3 Educational qualifications of respondents

Educational Qualification	Teachers		Administrators	
	Frequency	Percent	Frequency	Percent
Diploma	29	14.2%	0	0%
Degree	156	76.5%	5	50%
Masters and above	19	9.3%	5	50%
Total	204	100%	10	100%

#### **4.1.8.2 Teacher-level evaluation**

Regarding the computer related skill, integration and view of computers in teaching most of the teachers ICT know-how is low. Most of the teachers have some experience in word processing and e-mail. (See Table 4.6 and Table 4.7) Their skill and integration in those applications is far better than other applications. Their view towards the integration of computers and its benefits in TVET education more than 80% believes the view that computers can improve quality of education.

#### **4.1.9 Summary of the E-Learning Adoption**

According to the study and comments gathered from the TVET teachers and administrators the experience of TVET teachers and administrators on the use of computers in education is generally limited to some applications. The skill of respondents on computer usage and their attitude towards E-Learning on computer assisted teaching was discussed in section 4.3, 4.4 and 4.4. This limited experience has contributed to a limited practice on the integration of E-Learning in public TVET colleges. Based on the response obtained from the respondents, some of the problems that might have contributed for this low technology adoption include the following:

- ✓ The TVET curricula do not motivate the utilization of technology in the teaching and learning process. Information Technology is given as a common course to trainees but there are no periodic Information Technology courses training for teachers in their related field of teaching.
- ✓ Lack of awareness on the use of technology in education.
- ✓ Budget constraints

Providing solutions to the above problems have its own impact on increasing the level of adoption of ICT and applicability of E-Learning in public TVET colleges.

## 4.2 Discussion

This study, examined the infrastructure, usage of computers and views of the TVET teachers on the integration of ICT in the teaching Learning environment. The era seeks a digitally literate skilled manpower. The need of this type of manpower leads to the successful integration of technology in the teaching and learning process. Based on the findings of the study, the existing ICT know-how of most TVET college teachers, the integration of computers in teaching and the computer related attitude of teachers are generally low. The study identified the following challenges that are facing the existing TVET education system and tries to address the solutions in the following way.

### **(i). The College teachers' knowledge and skill in the use of Computers in teaching-learning environment.**

The study shows that although the colleges indicated have computers, there is a large variation in the use of computers from teachers to teachers. Here the challenge arises due to the teachers' educational background and the attitudes towards the use of ICT. To narrow the digital literacy gap of the teachers, special program and initiatives will need to be targeted at improving the computer knowledge and skill of the teachers in addition to the penetration of computers in every training area of the TVET. In the observed colleges the computers are available in the Information technology training departments and administration offices for office automation purposes mainly used by office secretaries.

### **(ii). Lack of separate teachers computer laboratory in TVET Colleges**

The Study shows in all the TVET colleges that were studied there was no separate computer laboratory for teachers. But there are initiatives in the TVET colleges to make available the digital technology to the teachers. A key challenge therefore relate to improving the teacher-computer ratio to a level that will ensure an effective use of computers to support the teaching, learning as well as research activities in the TVET colleges. Special initiatives will therefore need to be put in place targeting increasing the level of computer penetration and deployment within those colleges.

The implications of this finding can be translated into a key challenge, namely the need to put in place initiatives targeted at the promotion of the implementation of E-Learning systems and other types of virtual learning systems to supplement campus-based education.

**(vii). Lack of awareness of the potential of ICT in the teaching-learning process by the TVET administrators**

According to the interview conducted with the college administrators the majority of the colleges administrators have no clear picture about the potentials of E-Learning in the teaching-learning process. A key challenge therefore relates to the need to create awareness and periodical training of ICT to the college community.

The researcher believes that addressing the above challenges will direct to the accomplishment of the objective, which is investigating the existing facilities, work culture and characteristics of public TVET colleges for the successful implementation of E-Learning For Ethiopian Public TVET colleges' teachers.

Based on the challenges and solutions addressed above the researcher tried to design the E-Learning framework discussed in the next section so as to maximize the use of digital technology in teaching-learning activity.

