THE IMPLEMENTATION OF

INFORMATION TECHNOLOGY CURRICULUM

FOR OUTCOME BASED TRAINING SYSTEM

IN BURAYU TVET INSTITUTE

A THESIS PRESENTED TO

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BY

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Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY

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This is to certify that the thesis prepared by Ali Mume Ibrahim, entitled: the implementation of information technology curriculum for outcome based training system in Burayu TVET Institute and submitted for partial fulfillment of the requirements for the degree of Master of Arts (in Technical and Vocational educational Management) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

The main purpose of this study was to explore the implementation of information technology curriculum for OBTVET status in Burayu TVET Institute and to suggest necessary recommendations. To investigate the observed constraints descriptive design was selected, to this end, all (6) teaching staff and 52 level II and III randomly selected students of the institute were used to fill the questionnaires. In addition to the questionnaires, interviews, FGD (focused group discussion), document review and observation had been used. Accordingly, the data obtained from different sources were analyzed using both quantitative and qualitative methods. The results obtained revealed that availability of teaching staffs in terms of educational qualification were seen being sufficient, but their experience in teaching IT in the institute is insufficient. For both levels (II and III) the turnover of trainers is being a chronic problem that cannot be overcomed by the institute itself. There is no guidance and counseling service in the institute, and hence trainees were not in a position to get help in relation to some social, economic and academic problems. Allocated financial and material resources were insufficient. Besides these constraints, the implementation of information technology curriculum had been affected by mismatch of teaching-learning process with OBTVET requirements. This was resulted from limited awareness of the teaching staff. Oromiya TVET agency should give due attention to the teaching staff and facilitation of teaching-learning resources as well as provision of short term training to support OBTVET practices. Moreover, the institute needs to work in collaboration with Burayu city administrators to alleviate shortage of training and demonstration equipment's and to enhance cooperative training.

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ABBREVIATIONS AND ACRONYMS

CBCD: Competency-Based Curriculum Development

CD-ROM: Compact disk Rom

COC: Certificate of competency

EOS: Ethiopian Occupational Standard

EQF: European Qualifications Framework

ETQF: Ethiopian TVET Qualifications Framework

FGD: Focus Group Discussions

ICT: Information communication technology

IT:Information technology

ITOS: Information technology occupational standards

LAN: Local area network

MOE: Ministry of Education

OBE: Outcomes based education

OBET: Outcome-based Education and Training

OS: Occupational Standard

RAM: Random Access Memory

TVET: Technical and Vocational Education and Training

TTLM: Trainees Teaching and Learning Module.

VET: Vocational Education and Training

DEFINITION OF TERMS

Curriculum: - is a plan or program of all experiences which the learner encounters under the direction of a school, it is the totality of the experiences of children for which schools are responsible.

Implementation:-The act of accomplishing some aim or executing some order.

ROM – Read Only Memory _ Read Only Memory (ROM) as the name suggests is a special type of memory chip that holds software that can be read but not written to.

Operating systems: - The operating system is a special type of program that loads automatically when you start your computer.

Applications software:-An application program is the type of program that you use once the operating system has been loaded.

LAN: - (Local Area Network) is a system whereby individual PCs are connected together within a company or organization

WAN: - (Wide Area Network) allows to connect to other computers over a wider area (i.e. the whole world).

Computer viruses: - small programs that hide themselves on disks (both diskettes and hard disk).

CHAPTER ONE

INTRODUCTION

2. Back ground of the study

Curriculum is viewed as a composite whole including the learner, the teacher, teaching and learning methodologies, anticipated and unanticipated experiences, outputs and outcomes possible within a learning institution.Curriculum in general, is a plan for learning and it is regarded as central to the education process. Curriculum may be developed and changed in specific circumstances and influenced by various factors. The level of teacher training and available resources are among the determinant factors of curriculum development. Studies show that educational processes were traditionally regulated through inputs which means via the regulation of the contexts of societal actions. The curricula that define subjectrelated knowledge to be transmitted are classic instruments of the input regulation of education and training. Such system is content oriented and graduates are not prepared for the workforce. Lack of emphasis on soft skills needed in jobs is also the deficiencies of curriculum implementation in traditional education. According to Tyler (1950), cited Maphalala. (2006), educational purpose including objective, content, organization and evaluation are key issues in the process of curriculum development and plan instructions. Especially, identifying and formulating objectives for systematically planning educational experiences is an important element to identify both what the learner must be able to do after instruction and the content to which the learner's action applies. This sounds very much like stating an educational outcome.

One of the objectives of education in Ethiopia is to satisfy the country's need for skilled work force by providing training in various skills at different levels. Hence, according to the TVET strategy, (2002 G.C) the government has given special attention for information technology. More of the national strategy on TVET attempts to give quality education in technical and vocational training being supported by IT. The traditional method of teaching can be changed to the modern techniques only if TVET institutes are supported with information technology.Thestrategy further insists on regional states to bring change in economic development. First they have better create awareness on the use of information technology.

Remote areas can be facilitated with the teaching learning process, by the use of CD-ROM and local area network (LAN). The mentioned plan of Ethiopia above witnesses that our development relies more on new technology acquired man power by IT. The lasteight years of experience on implementing IT curriculum can teach everyone what improvement should be made in the future. The IT class rooms equipped with modern teaching material, electricity and computer net work cables need to be arranged in standard to avoid any accident in the room or the laboratory. To achieve the goal of the national plan of Ethiopia, quality education in TVET institute can contribute its part.ICT is the term commonly used to cover the range of computer and the telecommunication technologies involved in the transfer and processing of information (Bessant, 2007), to this scholar,AccordingIT (Bessant, 2007) was more on the application of the computer in distance communication and processing of data. IT is a subject taught at all levels from high school to university concerned with all aspects of programming & operating computers or using data and system generated by the use of computers for business or technical developments. Expansion of computer, internets, e-mail, mobile phones and fax machines are some of examples. Without using those technologies it is unimaginable to be the part of the advanced world.

Scholars like Schiller (1996) believed that globalization of the world are a result of electronic highway. The rapid development of satellitecommunication is vital to the rest of the world to keep up with united state.To work with confidence in globalized world the abovestatementasserts one has to be a man of information.

The proper instruments of information technology curriculum are expected to keep up the country with other world at accessible information. The development of computer technology has facilitated the progress of information processing and communication. Computer through network has influenced human civilization in business, culture, education, entertainment, communication, research and other developmental activities. It is with this understanding that the Ministry of education MOE (2002G.C) incorporated IT to be taught in TVET institute as main course and common course. The national technical and vocational education and training (TEVT) strategy final drafts (2002 G.C) has given special attention for IT curriculum for successful implementation in all areas of course given. This has made it one of new subjects in TVET curriculum, to prepare trainees for the world of work with computer skill. Computer skill training consists of more of practice on developing programs to solve social problem.

IT curriculum implementation to MoE of Ethiopia (2002 G.C) is new experience. The need for IT shop organization, having qualified teachers and personnel is not as such easy. The teaching methods, utilization of computer laboratory resource, need to be studied and learn from others' experience.Production of skilled and productive work force is one of the prerequisites for any socio-economic development. In this regard technical and vocational training programs play an important role by producing skilled labor that can either be employed in different organizations or create his/her own job. As the economy grows, education or training should be shaped and organized in such a way that it satisfies the development needs. Whatever natural endowment countries do own, there will not be meaningful development unless complemented with reasonable manpower production and utilization. Today the disparity between developing and developed countries can primarily be explained by the state of proper human resources development and utilization.

The basic objective of vocational and technical training is to supply qualified manpower at various levels ranging from lower to middle skill levels. In this regard, a system that allows proper organization and coordinated deployment of qualified manpower need to be carefully designed and implemented. Even if various efforts have been underway to provide vocational and technical training in some institutions, the issue of coordinated training program in terms of quality and coverage has not been tackled. As a result, the existing training system which was not based on the economic development trend of the country could not generate a work force initiated for creativity and capable of supporting the country's economic development.

Modern education was introduced to Ethiopia in early 20th century prior to that period. Traditional education was mainly provided by religious institutions in Ethiopia. As the world of work is expanding there was a need for skilled human resources and the old strategy of education could not satisfy those demands in a country. As a result of TVET began to receive recognition in the form of transferring skills from parents to children then in the form of on the job training. The concept was also developed to currently known methods of training known as apprenticeship (Roberts, 1965).In Ethiopia before and after the invasion of the Italian,

the Ethiopian government paid some attention for the establishment of vocational education and training.

2 .Organization of the study.

The study is organized in to five chapters. The first chapter includes the introduction, statement of the problem, objective of the study, signification of the study, delimitation of the study, organization of the study and the second chapter include that literature review, the third chapter have the methodology and chapter four contains data presentation and analysis chapter five included conclusion and recommendation of the study.

3. Statement of the problem

Starting from 2009.G.C trainees of Burayu TVET institute are assigned to my school particularly to my department (IT) for co-operative training, and therefore I have closely observed their skill and performance. During my observation they have told me a number of constraints like inability to perform office applications during co-operative training, the decrement of COC passers in different levels, the frequent turnover of teachers (average of two teachers every year) the alarming condition of drop outs every year (38.11%),the presence of outdated IT teaching materials, less demand of the graduates, less amount of current students in the department ,etc. are some of the current problems of the institute .

To check the above conditions I closely monitored and witnessed to their sayings and this coined me to conduct this research. Researching the problems of IT curriculum implementation will indicate the problems and come up to relevant recomendation, since curriculum provides guidance onduration of training, scope and sequence of learning, training resources, delivery method,and recognition of prior learning and Institutional/centre assessment.

Because of administrative and awareness level of curriculum implementers in Burayu TVET institute, the curriculum designed for IT is not properly implemented to attain the outcome based training (OBT), and hence the graduates of the institute are not fully equipped with the necessary skills and knowledge of IT to satisfy the current demand of the market.:

The aim of this research is to study the status of Burayu TVET institute, in relation to how the IT curriculum is successfully being implemented to meet the intended objectives (OBTVET).

The number of drop outs from the department increases from year to year, the number of trainees those who pass the COC exam at the end of their level was less than 2%.

This alarming condition of the department needs to be investigated to overcome the problems.

4. General objective of the study

The general objective of this study was to investigate the constraints of IT curriculum implementation and to come up with constructive recommendations to attain outcome based training (OBT). Implementation of the IT curriculum in TEVT institutes would help in preparing middle level computer skilled work force that can bring change in the economy. It was this intention that this study tried to assess what the existing problems around the implementation of IT curriculum in Burayu TVET institute.

4.1. Specific objectives of the study

The following are specific objectives of the study:-

1. Explore the process of teaching and asses the learning facilitiesthataffect the teaching learning process for delivering necessary skills and knowledge's to the learners based on the current demand of the market.
2. To identify the curriculum process in the institute is supported by enough budgets or not.
3. To examine the necessary supports provided for utilizing to increase the quality of teaching.
4. To find out computer and trainee safety mechanisms in lab for proper handling of IT equipment's in the lab.
5. Investigate teachers' qualification and experience (minimum of BSc in computer related degree) to the minimum requirement of IT curriculum implementation.
6. To come with constructive recommendations to attain outcome based training (OBT)

5. The main research questions

To assess the implementation of the curriculum, the research focused on the following basic questions.

1. DoesBurayu TVET institute hasavailable adequate amount of necessary equipment's to run ICT curriculum to the minimum standards of national TVET Agency?
2. DoesBurayu TVET institute have sufficient IT qualified (BSc degree and above) and experienced teachers to implement the curriculum effectively for outcome based training?
3. Is the current turnover of IT teachers affecting the implementation of the curriculum?
4. Does the institute properly allocate enough time (for practical class 70%) to efficiently implement the IT curriculum?
5. Do Burayu TVET institute administrators allocate sustainable annual budget for IT to replace frequently damaged equipment's and to buy additional materials for the curriculum?
6. What teaching methods do teachers in Burayu TVET institute use to manage the IT class and lab? Do they implement outcome based training system?

6. Significance of the study

The significance of this study is based on the principle to learn from the past, and to proceed forward in the future. The study beliefs to assess what strong experience are there to be learned and maintained and what short comings would be considered for the future in relation to IT curriculum implementation. Information technology is now becoming a global issue, which has come to be the need for each work force, especially in the developing countries, like Ethiopia. This study is believed to have the following significance:-

1. It may help concerned bodies (stake holders) such as Oromya TVET agency &MoE policy makers in valuing and improving the teaching learning process and technical support to the implementers.
2. To give due attention for teaching learning method of information technology (30% theoretical and 70% practical)

3. To create an opportunity for other departments to learn from the current failures of IT department.
4. It may also initiate researchers to conduct further research works in the area.
5. Increases the quality (outcome based skill) of IT graduates.
6. Improves the usage & handling of IT devices.

7. Scope of the study (boundary of the research)

Research limitations refer to the conditions that pose restrictions on the conclusion and application of a research endeavor (Best & Kahn, 2003). Thus, lack of financial resources has affected this research activities in taking more institutes to investigate more research problems .

Because of time and money constrains the study was limited toBurayu TVET institutedepartment of information technology. The study was delimited to IT because of the current status of the department(teachers turn over , dropout rate of students, out dated teaching materials, in appropriate teaching method of the teachers).As a result, it was exclusively limited to the investigation of the problems in Burayu TVET institute. For this reason, the research had taken the following reservations.

- It did not attempt to examine the training success or failure of each trainee during his/her stays in Burayu TVET institute.

- It did not attempt to examine the training achievements of trainees at the end of their apprenticeship-training program.

- It did not attempt to evaluate the qualities of previous trainings conducted through the apprenticeship training programs in each office.

CHAPTER TWO

REVIEW OF RELATED LITRATURE

2.1. Introduction

The literature review in both qualitative and quantitative research plays different roles. In quantitative research, it is done prior to the research activity to gain a general understanding of the existing knowledge of the topic under research. Besides, it helps to equate the results with the research results conducted by other researchers. Consequently, it becomes more detailed and longer (Creswell & Plano Clark, 2007; Johnson & Christensen, 2004).

The views of the researchers in the qualitative research (about the literature review), on the contrary, have resulted from the development of two schools of thought. One school of thought believes that the researcher should conduct a full coverage of the literature review (as in the case of ethnography) before collecting the data. On the other hand, the other school of thought thinks that it is not necessary to review the literature first due to the fact that new research questions, hypotheses and theory may emerge while collecting the data. The second school of thought goes on arguing that it is after we have collected the data that we should review the literature. However, this approach is not recommended by researchers in the field. This is due to the fact that the approach may not give chance to raise basic issue and make the necessary adjustment and take instant measures related to the research problem under investigation (Johnson & Christensen 2004). Actual data collection takes place Due to this reason; it is believed to stimulate theoretical foundation of concepts and relationships that may be brought to the situation under research. It also helps to pose questions in relation to the behavior that one wants to observe. Moreover, it provides information about the situation or the population that the researcher needs to research (Gelesne, 1999; Johnson & Christensen, 2004).

In addition, the literature review in the qualitative research is used to provide evidence for the purpose of the research and the research problems. It is, thus, brief and may not limit the type of information the research seeks from the participants. Due to this reason, it may even consider individual cases (Creswell & Plano Clark, 2007).

2.2.InternationalDevelopments in educational ICT curricula

National ICT policies have reached an established position in both developed and developing countries. A study funded by the Australian Department of Education, Science and Training revealed that most national ICT policies focus on the educational sector (Kearns & Grant, 2002). Education is put forward as the central actor to pursue and attain the objectives of the ICT policy; other sectors are expected to benefit indirectly from this approach. Educational ICT policies have been designed in a variety of ways, depending on the dominant rationales that drive curriculum development. As early as 15 years ago, Hawkridge (1990) discerned four different rationales that drive policies related to the integration of ICT and the use of computers in education:

- an economic rationale: the development of ICT skills is necessary to meet the need for a skilled work force, as learning is related to future jobs and careers;

- a social rationale: this builds on the belief that all pupils should know about and be familiar with computers in order to become responsible and well-informed citizens;

- an educational rationale: ICT is seen as a supportive tool to improve teaching and learning;

- a catalytic rationale: ICT is expected to accelerate educational innovations.

Current curriculum developments mainly reflect an economic and social rationale. National policies identify ICT literacy as a set of competencies needed to participate in society (OECD/CERI, 2001). The Europe 2002 objectives of the Lisbon Summit stipulate that all school-leavers must be digitally literate in order to be prepared for a knowledge-based economy (Commission of the European Communities, 2000).National documents such as the School Education Action plan for the Information Economy (EdNA School Advisory Group, 2001) and the National Educational Technology Plan (US Department of Education, 2004) take a similar approach. In the light of the socio-economic rationale, many countries have introduced ICT as a separate school subject in order to teach pupils a number of technical ICT skills (Plomp, Anderson, Law & Quale, 2003). National ICT curricula and frameworks, eg, the Qualification and Curriculum Authority/Department for Education and Employment (1999) and Alberta Learning (2000) stress the educational rationale. This approach builds on

the assumption that the use of ICT is beneficial for student learning. ICT literacy is according to this rationale a secondary effect of a content-related ICT use. The educational use of ICT should be embedded within subject-oriented competencies. Hawkridge (1990) also stresses the educational innovation potential of ICT use (catalytic rationale). ICT use helps to pursue

higher-order thinking and problem-solving skills. It is believed that learning to solve problems, developing research skills and studying problems of personal interest are the key to a successful education (Zuga, 1993).

Other benefits derived from ICT usage are that it fosters collaborative learning and flexible learning opportunities independent from time and place and that it offers opportunities arising from cross cultural use (van Braak, 2001). Though the distinction between of the four rationales discussed above is important, the OECD/CERI (2001) reports that there is a growing convergence between the economic, social and educational rationale. On the one hand, current policies convey the idea that ICT supports societal developments. On the other hand, policies state that ICT-based educational practices have to take a pedagogical position as a point of departure (Bryderup& Kowalski, 2002). A particular challenge for educational authorities resides in the need to address the economic, social, educational and catalytic rationales for the inclusion of ICT in education.

