ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
INSTITUTE OF EDUCATIONAL RESEARCH

Achievements, Challenges and Prospects in Implementing Information and Communication Technology Expansion Program: The Case of Selected Preparatory Schools in Addis Ababa

By

Leoulseged W/Hanna

June, 2010

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A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirement for the Degree of Master in Educational Research and Development

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Approved by the Board of Examiners

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Acknowledgement

My great thanks should go to my advisor, Dr.Daniel Desta, for his genuine and intellectual advices he has made for me during the research period. And Beza Mullu has to be thanked as well for her kind help done during data collections.

I also express my profound gratitude to Mr. Demissew Bekele who is the owner of Information and Communication Technology for Education Core Work Process, Mesele Wako, Program Producer at ICTECWP and Ephrem Demene, Zekarias Kebede, Habtamu Bireda and Zelalem Mengstu for their indisputable support in forwarding information needed for the study.

Last but not least, the research would not have been like this unless Elias Habtamu's and kind helps in financial as well as materials necessary for the study.

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Abbreviations and Acronyms

AACAEB-Addis Ababa City Administration Education Bureau

CD- Compact Disk

DVD-Digital Video Disc

EELPA-Ethiopia Electric Light and Power Authority

ETC-Ethiopia Telecommunication Corporation

GEQUIP-General Education Quality Improvement Package

ICT- Information and Communication Technology

ICTAD-Information and Communication Technology Assisted Development

ICTECWP- Information and Communication Technology for Education Core Work Process

MOE- Ministry of Education

PL-Plasma Television

UNDP- United Nations Development Program

UNESCO- United Nation's Education, Scientific and Cultural Organization

Abstract

The aim of the study was to assess the current status of ICT program in education specifically in preparatory schools. In order to fulfill this, descriptive survey method was employed to identify the perceptions and stands of the teachers and students towards the implementation and advantages of ICT for the teaching-learning process so as to impart quality education. To this end, data were gathered through questionnaires, interviews, observation and documents. For analysis, mean scores and percentages were used to see the perceptions and attitudes of the respondents. And also, data collected through interviews, observation and documents were analyzed in relation with the results of the questionnaires. The findings of the study revealed that most of the respondents had a positive perception on the values of ICT use in education to improve the quality of education in terms of accessing qualified teachers, getting teaching materials that were not accessed other wise and information needed for their subject matter, promoting student-center method of education and community participation, and improve the knowledge and skills of teachers and students even for future career. However, most of the respondents agreed that the implementations of ICT in the schools faced a lot of problems such as inadequate supply of ICT equipment such as computers, plasma television display and their necessary accessories and scarce skilled personnel and insufficient ICT rooms, electric disconnection, network problem, with a heavy background of unfriendliness to technology and little involvements of stakeholders. Due to these findings, it is strongly recommended that the ICTECWP structured under the Ministry of Education in collaboration with the stakeholders should work hard to solve those challenges of the schools in order to implement the ICT program effectively and improve the quality of education given in the country.

Chapter One

1. Introduction

1.1 Background of the Study

Education is fundamental for the overall development of any country. Due to this, they invest their huge capital to effectively use their human resources that in turn ascertain social, political and economic development. And indeed, education is one of the major instruments that is used to develop human skills and knowledge.

According to Todaro (1989), it is the human resources of a nation, not its capital or its material resources that ultimately determine the character and pace of its economic and social development. He goes on to state that the principal institutional mechanism for developing human skills and knowledge is the formal education system.

In developing counties, however, the provision of education has been challenged with a lot of problems such as shortages of qualified teachers and teaching materials and lack of information needed for the subject matter, the scattered living conditions of the communities and very few rates of literacy that are with a heavy background of unfriendliness to technology. All these factors have encouraged an interest in the use of information and communications technologies (ICT) to deliver education.

In addition, the fast changing world of today puts the need to produce an ICT literate work force to meet the demand of the economy. In this regard, now a day, the introduction and development of ICT in teaching–learning process is

taken to be as one of the methods through which quality of education could be improved.

In doing this, it becomes impossible to address the whole issues of education without the use of Information and Communication Technology (ICT). Providing modern education and connecting one to the world as well as satisfying the needs of the contemporary societies requires the use of this technology. It also becomes an indispensible mechanism to overcome those problems facing the education sector.