## CHAPTER FIVE

### 5. Design of E-Learning Framework

#### 5.1 General Design

Effort was made to see different E-Learning frameworks designed by different scholars searching the AAU Bibliographic library and different websites. But the E-Learning frameworks that go inline with the purpose of the study specially related to the TVET training were unavailable. The E-Learning framework designed by Badrul Khan (<http://BooksToRead.com/framework>) had played a role for giving insight in the design process of the E-Learning framework for Ethiopian TVET colleges.

The E-Learning Framework designed by a scholar Badrul Khan constitutes eight aspects. These are: Institutional, Pedagogical, Technological, Design, Evaluation, Management, Resource Support and Ethical aspects.

The designer, strongly believed that the e-Learning Framework can provide guidance in the design, development, evaluation and implementation of: Online Courses, E-Learning Environments, Distance Education Programs, Virtual Universities and Learning Management Systems(<http://BooksToRead.com/khan>)

The researcher share the same belief as that of the designer. The section below attempts to see some of the frameworks developed in different countries to facilitate the use of ICT in teaching learning process

#### 5.2 Frameworks developed in the use of ICT in Teaching

The potential use of ICT to support students and teachers has challenged the structures, policies and practices of both the TVET and the training itself.

Frameworks in the use of ICT in teaching were developed in different countries. Some of them are presented below.

### 5.2.1. Framework developed by Milken Exchange on Educational Technology

Milken Exchange was founded by the Milken brothers and focuses mainly on education, medical research and Jewish culture. The Milken Exchange on Educational Technology (<http://www.milkenexchange.org>) conducts research, presents news and reports into the use of ICT to support learning in American schools. In 1999, the Milken Exchange on Educational Technology published a report titled transforming learning through technology. The intention was to create a framework to support educators in charting their course toward the effective use of technology in learning and show evidence of progress along that path (Coughlin & Lemke, 1999). The framework is intended to provide indicators for policymakers to assess the status of schools in terms of their use of ICT to support learning. The framework is presented as a set of seven interdependent dimensions: Learners, Learning Environments, Professional Competency, System Capacity, Community Connections, Technology Capacity, and Accountability. It provides a continuum of progress for each dimension, based on the stages of instructional evolution using three levels: Entry, Adaptation, and Transformation. For each dimension a number of key areas are identified and also described in terms of these three levels.

### 5.2.2. Framework for Implementation of Learning Technologies in Western Australian Government Schools

In 1998 the Education Department of Western Australian released the "Framework for the implementation of Learning Technologies in Western Australian Government Schools" to support schools in the development of a learning technologies plan that was required to receive a government infrastructure grant. The framework has six dimensions: Planning, Integration and Use, Staff Capabilities, Electronic Educational Resources, Hardware, and Connectivity. This framework provides a useful starting point for developing a

Schools ICT Capacity framework with the need to add a technical support component.

### 5.2.3. Framework developed for the North Central Regional Educational Laboratory (NCREL)

This framework developed for the North Central Regional Educational Laboratory (NCREL) of the USA attempts to provide a comprehensive analysis of “critical factors in the educational system that strongly influence the effectiveness of learning technology” (North Central Regional Educational Laboratory, 2002). The framework identifies six “essential conditions for effective technology use”,

- (1) Forward-Thinking, Shared Vision
- (2) Educator Proficiency with Effective Teaching and Learning Practices
- (3) Digital Age Equity
- (4) Effective Teaching and Learning Practice
- (5) Robust Access Anywhere, Anytime
- (6) Systems and Leadership

Each condition has between five and eight components. Each condition has one or more associated questions that could be used to monitor and analyse the impact of ICT on students, teachers, schools, curriculum and educational systems although much of this would need to be inferred. In essence the framework is intended to be used as a checklist for schools to evaluate their use of ICT and support for such use. While the framework aims to be used at a school level, the conditions and components have a mixture of issues pertaining to teachers, administrators, school communities, and school systems.

Taking into consideration the above facts and understanding of the basic elements in the design of framework to use ICT in Teaching, it is attempted to design the E-Learning framework.

### 5.3 A Framework for the implementation of E-Learning

In this part the researcher tries to provide a framework to implement E-learning at TVET college level. The framework is based on the study concerned with the impacts of ICT on TVET teaching, TVET curriculum, teaching environments, teachers and TVET education systems.