2.3. The History of Information and Communication Technology (ICT)

The history of ICT originates from humble beginnings, which include the abacus. The abacus is thought to have been originally invented 3000 years before the birth of Christ. Revisions to its use/design continued for many years e.g. 500 BC a bead and wire version is developed in Egypt. Early versions of the calculator were gradually replacing this primitive method of mathematics. In 1624 Wilhelm Schickard built the first four-function calculator-clock at the University of Heidelberg, thus heralding a new era.

Mechanical versions of the calculator followed in the years to come. Calculators as we know them couldn't have existed until 1780, when Benjamin Franklin discovered (through experimentation) electricity. The 1st general purpose computer was designed by Charles Babbage around the year of 1833. In 1855 George and EdvardScheutz built a practical model based on Babbage's original designs. The 1st electronic calculator (named the Z1) is built by

KonradZuse in 1931. In the year of 1940 at Bell Labs, the Complex Number Calculator is tested and then demonstrated. This is thought to have been the first digital (pulse wave rather than analogue wave run) computer. Quickly approaching the computers that we use today, 1971 was the year that the Intel Corporation released the 1st microprocessor (the Intel 4004.) Macian E.

Hoff was thought to have been the leader of the project. The PC as we know it today was created by IBM and released during 1981. Apple introduces its PC alternative, the Macintosh, during 1984. It features a GUI (Graphical User Interface) which gave the IBM PC's DOS (text-based) run system stiff competition due to its usability and professional software .The World Wide Web is developed by Tim Lee in 1991, and CERN also creates the 1st Web Server. The Pentium chip is included in PCs for the first time in 1993 signalling the end for the 486.

2.4. How ICT has been embedded into today's industry and commerce?

Once a difficult problem, now an integral part of all industries, ICT has become accepted due to huge benefits for businesses that if were ignored would become massive disadvantages in the competitive marketplace. E-mail with its time saving cost effective nature was unused ten years ago, but now most businesses panic if their Internet connection stops working. Computers have replaced the traditional system of typewriters which were unforgiving if you made a mistake. Now backup copies and spell checkers make that process easier (as I've found out typing this). Filing space has been reduced with computerised records taking up the space of a PC instead of several cabinets. These benefits and others have helped ICT become embedded in today's industries.

The development of the World Wide Web has given commercial enterprises a new business avenue to go down. The whole area of commerce involving the Internet is termed e-commerce and has been used (not always successfully) since the arrival of the Internet during the mid-nineties. Early e-companies suffered from offering the same product (as actual physical stores) with no Internet specific benefits to attract new or existing customers. A large percentage of early companies boomed and then went bust, due to heavy investment followed by heavy withdrawal of funds. Huge amounts of funds were invested in companies who had

no product to sell and no experience of how to sell it (the nothing to sell that is.) The value of shares and the combined PLC (Public Limited Company) value of some of these companies were higher than the value of established profit making businesses. Once shareholders cleared the mud from their eyes and paid attention it was too late to turn these situations around. Thus the method of selling and running made allegedly unstoppable companies go bust overnight. A domino effect filled the air and soon people were wondering just what had happened to their dream investments. Fortunately the market for e-commerce is stabilizing as companies learn from their mistakes and offer products/services, which can only be accessed through the Internet e.g. E-bay.

The interactivity and relative speed of computers/the Internet are being used in ways, which could not be achieved using regular business practices. The Internet is a development in the history of ICT which is now (in 2005) greatly affecting the development of industry and commerce. The idea of e-commerce didn't exist until the invention of the Internet and from reading this document I hope the reader has understood as I have how the development of e-commerce has pushed forward industry and commerce into new lines of business. E-mail is another specific example, which has speeded up industries and given commerce a boost.

2.5. A Methodology for Teaching IT Ethics

At the AICEC99 conference Professor Walter Maner (1999) of the Bowling Green State University of Ohio provided a comprehensive overview of a range of methodologies that could be used as aids to deciding on an appropriate course of action involving an IT ethical problem. The full ranges of methodologies are available via the web site shown in the references. The important aspect of the methods reviewed by Maner is the notion of providing a way for users of IT to react to unforeseen problems by working through a series of questions and reflections. As a sample consider the method termed 'Worksheet for ethical decision making' (Maner, 1999, p.8).

The Joesphson Institute of Ethics lists the following three familiar ethical principles that are also relevant to students: Golden Rule: are you treating others as you would want to be treated? Publicity: would you be comfortable if your reasoning and decision were published? Kid-On-Your-Shoulder: would you be comfortable if your children were observing you?

In a similar manner Chris MacDonald (1995), a research associate at the university of British Columbia's center for applied ethics, states that it is important that people ask and answer this question when consider the nature of some form of action; am I comfortable with this decision? He goes on to suggest that these subsidiary questions also need to be asked.

1. If I carry out this decision, would I be comfortable telling my family about it? My clergyman? My mentors?

2. Would I want children to take my behavior as an example?

3. Is this decision one which is a wise, informed, virtuous person would make?

4. Can I live with this decision?

2.6. Parallel Space Methodology

To conclude this general review of methodologies I would like to briefly outline Morris's (1999) parallel spaces methodology. He refers to the real and virtual worlds as parallel worlds. This is a very useful and important notion because it gives us a way to focus on what the similarities and differences are between the

two. The virtual world is vastly more familiar to the younger generation than to the older generation. Of concern is the fact that ethical systems that have developed over many centuries may be found wanting in helping the young (and the old) to make decisions about the new situations they may be confronted with in the virtual world.

The virtual world seems to introduce an element of distance and secrecy that are different to the real world. To help explore these differences, Morris introduces the idea of externalizing an Internet (cyberspace) setting to a real setting and internalizing a real space setting to an Internet (cyberspace) setting. He considers the case of a virtual rape and makes the point that from an internalized viewpoint the rape could be viewed as more of a defamatory or humiliation action. In other words, not as 'bad' as a real physical occurrence of rape. He goes on to suggest that we need another level, which is termed staged analogy and interpretation, to enable the externalized and internalized view to be understood. For example, in terms of the virtual rape case, you would image a situation where all parties are together and witness the

rape on a 'stage'. In this case the viewers of the rape would be powerless to intervene and the victim would certainly suffer more than just feelings associated with defamation.The steps associated with the parallel space methodology are as follows:

1. Identify parties and their interests

2. Explain the ethical problem

3. Construct an external and internal analogy

4. For each analogy identify the values and outcomes

5. Devise a staged analogy to highlight contrasts

6. Select an appropriate course of action

The advantage of this method is that it requires the comparison of the virtual and real world situations by use of a parallel world's analogy. This key feature is built in the method to be introduced in the next section.

2.6.1. **The Proposed Methodology**

Before outlining and justifying in terms of the preceding discussion a methodology suitable for school use I believe it is important that a school undertakes what I have termed precursor steps. It is important to develop a code of ethical practice that will help guide students and teachers in understanding the rules and regulations as set out in the acceptable usage agreement. A set of principles is outlined below and these are consistent with those principles outlined in an earlier section of this paper by Colero, Johnson and MacDonald. Additionally, it is important that the school has an effective security system and that users are informed of how it functions and what legal obligations exist.

*2.6.2.*Precursor steps

Involve staff and students in the development of a code of ethical practice using the principles outlined below that underpins the rules and regulations outlined in an acceptable usage agreement; Ensure staff are aware of the ethical and legal issues associated with the use of IT; Ensure that the security aspects of the schools network are well documented and understood; and Ensure that parents are informed about the above.

In many situations it will be simple to establish that someone has done something that is clearly wrong, for example, deleting another person's file and there will be no ethical dilemma as such. In these cases, the methodology can be useful as way to have people experience the wrong doing from another point of view. In other circumstances the situation will be less clear cut in terms of the rights and wrongs and in terms of unforeseen consequences. For instance in scenario number 2 where pornography is found on a disk belonging to a teacher. Pornography in general is not illegal to possess and hence a teacher has rights. A student in such circumstances would be faced with a difficult ethical situation.

2.7.ICT Application in Technical and Vocational Education and Training Institutions.

The rapid growths in the use of the computer and computer-based technologies during the past two decades have similarly had an impact on the educational system around the world. Knowledge and skills in computer technology have become progressively more important as instructional tools in institutes, and higher educational institutions. The vocational and technical teacher development program becomes an important component in this new delivery system to ensure they can cope with new technologies in preparing students to enter the work place.

ICT was one of the most important instructional technology tools used in the new educational policy of Ethiopia. Computers and computer-based technology become common tools used in teaching and learning in vocational and technical schools. In the last eleven years, information and communication technology (ICT) and computer technology application have become widely used in postsecondary (preparatory) schools, State and private institute and universities and recently as a major subject in TVET institute of Ethiopia. Schools have

started to receive computers and ICT equipment to enable them to utilize ICT and the Internet. Since the development, our country needs to explore and describe the current practices of ICT, constraints, and strategies in the implementation of ICT in technical and vocational institutes.

Teacher has been the change agent between the learner and technology, and plays a critical role in the success of teaching and learning in vocational education programs. Therefore, the teacher should stay abreast of changing technology in order to assure his/her roles still relevant to produce good workers in this complicated business world. Nowadays, computer technology affects the way education is delivered for preparing workers.

To be more specific, the change of computer technology also affects technical and vocational and training institute. According to Wanocott (2001), information and communication technology (ICT) has become a powerful technology tool in delivering TVET program around the globe. Before that, in 1998, McKenzie also noted that computer and information technology would be used broadly in delivery the CTE programs in the future, in response to technology changes, particularly in the educational system.

Many scholars support using computers in educational activities. Zirkle(2002) noted that new technologies, such as a computer, promises rich education experiences. He reported that students who were taught using both traditional methods and the internet performed better than those who were only exposed to the traditional methods. Day, Raven, and Newman (1998) also found that students who were taught using ICT in a laboratory achieved better level than those students who were taught using the traditional classroom approach. Knowledge of computer technology and computer-based technology has become tremendously important to technical and vocational teachers in the new information age.

Vocational and technical teachers have realized the value and usefulness of computer technology in their programs. However, they do not have the necessary skills and knowledge to use it effectively for instructional purposes. In order to ensure that technical and vocational education will remain valuable to the educational system, vocational and technical programs must continue to enrich the programs to prepare students for the workplace and society. In order for teachers to do that, they must continue to value computer technology and seek ways to connect program and instructional management with appropriate computer technology,

especially the Internet. Teachers' competency in computer technology is essential if they are to be successful instructional leaders as they use and transfer this competency to their students. Certainly, this computer technology foundation is a necessity for all teachers and students (Kotrlik, 2000). Lu (2002) noted that computer technology has a great effect on teaching and learning vocational programs. Computer technologies are developing at a rapid pace, carrying the potential to deliver vocational education to more learners in more satisfactory ways. Vocational education teachers should be encouraged to participate in professional development activities to acquaint them with the uses of computer technology for improving teaching effectiveness.

Vocational and technical teachers will continue to be challenged by these new technologies and must be able to use these new technologies that are continually changing the ways how people live, work, and learn. Moreover, Bork (1985) noted that the application of computer technology use in education would be very important and would become the dominant delivery system in the next 25 years. According to Wanocott (2001), computer technology and computer based technologies have become a popular teaching tool for technology instructors. With the high quality of graphical-user interface, high speed processing, and affordability, computer use in preparing the workforce has come of age. The educational software designer is now able to design and develop multidimensional educational software that includes high quality graphics, stereo sound, and real time interaction.

Miller (1997) found that, overall, vocational teachers understand the importance of computers in education. The problem is technical and vocational educators today face the challenge of utilizing and integrating computers and related technologies into their instruction in a manner that enhances student learning and achievement. Within the last two decades, affordable technology has allowed schools to experience a growing investment in technology for the teaching/learning process (Sheingold& Hadley, 1990). Dwyer (1999) stated that computer technology-based learning environments can help students acquire the type of knowledge, skills, and attitudes needed for success, for example, cooperative team projects via e-mail and the Internet, electronic discussion, experiential learning activities via specialized software, simulation of real-life observation experiences, computerized movies with interactive check sheets, and practice activities for developing decision making, problem solving, and management skills. Several scholars have discussed the barriers to the implementation of

technology. Glenn (1997) noted that the organizational structure of schools inhibits teachers' efforts to learn new technologies and resist innovation, for example, the limited amount of time available to teachers to learn new technology.

Fabry and Higgs (1997) found that the major issues in the implementation and integration of technology in teaching and learning includes resistance to change to something new (teacher, student, and school), teachers' attitudes, training, time, access, and cost. Smerdon, Cronen, Lanahan, Anderson, Iannotti, and Angeles (2000) also found that the barriers to the use of the Internet and computers for instruction included lack of computers, lack of release time for teachers to learn how to use technology, and lack of time in the school schedule for student computer use. The Office of Technology Assessment (1995) reported the barriers of using computer technology in education include lack of teacher time, limited access and high costs, lack of vision or rationale for technology use, lack of training and support, and current assessment practices that may not reflect what has been learned with technology.

2.8. ICT application in vocational and technical education and   training in Malaysia.

The rapid growths in the use of the computer and computer-based technologies during the past two decades have similarly had an impact on the educational system around the world. Knowledge and skills in computer technology have become progressively more important as instructional tools in schools, and higher educational institutions. The vocational and technical teacher development program becomes an important component in this new delivery system to ensure they can cope with new technologies in preparing students to enter the work place. The computer has become an important tool for teaching and learning in the Malaysian Educational System.

In 1996, the Ministry of Education launched the Smart school (SekolahBestari) project to ensure Malaysian students can compete in the global economy. ICT was one of the most important instructional technology tools used in this new educational project. Computers and computer-based technology become common tools used in teaching and learning in vocational and technical schools. In the last ten years, information and communication technology (ICT) and computer technology application have become widely used in secondary and postsecondary educational institutions in Malaysia. Schools have started to receive computers

and ICT equipment to enable them to utilize ICT and the Internet. Since the development, Malaysia needs to explore and describe the current practices of ICT, constraints, and strategies in the implementation of ICT in technical and vocational schools.

2.9. Teachers' ICT Skills and ICT Integration in the Classroom

The explosion of Information and Communication Technology (ICT) in the last two decades has impacted the life of many people and the nature of jobs in all fields. Education as the main vehicle for human capital development needs to heed to the constant changes in the world of work. In line with the rapid development and usage of ICT in the workplace, it is important that the current generation of students need to well-prepared with ICT knowledge and skills for them to face the tasks in the world-of-work in the future. In fact, ICT is the way of life for the majority of us and we should be fully prepared to live in the ICT world. Malaysia has a vision called VISION 2020 with the purpose of embracing the knowledge economy in order to become globally competitive.

To be able to compete in the globalized world, Malaysia needs to develop knowledge workers. Thus, in line with that VISION, The Ministry of Education in Malaysia has recommended the minimum ICT skills that teachers should have in order to lead Malaysian students to compete in the global economy. Countries that are able offer high skilled workforce will be able to attract potential investment in large amount. Technical and vocational education and training (TVET) has the capability of preparing high skilled workforce and the integration of ICT in their classroom will enhance the quality of TVET graduates and will make them the most sought after potential employees. However, in order to integrate ICT in TVET classroom, teachers must have the required skills.

Many studies have been conducted in this country to assess the level of ICT integration in the classroom (Paryono and Quito, 2010; Sukri, 2010; Mahmud and Ismail, 2010; Ngah and Masood, 2006; Wahab and Kaur, 2006; Mustapha, 2000; Bakar and Mohamad, 1998). These studies report that the level of IT integration is low or moderate, and the integration of IT into the classrooms is a dynamic process connecting various factors such as teachers' skills, experience with IT, gender, age of teacher, level of qualification, type of training, computer and peripheral available at schools, and administration support. These studies assessed the

teachers' basic IT knowledge and skills with the presumption that any teacher of any subject will need to acquire it. Accordingly, the current study examines the level of IT integration as well as the new ICT skills that the technical and vocational teachers need in teaching engineering subjects specifically in technical and vocational schools in Ma-laysia.

2.10. The need for effective integration of ICTs in TVET.

Technical Vocational Education and Training (TVET) is one of a recognized and effective process by which quality, up-to-date, information literate and knowledgeable workers are prepared, trained or retrained worldwide. UNESCO and ILO (2002) defined TVET "as a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life." In a nutshell, TVET prepares human resources for the ever changing world of work. In that, for effective participation in the world of work the 'study of technologies and related sciences' as reflected in the definition, is of paramount significance that can be realized with adequate ICT arrangement in TVET institutions.

Practical skills can now be delivered virtually via a well-organized ICT set up; gone are the days where practical skills are taught using hands-on learning only. Programmed instruction in form of software and interactive video made it easy for practical skills to be taught using ICTs. So also, job that requires only hands-on Saud et al. 6669 experiences are now possible via computer controlled programs. As such, the need for ICTs integration in TVET remains a great challenge, considering the impact ICTs make in the world of work that 'needs a knowledgeable workers skilled in information technologies (Rojewski, 2009). By implication, the use of ICTs in the training, up-grading and re-training of workers is of paramount significance, and "an essential aspect of teaching's cultural toolkit in the twenty first century, affording new and transformative models of development" (Leach,2005). The aim of TVET is to prepare people for (self-) employment and to be a medium of evolution for people to the world of work; by making individual to have a sense of belonging in their communities. Consequently, TVET is seen as an instrument for reducing extreme poverty (Hollander and Mar, 2009). These distinctive features of TVET make ICTs application a mandatory component that can aid to achieve a sustainable and globally recognized workforce. ICTs

according to Zarini et al.(2009),'facilitate the development and strengthening of TVET around the world by enhancing networking and knowledge sharing opportunities. The implication is for TVET institutions to further deploy and strengthen their commitment toward training and producing "ICT-capable" graduates that will meet up with the challenges of virtual workplaces. Thus, knowledge in the exploitation of ITs is critical to the present day workers (Zarini et al., 2009).