Using ICT in education enables the sharing of knowledge regardless of time and space. It can provide access to education in remote areas. It also imparts the opportunities to get quality education that is provided by qualified teachers with adequate information. It introduces one to the modern world. It can also be used as a technological divide between the 'haves' and 'have-nots' of societies.

Hence, today education without the use of ICT means isolating oneself or even a society from the globe and creates knowledge gaps between those who have and have not. Finally, it becomes one of the major reasons for backwardness. Due to these, various countries have already included and made satisfactory development in the use of ICT in the education sector.

The government of Ethiopia also formulated education and training policy in 1994. The policy made its base on the intention, as it is mentioned in the policy document, of cultivating the citizens with an all-round education capable of playing conscious and active role in the economic, social and

political life of the country at various levels. The policy document also highlights the major problems. Among them, limited access, inequitable distribution of school services, problems of efficiency, lack of quality and relevance and undemocratic contents are the major ones (MOE,1994).

Although a lot of attempts have been made to overcome those problems mentioned in the policy document and brought a significant progress seen quantitatively, it has not yet been free from criticism for its poor quality. And of course, it is very difficult to meet the intended target set in the policy document and fulfill the needs of the societies without curbing those quality related problems seen in the education sector. Due to this, the Ministry of Education has developed the General Education Quality Improvement Package (GEQUIP) that has been made to be implemented since 2006. Right at the outset, the package discusses the major challenges facing the education sector. In order to overcome those challenges, the package identifies the following six major pillars:-

1. Teachers Development Program
2. Schools Improvement Program
3. Ethics and Ethical Education Program
4. Curriculum Improvement Program
5. Information and Communication Technology Expansion Program
6. Management and Leadership Improvement Program

Among these six pillars, Information and Communication Technology Expansion Program (ICTEP) is incorporated as one of the major programs

without which quality education is impractical. Apart from this, the package thrashes out the main problems faced in using ICT. Misunderstanding of the technology, problems in the presentation of the programs, technical errors during the program, lack of training on ICT for teachers and educational professionals as well as precluding ICT issues from the curriculum are the main challenges mentioned in the package.

In addition to these, the package sets objectives in order to ensure the use of ICT in education. By using ICT, address the issues of quality education in both formal and nonformal way, modernize the working environment by providing training on ICT for leaders of the education sector and teachers and upgrade the students' competence on the use of ICT by incorporating it in the curriculum are the major issues discussed in the objective part.

Apart from these, the package also contains the strategic issues that clearly show the firm stands of those in the education sector to expand the use of ICT in education. These strategic issues are to correct the misconceptions in the use of ICT, revise the approach, and modify the use of satellite program by implementing ICT and incorporating ICT in the curriculum.

However, Even though having the ICT technology is a progress on its own and the initiation made to use ICT in education is promising, still it can never be a guarantee for quality education. In light of this information, therefore, it is paramount important to scrutinize the state of implementing ICTE program in the country in general and in Addis Ababa City Administrative in particular.

1.2 Statement of the problem

The poor socio-economic conditions of most developing countries like Ethiopia draw back the attempts made in various sectors for development. One of the major challenges is incapability of the education sector to go hand in hand with technological change. It becomes impossible to continue with the traditional education system. Teachers cannot go a bit ahead of their students with the pervious teaching methods. The environment urges them to change.

ICT is the main agent for this change. It revolutionizes the teaching-learning surroundings. This means an education with ICT adding pedagogical and learning values, enhancing the quality, access and efficiency of the education systems in the classroom and beyond.

Failing to use ICT in the education sector, on the other hand, providing quality education and accommodating equity of education given in the urban and rural sides of the country will become a challenge. The distributions of qualified teachers and resources will also be at risk. And also getting information from various sources cannot be easily accessible. These problems are also facing the education sector of our country. Although most of the secondary schools found in Addis Ababa have the meager equipments of ICT and gained some observable achievements, many of them are not still the beneficiaries of the technology.

Therefore, this study will try to scrutinize the achievements, challenges and prospects in the implementations of ICTE program in some selected schools in

Addis Ababa so as to ensure quality education. And the study was aimed at seeking answers for the following five basic questions.