The framework suggests a number of dimensions to consider when evaluating the use of ICT to improve the teachers teaching-learning activity. Here we see the teachers both as a learner of ICT (since the study revealed that the ICT know-how of most of the teachers is low) and the user of ICT for teaching activities.

This study has identified significant challenges on the use of ICT for teaching courses by the teachers, teaching environments, teachers' computers know-how, The TVET college provision of ICT capacity, TVET curriculum and ICT policy and practice. These are presented here as five dimensions with their possible components given in brackets

- (i). **Teachers use of ICT in teaching** (Interest, Motivation, Integration & Use, Capabilities & Outlook)
- (ii). **Teaching Environments** (Computer-based and Networked Environment)
- (iii). **Teacher Professional ICT know-how** (Familiarity, Skill and Understanding)
- (iv). **TVET ICT Capacity** (Hardware, Connectivity, Software, Technical Support, Digital Resource Materials)
- (v). **TVET Administrative Environment** (Leadership & Planning, Curriculum Organization, Curriculum Support)

The relationships of these dimensions to each other are represented in Figure 5.2. Each dimension may be represented by an outcome as described below

**Teachers use of ICT in teaching:** - Through the use of ICT teachers develop an appropriate level of capability, become more engaged with their own learning,

and achieve teaching outcomes across the curriculum in delivering the course content.

**Teaching Environments:** - ICT is used to support pedagogical practices that provide digital technological environments that help the teaching activities.

**Teacher Professional ICT Know-how:** - The teacher exploits the characteristics of ICT to support the teaching of students by, effectively integrating computers and digital technologies.

**TVET ICT Capacity:** - The TVET provides ICT capacity to ensure that all teachers and students have immediate access to hardware and software that are required to support the course designed in accordance with the TVET curriculum.

**TVET Administrative Environment:** - The TVET Administrative environment is supportive of teachers and students use of ICT built on a digital technology based vision that prepares teachers to teach, work and live successfully in a knowledge-based, global society.

## 5.4 Out come based Framework of E-Learning implementation

The effective implementation of the E-Learning strategies will lead to the following out come based E-Learning framework depicted by the figure below.