One of the possible means of acclimatizing TVET to develop human resources for the ever dynamic world of work is to focus its investment in the integration of ICTs in the curriculum implementation process (teaching and learning). Zarini et al. (2009) further stressed; Information and communication are becoming ubiquitous. By 2015, virtually all people living in industrial countries will have access to multimedia services based on mobile or other terminals. The same trend will take place in the developing world. Services based on ubiquitous computing, telecommunications and information retrieval are developing very rapidly. The key-words are real-time information, multilinguist; location awareness, targeting and personalization. Government functions and services are increasingly moving on-line. Internet shopping is also ever increasing.

2.11. The experience of implementing apprenticeship training.

 The history of apprenticeship training at the global level has undergone consecutive historical courses. In line with this, we observe disparities in the experiences of implementing apprenticeship training program. The variations are very significant. Notwithstanding the challenges countries may face, we see some countries accumulating rich experiences and others not. Indeed, some of these experiences may be imitated.However, it will be difficult to discuss the apprenticeship experiences of all countries of the world. A sample of countries from Europe, North America, Africa and Australia may suffice to cite for benchmarking. Depending on the economic, social and geographical differences of these countries, it appears important to mention the lessons that can be drawn. In conformity with this, the rich experiences of these countries may serve a lot when designing future apprenticeship training.

2.12. The German Experience

In Germany, children are enrolled in compulsory full-time schooling at the age of six. Following four years of primary school for all, educational paths are divided into the secondary general schools, intermediate schools, grammar schools, and in almost all the Landers /a federal union of 16 states/ comprehensive schools. This schooling takes 9 years. Upon completion, trainees who do not attend any full-time-school are asked to attend part-time (vocational) school for 3 years. However, in practice, trainees attend school from the ages of 6 to 18. The different educational paths come together again. As a result, trainees who belong to this system include those who completed education in special, secondary general (Hauptschule), intermediate (Realschule), comprehensive, vocational and grammar schools (Gymnasium).

The dual system is, thus, the one that absorbs the largest number of trainees at upper secondary level, with approximately 53 % of an age cohort training for a recognized training occupation in Germany. Compulsory education exists for persons (aged 6-18) and for trainees in the dual system (even if they are over 18) (Hippach-Schneider, Krause &Woll, 2007). The dual system is described as dual since the training is conducted in two places of learning- the enterprises and the training institutions (Cedefop, 2007). Trainees can enter the dual system for two, three or four years depending on the occupation. This can be realized when they have completed full-time compulsory schooling (Misko, 2006).This kind of TVET training system in Germany is, in general, established on a legal ground. To this end, training in enterprises is regulated by a series of federal Laws and Regulations (Hippach-Schneider, Krause &Woll, 2007).

The most significant conditions are the free choice and practice of an occupation, as depicted in the Constitution (Grundgesetz: Article 12 (1)) and Federal Government legislation for out-of-school vocational training (Article 72 (1), (2) and Article 74 (1).The German dual system is believed to equip trainees with the required skills of the occupations. This is due to the fact that the training program is systematically conducted in two settings: in the learning companies and in the TVET schools. This kind of training program lasts for three years. However, there are laws that permit a reduction in the training period. This can be done by establishing agreement with enterprises. Accordingly, the agreement obliges both parties to

meet the main objectives of the training in the dual system by acquainting the trainees with the skills of the occupation (Hippach-Schneider, Krause &Woll, 2007).The current competence based vocational training in Germany requires trainees to exercise an occupation in order to become skilled worker. Thus, successful completion of the apprenticeship training program enables the trainee to become qualified skilled worker. On the other hand, full-time TVET education commitment must be ensured by the trainee using written format prior to the beginning of the training, and this right is provided to all German citizens.

Apprenticeship training in Germany takes place on the basis of the training contract signed between a training enterprise and the young people. A contract established in this way ensures the trainee to stay in the enterprise for three or four days, and in the vocational school up to two days a week. The agreement imposes the enterprises to shoulder the cost of the in-company training and remuneration. The amount of the remuneration, however, increases with every year of training, and reaches about one third of the starting pay for a trained skilled worker. The professional competences in the occupation to be acquired in the enterprises are specified in the agreement and oblige the enterprises to incorporate them in their training plan. Enterprises are expected to provide training places in both the industry and the public service. Moreover, enterprises enter into a contract with trainees to provide them with the professional competences in the occupation (Hippach-Schneider, Krause &Woll, 2007). The requirements of the dual training system guarantee a uniform national standard which ultimately ensures to meet the requirements of the occupation. Due to this reason, the training that takes place in training enterprises is implemented by people who have skill in that profession. The suitability of training at the enterprises is monitored by the relevant autonomous industrial bodies (Chambers).

The training enterprises are thus advised to prepare detail training plans for trainees. This plan should, in fact, correspond according to its practicality and time structure.It may be observed that most of the time small and medium-sized enterprises are often unable to provide all the learning content. Sometimes they lack suitable training personnel or may not cover all the training content themselves. As a result, there are various possible ways of overcoming these problems. We can cite the following (Hippach-Schneider, Krause &Woll, 2007): Educational institutions offer intercompany training periods designed to supplement in-company training. They are often sponsored by autonomous bodies in the relevant sectors of industry.

Enterprises form coherent training structures may also be asked to arrange special programs for the trainees. Besides, there are other models of implementation in collaboration with other enterprises in which the lead enterprise bears overall responsibility for training. In these models, parts of the training are conducted in various partner enterprises in which some periods of training take place outside the regular enterprise.

The parts of training may be conducted in a nearby large enterprise with a training workshop on the basis of an order and against repayment of cost. Some of the comments on dual system are that the rise in the general-education level and age of the youth who take part in the vocational training offered by enterprises and the decrease in job offers have increased the competition between youths. Besides, trainees in the dual system concentrate in more highly valued occupations than the less ones. Moreover, it is harder for youths to obtain training in small or public bodies than the other. Other critics of the dual system also comment that it performs well in the manufacturing than in the service industries (Tremblay & Le Bot, 2000).

2.13. The Australian Experience

The Australian educational system is organized as primary, secondary and tertiary. The primary education takes seven years of preliminary courses that requires children to start at the age of 5 and ends at 12. It orients the children with the general education and makes them ready to join the society and to the next level of education. The secondary school starts at the age of 12 and it is compulsory to complete two years of junior high school till the Year 10, after which students have two options: either to pursue their further academic education or choose vocational education. Thus, students should accomplish another two years of high school diploma. After this, trainees leaving junior high school can go for vocational education or for apprenticeship training to enter the work force. Students whose choice is vocational streams should pass through the apprenticeship training program. Modern apprenticeship in Australia was believed to start during the colonial time.

The kind of training offered during that time was known as state-based apprenticeship which was imported from UK. Young people were indentured to a master craftsman to learn trade or craft. However, when the Australian federation came into being, it was replaced by a new kind of national system of apprenticeship training (NCVER, 2011). At present there are two

types of apprenticeship training programs in Australia: the traditional and the non-traditional. The traditional type includes trade and craft areas like engineering, building and construction, plumbing, automotive mechanics, commercial cookery, hairdressing, and printing. On the other hand, the non-traditional type includes information technology, retail, childcare, tourism and hospitality. No age limits are imposed to take part in apprenticeships or traineeships. Therefore, mature apprentices can be accepted in the manufacturing industries (Misko, 2006).In the actual apprenticeship practice, apprentices spend all days of the week on job with a training provider except for two days. Although this is the case, some special programs can also be arranged by enterprises for off-the-job training for some times in a year. However, since 1998, a new apprenticeship training program has been introduced to enable apprentices and workers to take part in part-time apprenticeship programs offered at the workplaces (NCVER, 2011).

Besides, trainees in schools have the right to participate in school-based apprenticeships at the end of their secondary school education However, total school-based apprenticeship trainings are criticized due to their failure in allowing apprentices to have adequate time in the workplaces to complete work tasks and projects and thereby develop vocational skills (NCVER, 2011a). As in some countries of the world, apprentices in Australia are required to sign training contract with an employer or a group of training company. The agreement ensures the apprentice to earn a training wage. It also guarantees the apprentice to develop a training plan based on the units of competency to be grasped. This kind of plan is developed by recognized training organization with employers and apprentices (Misko, 2006).

2.14. Evaluation of training.

Earlier in an experiment conducted by Roscoe and Willigies (1980), the result of training was measured by its application to a new situation. The transfer of training results to a new situation was checked by using two groups; namely, the control and experimental group. Accordingly, one group devoted 500 hours to the research of literary German during two years of class work and the group devoted an average of 100 hours to the research of the key to rapid translation of German. At last members of both groups required an average of 100 hours of individual tutoring to reach criterion performance in translating German. Members of the control group with no prior research of German required an average of 200 hours of

tutoring to meet the same criterion. Thus, the result of the experiment has shown that knowledge gained through training was transferred easily to situation that can be applied.In another research to investigate the relationship of motivation to transfer skills and knowledge learned in computer based training; Seyler, Holton, Bates, Burnett and Carvalho (1998) have identified individual attitude and environmental variables as the most influential contributing factors.

In a recent research to identify the conditions that can facilitate the transfer of training, Pham, Segers and Gijselaers (2010) also identified trainees' motivations and the trainees' use of transfer strategies as the most influential ones. They further recommended reinforcement as an instrument to raise trainees' self-efficacy and motivation to transfer, as well as to support trainees in the development of their own learning transfer strategies. Besides, from the experiment results mentioned above, using simple observation even, one can practically observe the application of training in day to day training programs. No matter when, where, how and who organizes training, its objective is to alter people's knowledge, skill and attitude in relation to a training objective. Its focus will be to bring a 'change'.

The change in knowledge, skill and attitude should be measured. Unless this is applied, it would be difficult to design and implement training. The motivation of training is evaluated by assessing the satisfaction level of the trainees with the training and their opinions about its applicability on the actual job. Hence, it is evaluated by the supervisors themselves or by another external group who may examine the materials and the way they are presented to the trainees.The motivation in training can also be shown by demonstrating the skill learned. This can be seen when the trainee uses what was learned to perform a new task within a controlled environment of the job situation. This requires the trainee to apply learned material in new and concrete situations (CalSWEC, 2004).

However, the selection of tools in using them to collect data for measuring training depends on the purpose of the training. If the purpose is to take corrective measures during the training process, formative evaluation takes place; whereas, summative evaluation takes place at the end of the training. At times, even an assessment of the impact of training on employee performance can be evaluated (Eseryel, 2002). In line with this, Kirkpatrick (as cited in Phillips, 2004) forwarded four levels of assessing training effectiveness. According to him,

evaluation of training must start with level one and should go up to level four. These levels are described as follows: A measure of participants' reactions to a course. Most of the time reaction in this level (first level) is assessed through surveys. A measure of the amount of information that participants gained and can be assessed using criterion-referenced tests in the second level. A measure of the amount of material learned and applied by participants in their everyday work. This level (third level) is assessed using observations and interviews with co-workers and supervisors.

A measure of the financial impact of the training course on the bottom line of the organization. However, the assessment the fourth level is not clearly defined by Kirkpatrick. Some researchers, recognizing some shortcomings of Kirkpatrick's four level approaches, have attempted to modify and add basic framework. To this end, Kaufman (as cited in Tüzün, 2005) has expanded the definition of Level 1 and added a fifth level addressing societal, client responsiveness and consequences. This moves evaluation beyond the organization, and examines the extent to which the performance of program has brought to the society and environment surrounding the organization (Tüzün, 2005).

The simplicity of the model has caused it to be the most widely used methods of evaluating training programs. ASTD's survey which reports feedback from almost 300 Human Resource executives and managers revealed that more than fifty percent of organizations that conduct evaluations use the Kirkpatrick model. In addition, it is still one of the most widely used approaches (Tüzün, 2005). In any case, we should understand that various methods of collecting data can be employed to check the effectiveness of training.

2.15. Assessment in Outcome Based TVET

Assessment is an integral part of teaching- learning process which is used for better understanding of the current knowledge that a student possesses. And, sustained teaching relies on the ability to analyze how learners are learning in relation to what they need to accomplish (Mokab, 2005). Assessment, as explained by Huba and Freed (2000, cited in *Wright College, 2006)* is the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know understand and apply as a result of their educational experiences. In this case the ultimate goal

is that assessment results are used to improve subsequent learning. Likewise, assessment is defined as the means of obtaining information which allows educators, learners and parents to make informed decisions about learners' progress (Scotish education department 1991, cited in Mokab, 2005).

According to Adedoyin (2010) and Acharya (2003), outcome-based education and training is a form of education that restructures conventional education systemwhich requires students to demonstrate what they know and they are able to do after some learning process. In relation to this, anticipated demonstration is defined by setting benchmarks for each level of the program and supposed to include the entire student in the program. However, proposed benchmarks are different in every level of study and able to address and define the goals of the curriculum ateach level of learning. Given that, it establishes ways to assess whether students have reached these goals at that level of study. It also ensures commitment in providing an opportunity of education and enables to reach at the required learning outcomes for improvement.

From the proceeding definitions it is clear that the way students learn can change the assessment method according to teaching- learning approach and intended goals of the learning outcomes. Consequently, the shift of educational system from conventional learning approach to OBTVET demands enormous changes to be made to the assessment of learning. Thus, with OBTVET being a learner-center and result oriented approach to education it implies that the way learners assessed must be changed accordingly. In this regard, no longer could the old system of end-of-year examinations be sufficient to assess progress of the learners in attaining the outcome. Learners have to work toward an outcome where progress is determined by demonstration (Ramroop, 2004).

For the training to be successful, it requires radically new forms of assessment which also needs a radical shift through demonstration assessment, timing, recording and reporting. This also helps for the development of learner by identifying learning problems and monitoring the learner progress. In this regards assessment must be based on specific and clearly defined outcomes (Ramroop, 2004 and Maphalala, 2006). Mokab (2005) argued that, in order for OBTVET to be realized its intentions; assessment must be move from emphasis on summative as a single event to developmental (formative) assessment. Formative assessment

serves as a tool in assisting both the learner and the educator in ascertaining learning progress. In outcome-based education and training curriculum design is strongly linked to assessment. That is, training materials are directly related to the units of competence and the curriculum modules. And it needs to implement valid and reliable assessment procedures. In this regard, well-designed assessment allows students to demonstrate what they know and can do. For this reason, learner's assessment is based on performing competences required by a specific learning outcome and by the occupational standard which needs continuous assessment.

2.16. The Role of Teachers in OBET

If courses are planned with an outcomes-based approach the initial task is to identify desired outcomes. However, the intended outcomes are not an end by themselves. The guiding principles are important to reach at desired outcomes. Spady (1994) argued that in Outcome-Based education and training system the outcomes and principles are the main elements to reach at desired goal of learning. In this perspective outcomes are used to guide teachers concerning what they teach in OBET and the principles that enable them how they teach in OBET. Thus, these two elements are regarded as structural components of OBET. Learning outcomes and OBET principles direct teachers toward their role.

According to Killen (2000), in OBET approaches a much stronger emphasis is given to learners' role in the learning process. Because, students are expected to be able to do more challenging tasks other than memorization and reproduce what was taught. However, teacher still set the learning agenda based on OBET principles and outcomes.

Teachers need to create high level of interaction with their students to increase their understanding. (2004), stated that the teacher must continually monitor each student's work, determine what skills and tasks each student has mastered and provide immediate feedback. In general, teachers are responsible to design, plan, instruct, assess and evaluate as placed in predetermined outcomes. They are also expected to advise, consult, facilitate and provide demonstration based on the goals of instruction.

2.17. General Over View of the Ethiopian TVET.

Studies show that the introduction of TVET in Ethiopian education system dated back to more than 50 years. However, the development of the sub-sector was slow and not to the desired level and quality. It was the most neglected area in the history of Ethiopian education system. The institutions have been made insignificant progress in terms of expansion and contribution to economic development. But, after the introduction of the education and training policy of the country in 1994, the number of formal and non-formal TVET provision centers has increased.

For the improvement of TVET access the government of Ethiopia has recognized the importance and the needs for establishing a large number of TVET institutions in effort to promote economic and technological development in the country. The government supports expansion of the system to provide options for the increasing number of school leavers (Edukans Foundation, 2009). The strategic thinking behind the expansion of the TVET sub-sector of the country is to meet the middle level human power of the industry service and commercial sectors which become very essential to the overall development of the country. In this regard, the Ethiopian government has initiated a new push towards creating frameworks conducive to economic and social development through TVET strategy. This National TVET Strategy is an important element of the overall policy framework towards development and poverty reduction (MOE, 2008).

2.18. Recent Trends of the Ethiopian TVET

According to AU (2007) the primary objective of all technical and vocational education and training programmes of internationally is acquisition of relevant knowledge, practical skills and attitudes for gainful employment in a particular trade or occupational area. It is an instrument for producing technicians equipped with practical knowledge. Thus, the need to link training to employment either self or paid employment is at the base of all practices and strategies. In recent years, in view of the rapid technological advances taking place in the labor market, flexibility, adaptability and life-long learning have become the second major objective. The third objective, which is particularly important for Africa, is to use TVET as a vehicle for economic empowerment and social mobility and for the promotion of good

governance and regional integration. In the Ethiopian context, TVET institutions are mainly to reproduce new and selected technologies and transfer the same to the relevant industry in order to increase the competitiveness of the sectors based on international standards.

The institutions also work for creative capacity building technologies; which are needed for economic development of the country. In this regard, their benefit will be significant as the trainees pass through this process and endowed with outstanding international workforce principles. Graduates of the Ethiopian TVET institutions are also expected to be job creators rather than expecting jobs to be provided by the government. Therefore, the Ethiopian TVET like many modern TVET systems of other countries is undergoing a reform process. For this reason, outcome-based approach to TVET is a choice for the reform activity of the country (MOE, 2008).