1. What practical activities have been done in order to implement ICT in the schools?
2. Are there adequate resources and personnel that facilitate the implementation of the program?
3. Does the use of the technology add any values to the quality of education?
4. To what extent is the gap between the program at hand and the reality on the ground?
5. What are the major challenges faced during the implementations of ICT in the schools?
6. What should be done in order to solve those challenges that have been faced during the implementations?

1.3 Objective of the Study

1. 3.1 General Objective of the Study

The main objective of the study was to assess the major achievements and challenges that have been faced during the implementation of ICT in order to ensure quality education. And also the study was aimed at identifying those factors that should be done in the future to use ICT in a way that contributes to the quality of education.

1.3.2 Specific Objective of the Study

The specific objectives of the study were the following

1. Identifying the availabilities of the components of ICT in the schools
2. Assessing the improvements made on the knowledge and skills of teachers and students in using Computer and Internet
3. Observing the extent to which the schools have the needed infrastructure to implement ICT effectively.
4. Finding out those factors that challenge the implementations of the program
5. Recommending ways that help improve the implementations of ICT in the secondary schools.

1.4. Significance of the Study

This study is significant for the following reasons.

- The study may be useful to the school to identify those promising endeavors that have been made to practically use ICT including the challenges and prospects gained so far.
- Besides these, the recommendations may be helpful to the policy makers as well as the concerned government bodies which are working on the area.
- It may also serve as a spring board for undertaking further studies and
- Provides practical information that relies on scientific research methods to interested groups in the area.

1.5. Scope of the Study

Although the issues of ICT in education are multifaceted, this study was delimited to the implementations of ICT in terms of Plasma Television and the provisions of computer and internet service. Its components such as school net and educational radio as well as other related issues were beyond the scope of the study though they are important and indeed critical. Moreover, in order to address its very objectives and for the purpose of manageability, the research was held at four Preparatory Schools found in three Sub-Cities of the capital. The activities done to implement the ICTE program by the concerned bodies such as Information and Communication Technology for Education Core Work Process (ICTECWP), Addis Ababa City Administration Educational Bureau (AACAEB) along with the schools administrative were discussed in this study.

1.6 Limitations of the Study

This study focused on assessing the status of the implementations of ICT program which has been a recently undertaken measure to improve the quality of education. In this regard, some of the respondents were very reluctant to return the questionnaires. In addition, it was very difficult to get recent and relevant literature written on the use of ICT in education in Ethiopia. Last but not least, time and finance were also factors that limited the study.

1.7 Organization of the Study

The main objective of the study was to assess the current status of the implementation of ICT use in education. Thus, the first chapter of this study introduces the background of the research; the second chapter deals with

review of related literature; the third chapter focuses on the research methodology; chapter four deals with the presentation, analysis and interpretation of the study. The last chapter was made to stress on the summary, conclusion and possible solutions recommended for solving the challenges identified

Chapter Two

2. Review of Related Literature

2.1 Education and Technology

Education is one of the major agents for change. The impacts of the changes can be manifested in politics, economy, social and culture of the nations. However, in order to make the changes more fruitful, the sector should be developed and articulated in a way that brings the intended outcome set right at the outset. This can be brought into reality when the sector is well equipped with the necessary and modern technology. Technology in education is useful in making the teaching-learning process successful so that many scholars advise the professionals in the sector to use technology that facilitate the course of action (Toffler, 2005). With this regard, education should be well equipped with the necessary technology that brings changes that are useful to the society. Here, what should be considered is that education and technology cannot be seen separately. In other word, in education, technology is used to make the teaching-learning process proceed in a way that comes up with fruitful results. Toffler (2005) states that the way in which technology is incorporated into their pedagogy in relation to the classroom, planning, practicing and reflection identifies that teachers' presentation of work improved and the transmission of knowledge become more efficient with the use of technology.

Education and technology have to go hand in hand in order to make the environment conducive for the school communities. Most of the time, in the

developed countries, it is difficult to provide education service without the use of technology due to multifaceted challenges such as scarcity of qualified teachers educational materials and the scattered living conditions of the society so that the use of technology which help minimize these challenges become crucial. Thus, the use of technology matter in education a lot.

2.1.1 The Benefits of Technology in Education

Technology in education is intended to improve education over what it would be without technology. According to Reeves (1998) technology in education have various positive impacts on the teaching-learning activities. Some of the claimed benefits are easy to access course materials, improve students' motivations writing, promote wide participation and make subjects easier to learn. In addition, with proper structuring it can become easier to monitor and maintain student work while also quickly gauging modifications to the instruction necessary to enhance student learning.