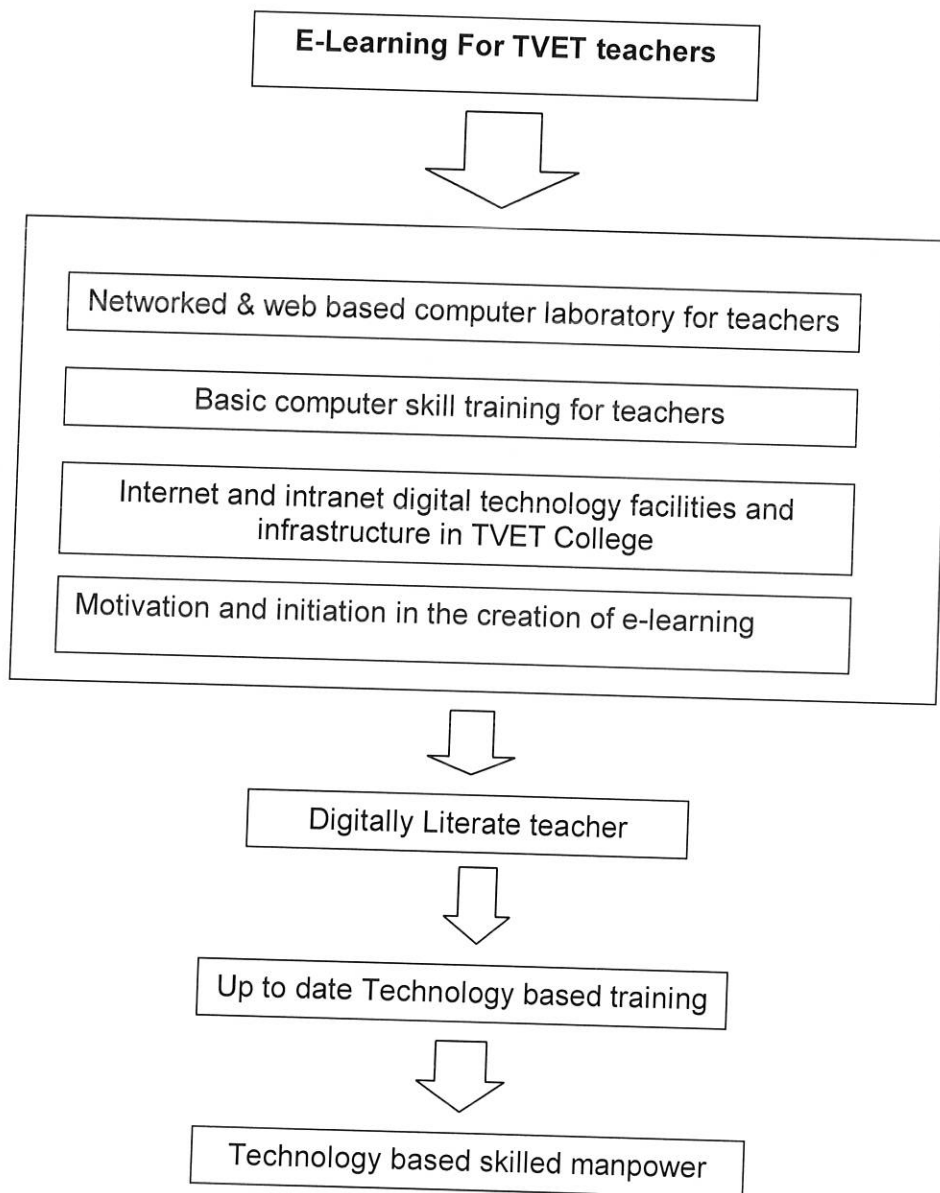


Figure 5.2 Out come based Framework of E-Learning implementation

- ❖ Similar to the deployment of ICT facilities, the existing LAN and Internet connectivity in TVET colleges is also low. Based on the findings of the study, Internet connectivity in these schools is also poorly exercised only 15.2% of the teachers often use the Internet as the main source of materials.
- ❖ The culture of the TVET teachers' in utilizing the existing computers, connectivity, and digital contents in the actual teaching and learning of subject areas, is not yet developed.
- ❖ Most teachers in the studied TVET colleges are skilled in word processing. However, teachers' usage of computers for the teaching and learning process is low.
- ❖ The attitude of the TVET teachers towards use of computers in education is encouraging. However, the potential benefits of computers in the teaching and learning process are not yet fully recognized.

### 5.6.2 Recommendations

The following recommendations are forwarded based on the outputs of this research work.

- To bring about the desired success in TVET, up-grading teachers' ICT know-how in line with the quick changing technology is undeniable. Teachers-development program through using E-learning program is an easy way to upgrade the qualification and the competencies of teachers. Therefore, the concerned bodies and TVET colleges have to play their own role for the success of the program.
- The colleges have to provide a separate networked Computer laboratory for the teachers.
- Effort should be exerted to create ICT awareness and TVET teachers should be trained on the basics of ICT and technical skills on networking and troubleshooting.

This work focused on the assessment of existing practices to provide a general view of the adoption of E-Learning technology in teaching and learning process in Ethiopian public TVETs. However, the result of this work reveals that for the successful implementation of E-Learning program, it needs a detailed study and reevaluation of all subjects across the curricula. Therefore, the way of integration of computers based on this approach remains potential research area.

The subjects offered in the TVET curricula vary; some need courseware that can be organized from on the shelf learning objects while some need local development on the context of TVET training. Moreover, localization to the Ethiopian context is also required to fit the local languages. Therefore, this is a potential research area where analysis of the existing subjects and development of prototypes is required.

Based on the feedback, further research on design of the framework needs to be undertaken for proper implementation.

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## Appendices

### Appendix A: Research Questionnaire for TVET Teachers.

**ADDIS ABABA UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
FACULTY OF INFORMATICS  
DEPARTMENT OF INFORMATION SCIENCE**

#### Questionnaire: To be completed by TVET teachers

Dear Respondent;

This questionnaire is prepared to gather general information concerning the TVET teachers' knowledge, skill and usage of ICT in the teaching-learning environment. The genuine response you provide is highly valuable and determines the effectiveness of this investigation. Please, be assured that I will treat your responses confidentially and it will be used only for the purpose of the research.

Thank you in advance for your cooperation.