2.19. The Ethiopian TVET Reform into Outcome Based Approach

At present Ethiopian TVET system is undergoing fundamental change in its teaching-learning approach which enhances the goal of poverty reduction strategy. According to MOE (2008) TVET of the country is re-organized into an outcome based system. This reform is intended to ensure competences needed in the labor market and it become the final benchmark of teaching, training and learning. The purpose of this reform is to make TVET serve as important tools for the countries poverty reduction strategy by different international fund providers.

As GTZ (2006) noted the TVET system reform of the country is able to develop a coherent and comprehensive TVET system that allows Ethiopia to train the middle level workforce and it boosts the country's economic growth and competitiveness in global markets. Therefore, the Ethiopian TVET Strategy reflects best international practices regarding governance, management, delivery and financing. This reform also ensures fair rates of funding, standard-based quality assurance and transparent accountability mechanisms and used for any kind of training provided by any kind of providers. Likewise, the Ethiopian TVET Qualifications Framework addresses importance of a reform from expanded opportunity point of view.

MoE (2010) describes that an outcome-based TVET system creates ways for the fair recognition of the wide range of formal, non-formal and informal training and learning existing in the country. Thus, building an outcome-based TVET system is the centerpiece of the TVET reform. For this reason, the main thrust of the strategy relies on an outcome-based system, dedicated and trusting cooperation among stakeholders. Hence, it opens access to qualifications for previously neglected target groups and increase chances of an occupational career and creates options for further education and training.In general, the reform is expected to reflect an important improvement regarding poverty reduction. To this end, it ensures achievement of its intended goals and thus, it is appropriate to address the development needs of the Ethiopian economy.

2.20.Overview of the Ethiopian National TVET Reform Objectives

Conducting the present TVET reform of the country is taken as a strategic thinking to enhance the contribution of the TVET institutions in economic development. According to the Ethiopian TVET Strategy (MOE, 2008) and engineering capacity building program (2006), the national TVET strategy development is to reflect an important paradigm shift of recent years. It places quality and relevance of TVET as its priority towards the competence needs of the labor market and intended to create a competent, motivated and adaptable workforce in driving economic growth and development. This can be ensured through increased cooperation and partnership with the private sector concerning to governance, planning, financing and implementation of the training. Thus, the development of this strategy involves a broad range of stakeholders from the private and public sectors. Establishing coherent, comprehensive and integrated TVET system based on outcomes rather than curricula is important to bring the intended target of the institutions. Through outcome-based TVET system the federal government of Ethiopia aspires to meet its responsibility to ensure quality and relevance of the institution by:

• Facilitating the setting of National Occupational Standards which is fairly equivalent to international standards and;

• Organizing an occupational assessment and certification system which offers national occupational qualification certificates to those who have proven, in an assessment that they are competent in accordance with the defined occupational standards.

2.21 The Ethiopian TVET Qualifications Framework and Accreditation

TVET has a direct consequence on fundamental political, economic and social development. Therefore, TVET transformation is dynamic that needs efforts to find suitable concept and approach how to beststandardize the TVET trainer's professional development. From this point of view, it is very important that quality of TVET is significantly depends on the qualification and motivation of the teaching staff combined with other standards. Thus, the general agreement worldwide in relation to trainer's development refers to the creation of an internationally benchmarked TLTQF (MOE 2010g). Hence, the principal function of NTQE is to strengthen mutual trust between the different stakeholders. It also entitled to facilitate the transfer, transparency and recognition of qualifications based on training outcomes which are assessed and certified by respective nationally accredited competent bodies.

The NTQF rationalizes all TVET into a single nationally recognized qualification and defines the different occupational qualification levels to be awarded and describes the scope and composition of these qualifications and the degree of responsibility a qualified person can assume in the workplace (MOE, 2010h). In this regard, NTQE is responsible to set the overall frame for the outcome-based TVET system of the country. And it describes five qualifications levels with different descriptor. Thus, the Ethiopian TVET Qualifications Framework is based on the following assumptions:

• All qualifications will be described using one single set of descriptors, which will be subject to discussions with stakeholders, because these descriptors will be used in the education and training system as well as in the world of work.

• One single set of levels will illustrate all qualifications.

• All qualifications and sub-qualifications will be described and assessed in terms of learning outcomes, regardless of the venue where or the way in which they were acquired.

• All qualifications can, in principle, be organized in units for which a certain amount of learning time can be assumed and corresponding credits at a specified unit level can be granted. Furthermore, units can be packaged to become a full occupational qualification and are aligned to the qualifications hierarchy with the help of rules and descriptors.

• Qualification frameworks and outcome-based standards provide the foundation for a learner-centered training system. This opens up options for individuals and, in doing so, assign them responsibility for organizing their respective education and career path. The Ethiopian TVET registration and accreditation also depends on the NTQF. For this reason, ministry of education has prepared documents on the process of registration and accreditation. Accreditation of program involves both a status and a process. As a status, it provides public notification that a programs provider meets standards of quality set forth by accrediting agency.

 As a process, NTQF reflects the fact that in achieving recognition by the accrediting agency, the program is committed to self-study and external review in seeking not only to meet standards but to continuously seek ways in which to enhance the quality of TVET program provided by different providers. Self-awareness can be conducted through simple questionnaire which is filled out by the people in order to assess the system. This assessment is essential to make the trainees to think about themselves, their interests, their values and aspirations in a systematic and focused way and TVET institutions must be consider all necessary physical facilities like library, workshops, and like others (MoE,2010b) TVET institutions must be consider all necessary physical facilities like library, workshops, and like others (MoE, 2010d).

2.22. Understanding the Ethiopian Occupational Standard

Learning outcomes for required occupational competences are formulated in terms of knowledge, skills and attitude (KSA). Hence, in order to define competence and learning outcome requirements, it is important to develop a consistent and coherent terminology of competences.

According to MoE (2010f), occupational standard defines the competences required for effective performance in the workplace and describes the work that is performed and

expressed as outcomes. Practically, it focuses on workplace activity rather than training or personal attributes through emphasis on outcomes and on the application of skills and knowledge, not just on specification. This means it is concerned with what the person is able to do and also with the ability to do this in a range of contexts. The document must be understandable to employees, employers, supervisors, workers, competence assessors, learners and trainers. Similarly, the Ethiopian TVET strategy MoE (2008) defines occupational standard as the competences that a person must possess to be able to perform and be productive in the world of work. It includes the entire range of KSA necessary to perform a specific job. The contents are focus on competences required by the occupational fields to reflect real job rather than prescribed requirements of an occupation. Thus, it keeps pace with changes in technology and job requirements. Based on particular work function that focuses on what people are expected to perform (duties and tasks), a unit of competence is measurable and achievable in terms of outcomes.

This unit of competence is part of occupation and consists of a series of units of competences. It may be accumulated over time to achieve the full qualification. It can also break down into elements of competence, which must be stated very precisely in order to avoid ambiguity. They include performance criteria to indicate the standard to which the outcome described has to be demonstrated. It includes a range of statements describe the contexts and variations over which the element of competence shall apply.

Occupational standards can be checked for compatibility with the participation of the industry and verified to be in conformity with the national vision according to appropriate internationally recognized occupational standards. Then, it shall be approved as the national occupational standard by the federal TVET agency. And federal TVET agency prescribe the procedures to be followed for standard setting and publishing them (MoE, 2008). The national qualification framework is then, based on predetermined occupational standards.When an occupational standard is defined by the respective industry, it is also assigned to a certain level in the NTQF. Assessment towards the qualification at that level is done according to the learning outcomes, duties and tasks specified in the occupational standards (MOE, 2010f). However, as indicated in the national TVET strategy occupational standards development must be based on the needs of labor market analysis. It serves as an instrument to identify the needs for new occupations as well as indicating the need for revision and adaptation of

existing national standards once technological or economic developments bring about changes to the qualification needs. For this reason, the labor market analysis can be conducted through local labor market assessments. This can be carried out by the TVET institutions but, regional labor market could be assessed by regional TVET agencies following the economic corridors of the region.

During assessments national economic development strategies should be referred. Therefore, regional and local TVET need to check if their training provision mainly targets lower level occupations based on this information (MoE, 2010b). In general, the Ethiopian occupational standard (EOS) is developed with the direct participation of the industry related to the occupation and ultimate standard. Thus, accreditation process will be based on it. To this end EOS is a corner stone and plays a very important role for the curriculum development and assessment in the TVET system of the country. Burayu TVET is also expected to practice the curriculum implementation process based on national occupational standard as per its exclusive mission and job behavior that will enable it examine its information technology skilled trainees with respect to their mission. All designed Programs are intended to develop the necessary knowledge, skills and attitude of the learners to the standard required by the EOS. For this reason, the contents of the programs are in line with the Ethiopian Occupational Standard (EOS).

CHAPTER THREE

RESEARCH DESIGN AND METHOD

3.1 Back ground of Burayu TVET institute

Burayu TVET institute is one of TVET institutes in Oromya, 14 kilometers from the capital. Based on the national education and training policy of Ethiopia the institute admits students who have completed grade ten, based on the entrance point limited by ministry of education/regional administration. The institute was founded in 2005 G.C with three departments and few teachers, but previously it was a training center for adults to train some skills like pottery. (y¯L¥îC ¥sL-¾ Èb!Ã). By the support of Burayu city administration, now it has been expanded with additional buildings to increase the intake capacity of the institute with different departments like construction, information technology, electricity & electronics, Garment, General metal fabrication & lather manufacturing. Under these different departments there are different sub sections which are related to the main departments. In addition to this the institute trains small micro enterprise on cobblestone to equip them with necessary skills of constructing roads. Based on the new education and training policy of the country the institute trains students with different levels like level 1 level 2,level 3 & level 4 to meet the manpower needs of Burayu in particular & other parts of the country in general.

3.2. Methodology
3.2.1. Research design.

To describe the implementation practices of IT curriculum in Buryu TVET institute, descriptive research design was selected on the bases of the theory that it is helpful to gather adequate information from the research participant for the study. The suitability of this design was noted by many scholars. According to Best (1970) cited in Cohen, (2005) many educational research designs are descriptive. Descriptive research design enable to deal with practices that prevail, points of views, processes that are going on, effects that are being felt and trends that are developing. It is helpful to assess how and what exists in relation to some preceding event that has influenced and affected at present condition or event.Similarly, descriptive studies look at individuals, groups, institutions, methods and materials in order to describe, compare, contrast, classify analyses and interpret things and events that constitute their various fields of inquiry.

3.2.2. Research participants.

Burayu TVET institute consists of six departments, namely:Construction Technology, Electricity& Electronics Technology, Garment, Lather Manufacturing, Information Technology (IT) &General metal fabrication. In order to see OBTVET implementation status in the institute, one department was selected using purposive systematic sampling technique. This is based on the fact that OBTVET have been practiced in the department of IT. As a target population for the distribution of questionnaire, 6 teaching staffs and 130 Level IIand III students in the institutewhere selected.

Based on this fact, random sampling technique was used to select 40 % 0f the sample population that is 52 students and directly all 6 (100%) teachers.Denscombe (2007) argue that the complexity of the competing factors that the decision on sample size tends to be based on experience and good judgment rather than relying on a strict mathematical formula. Moreover, the department head, academic dean, the registrar were interviewed to support the information obtained from the questionnaire. In support of the data obtained from questionnaire and interview, focus group discussion was also conducted with 10 students divided into two different groups.

3.2.3. Data collection instruments.

Human experience is varying within an individual and groups, as a result of this fact;it is not advisable to use a single instrument. Therefore, different instruments were employed in this study. These are: interview, questionnaire, focus group discussion, observation and document review.

3.2.3.1 Interview

Interview was conducted with academic dean, department head, and one registrarofficer.The interview was conducted based on structured open ended questions and additional questions were raised based on the responses of the participant. The rationale behind interview was based on the assumptions that an interview allow to produce a higher response rate.

3.2.3.2 Questionnaire

open ended and close ended questionnaire was employed to gather information from teaching staff and 52 students. This instrument enables to collect large samples and relatively standardized information from the respondents.

3.2.3.3 Focus Group Discussion (FGD)

Focus group discussion was conducted at the institute with two groups of students each consisting of 5 members to elicit information on implementation of IT curriculum in the institute. The participants were students who represent both levels. Discussion was taken place based on pre designed questions and additional questions were raised in order to encourage discussion from all respondents. This focus group discussion enables to understand the reason behind the views and opinions under review that are expressed by group members. It is believed that through the discussion it is possible to generate more ideas and make an exhaustive argumentation among the group members.

3.2.3.4 Observation: Observation was used to collect primary data and practical situation of the institute. To understand real live situation and to support data gathered using other instruments this method is appropriate. The observation was made by taking an appointment with IT teachers, institute academic dean. It can give an opportunity to understand the context of programs and to see things that might be unconsciously missed to discover things that participants might not freely provide in other techniques of data collections and to move beyond perception based data.

3.2.3.5 Document Review

To see and elicit availability of important document like curricula (an integrated course of academic studies) materials, IT occupational standards, organizational structure, guide line documents and legislation materials, maintenance schedule document review had been undertaken to support the data gathering activities.

3.2.3.6 Validity and Reliability

The issue of validity and reliability is important components of quantitative and qualitative data analysis. Validity and reliability are interconnected concepts. This means it can be demonstrated by the fact that a measurement cannot be valid unless it is reliable (Cohen, 2005). In this study both validity and reliability of the items were checked prior to the final distributions of questionnaires. In this regard, to check validity of the items content of the questionnaires were commented by different experienced individuals in researching problems in my school. Moreover, employment of different instrument in this study can ensuretheconceptofsecuring validity.

3.2.4. Data collection procedure

 The research design and methodology used in this study is drawn based on the methods and designs discussed in the preceding sections. The study try to incorporate different data obtained from primary and secondary sources. In order to gather these data various instruments were used that have been designed to collect both qualitative and quantitative data. The primary data were those that were collected as a fresh and for the first time and thus happen to be original in character. The secondary data is used to supplement the research topic for relevant conclusion and recommendation. The researcher would have to decide which sort of data he/she would be using (Kothari 2004).The primary data is collected through questionnaire , observation, and interview .The secondary data was collected by checking its relevancy to the study. Relevant books, journals, declarations and legal documents, as well as from the internet that reflects the experiences of IT of other countriestolook their trends in this issue.

3.2.5. Data analysis

To analyze the data collected from different sources and based on the specific nature of the data, a variety of methods were employed. Thus, the collected data were coded, edited, and ordered. To manage the data easily, the raw data was organized in to different categories in accordance with the proposed objectives. In this regard, all the close ended questions of the questionnaire were quantitatively analyzed, interpreted and reported using frequency, percentages, mean, and standard deviations. Tables are used to show the data secured and

make the possible assessment to reach to relevant conclusion. To come to reasonable conclusion percentile & Charts, pictureswere chosen to support tables and increases Visual judgment. In this regards, descriptive statistics were used to summaries responses given by the research participants. The data obtained from the open ended questions of the questionnaire and from all the other tools were qualitatively analyzed using textual descriptions i.e. similar answers of open ended questions were expressed by statements. From the analysis of both quantitative and qualitative, major findings and conclusions were made. Finally, based on the major findings some recommendations were given.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

This chapter presents results of data analyses gathered using different tools vis-à-vis the basic research questions raised in chapter one.

4.1. Characteristics of Respondents

This section provides a description of the respondent background. The researcher believes that it is useful for understanding the situation of the research participants in terms of sex, level and age. In this regard, Table 1 presents background characteristics of the sample students and Table 2 presents back ground information of sample teaching staff

Table1: Sample Student Background

	M	F	T	
Sex	22	30	52	
%	42.31	57.69	100	
	15-18	**19-25**	**>26**	**T**
Age	47	5	0	52
%	90.39	9.61	0	100
	II	**III**	**IV**	**T**
Level	38	14	--	52
%	73.08	26.92	--	100

As it is shown in the above Table 1, the distribution of the respondents according to sex shows that most 30(57.69%) are females and l 22(42.31%) of the respondents are males. To understand the real situation of the gender balance in the institute, documented evidence were reviewed and numbers of male students have been smaller than females by half. However, there is no observed gap in the institute in promoting male enrolment, but it is a result of availability of male trainees in the institute which is beyond the scope of this study. This year

(2013 G.C) 38 (73.08%) level II and 14 (26.92%) level III students were enrolled and attending IT as a measure course ,but Burayu TVET institute is not in a position to give level **V** because it is only limited to college level TVETs.

Table2: Sample Teaching Staff Back Ground

	M	F	T		
Sex	5	1	6		
%	83.33	16.67	100		

	25 - 30	31 - 36	37 - 48	> 48	T
Age	5	1	--	--	6
%	83.33	16.67	--	--	100

Table 2 above indicates the distribution of respondents of teaching staff. According to the Table most of the teachers are males 5(83.3%) and only 1(16.7%) of them is a female. Similarly, documented evidence indicated that most of the teaching staff in the institute observed are males. The experience of teachers (on table 3) range from fresh graduates (83.3%) to experienced once (16.66). Further, the table also demonstrates the age of sample teaching staff. Consequently, 5 (83.3%) of the respondent age have been 22 to 27 and the age of one teacher is 36. There were no respondent with the age less than 25 and more than 36. This shows that the teaching staff of the institute is dominated by youngsters.

4.1.1. Employed Inputs

Curriculum implementation requires appropriate and sufficient teaching- learning resources. Thus, to understand existing inputs in the institute data were generated and presented in the following sections. In the process of teaching learning activity, experience and qualification of the teaching staff are the most important inputs. Therefore, the data generated on these points presented in Table 3.