According to Jacob (1995) who studies the effectiveness of computers used for instruction, students usually learn more in less time when receiving computer-based instruction and they like classes more and develop more positive attitudes toward computers in computer-based classes.

In addition, technology in education can also be perceived as the application of technology to any process of educational sector. According to Vanaja and Rajasekar (2008), it refers to the use of the technology advancement in terms

of various equipment, materials and machines for educational purposes. It involves the increasingly complex range of audiovisual equipment, hardware and sophisticated electronic devices.

They conclude that technology in education serves the needed appliances; equipment and mass media for realization of different purposes and functions of education; enables training the teachers to handle and make optimum use of equipment; to develop a positive attitude towards these appliances; for demonstrating the relevance and use of the appliances in the context of individualized and group learning for achieving the goals of both formal and informal education.

Thus, technology in Education is a catalyst for teaching and learning in the classroom; enhance positive educational change; improves the quality of education imparted in schools; enhance system change and academic success through assistive technologies for K–12 students with special needs; uses technology to support limited English proficient Students' learning experiences; provides professional development for effective technology use; applies technology to improve student achievement; develops a School or District Technology Plan; ensures Equitable Use of Education Technology and Promotes Technology Use in Schools.

2.1.2 Criticism on the Use of Technology in Education

Although technology in the classroom does have many benefits, there are clear drawbacks as well Newhous (2002). Lack of proper training, limited access to sufficient quantities of a technology, and the extra time required for many implementations of technology are just a few of the reasons that technology is often not used extensively in the classroom.

Similar to learning a new task or trade, special training is vital to ensuring the effective integration of classroom technology. Since technology is not the end goal of education, but rather a means by which it can be accomplished, educators must have a good grasp of the technology being used and its advantages over more traditional methods. If there is a lack in either of these areas, technology will be seen as a hindrance and not a benefit to the goals of teaching (Deignton, 1971).

Another difficulty is introduced when access to a sufficient quantity of a resource is limited. This is often seen when the quantity of computers or instructional television for classroom use is not enough to meet the needs of an entire classroom. It also occurs in less noticed forms such as limited access for technology exploration because of the high cost of technology and the fear of damages. In other cases, the inconvenience of resource placement is a hindrance, such as having to transport a classroom to a computer lab instead of having in-classroom computer access by means of technology such as laptop carts.

Technology implementation can also be time consuming. There may be an initial setup or training time cost inherent in the use of certain technologies. Even with these tasks accomplished, technology failure may occur during the activity and as a result teachers must have an alternative lesson ready. Another major issue arises because of the evolving nature of technology. New resources have to be designed and distributed whenever the technological platform has been changed. Finding quality materials, to support classroom objectives after such changes, is often difficult even after they exist is sufficient quantity and teachers must design these resources on their own (colleen and Edward, 1999).

2.2 ICT and Education

Today's issues of most scholars are not whether the use of technology in education is an important factor or not, rather what types of technology are very useful compared with others that bring about change in the education sector. Most of the educators suggest the idea that focuses on ICT. The education sector is now extremely enforced to use ICT (Nombiar ,2005). This is due to the reason that ICT can address the major problems of education that can be observed today. Those problems are many. Cairncros (2005) identifies some of the major constraints on delivering education to the right people at the time. And he underlines that in developing countries, there is frequently a shortage of qualified teacher, people may live in a scattered communities in rural area, money for books and teaching materials may be all these challenges have encouraged an interest in the use of ICT.

However, those issues of education are access, efficiency, quality and relevance of the education that can produce graduates that can curb the problems of the communities under which the education sector serves. Therefore, the use of ICT in education possibly solves those problems outlined above. It can be possible to deliver education without the problem of space and time. In most developing countries, most of their societies live in the rural side so that large part of their population is far from education imparted in their more developed cities.

Even though education is provided in those areas, it is given with unqualified teachers so that by using ICT, it is possible to deliver quality education. The other issue is sharing resources. Resources are scares so that it is impossible to satisfy the entire education sector. However, it urges the education sector to use the available resources very wisely. It is possible in order to perform this successfully with the use of ICT. The use of ICT can help us share meager resources to as many schools as possible.