#### **PART A: Personal details (please circle your choice number)**

1. Name of the TVET \_\_\_\_\_
2. Your Department \_\_\_\_\_
3. Your educational qualification:
  1. Certificate
  2. Diploma
  3. Degree
  4. Master and above
4. Teaching experience:
  1. Less than 5 years
  2. 5 to 10 years
  3. 11 to 15 years
  4. More than 15 years
5. What level are you currently teaching
  1. 10+1
  2. 10+2
  3. 10+3
6. What courses are you currently teaching?
  1. Vocational courses
  2. Technical courses
  3. IT
  4. Common Course

7. How do you get access to computers? (Select more than one if necessary.)

1. No access 2. At home 3. At school 4. At Tele-centers

5. other (please specify)\_\_\_\_\_

8. What is Your computer-related qualification?

1. Degree 2. Diploma 3. Certificate 4. none

5. Other (please specify)\_\_\_\_\_

**PART B: Computer related Skills (please circle one of the numbers).**

**Description:**

**High (1) = I have good experience on it.**

**Medium (2) = I have some experience on it.**

**Low (3) = I have seen how people use it.**

**None (4) = I have no experience on it or I don't know the item.**

	High	Medium	Low	None
1. Using word-processing applications				
like Microsoft Word	1	2	3	4
2. Using spreadsheet applications				
like Microsoft Excel	1	2	3	4
3. Using database systems				
like Microsoft Access	1	2	3	4
4. Using email	1	2	3	4
5. Using search engines	1	2	3	4
6. Using online learning materials	1	2	3	4
7. Using educational CD-ROMs				
like Encarta encyclopedia	1	2	3	4

8. Using Learning Management Systems	1	2	3	4
9. Web page development	1	2	3	4
10. Publishing a web page	1	2	3	4

**PART C: Usage of computers in Teaching (please circle one of the numbers)**

**Description:** 1= Often                      2= Sometimes                      3= Never

1. Providing students with PowerPoint slides	1	2	3
2. Using Word Processing applications	1	2	3
3. Using spreadsheet applications	1	2	3
4. Using educational CD-ROMs	1	2	3
5. Using email for academic matters	1	2	3
6. Using online learning materials	1	2	3
7. Using Local Area Network for Collaborative work	1	2	3
8. Using Computer based Simulation and/or games	1	2	3
9. Using Computer based Tutoring	1	2	3
10. Using courseware authoring tools	1	2	3
11. Using Learning Management Systems	1	2	3
12. Using the Internet as the main source of materials	1	2	3

**PART D. Teachers' Views of Integrating Computers in Teaching (please circle one of the numbers)**

**Description:**

1= strongly Agree 2= Agree to some extent 3=strongly Disagree 4=Undecided.

1. Computers can improve quality of education.	1	2	3	4
2. Computers can provide self-paced learning.	1	2	3	4
3. Internet can provide collaborative learning.	1	2	3	4
4. Computers can provide equal opportunity to every learner.	1	2	3	4
5. Online learning resources help for self-empowerment.	1	2	3	4
6. Computers can help teachers to teach better.	1	2	3	4
7. Computer-based tutorials can improve learning.	1	2	3	4
8. Computer-based simulations can improve learning.	1	2	3	4
9. ICT education should be incorporated in TVET education	1	2	3	4
10. Computers should Assist TVET education.	1	2	3	4
11. Computers should be introduced in all TVET courses.	1	2	3	4
12. Computers should Assist Secondary education.	1	2	3	4

PART E. Please use this part if you have any comments.

Please feel free to give any other comments and suggestions.

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Thank you again

## **Appendix B: Research Questionnaire for TVET Administrators.**

**ADDIS ABABA UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
FACULTY OF INFORMATICS  
DEPARTMENT OF INFORMATION SCIENCE**

### **Questionnaire: To be completed by TVET Administrators**

Dear Respondent;

This questionnaire is prepared to gather general information concerning the TVET teachers' knowledge, skill and usage of ICT in the teaching-learning environment. The genuine response you provide is highly valuable and determines the effectiveness of this investigation. Please, be assured that I will treat your responses confidentially and it will be used only for the purpose of the research.

Thank you in advance for your cooperation.