Table3 : Sample Teachers Experience & Qualification of Academic Staff in the department

	Tot	Diploma			Degree			Msc		Tot
		M	F		M	F		M	F	
Educational Level	--	--	--	--	5	1	--	-	-	6
%	--	--	--	--	83.3	16.7	--	--	--	100
	IT	M	F	Comp.sc	M	F	MIS	M	F	T
Field of study	6	5	1	--	--	--	--	-	-	6
%	100	83.3	16.7	--	--	--	--	-	--	100
	< 4 y	M	F	5-7 y	M	F	8 - 10 y	M	F	
Work experience	5	4	1	--	--	--	--	1	-	6
%	83.3	66.67	16.66	--	--	--	--	16.7	-	100

As can be seen from the Table 3, majority of the teaching staffs have experiences in the range of 2 to 5 years (83.3%), only 1(16.7%) of them were with an experience of greater than 10 year. Therefore, most of the trainers are inexperienced to conduct the teaching learning process to fulfill outcome based training curriculum system. All trainers in the institute are qualified to implement the curriculum but they were not taking methodology courses when they were in their colleges. Theabove Table 3shows thatthere are a total of 6 teaching staffs to provide trainings in the institute .Accordingly; most of the teaching staff academic qualification observed is BSc in IT, but there is no trainer with MA or MSc degree. In this regard, all of the teaching staff are graduated with first degree.

There is no teaching staff with the educational level more than first degree. Further, to support the data obtained through questionnaire an interview was conducted with office of the registrar. According to the interview most of the teaching staffs were holding adequate educational qualification with less experience of teaching to implement the curriculum in the institute. However, shortage of hardware maintenance professional was observed in IT department. Additional data have been gathered from the teachers on the relevance of the teachers' experience and qualification level.

According to the discussion, most research participant argued with the idea that obtained from the interview. However, the entire participant claim access of short term training on outcome based training system in TVETs. They pointed out that there is no continuous short term training on the new approach to TVET. These participants pointed out that to support available experience with relevant knowledge on curriculum development and implementation short term training is needed as mandatory component.

4.1.2. Supporting Staff

In order to obtain information on the employed supportive staff, data were gathered through interview. For this purpose sample teaching staff and students of the institute were requested to give their ratings on availability of supportive staff and access of guidance and counseling services. An interview with the institute academic dean on the number of supportive staffs (lab assistance) confirmed that there were no sufficient supportive staffs to support teaching learning activity of the institute. However, there was a gap in some areas which needs special

attention in the process of curriculum implementation. In this regards, there was no sufficient guidance and counseling services in the institute. An interview indicated that teachers tried to provide counseling service for their student in their area of study and the institute provide induction course for new students regarding the basic concept, implementation and procedures of the programs.

4.1.3. Financial Inputs

The main source of financial income for the institute is allocations of the budget from the Burayu city administration.

Table 4: Respondents Perception Concerning the Adequacy of Financial Resources

No	Questions / items/	Teachers response	
		Mean	St.d
1	There is adequate budget for running cost to implement the curriculum?	1.2	2.16
2	Adequate budget is allotted for purchasing capital goods.	1.2	1.09
3	There are adequate training equipments in the training rooms to learn effectively(computers, printer, scanner etc)	1.2	1.30

Regarding adequacy of the budget for running cost the result obtained from interview of both groups (teaching staff and students) observed comparable and rated negatively. This means there is no significant different between teaching staff and student responses. In table 4 it is clearly indicated by the mean of 1.2and standard deviation 1.09 that indicates financial inputs for the department of IT was insufficient. In order to clarify and communicate the result obtained through questionnaire an interview was conducted on the same issue and the

department head claimedthat budget allocation for capital goods and running cost is inadequate to run continued and scheduled program. This financial constraint has negative impact on the day to day teaching-learning activities. Therefore, the result obtained from teaching staff with support to an interview result can address the real condition of allocated budget.

4.1.4. Physical Facilities

Because of vocational training in an expensive exercise, a lot of effort has to be put in to planning and organization with the necessary equipments and ICT materials resources. But when we come to Burayu TVET institute the training materials are too short or absent to conduct the teaching learning process. Data were collected to know availability of physicalfacilities in the institute and It is below the standard and one computer is not for one student.Trainees use one computer for there and sometimes for four. The types of computers are out of date compared to the computers that they are working during cooperative training. Even if my samples are 52, I analyzed the ratio of students to the computers by looking the total number of IT trainees in Level one and Level II (130 trainees).Considering the library accommodation capacity is not to the standard. The library should be 1.7 m^2 per trainee(Source: Registration and accreditation of program in TVET (Mar, 2010:11) but for all trainees of the institute there is only one library without any relevant references.

When available furniture in the institute is compared with MoE standard; except white board most of the furniture's in IT lecture and laboratory are not fulfilling the required standards. Moreover, additional data were obtained through questionnaire on store facilities from teaching staff and students as presented in the tube below.

Table 5: Available furniture's in the institute

No	Material/space	Number	Ratio	Remark
1	Average available instructional room	--	--	Computer lab is used as a lecture room
2	Computer labs for all IT levels	2	--	--
3	Workshops in the institute	--	--	--
4	Number of computers	42	1:3	The total IT trainees were 130
5	LCD projector	--		--
6	Printer	1	1:130	The total IT trainees were 130
7	Internet line	--	--	--
8	External hard disk	--	--	--
9	Flash disk	2	1:65	--
10	Digital video camera	--	--	--
11	Digital photo camera	--	--	--
12	Scanner	--	--	--
13	Network cable	--	--	---
14	RJ 45 and RJ 11 connectors	--	--	---
15	VGA cable	2	1:65	---
16	Necessary software	--	--	Bought individually
17	Other peripherals	--	--	Bought individually

As clearly described in the table the amount of resources for the implementation of the curriculum in the institute is below the minimum standard(one computer for one trainee) to attain outcome based training.

Table 6: Respondents Rating Scale onstorefacilities.

No	Questions(Items)	Teaching staff response (N=6)		Student Responses (N=52)		Total (N=58)	
		Yes	No	Yes	No	Yes	No
1	Stores for the institute Academic and logistics material is sufficient	0	6	5	47	5	53

From the above results the response of teaching staff and students seems almost similar. This means stores for the institute academic and logistics material is relatively insufficient. Because there is no significant difference between responses of teaching staffs and students. To communicate the data obtained through document review on infrastructural facility; available infrastructure was seen through observation time. From the observation it was seen that there exist common teaching facilities like White board, table and chair for the instructors. However, the computer labs were used as a lecture rooms and not constructed to fulfill the requirements. Researcher as observer was also made during class lecture to see real circumstances of the computer labs. The observation revealed that both of the computer labs were overcrowded and inconvenient for teaching learning activity. The computer labs were observed poorly organized. According to the record of the registrar office there were 130 students in the IT department. However, the institutes library can accommodates only 30(23.08) of the total IT student at a time. This figure is less than what MoE standard required (1.7 m^2 per trainee). Furthermoretherewere no sufficient reference books and recently published articles in the library: that is the observation and in-depth interview with librarian confirmed that there was no Internet access and, reading rooms have been overcrowded also with other department students. Concerning internet services FGD (focus group discussion) were made with teaching staff and students and almost all the research participant argued that there was no sufficient service. Therefore, absences of these facilities affect motivation of the staff toward research and innovation. Available of safety items were observed insufficient and

existing fire extinguishers are not installed in appropriate place. For this specific point one respondent from this department replied that there is no regular check for its functionality and it is not in a position to secure computer laboratory activates.

Figure 1.Students' in the computer room.

As it was stated earlier and deduced from the picture above, the arrangement and ratio of computers to the students is not enough to conductout come based training system in the institute. Old HP brand computers (with 20 GB storage, 2.4 MHz speed and 512 Mb RAM) currently used are not to the standard. This days there are computers with up to 1 TB (terabyte),multi processors with different speeds and up to 6 GB RAM (random access memory) The institute assumed to train IT middle level professional students must not use outdated computers and accessories since the graduates are exposed to modern once when they are out of the institute.
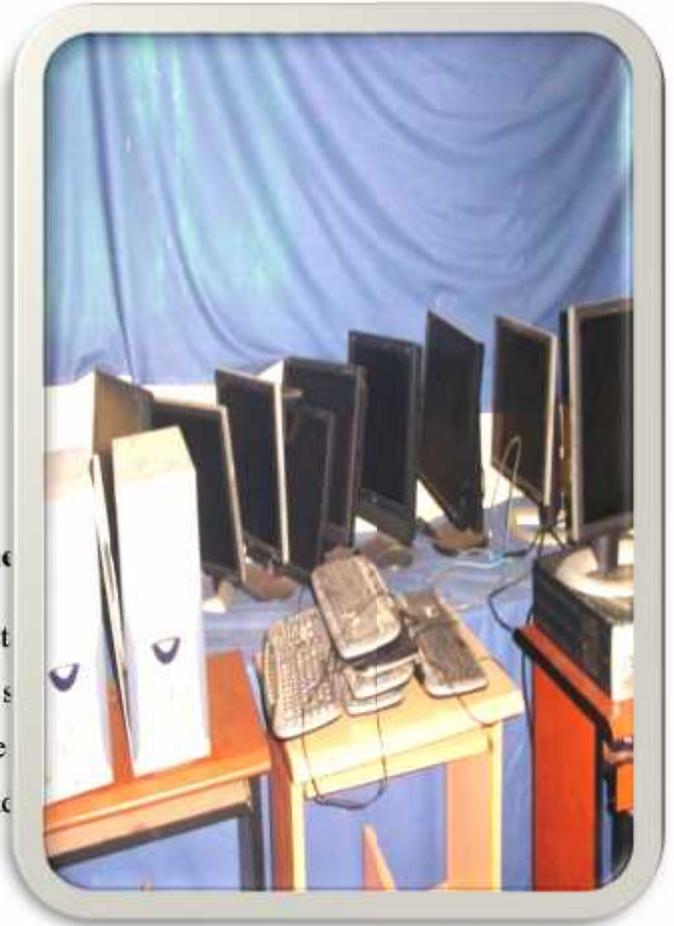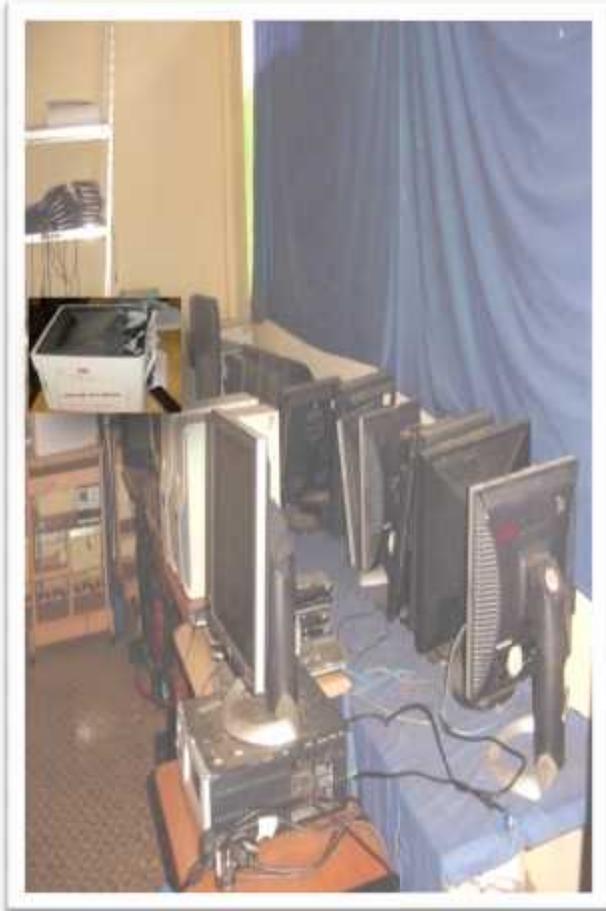
4.1.5. Teaching Learning Process

Appropriate implementation of the teaching-learning activity is the main stage of the implementation of designed programs. Based on this fact data were collected through different tools and presented in the following section.

Table 7: Teaching Methods and Assessment Techniques

No	Common method of teaching to make the class interactive		Students		Teachers	
			N	%	N	%
1	Teachers teaching method	Verbal question & answering method	7	13.46	--	--
		Project analysis method	4	7.69	2	33.33
		Class presentation method/lecture	14	26.92	--	--
		Combination of the above methods /all	27	51.92	4	66.66
		Total	52	100	6	100
2	Teachers assessment techniques	At the end of the course exam/Summative	32	61.54	4	66.66
		Continuous/formative	16	30.77	1	16.67
		Unannounced assessment	4	7.69	1	16.67
		Total	52	100	6	100

The Table 7 above shows that, out of the total respondents those requested to indicate teaching method 27 (51.92) replied that Combination of lecture and practical (is the most common employed teaching method and 14 (26.92%) replied that as lecture as a teaching methods. According to 4 (7.69%) of the total respondents project analysis had been used as teaching method in the institute. The rest 14 (26.92) of the respondents indicated that the common method was lecture/presentation. This means some of the teachers use lecture method and others use student center.

Concerning teaching and assessment techniques focus group discussion was conducted with teaching staffs. This group assured that the institute tries to follow the teaching – learning policy which is set by MoE, but due to different reasons application of learner- center approach and continuous assessment is not properly addressed. Most of the research participants claimed that implementation of student center methods of teaching and continuous assessment technique needs more teaching-learning resources, which is insufficient. In this regard, one respondent from Level III department of IT says

implementation of continuous assessment requires sufficient laboratories and demonstration rooms with important inputs to see the level of student achievements. But there exists shortage of computers and related devices that inhibit implementation of continuous assessment. This could be enforcing teachers to make assessments at the end of the course and as required based on the accessibility of facilities, because available workshops cannot accommodate required students at a time. Similarly, to see student competence performance it needs to integrate the class lecture with cooperative training, but due to limited facilities there were no strong such activities. Furthermore, to see real situation of teaching method in the institute observation was undertaken. From the observation, it was seen that some teachers were active participant rather than facilitators and they delivered lecture without student participation.

Figure 3. Participation of trainees in the class.

Figure 3 shows that students when not allowed to evaluate their trainers for proper implementation of the training process and it shows that students are not fully participate in the training system and hence student centered teaching method is not fully implemented and this hinders the implementation of the curriculum in line with the intended objectives.

Q.6. Are you provided with the opportunity to evaluate your teachers' Performance on the teaching -learning activities? (%)
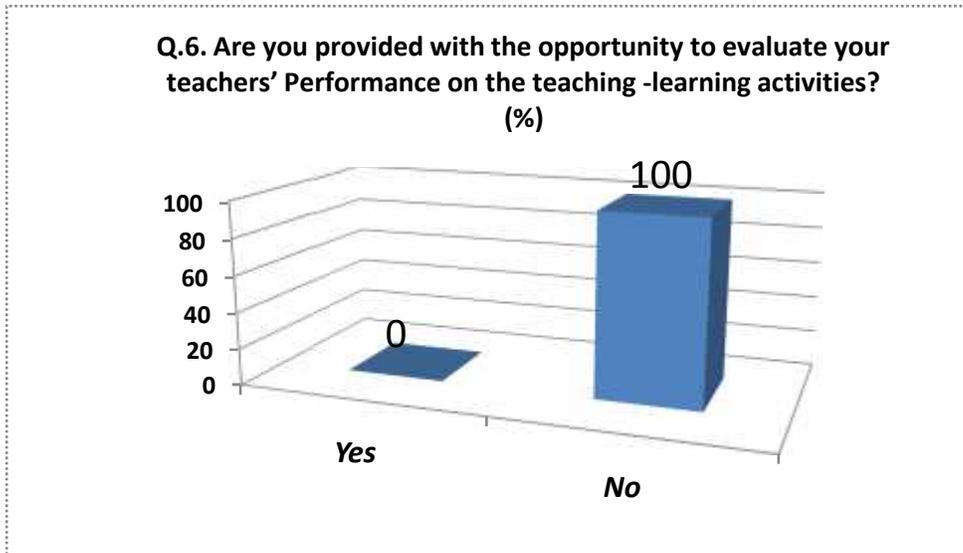
Figure4. The opportunity given to trainees to evaluate teachers'.

The above graph depicts that no opportunity given for trainees to evaluate the performance of their teachers. The evaluation methods of the department and method of class observation was not adequate and this will affect the improvement of trainer's methodology to deliver quality training.

Q.12 .Do you think that the assessment practice in your Institute is useful for career development/creates your own business?

Figure 5.Assessment techniques for career development.

Graph 3 shows the response of trainees towards the assessment techniques that their teachers use was not supportive to their career development and to pass the COC exams. 61.54% of the respondents do not believe that the method of assessment would not prepare them to the existing labor market computation, but 38.46of them respond positively to the importance of assessment techniques for their career development.

Graph 4 also indicates that 73.08% of the students knew the teaching method of their teachers and the rest 26.92% are responded that their instructors method of teaching is not uniform, some teachers use different methods according to their interest i.e if they are not in a mood of teaching they can give us a group work and leave the computer laboratory without any assistance, and hence trainees use their own work and some of them play computer games in their practical class ,this obviously affect curriculum implementation interims of time.
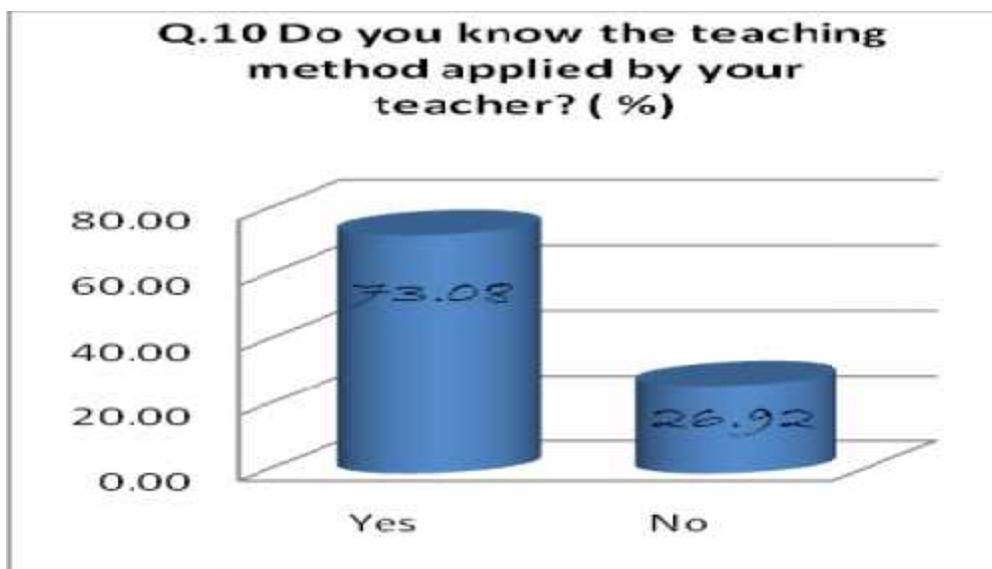
Figure 6.Assessment techniques for teaching method.