2.2.1 The Implementations of ICT in Education

As it has been outlined above, today's education urges the use of ICT. This is because of the fact that the dispersed living condition of the societies creates many challenges to the education sector. Those challenges are lack of qualified teachers, scarce resources, scattered ways of living conditions of the societies and the needs of minimizing the educational wastes. In order for addressing all these issues of education, the situations inflict the use of ICT in the sector.

Besides, the working conditions of today necessitate the generation to be proficient in the use of ICT. Dfes (2005) state that the modern world economy requires all young people to be competent in the use of ICT. However, McCannon and Crews (2000) cited in OCED (2004) argue that ICT invaded schools only after the advent of personal computers. They further argue that the introductory use of computers were in administrative tasks rather than as learning tools.

2.2.2 The Definitions of ICT

Various ideas have been forwarded in order to define ICT in general and ICT in education in particular. Bluton (1999) defines ICT as shorthand for a computer, software, networks, satellites, links and related systems that allow people to access, analyze, create, exchange, and use data, information, and knowledge in ways that, until recently, were almost unimaginable.

Dawyer et.al (1997), on the other hand, states that this new ICT technology has fueled exponential growth in societies' ability to generate, exchange and consume information. The technology is digital that allows the manipulation of data (Kennelvell, et.al, (2000). And he considers the term ICT as the set of tools used to process and communicate data.

According to Gardener (2002), ICT is a computerized device that utilizes the power of microprocessors to manipulate data in a digital format. ICT systems can offer fast processing, vast storage capability and the facility to search and combine data in different ways. ICT has been implemented into schools for many years. Vrasidas and Glass (2005) identify that the efforts for introducing

ICT in the schools data as the decade of 1960 when network connection between schools main frame computers constituted the first infrastructure for promoting computer based learning.

In the past, the abbreviation IT was used, but recently it has become popular to broaden the term to explicitly include the field of electronic communication so that people tend to use the abbreviation ICT (Information and Communications Technology).

ICT is an acronym that stands for Information and Communications Technology. It is the integration of information processing, computing and communication technologies. And it is changing the way we learn, work and live in society and are often spoken of in a particular context, such as in education, health care, or libraries.

According to Tinio (2002), ICTs stand for information and communication technologies and are defined, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information". But the use of computers and the Internet is still in its infancy in developing countries, if these are used at all, due to limited infrastructure and the attendant high costs of access. Moreover, different technologies are typically used in combination rather than as the sole delivery mechanism.
And others try to make linkages between the term ICTs with different electronic devices that can be used to store, create and disseminate date.

Realizing educational objectives of the "information age" requires integrating modern forms of information and communication technologies (ICT) into education. To do this effectively, education planners, principals, teachers, and technology specialists must make many decisions in the following areas: technical, training, financial, pedagogical and infrastructure requirements. For many, this is a complex task similar to not just learning a new language, but learning how to teach in a new language.

2.2.3 Types of ICT

As outlined above, the term ICTs includes all the technology that we use to create, store, exchange information in the form of data. According to those authors who provide the definitions of ICT confirm that ICT includes such technologies as radio, television, video, DVD, telephone satellite systems, computer and network hardware and software; as well as the equipment and services associated with these technologies, such as videoconferencing, e-mail and blogs.

On the basis of this definition, it becomes difficult to firmly categorize the dynamically emerging and developing ICT. However, Blurton, (1999) classifies it as “New” and “Old” ICT. According to his category, old ICT includes print, films, videos, tapes, telephone, television and radio. And the new one incorporates computer, internet, World Wide Web and so no.

Still others consider it as Interactive and Non-interactive based upon the way the communication takes place between students and teachers and between students of different classes or geographical location (Yared, 2001). In this case, the notion of interactive ICT focuses on the interaction that can exist between students of different area or the communication between teachers and students to move facilitate the teaching and learning process. On the basis of this classification, ICT is categorized into one way communication that means one way audio and one way audio and video; and two way communication to mean two way audio, two way audio and two way video and in some cases two way video and one way audio.

But, the notion of interactive could go apart from the above explanation when, instruction and material are considered. Here it denotes the interaction between the students and the material while the students are being engaged in the self study of the material. This depends on the potential of the learners' material whether it evokes successive responses from the students' progress through the content of the materials or not.