1. Name of the TVET college \_\_\_\_\_

2. Your educational qualification:

1. Certificate   2. Diploma   3. Degree   4. Masters and above

3. Total years of service:

1. Less than 5 years                      2. 5 to 10 years  
3. 11 to 15 years                            4. More than 15 years

4. Do you have any experience/plan on the integration of computers into the TVET curriculum?

- Application software integrated in a course.

E.g. Spreadsheet Applications in accounting, etc.

-Special software integrated in a course.

E.g. Simulator in Auto Mechanics

If yes, in which courses? In what way?

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5. What is the current teacher to student average ratio in each of the TVET courses? \_\_\_\_\_

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6. Do you believe that the digital technology can be applicable in your TVET? Why? How? \_\_\_\_\_

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7. Do you think integrating Learning Management System (e-Learning) in TVET curriculum is feasible? How?

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8. How do you rate the current quality of education at TVET colleges? Why?

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9. How do you evaluate the teachers qualification in relation to their course management?

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10. What kind of attitude does the management have towards the enhancement of classroom teaching with e-learning forms of education?

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11. Is there a separate computer Laboratory for teachers?

1. Yes                      2. No

If your answer for question 11 is yes. Please answer the following

12. What is teacher to computer ratio?

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13. Does the teachers' Computer laboratory have Internet Connectivity?

1. Yes                      2. No

14. How many hours per day does the computer laboratory give service for the teachers? \_\_\_\_\_

15. Is there an Information communication Technology Club in Your TVET?

1. Yes                      2. No

16. Do TVET teachers participate in the club?

1. Yes                      2. No

17. If your answer is No for question 16, why?

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18. Does your TVET college give computer related training to the teachers every years? If yes, for how long time?

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19. Is there Local Area Network in your compound that links one department with the other?

1. Yes                      2. No

20. Does your TVET College have a computer system Administrator?

1. Yes                      2. No

Thank you again

## **Appendix C: Interview Questions for the survey of E-Learning Initiatives**

### **Selected Organization for the survey of e-learning initiatives**

1. AAU Information Science Department
2. AAU Technology Faculty
3. AAU ICT Development Office
4. Ethiopian Civil Service College
5. College of Telecommunication and Information Technology
6. Engineering Capacity Building Program Office

### **Interview Questions**

1. What E-Learning initiatives are there in your college/Faculty/Organization?
2. In what way you are implementing the E-Learning in the teaching-learning environment?
3. What are the benefits of E-Learning in this college/Faculty/Organization and which subject and branches benefit from it?
4. How does E-Learning help to bridge theory and practice in your college/Faculty/ Organization? What are the strengths, weakness, opportunities and threats are observed in relation to the use of E-Learning in your college/Faculty/ Organization?
5. If E-Learning is implemented in your college/Faculty/Organization, what are the lessons learned?

## Appendix D: Personal Details of respondents

### Number of respondents in each TVET

Name of TVET	Frequency	Percent	Valid Percent	Cumulative Percent
Entoto	46	22.5	22.5	22.5
Misrak	39	19.1	19.1	41.7
NefasSilk	42	20.6	20.6	62.3
Tegbarid	39	19.1	19.1	81.4
Wingate	38	18.6	18.6	100.0
Total	204	100.0	100.0	

### Department

	Frequency	Percent	Valid Percent	Cumulative Percent
Business	64	31.4	31.4	31.4
Construction	22	10.8	10.8	42.2
Industrial	56	27.5	27.5	69.6
HomeScience	21	10.3	10.3	79.9
Common Course	41	20.1	20.1	100.0
Total	204	100.0	100.0	

### Educational Qualification

	Frequency	Percent	Valid Percent	Cumulative Percent
Diploma	29	14.2	14.2	14.2
Degree	156	76.5	76.5	90.7
Master and above	19	9.3	9.3	100.0
Total	204	100.0	100.0	

### Courses currently teaching

	Frequency	Percent	Valid Percent	Cumulative Percent
Vocational Courses	105	51.5	51.5	51.5
Technical courses	72	35.3	35.3	86.8
Common Courses	27	13.2	13.2	100.0
Total	204	100.0	100.0	

## Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university and that all sources used for the thesis have been duly acknowledged.

Name : Asfaw Seyoum

Signature: 

Date: 27/02/02 E.C

This thesis has been submitted for examination with my approval as a University advisor.

Name : Dr. Rahel Bekele

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

July 2009