The above graph shows that the method of teaching employed by their instructors is not constant. Respondents argue that instructors use a method which is convenient to them, and therefore we can't tell the exact method of teaching of our instructors since it is not constant and the rate of turnover is high

4.1.6. Employed Instructional Materials and Supplementary Documents

Teachers were requested to fill the questionnaire on the issue of instructional material and supplementary document. Response obtained from research participant presented in Table 8 below:

Table 8: students' response regarding Instructional Material and Supplementary Documents.

No	Questions/Item	Students response					
		Yes		No		Total	
		N	%	N	%	N	%
1	Do you get the course outline at the beginning of the class?	--	--	52	100%	52	100%
2	Are you provided with necessary handouts to supplement the course./lab manual/	12	23.08	40	76.92	52	100
3	Do you have workbook/lab manual to exercise application programs?	--	--	52	100%	52	100%
4	Are you provided appropriate instructional materials/teaching aids to deliver the course.	23	44.23	29	55.77	52	100

To understand whether students got Instructional Material and Supplementary documentsat the beginning of each course; data were gathered from students and presented in Table 8above. From the Table it is possible to realize that course outline is not given to the learner at the beginning of the course. All respondents 52(100%) replied negatively on getting the course outlines.

Table 9: teachers' response regarding Instructional Material and supplementary Documents

| No | Questions/Item | Teachers response | | | | | |
| | | Yes | | No | | Total | |
		N	%	N	%	N	%
1	Have you delivered course outline at the beginning of the class.	--	--	6	100	6	100
2	Have you prepared and used handouts to supplement the course.	6	100	--	--	6	100
3	Is there a workbook/lab manual for exercising application programs in the lab?	--	--	6	100	6	100
4	Is the trainees provided appropriate instructional materials /teaching aids to deliver the course.	4	66.66	2	33.33	6	100

As it is clearly observed in Table 9above 4(66.66%) of the total sample confirmed that they used appropriate instructional materials, where as 2(33.337%) of them replied that they did not use appropriate instructional materials. According to those respondents who were unable to use appropriate instructional materials for implementing the curriculum need sufficient resources in order to train students to be active participants and skillful. Concerning preparation of course outline for each course and handouts 6 (100%) of the teachers responded that they prepared to meet the implementation of the curriculum. To supplement the data gathered through questionnaires, the focus group discussion was conducted on instructional materials. According to the discussion there is shortage of instructional materials to use it properly in the institute.

Most of the respondents indicated that either there is scarce in availability of instructional material or outdated instructional facilities in the institute. To observe real situation on the ground researcher as observer was conducted. From the observation he confirmed that some of the computers and application programs on hand for teaching learning activity were seen outdated. For example, the storage capacity, speed, RAM and some other related hardware and software are not preparing the trainees for the current market.

4.1.7. Governance and Management of the institute.

In order to understand governance and management conditions of the institute data were collected through document review, questionnaire and interview. In this regards, appropriateness and effectiveness of the governance and organizational structure of the institute were reviewed from the institute legislation, hiring policy, rules and regulation manuals. According to the legislation of Oromiya TVET agency, the institute is governed by management committee. The committee includes institute dean as chair person and the Institute deputy is the secretary, whereas all the department heads are the members of the committee. In addition to these members, three representatives from teaching staff and institute student affairs are included in the academic commission of the institute. In order to know ways of delegation in the institute and conduciveness of the environment for teaching learning activity: sample teaching staffs and students were requested to fill out the questionnaire. Accordingly, the following results were obtained. The rating scale of the response had been based on research instrument with five response alternatives or categories (strongly agree, agree, neither agree nor disagree, disagree and strongly disagree) and presented in the Table 12 below.

Table 10: Conducive environment for teaching Learning environment

| No | Items | Response N=52 | |
		Mean	Std.d
2	The environment for which the institute situated is conducive for implementation of outcome-based training.	10.4	16.82
3	The relationship between teachers and students are friendly and useful for teaching learning activity.	10.4	10.45

The result obtained from the Table 10above for the listed two items is positive.The compound is conducive and safe for teaching learning process, the relation of trainees and trainers is

good, the harmonious relationship and safe compound of the institute is good opportunity to students and teachers since no attention diverters are found around the institute.

even if the compound is conducive for the implementation of the curriculum for outcome based training system, the basic training materials are hindering the implementation of IT curriculum in the institute. This is because of low budget and awareness of committee members. On ways of management in accordance with document reviewed, interviews were conducted with department heads. Accordingly, they indicated that some of the above mentioned committees are not fully functional and every piece of relevant work is not delegated to appropriate destination.

4.1.8.Guiding Principles

To understand core principles of the institute on student admission, staff promotion and certifications the data were generated through different approaches.

4.1.9. Student Admission and Placement

In order to understand admission and placement situation of the learner, sample students were requested to fill out the questionnaire. Accordingly, the data obtained is presented in the table below.

Table 11: Student Admission from 1988-2006 and Placement.

Year	M	F	T
1998	12	13	25
1999	21	14	35
2000	32	17	49
2001	36	44	80
2002	32	72	104
2003	44	81	125
2004	66	70	136
2005	54	89	143
2006	44	86	130
Total	341	486	827

Source:-Burayu TVET institute record office.

As can be observed from the Table 11above, educational level of the students those joined Burayu TVET institute department of IT were all grade ten completed students. The academic dean was interviewed whether student interest was considered or not. According to the dean; student's interest is not the only parameter that was seen during the placement. Besides student's interest, there are other parameters that were taken into consideration. Some of these parameters were; the academic background of the student, the opinion of the organization about required manpower to be learned in the institute and the institute's interest in balancing departments. However, the institute tries to consider students' interest in combination with other parameters.

Table 12: Students' interest in selecting department and educational back ground

No	Question /item/	Category	N	%
1	Educational level of the candidate at the time of entry	Grade 10	52	100
		Previous Grade 12	--	--
		Other	--	--
		Total	52	100
2	Reason to joining the IT department	By placement	5	9.62
		Interest	43	82.69
		lack of choice	4	7.69
		Total	52	100

The above table clarifies the enrolment criteria used in the institute; data were obtained through interview from academic dean and registrar officer. As confirmed by the office of academic (vice dean) and office of registrar (record office), an enrolment of the student is based on the policy set by MoE. To communicate this fact with the institute teaching-learning community focus group discussion had been conducted. The Institute enrolls students based on the admission point established by Oromiya TVET agency on general secondary education certificate examination (at the end of grade ten). All of the students enrolled in IT department were those who have completed grade 10. The interest of the students was not maintained because of the shortage of material resources and the capacity of the department.

Table 13: Students Dropout from 1988-2006

Year (e.c)	M	F	Total completed	Dropout N	Dropout %	Remark
1998	9	11	19	6	24.00	
1999	18	12	30	5	14.29	
2000	18	21	39	10	20.41	
2001	20	26	46	34	42.50	
2002	26	21	47	57	54.81	
2003	23	38	61	64	51.20	
2004	22	24	46	78	57.35	
2005	16	28	44	99	69.23	
2006	5	7	12	12	9.23	Up to this data collection
Total	157	188	344	365	Av.Dropout/year = 38.11%	

Source: - Burayu TVET institute record office

The above data shows that the number of dropouts increases at an increasing rate. According to the information obtained from FGD interview and data from record office, because of economic, social and other reasons students dropout rate was high. Number of dropouts for the last eight years including the current academic year was 365, an average of 38.11% students were not completing their lesson every year. This alarming condition invites me to look for the problem deeply.

4.1.10. Internal and external supervision system.

The institute vice dean is responsible for the training system in the institute. He is expected to supervise the daily activity of the department in the regular bases as internal supervisor but this was not a trend of the institute except some conditions. There was no schedule for the regular supervision of the system for supporting the activity in the department.Responsible trainers are doing their task by themselves based on their interest. External supervisors from Oromiya TVET agency came once or twice a year to supervise the curriculum implementation in line with outcome based training system. As the respondents comment the external supervisors as problem listeners but not solvers, because all the past supervisors are not in a position to solve the problems of the institute except taking notes and listening the problems. Responsible supervisors are highly recommended to accomplish their task for the proper implementation of the curriculum.

4.1.11. Curriculum Design and Teaching Staff Development

An interview was conducted on the issue of curriculum with the dean, vice dean, and IT department head. According to the interview, curriculum of the institute was developed by the institute in line with MoE. To keep the quality of the curriculum, developer of the curricula were received training on the method of curriculum design and how to follow the guidelines in the curriculum development process. In this regard, all the necessary curricula materials were prepared for all levels. To supplement the above result, document review has been conducted to assess available instructional materials in the Institute. In this regard, necessary curricula material observed ready for each program being implemented in the institute, which is in accordance with MoE standards. Concerning teaching staff development and the issue of training on outcome based TVET teachers were requested to fill out the questionnaire. Response of this research participant is presented in the following table.

Table 14: Teachers Training on outcome based training to implement the curriculum of IT.

No	Question Item	Response	N	%
1	Have you ever taken any training on theconcept of Outcome-based TVET?	Yes	1	16.67
		No	5	83.33
Total			6	100

As can be seen from the Table 14 above, training on outcome-based TVET almost all 83.33% of the respondents were replied that there was no training in the institute or other level given to them to implement and aware outcome based training. On this issue an interview was conducted with the head of department and academic dean to generate how far the institute trains teaching staffs on new approach to TVET. Most of the respondents, specifically the department head argued that training on OBTVET system was insufficient and needs special attention in order to equip trainer with better understanding of outcome based training, But the dean explains that the institute had supported teaching staffs in facilitating chance of education for the smooth functioning of the teaching-learning processes, however, this does not mean that all the necessary training is given to the teachers regarding to OBTVET. Since outcome based training is new approaches it needs more effort to bring the staff at required competences and implement the curriculum as designed. In other hand, there exist shortages of continuous training on the new designed approach of the training.

4.1.12. Challenges in Implementation of IT curriculum in Burayu TVET institute.

To understand factors that hinder implementation of the curriculum data were collected from the institute communities. In this instance, data obtained through questionnaire, interview and focus group discussion to answer research question number four had been presented and analyzed under the following sections.

4.1.13. Low Awareness

Teachers were requested to fill out whether they have similar idea about curriculum implementation in line with outcome based training or not and replied in different ways. The percentage was used to know how many respondents affirmatively replied within departments and in the institute.

4.1.14. Financial Constraint

As can be understood from the research participant outcome based implementation of curriculum in TVET system needs sufficiently furnished computer laboratories and instructional rooms. The department head argued that lack of up-to-date instructional instruments and running cost for purchase of training materials had been major constraints of outcome based training implementations. Commonly, all the trainers argued on financial burden on the provision of adequate and appropriate teaching resources. Moreover, respondent from the department explain that to equip students with required skill on new models and today's technology, it needs continuous on job training in accordance with current market needs. But there exist financial deficiency to implement what designed on paper work. On similar issue another respondent responded that there is no sufficient financial resource to integrate teaching learning activity with cooperative training. Even though the entire research participant believes on requirement of strong linkage with offices it was hardly possible because of the fact that most offices workers at Burayu city administration are not positively looking apprentice in their offices. Discussion with students and teachers indicates that there has been cooperative training at the end of education year, However, there is no a system of continuous work based training in the institute.

4.1.15. Necessary Conditions for Successful Implementation of IT curriculum in Burayu TVET institute.

Necessary data were generated on condition for IT curriculum implementation. According to interview conducted with deans and trainers, almost the entire research participant of the department suggests similar opinions. In this regard, well organized computer lab and office linkage in order to address the needs of the current market and to implement the curriculum in line with outcome based training system. Trainers needs short term training in order to develop their approach of implementation practices. Moreover, common views of the department head and participant of FGD have been indicated in the following paragraph.

Adaptability of the outcome based training to the department needs to be incorporated with relevant offices to develop concept of Outcome based training with real world of work. In such a way that continuous trainers training on new technologies and in relation to institute program must be integrated with offices to adopt current demands of TVET training. Qualitative data also address the needs of well-organized computer laboratories for teachers on the concept of OBT. In this regard, it is important to empower teachers and other academic staff to participate in any workshops on outcome based training curriculum implementation. This has positive impact on implementation of predesigned program. Similarly, encouraging student-center of teaching-learning approach is needed to enhance student self-confidence for their future careers. In this approach trainers should create their own mechanisms that enable them to be competent enough in their activity.

4.1.16. The Status of IT curriculum Implementation in Burayu TVET

In the process of outcome based training implementation teaching learning inputs are important factors. In this regard, the quantitative analysis of the data obtained through document review from the record office indicated that most of the teachers hold sufficient level of qualification in terms of educational achievement. This means 100 % of the teaching staff holds first degree. Similarly, the analysis of the data obtained through questionnaire from the sample teachers indicated that teaching staff of the institute possess insufficient experience in terms of service years. According to this result only one trainer of the staff have the experience more than 10 years. Even if the teaching staffs are qualified the problem of turnover (average of two teachers per year) affects the implementation of the curriculum based on the settled objective. Concerning employed supportive staff, quantitative data analysis obtained from the sample of teaching staff and students responded negatively. On this point, the means of the responses of the sample student and sample teachers were similar.

Quantitative result on availability of guidance and counseling service there were no significant different among respondent groups. In contrast, qualitative data on this point indicated that there is no sufficient guidance and counseling service in the institute. Therefore, the result obtained from the qualitative survey reveals that supportive staffs in the areas of counseling service needs improvement.

Regarding staff structural standard, legislation and organizational chart of the institute were reviewed and qualitatively analyzed. According to this documented, evidence there exist properly addressed organizational structure and well defined human resource structure. Furthermore, available financial input for the implementation of the curriculum was analyzed. In this regard, the quantitative result indicates that responses on running cost were evaluated negatively. Regarding employed physical inputs quantitative analysis on space provided indicated insufficient. On these issues qualitative analysis also reveals the same result on both space provided and instructional furniture. However there were no LCD projectors and notice board in lecture rooms. Similarly, some of the ICT devices in the department were seen outdated. The computer laboratory in the department has been observed poorly stocked. Likewise, qualitative and quantitative analysis indicated that library of the institute is inadequately organized and poorly equipped.

The library can accommodate only few students. This means the library capacity observed below standards. Within the library there is no internet access and, reading rooms are overcrowded. Even in the entire institute there is no internet access and this has a negative impact on research and innovation. On the issue of safety items, from the discussion (FGD) insufficient allocation of the items was concluded. In the process of Curriculum implementation, the focus of instructional materials is to meet intended goal of teaching-learner activity. For this purposes data were collected and analyzed in regard to this issue. Accordingly, quantitative analysis on the use of appropriate material indicated almost all sample teachers unable to use appropriately the teaching materials for the intended objectives.

According to qualitative result of these points the reasons that claimed and observed on inappropriateness of instructional material is indicated as insufficiency and outdate resources. Concerning preparation and delivery of course out line both qualitative and quantitative result confirmed that, teachers are not preparing course outline on timely base and in proper manner. On this point quantitative result obtained from students show that 100% of the total respondent responses had been negative. Similarly, quantitative result on preparation of computer laboratory manual and course plan shows insufficient.

4.1.17. Burayu TVET institute in implementing IT curriculum:

Qualitative data analysis from document review and an interview on governance and management show that the institute is governed by the committee of all components from each structure of the teaching learning community. This ingredient ensures appropriate responsibility assignment approach of the necessary duties. To communicate and compare this result quantitative data obtained from sample of teaching staff and student were analyzed in regard to appropriate delegation. The result obtained was not positively valuated. This result discloses that appointed committee are not fully functional. In addition to governance and management the research participants were requested to valuate environmental conduciveness of the institute. Accordingly, on this specific issue, the result reveals that there is negative perception from the teaching learning community. Moreover, admission and placement of the student is another important issue of curriculum implementation in the institute. Besides some limitation on placement procedures both quantitative and qualitative result indicated

appropriateness of the criteria. This means the institute admission is based on predefined MoE stated direction with some additional criteria from Oromiya TVET agency.

In regard to staff promotion, qualitative analysis from document review indicates that promotion of trainers in the institute is based on pre-designed standards and documented guidelines. Curriculum design and staff development is also a core element in outcome based training. On the approach of curriculum design qualitative result obtained through interview indicates that developers of the materials had received training on the process of curricula development. In this regard, the Oromiya TVET institute prepared curricula materials that were delivered to the department in the institute. These materials were designed based on MoE stated standard in combination with need assessment of the Oromiya TVET agency.

In order to implement pre-designed curriculum staff development is important elements. According to qualitative result on this point, except some limitation in regard to short term training on curriculum implementation concept, the institute effort in providing access to university has been strong aspect of the institute. However, as a result of limited access to short term training there is inconsistence understanding of curriculum implementation and outcome based training among trainer staff. In support of this idea, quantitative analysis on short term training indicated that only 16.67 %of the total respondent ensures availability of short term training. In addition to the above reason and lack of incentives in the institute discouraged trainers to search for another job (turn over) and this highly affect the implementation of IT curriculum. Data from interview verified that the process of substituting a trainer in the place of the other will take a long time and in the middle students are left without trainer and hence the designed curriculum was not covered properly.