Besides, even there is such a distinction which classifies ICT into single and digital. However, for the purpose of this study, the focus will be only on educational television, computer and internet that are the major types of ICT used in the education sector of today. Thus, below are their descriptions:-

2.2.3.1 Educational Television

Transmitting information through television was first experienced in 1914 when Raul Ripikaw invented a mechanical system for transmitting views by direct wires. After further development made on the technology, educational broadcast began in Iowa in 1933. However, because of the economic depression and world war, it did not sustain and become effective. It was after the Second World War that educational television broadcast reemerged and defused throughout the world (Murray, 1987; Demiray and Isman, 1999).

Despite its role in solving access, equity, and quality related problems resulted from insufficient budget. Lack of qualified teachers; geography dispersion of the community; lack of basic infrastructure, the educational television has not attained the promises expected by many educators.

However, it gradually appeared less appreciated by the users. Some of its weak background was attached to the monochrome count parts of the television low quality, non versatility, and its unaffordability, unease of transportation and so on. Therefore, it did not meet the dynamic demand of the society that goes with a set of changing society and technological circumstances. But, this had been solved through the emergency of other components of the technology including the video that when integrated with television can minimize the deficiencies (Murray, 1987).

Even though many other new technologies like video conferencing and computer are emerging with more dispensable characteristics that are pedagogically conducive for learning. According to Heinich (1986), Television broadcasting has been widely used as educational tools in both distances and conventional education.

According to Vanaja and Rajasekar (2008), Educational Television is a system that presents learning content in various subjects produced by an agency. It is a means of providing direct instruction (formal) as well as continuing education (non formal). It has the capacity to bring the world into a classroom; Improves the quality of education; is used as a Catalyst; a means of extending students' experience and introduces affective education; and is applied as a means of equalizing educational opportunity as well as a means of improving efficiency and productivity and Television-based instructional system

They also explain further the roles of educational television Program. These are to introduce the content for the teacher to elaborate later and to provide drill and practice to the students; to provide background materials for the lesson the teacher will deliver; to reinforce and review ideas already covered in class; and to provide salient illustrations that will stimulate class discussion and discovery

Limitations of Educational Television; It is a one way communication; Problem of pacing learning and teaching; Low and poor accessibility; Costly affair both

production and receiving; Difficult to integrate Television and classroom teaching and Visual become a source of distraction

2.2.3.2 Computer

Scholars define the term computer in different but in a much related ways. According to Mellar (2007) ,A computer is a device that accepts information (in the form of digitalized data) and manipulates it for some result based on a program or sequence of instructions on how the data is to be processed. Complex computers also include the means for storing data (including the program, which is also a form of data) for some necessary duration.

A program may be invariable and built into the computer (and called logic circuitry as it is on microprocessors) or different programs may be provided to the computer (loaded into its storage and then started by an administrator or user). Computer can record, analyze and react to individual response that are typed on key board or selected with a mouse. It also has the abilities to control and integrate a wide variety of media like picture, graphics, moving images and printed information (Demiray and Isman, 1999)

Computer is widely used in education as a medium of instruction since 1970s (Newhouse, 2002). The potential it posses to integrate the wide variety of media and its flexibility of being used along with other technologies enable it to have more applicability in education.

According to Heinich (1986) and Reeves (1998), there are two ways of using a computer in education. Computer Assisted Instruction (CAI) and Computer Managed Instruction (CMI). In CAI, the students interact directly with the computer as part of the instructional activities. In CMI, on the other hand, the computer helps both the instructor and the students in maintaining information about the students and in guiding the instructional process. Computer, as in the case of an object of instructions, is directed to facilitate the easy use of the technology.

2.2.3.3 Internet

The Internet is a worldwide system of computer networks in which users at any one computer can, if they have permission, get information from any other computer. According to Blurton (1999), internet is shorthand for the infrastructure that brings together people in different places and time zones, with multimedia tools for data, information, and knowledge management in order to expand the range of human capabilities.

It was conceived by the Advanced Research Projects Agency (ARPA) of the U.S. government in 1969 and was first known as the ARPANET. The original aim was to create a network that would allow users of a research computer at one university to be able to "talk to" research computers at other universities.