4.1.18. Challenges and Necessary conditions of IT curriculum implementation:

The qualitative and quantitative analyses of the data revealed that low awareness among teaching staff (83.33%) and department on the idea of proper implementation of the program indicated as significant inhibiter. In this regard, the result obtained on common understanding of curriculum implementation had been 80% in the case of level III and 20% in the case of Level II. This means different levels are considerably different in regard to overall idea of curriculum implementation. Similarly, qualitative result on financial constraint indicated as if

it is major factors that hinder implementation of curriculum in Burayu TVET institute. In the process of outcome based training up to date teaching-learning equipment are required, however the result pointed out that financial constraint as major limiting factor in fulfilling this teaching-learning facilities. In this regard, qualitative result reveals the institute needs to be give due attention in finding alleviation mechanisms of the problems attached to awareness and financial constraints. Moreover, encouraging student-center of teaching learning approach is needed to enhance student self-confidence for their future careers. In this approach trainers should create their own mechanisms that enable them to be competent enough in their activity.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.

Six basic research questions were proposed to assess the implementation status of information technology curriculum of at Burayu TVET Institute. In order to answer these research questions, data collection instruments were developed, tested and finalized. In this regard, the collected data were presented, analyzed and discussed. Hence this chapter presents summary of the major findings, conclusions of the study and necessary recommendations.

5.1. Summary of Major Findings

The main purpose of this study was to assess the state of implementation of information technology curriculum of Burayu TVET institute. Accordingly, this study came up with the following major findings based on analysis of both quantitative and qualitative data.

1. The qualification of the existing teaching staff members is sufficient to undertake their responsibilities; this means all of the teaching staffs have bachelor degree. Majority of the teaching staff have an experience of four years and below and hence majority of qualified instructors do not employ satisfactory method of teaching and this will indicate that the curriculum is not implemented fully yet , since experience is one of the inputs for proper implementation of the curriculum for outcome based TVET system. Moreover, there was adequate manpower for all competence levels. However, there is shortage of manpower in guidance and counseling service. On this specific issue there was no structural gap. This means the qualitative analysis reveals that the organizational chart of the institute has documented the necessary manpower in terms of quantity and components.

2. Concerning financial inputs for both running cost and purchase of capital goods, it was insufficiently allocated. Similarly, physical resource allocation in most cases was seen inadequate. There were outdated ICT equipment's and software have currently been used.

- The availability and use for data processing and communication peripherals, such as , photocopiers, computers, printers, scanners, digital photo and video cameras, LCD projectors were found very little or absent.

- IT uses expensive "tear and wears "like computer mouse, keyboard, power unit, monitor etc, especially at a training level, the frequency of damaging is very high. It was found that there was shortage of budget in the institute for stationary and maintaining IT laboratory materials. The budget used in IT department compared to others is very low and not enough to run the curriculum efficiently.

- Computer maintenance rooms can contribute much in the process of teaching and learning process, but in Burayu TVET institute there is no computer maintenance room that contributes for preventive maintenance, basic trouble shootings and to advance computer maintenance courses.

- The anti-virus management system in the institute is almost not implemented; this is because of budget to buy antivirus programs and the absence of internet connection in the institute.

3. Regarding teaching learning process, there were different employed teaching methods and assessment techniques in the institute. In this regard, significant numbers of teaching staffs failed to follow the implementation of IT curriculum for the needs of competency based training.

- It was found that the availability of work book, IT text book, and access of printer in IT laboratory was not satisfactory.

- The processes of curriculum development have been in line with MoE guidelines in combination with Burayu TVET institute need assessment. Thus, curricula materials were not uniformly and fully prepared for each courses and competences.

4. Available spaces for teaching-learning activity in the institute were seen insufficient. Library of the institute was observed below standard in terms of accommodation capacity and physical facility. It was poorly organized, stocked and without internet access. Similarly, there was no internet in most offices of academic staffs and no well

organized and resourced information technology center in the institute. Moreover, computer laboratories of the institute were insufficiently and inadequately equipped.

- Computer labs were used as IT lecture rooms in the entire training institute. Moreover, all buildings and class rooms were not constructed for the purpose of IT Laboratories. This creates a problem on computer settings, electric wiring, and computer network cables are improperly positioned.

5. It was found that circumstances of the institute concerning governance and management were not characterized by clear and transparent delegating principles. There was not appropriate system to enhance teaching-learning community to participate in decision making process. Thus,

- In the areas of placement issues, the institute enrolment procedure is not appropriately addresses the requirements, because some fresh graduates are placed without computation and other unknown reasons.

- Promotion of academic staff of the institute was not fully based on pre-designed standards. This means principles and regulation of the institute were not clearly addressed.

- The most serious problem of the institute is turnover of teachers. The management is not in a position to substitute trainers soon and this affect the course coverage and other teaching learning activities.

6. Access to university education for academic staffs had been strong aspect of the institute and, lack of short term training on curriculum implementation had been observed negative features of the institute.

7. The other serious challenge of the curriculum implementation process in the institute had been low awareness of teaching staff in particular and institute teaching-learning community in general. Qualitative analyses on the necessary measures in adopting curriculum implementation to address competency based training indicated that more short term training have to be organized for teachers' to enhance their understanding of curriculum implementation and to bring the staff into common understanding.

Moreover, in order to alleviate financial burden it needs to find ways of generating financial sources.

5.2. Conclusions

Based on the analyses major findings were identified and presented in previous section. Thus, the following conclusions have been drawn from the findings.

1. Even if the educational qualification of trainers is sufficient most of them are not experienced in the area of teaching. There were relatively enough staffs in terms of numbers and level of qualifications to implement the curriculum. However, there was no assigned professional that facilitates guidance and counseling services. Similarly, available offices and physical inputs were inadequate for proper teaching–learning activities to implement the curriculum effectively. To facilitate such important ingredients of teaching – learning process, allocated financial budget were seen scarce. For this reason, existing services were unsatisfactory. Beyond these problems currently used teaching method and assessment techniques had been inconsistent. Implication of these conclusions is that the institute manpower allocation was primary based on teaching staffs and fail to address the issue of guidance and counseling services, which is an integral part of the effective functioning of the curriculum.

   Burayu TVET institute budget allocation was based on conventional TVET institutions and unable to fulfill the new approach competency based training. Moreover, the institute trainers have no common understanding of teaching and assessment techniques that needed in implementing IT curriculum for competency based training. Therefore, it can be possible to conclude that implementation status of IT curriculum for occupational competency system in the institute was insufficient. However, available teaching staff educational qualification and their commitment in document preparation can improve scheduled program if the institute alleviate forgone problems.

2. Governance and management, which is critical to address conditions of the institute working principles and implementation of scheduled program. The institute academic management was organized in appropriate ways and able to work in line with national frame work. For this reason, admissions of the student, staff promotion and issues of curriculum design have been satisfied criteria's of MoE. However, lack of implementing prepared

Information technology occupational standards (ITOS) in the case of most competence areas (networking, maintenance, office automation) and certification issue had been distinguished as one of the negative aspect of the institute working circumstances.

3.   Even though academic community of the institute had been integrated and organized in appropriate way, there exists inconsistence in understanding within the staffs about curriculum implementation. Most of the staff has low awareness about outcome based TVET. In addition to low awareness, financial constraint had been another factor that challenging the program implementation particularly in substituting damaged IT equipments and replacing with new and updated once.

4.   The needs of short term training and panel discussion have been addressed as important factors to alleviate the problems attached to the issue of awareness. Moreover, creation of financial source can improve curriculum implementation practices through provision of proper facilities. This implies that there is no customized system of short term training in the institute.

5.3. Recommendations

The institute needs to give due attention on the issue of inputs, teaching-learning process and the occupational standards. From these implications the following can be possible recommendations for proper implementation of IT curriculum system in the institute.

1. Lack of adequate teaching learning resources was clearly identified especially computers, printers and other IT facilities and demonstration items. Therefore, as the availability of this facilities are one of the influential factor in outcome based training in implementation process of TVET system, supplying and facilitating of these equipments in terms of its quantity and quality should be given due attention by Burayu TVET institute and relevant stakeholders. Moreover, the institute can find out alternative ways through creation of strong network and linkage with relevant ICT institutions around the institute.

2. The finding confirmed that the teaching process currently employed in the institute is unable to address demands of outcome based training. In this regard, the institute has to organize workshops, seminars and panel discussions on curriculum implementation on teaching and assessment approaches. Moreover, Burayu TVET institute needs to assist the institute by preparing the ground rule for the teaching-learning process in implementation of curriculum in line with competency based training. An emphasis on this critical issue of teaching learning process can ensure proper implementation of the scheduled program.

3. Even though the institute governed with well-organized and structured principles, the study indicates that the institute is not in a position to implement the stated occupational standard in most competence areas. Not implementing the occupational standard has adverse effect on implementation of scheduled program. Therefore, in order to pace the training with National TVET qualification framework the study recommends that the Burayu TVET institute should practice required information technology occupational standards (ITOS).

4.   A number of challenges had been identified that hinder the implementation of IT curriculum in Burayu TVET institute; these challenges have mainly emerged from financial burden and lack of awareness. Continuous teaching staff development shall be needed in order to maintain and adapt required knowledge and awareness for proper implementation practices of the curriculum. In this regard, it is advisable to use different system to create consistent awareness on outcome based training to raise teaching staff understanding of the system and implement the curriculum.

5.   The training equipments in IT department are in scarce: on the other hand there are idle computers and other electronic devices with simple faults. The timely and regular maintenance of training IT materials and equipmentshas paramount importance in the training system. All this can be prevented by identifying and addressing the problem.establishing the cause of damaged and setting the right priorities need knowledge and skill. Therefore trainers should get the necessary maintenance training facilitated by the training institute and Burayucityadministration.

6.   To alleviate budgetary problems, the institute has to organize income generating activities (photocopy, printing, electronic devices maintaining service) in and around the institute.This is because the institute is located near to the main road and there are a number of governmental offices that need the above services.

7. The week attachment of the institute for cooperative training must have to be improved by continuous and strong attachment of institute management with relevant offices.

8.   The rapid and frequent turnover of trainers for additional benefits can be minimized by giving incentives on institutional level by :-

   1. Crating strong attachment with city administration to arrange condominium home or covering some amount of house allowance for trainers like teachers in Addis Ababa.
   2. The other possibility is to give a chance for trainers to maintain and install IT devices in governmental offices of Burayu for additional income during their off hours.

3. Preparing a training program for community members on basic computer courses and others for the benefit of IT trainers of the institute.

As indicated under scope and limitation section of this paper, the study was only concerned to the implementation status of IT curriculum at Burayu TVET institute. Thus, this research cannot cover overall training system of Burayu TVET institute. Hence, additional research is needed to clarify challenges in the area of outcome based training system implementation issues. More specifically, extended study is required to find out solutions for the problems attached to financial burden, improvement of trainer's awareness and ways of cooperative training in regard to office integrations and linkages that enhance work based training. In this view, the study shall provide an opportunity for further research on curriculum implementation practices of other departments in the institute.

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ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES

COLLEGE OF EDUCATION AND BEHAVIORAL STUDIES

DEPARTMENT OF CURRICULM AND TEACHERS' PROFESSIONAL DEVELOPMENT.

Questionnaire to be filled (completed) by Information technology Teachers

Dear Respondents:-

The objective of this questionnaire is to collect accurate and necessary information on the "The implementation of information technology curriculum for outcome based training system in Burayu TVET Institute". Hence, the success and effectiveness of this research is highly dependent on the accurate and genuine information that you give and thus I would kindly request you to collaborate with me in filling this questionnaire thoroughly and completely. Here one thing I went to remind you is that, your response will kept confidential and will only used for purpose of the study.

Thank you in advance for your collaboration!!!

General direction.

1. No need of writing your name on the questionnaire.
2. Please follow the relevant instruction when filling out the questionnaire.
3. Put (✓) mark if you agree with the given option.
4. Please write short answers in the space provided for items that require opinion.

1. General information (personal data) of the respondent.

1.1 Sex   A. Male ☐   B. Female ☐

1.2 Age   A. Under25 ☐   B.26-36 ☐   C.37-47 ☐   D.48 and above ☐

1.3 Educational Level

A. Diploma ☐   B. Degree ☐   C.MSC ☐   D. other ☐

1.4 Work experience (years of service) on teaching

A. below 4 years ☐   B.5-7 ☐   C.8-10 ☐   D.11-13 ☐   E. 15 years and above ☐

1.5 Field of study (specialization)

A. information technology ☐   B. computer science ☐

 C. Management information system ☐   D. other ☐

Part I: -Please rate how strong you agree or disagree with each of the following statements by placing a check (✓) mark in the appropriate box.

No	Description	Strongly Agree (5)	Agree (4)	Neither agree Nor disagree (3)	Disagree (2)	Strongly Disagree (1)
1	The environment for which the college situated is conducive for implementation of IT curriculum.					
2	There is adequate budget for running cost to implement the curriculum?					
3	Adequate budget is allotted for purchasing capital goods.					
4	There are adequate training equipments in the training rooms to learn effectively(computers, printer, scanner etc)					
5	There is Library with relevant and sufficient copies of books, lab manuals, modules.					
6	There is sufficient Supportive staff for effective implementation of the IT curriculum in the institute.					
7	There are different rooms for theoretical and practical classes. (availability of lecture rooms)					
8	IT rooms are fully furnished and there is strong database system in the institute.					
9	Safety condition in computer labs is conducive.(electric wire, network cable etc)					
10	Damaged computers or accessories are maintained timely					
11	Stores for the institute academic and logistics material is sufficient					
12	There is internet access in the institute.					
13	There is a reliable power source in the institute.					
14	The college has adequate relationships with different stakeholders					
15	Adequate orientation and guidance service has given for the trainees at their arrivals and during the class.					

No	Description	Strongly Agree (5)	Agree (4)	Neither agree Nor disagree (3)	Disagree (2)	Strongly Disagree (1)
16	There is sufficient inspection from immediate supervisors about the teaching learning process.					
17	There is ways of delegation for different management processes					
18	Burayu City administrators and responsible officials supervise and support the institute.					
19	There is sufficient inspection from external supervisors about the teaching learning process and the supervisors comment is constructive and improve our efficient					

Part II: - mark (✓) if you agree with the given option.
2. Knowledge, implementation of the program, teaching and other facilities
2.1. What is your idea in implementation of IT curriculum for outcome based training system in your
institute. Write your answer briefly.
_____
2.2. Do you think that all trainers in IT department have similar idea in implementing the curriculum?

a) Yes ☐   b) No ☐
2.2.1. If No what do you think the reason?

_____
2.3. Have you ever taken any training on the concept curriculum implementation for Outcome-based
TVET?   a) Yes ☐   b) No ☐
2.3.1. If yes; how many times_____; where_____; organized by
whom_____
2.4. What kind of teaching method are you using to deliver the course?
_____
2.4.1. Among the methods, which one do you think the best method?

_____
2.4.2. Do you employ learner-center approach of teaching?

a) Yes ☐   b) No ☐
2.5. Do you use appropriate instructional material/aid to deliver the course?

a) Yes ☐   b) No ☐
2.5.1. What kind of instructional materials do you use to deliver the course?
2.6. Do you prepare annual plan for each course?

a) Yes ☐   b) No ☐

2.7. Do you prepare a computer lab manual/module for your course?
                    a) Yes ☐   b) No ☐
2.8. Do your students get computer lab manual?
                    a) Yes ☐   b) No ☐

2.9. Do you let your students help with each other in the computer lab and write report on it?
            a) Yes ☐   b) No ☐
    If your response to question 2.9 is yes, do you mark their report and return it to them with
relevant feedback?   a) Yes ☐   b) No ☐

2.10. Do you let your students know the assessment techniques you plan to use in advance?
            a) Yes ☐   b) No ☐
2.10.1. What forms of assessment techniques do you use?
_____
2.11. After graduation, what level of knowledge do you expect from your student?
_____
2.12. Is there any internship or work-base program for your student within the company or
organization
inBurayu city administration?
            a) Yes ☐   b) No ☐
If yes, how often? _____ _____ If No, why? _____
_____
2.13. State anything that you wish to say about this college that may be relevant to the
college?
Strong points _____
_____
_____
_____
_____
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_____

APPENDIX -B

**ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES
COLLEGE OF EDUCATION AND BEHAVIORAL STUDIES
DEPARTMENT OF CURRICULM AND TEACHERS' PROFESSIONAL
DEVELOPMENT.**

Questionnaire to be filled (completed) by Information technology **students**.**Dear student:-**
The objective of this questionnaire is to collect accurate and necessary information on the
"The implementation of information technology curriculum for outcome based training
system in Burayu TVET Institute". Hence, the success and effectiveness of this research is
highly dependent on the accurate and genuine information that you give and thus I would
kindly request you to collaborate with me in filling this questionnaire thoroughly and
completely. Here one thing I went to remind you is that, your response will kept confidential
and will only be used for purpose of the study.

Thank you in advance for your collaboration!!!

General direction.

1. No need of writing your name on the questionnaire.

2. Please follow the relevant instruction when filling out the questionnaire.

3. Put (✓) mark if you agree with the given option.

4. Please write short answers in the space provided for items that require opinion.

1. General information (personal data) of the respondent.

1.1 Sex   A. Male ☐   B. Female ☐

1.2 Age   A.15-18 ☐   B.19-25 ☐   C. above 26 ☐

1.3 Level

 A. II ☐   B. III ☐

Part II: -Tick (✓) on the alternatives given in the box.

No	Description	Yes	No
1	Did you get the course outlines at the beginning of each course?		
2	If yes, do instructors conduct the course according to the course outline?		
3	Do you get information about the methods of assessment in the course outline?		
	If No what are the possible limitations? _____ --		

No	Description	Yes	No
4	Is the teaching learning process inviting to let you actively participate in the process?	Yes	No
5	Is your learning progress assessed during course on progress?	Yes	No
	If yes how often? _____ _____ _____ _____		
6	Are you provided with the opportunity to evaluate your teachers' Performance on the teaching learning activities?	Yes	No
7	If yes, are you satisfied with the competency of your teachers on their subject area?		
	If No, please write important comments that you think to be need improvement------------------- -- --		
8	Is the teaching learning process supported by practical exercise in the lab?	Yes	No
9	List down the instructional materials that your instructor used to deliver courses? 1----------------------------------2---------------------------------3-------------------------------		
10	Do you know the teaching method applied by your teacher?	Yes	No
11	What is the assessment technique applied by your teacher? Write down common assessment techniques_____ _____ _____ _____		
12	Do you think that the assessment practice in your Institute is useful for career development/create your own business?	Yes	No
13	Have you ever been taken any training on the concept of work based education?	Yes	No

| 14 | If yes; how many times_____ _ Where_____ whom_____ | | | | | | by | | |

Part II: -Tick (✓) under the appropriate figure for the following items.

No	Description	Strongly Agree (5)	Agree (4)	Neither agree Nor disagree (3)	Disagree (2)	Strongly Disagree (1)
1	The environment for which the Institute situated is conducive for implementation of IT curriculum.					
2	There is enough time to perform your IT projects.					
3	There are adequate training equipments in the training rooms to learn effectively(computers, printer, scanner etc)					
4	There is Library with relevant and sufficient copies of books, lab manuals, modules.					
5	There is sufficient Supportive staff for effective implementation of the IT curriculum in the institute. (Guidance. lab technician)					
6	There are different rooms for theoretical and practical classes.					
7	Considering its capacity the Institute has accepted adequate number of trainees					
8	Safety condition in computer labs is conducive.(electric wire, network cable etc)					
9	Damaged computers or accessories are maintained timely.					
10	There is internet access in the institute.					
11	There is a reliable power source in the institute.					
12	The Institute has adequate relationships with different stakeholders					
13	Adequate orientation and guidance service has given for the trainees at their arrivals and during the class.					
14	The relationship between teachers and students are friendly and useful for teaching learning activity.					

APPENDIX - C

National TVET-Qualification Framework for Level II *(IT)*

1. Operate Database Application
2. Update and Document Operational Procedures
3. Administrate Network and Hardware Peripherals
4. Care for Network and Computer Hardware
5. Access and Use Internet
6. Implement Maintenance Procedures
7. Maintain Equipment and Consumables
8. Apply Problem Solving Techniques to Routine Malfunction
9. Participate in WorkplaceCommunication
10. Work in Team Environment
11. Develop Business Practice
12. Apply Continuous Improvement Processes (Kaizen)
13. Connect Hardware
14. Peripherals
15. Install Software
16. Application
17. Record Client Support Requirements
18. Protect Application or System Software
19. Maintain Equipment and Software Inventory and Documentation
20. Operate Personal Computer
21. Apply Quality Standards
22. Work with Others
23. Receive and Respond to Workplace Communication
24. Demonstrate Work Values
25. Develop Understanding of Entrepreneurship
26. Apply 5S Procedures

APPENDIX – D

National TVET-Qualification Framework *for Level III (IT)*

1. Gather Data on Business Requirements Determine Best-Fit Topology

2. Configure and Administer Server Create Technical Documentation

3. Monitor and Administer Stem and NetworkSecurity

4. Provide First Level Remote Help Desk Support

5. Identify and Resolve Network Problems

6. Monitor Implementation of Work plan/Activities

7. Conduct / Facilitate User Training

8. ApplyQuality Control

9. Lead Small Teams

10. Lead Workplace Communication

11. Improve Business Practice Maintain Quality System and Continuous Improvement Processes (Kaizen)

Source

Ministry of Education, Information Technology Support Service, Ethiopian Occupational Standard, Version 2, July 2010, (pp 96)

APPENDIX – E

Sample IT Curriculum in a Competency base

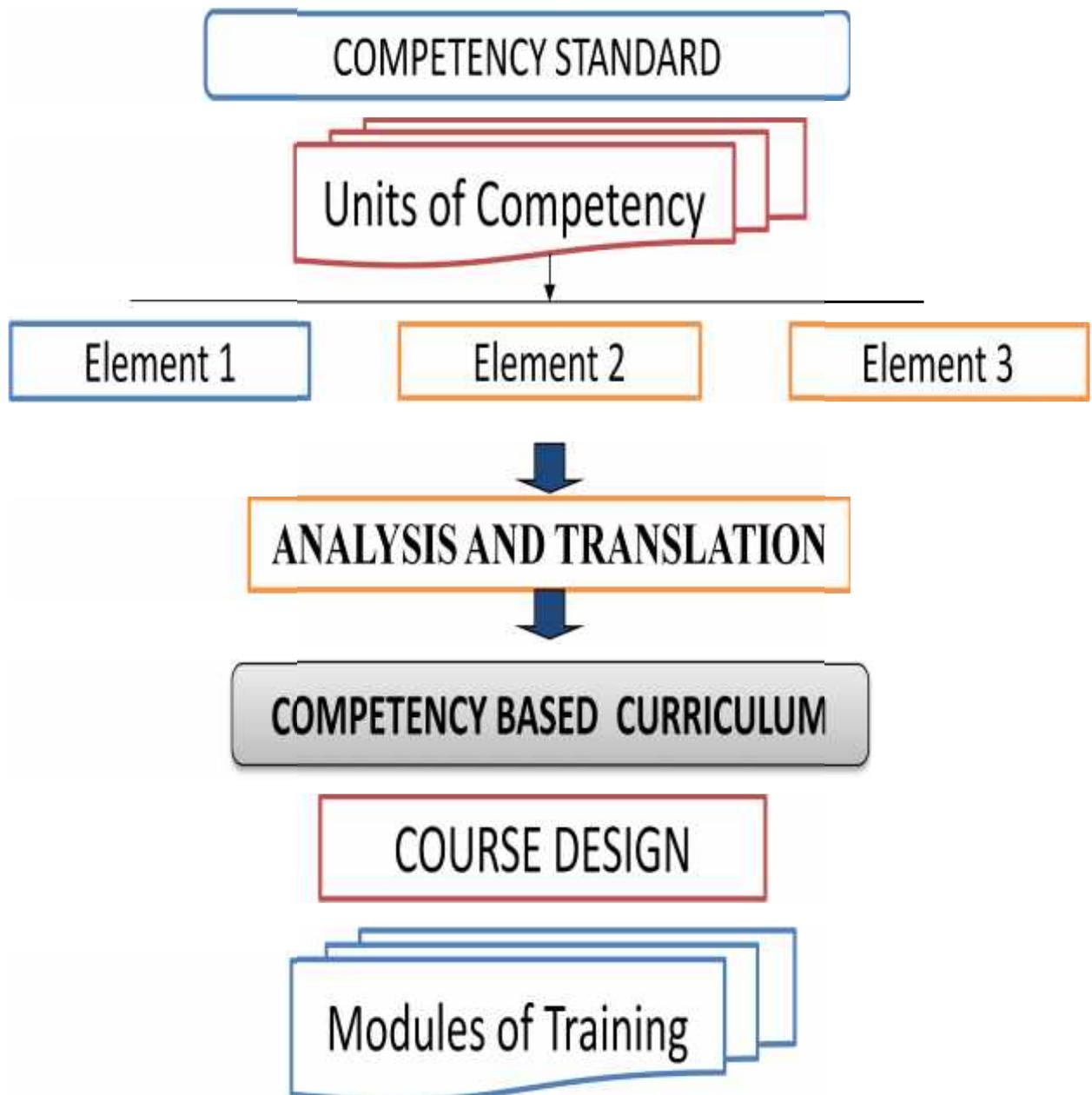|	
Unit of Competency	Use Personal Computer
Module Title	Using Personal Computer
Module Description	To provide participants with the knowledge, skills and right attitudes in using a personal computer. It includes performing basic computer operations in Windows environment, creating and editing documents with the use of a word processor and using the internet.
Nominal Duration	20 hours
Level of qualification	NC III
Prerequisite modules	none
Co requisite modules	none
Contents	Computer hardware and software Windows Operating System
Conditions of Assessment	The participant will have access to –computer with Windows Operating System
Methodology	The following learning strategy may be applied – Lecture, Demonstration, Hands-on Exercises

Assessment Task	Participants are asked to perform basic computer:-operations such as navigating through windows environment, launching software applications, opening and printing files.
Learning Outcome 1	Perform basic computer operations
Assessment Criteria	This learning outcome is achieved when the participant can do the following 1.1) identify computer hardware and software 1.2) describe procedures for safe use of PC and peripherals 1.3) identify parts and functions of Windows 1.4) navigate through different folders and subfolders 1.5) launch software applications 1.6) open data files 1.7) print files
Learning Outcome 2	Create, edit and print documents
Assessment Criteria	1.2) describe procedures editing documents 1.1) open a document
Relationship with Competency standard	This module addresses the unit of competency- *Using Personal Computer* from the Competency Standards for Automotive Service Technician

Source

Ministry of Education, Information Technology Support Service, Ethiopian Occupational Standard, Version 2, July 2010, (pp 96)
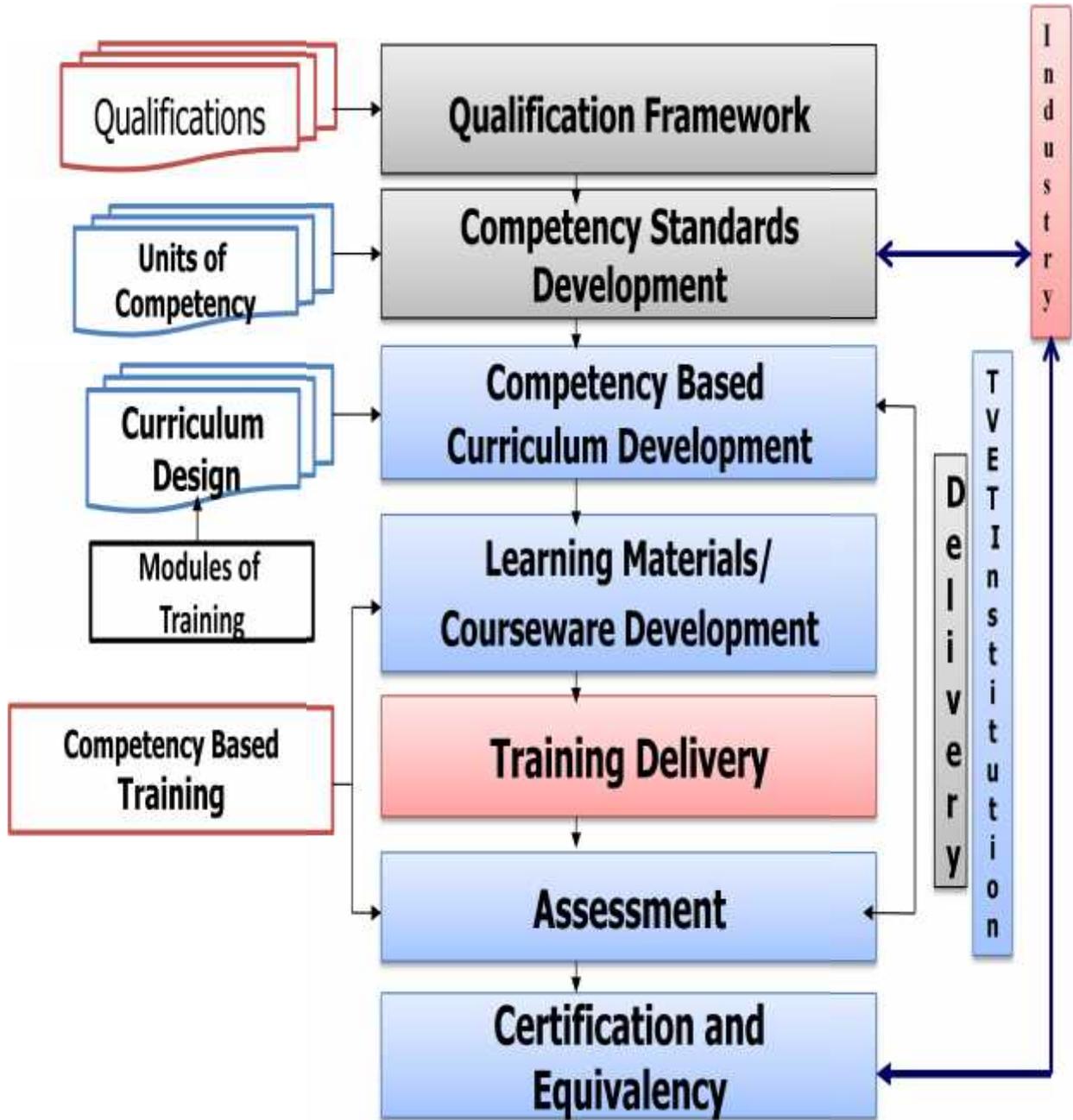
APPENDIX - F

DEVELOPMENT OF COMPETENCY BASED CURRICULUM

COMPETENCY STANDARD

Units of Competency

| Element 1 | Element 2 | Element 3 |

ANALYSIS AND TRANSLATION

COMPETENCY BASED CURRICULUM

COURSE DESIGN

Modules of Training

Source: -Federal Democratic Republic of Ethiopia Occupational Standard (August 2011).
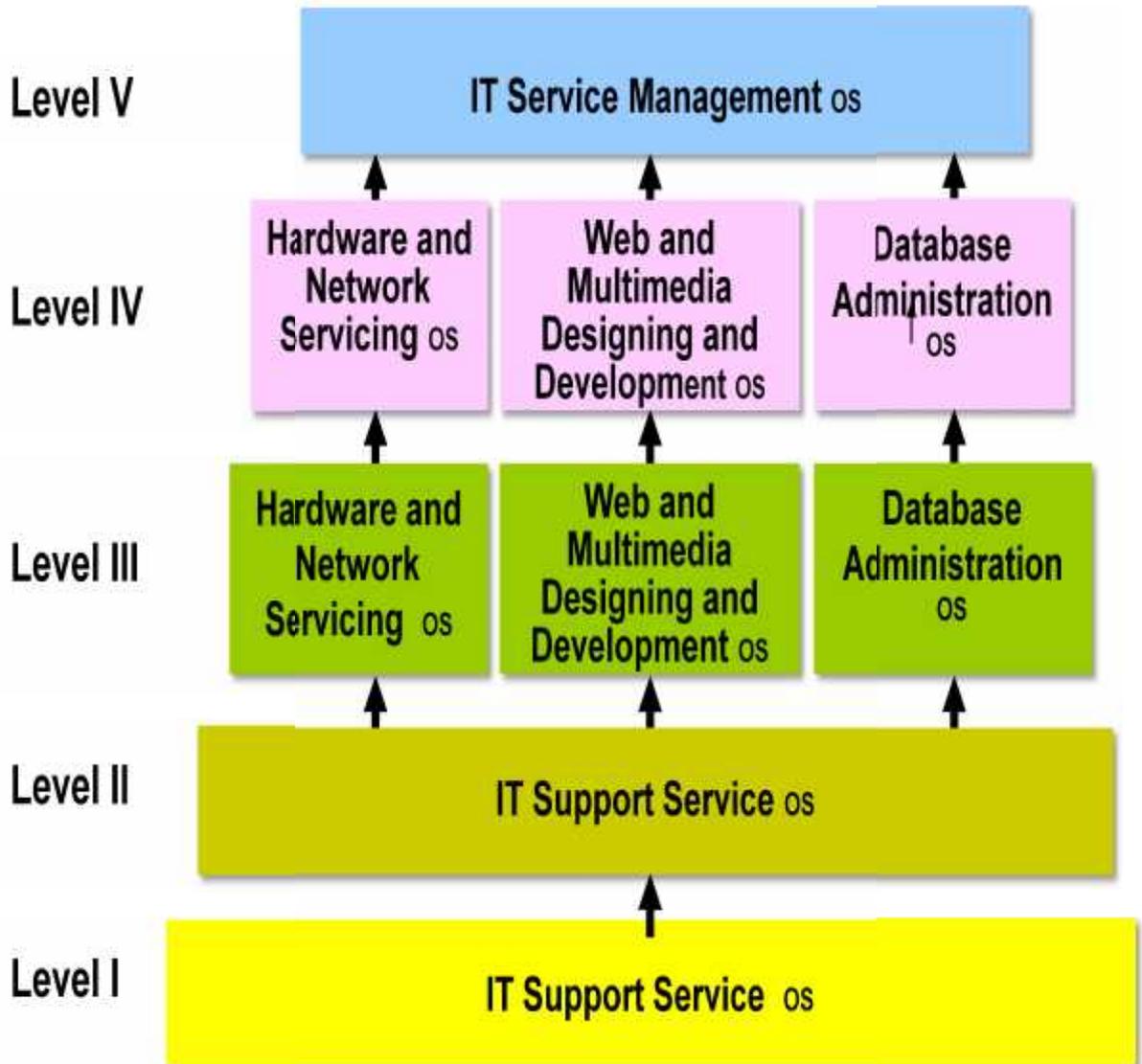
COMPETENCY BASED TVET FRAMEWORK

Source:-Federal Democratic Republic of Ethiopia Occupational Standard (*August 2011).*

National TVET-Qualification Framework

INFORMATION TECHNOLOGY

Level V	IT Service Management os
Level IV	Hardware and Network Servicing os — Web and Multimedia Designing and Development os — Database Administration os
Level III	Hardware and Network Servicing os — Web and Multimedia Designing and Development os — Database Administration os
Level II	IT Support Service os
Level I	IT Support Service os

Source

Ministry of Education, Information Technology Support Service, Ethiopian Occupational Standard, Version 2, July 2010, (pp 96)

Declaration

I hereby declare that this thesis is my original work and that all sources of information used

for the thesis have been duly acknowledged.

Ali Mume Ibrahim

Signature --------------------

Date ----------------------------

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

AtoBisratAshebo

Signature --------------------

Date ----------------------------