Today, the Internet is a public, cooperative, and self-sustaining facility accessible to hundreds of millions of people worldwide including students

living in anywhere and at anytime. Using the internet, we can have access to millions of pages of information.

Some of the above discussion on educational use of computer focuses on the major application of computer instruction. Nevertheless, application of computer instruction in education goes beyond that when simultaneously used with the internet technology. Newhous (2002) for example, pointed out that the 1990s computer assisted and information access was the result of popularity and accessibility of internet based services such as electronic mail and the World Wide Web.

Thus, internet has the potential of fostering the effectiveness of educational use of computers. Besides, the above author explained that in concrete way that internet use is one of the elements of effective ICT use in education. It offers the possibility to search for information and to meet and work together. It is also discussed in UNESCO (2004), internet has significant role to contribute and support new pedagogical methods, access to remote resources, enabling collaboration etc.

2.3 The Purposes of ICTs in Education

ICTs have the potential for increasing access to and improving the relevance and quality of education. It thus represents a potentially equalizing strategy for developing countries. According to the report organized by the World Bank (1998),

> ICTs greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor. One of the greatest hardships endured by the poor, and by many others, who live in the poorest countries, is their sense of isolation. The new communications technologies promise to reduce that sense of isolation and to open access to knowledge in ways unimaginable not long ago (P, 11).

However, the reality of the Digital Divide the gap between those who have access to and control of technology and those who do not—means that the introduction and integration of ICTs at different levels and in various types of education will be a most challenging undertaking. Failure to meet the challenge would mean a further widening of the knowledge gap and the deepening of existing economic and social inequalities. Thus, the purposes of ICTs in education are multidimensional. But, Aphek (2005) summarizes some of the major purposes of ICT in education as follows:

2.3.1 Expanding Access to Education

ICTs are a potentially powerful tool for extending educational opportunities, both formal and non-formal, to previously underserved constituencies scattered and rural populations, groups traditionally excluded from education due to cultural or social reasons such as ethnic minorities, girls and women, persons with disabilities, and the elderly, as well as all others who for reasons of cost or because of time constraints are unable to enroll on campus.

One defining feature of ICTs is their ability to transcend time and space. ICTs make possible asynchronous learning, or learning characterized by a time lag

between the delivery of instruction and its reception by learners. Thus, by using ICT, it is possible to impart education at anytime and anywhere.

The other one is access to remote learning resources. Teachers and learners no longer have to rely solely on printed books and other materials in physical media housed in libraries (and available in limited quantities) for their educational needs. With the Internet and the World Wide Web, a wealth of learning materials in almost every subject and in a variety of media can now be accessed from anywhere at any time of the day and by an unlimited number of people. This is particularly significant for many schools in developing countries, and even some in developed countries, that have limited and outdated library resources. ICTs also facilitate access to resource person's mentors, experts, researchers, professionals, business leaders, and peers all over the world.

2.3.2 Preparing Students for Job

One of the most commonly cited reasons for using ICTs in the classroom has been to better prepare the current generation of students for a workplace where ICTs, particularly computers, the Internet and related technologies, are becoming more and more ubiquitous. Technological literacy, or the ability to use ICTs effectively and efficiently, is thus seen as representing a competitive edge in an increasingly globalizing job market. Technological literacy, however, are not the only skill well-paying jobs in that the new global economy will require.

2.3.3 Improving Quality of Education

Improving the quality of education is a critical issue, particularly at a time of educational expansion. ICTs can enhance the quality of education in several ways: by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner-centered environment.

Motivating to learn:- ICTs such as videos, television and multimedia computer software that combine text, sound, and colorful, moving images can be used to provide challenging and authentic content that will engage the student in the learning process. More so than any other type of ICT, networked computers with Internet connectivity can increase learner motivation as it combines the media richness and interactivity of other ICTs with the opportunity to connect with real people and to participate in real world events.

Facilitating the acquisition of basic skills**:-** the transmission of basic skills and concepts that are the foundation of higher order thinking skills and creativity can be facilitated by ICTs through drill and practice. Educational television programs use repetition and reinforcement to teach the alphabet, numbers, colors, shapes and other basic concepts. Most of the early uses of computers were for computer-based learning (also called computer-assisted instruction) that focused on mastery of skills and content through repetition and reinforcement.

2.3.4 Transforming the Learning Environment into Student-centered

The technology opens the world of learning up to the students. It places them in the heart of their education promoting a more autonomous experience. As Loveless and Ellis (2001) state the ICT technologies give students access to world of knowledge that would otherwise be denied to them. Research has shown that the appropriate use of ICTs can catalyze the paradigmatic shift in both content and pedagogy that is at the heart of education reform in the 21st century. According to Dawyer (1997) if designed and implemented properly, ICT-supported education can promote the acquisition of the knowledge and skills that will empower students for lifelong learning. Simonson and Thompson (1997) further state that ICT especially computer capability to interact with students and react with the individual needs has the potential to provide the context for student-centered learning assist students in learning to educate themselves. When used appropriately, ICTs especially computers and Internet technologies enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way. He further explains the roles of ICT in making the classroom teaching student-centered, ICTs prop up:-

• Active learning:- ICT-enhanced learning mobilizes tools for examination, calculation and analysis of information, thus providing a platform for student inquiry, analysis and construction of new information. Learners therefore learn as they do and, whenever appropriate, work on real-life problems in-depth,

making learning less abstract and more relevant to the learner's life situation. In this way, and in contrast to memorization-based or rote learning, ICT enhanced learning promotes increased learner engagement.

• Collaborative learning:- ICT-supported learning encourages interaction and cooperation among students, teachers, and experts regardless of where they are. Apart from modeling real-world interactions, ICT supported learning provides learners the opportunity to work with people from different cultures, thereby helping to enhance learners' teaming and communicative skills as well as their global awareness.

• Creative Learning:- ICT-supported learning promotes the manipulation of existing information and the creation of real-world products rather than the registration of received information.

• Integrative learning:- ICT-enhanced learning promotes a thematic, integrative approach to teaching and learning. This approach eliminates the artificial separation between the different disciplines and between theory and practice that characterizes the traditional classroom approach.

• Evaluative learning:- ICT-enhanced learning is student-directed and diagnostic. Unlike static, text- or print-based educational technologies, ICT-enhanced learning recognizes that there are many different learning pathways and many different articulations of knowledge. ICTs allow learners to explore and discover rather than merely listen and remember.

2.4 The Uses of ICTs in Education

As it is discussed in the previous section, ICT includes various electronics devices in that some of them are more useful than the others. In this case, the choices of those ICT technologies that are more appropriate than the others are left to the educational planners.

According to Carlson (2002) states that the planners must first of all be clear about what educational outcomes are being targeted. These broad goals can easily guide the choices of the technologies and the modalities of use. This is because of the fact that the potential of each technology varies according to how it is used. The scholar mentioned above outlined five levels of technology use in education in general and ICT in particular. These levels are presentation, demonstration, drill and practices, interaction and collaboration. On the basis of his conclusion, ICT can be used in all of the five levels. However, even though the choices are left for the planners in the education sector, and of course, a firm response must be recorded for the question like for what purposes do we use ICTs such as educational television, computer and internet? And he recommends the three ways of choices that can be applied whenever ICTs are used in education as presented below.

2.4.1 Educational Television

The three general approaches to the use of educational television are those such as direct class teaching, where broadcast programming substitutes for teachers on a temporary basis; school broadcasting, where broadcast programming provides complementary teaching and learning resources not

otherwise available; and general educational programming over community, national and international stations which provide general and informal educational opportunities.

2.4.2 The Use of Computers and the Internet in Education

There are three general approaches that are suggested by Carlson to the instructional use of computers and the Internet in education. According to him, the first one is learning about computers and the Internet, in which technological literacy is the end goal. The second is learning with computers and the Internet, in which the technology facilitates learning across the curriculum. And the third one is learning through computers and the Internet, integrating technological skills development with curriculum applications. Let us see each in briefly below:

2.4.2.1 Learning about Computers and the Internet

Learning about computers and the Internet focuses on developing technological literacy. It typically includes: fundamentals: basic terms, concepts and operations use of the keyboard and mouse; use of productivity tools such as word processing, spreadsheets, data base and graphics programs; use of research and collaboration tools such as search engines and email; basic skills in using programming and authoring applications; developing an awareness of the social impact of technological change.

2.4.2.2 Learning with Computers and the Internet

Learning with the technology means focusing on how the technology can be the means to learning ends across the curriculum. It includes: presentation, demonstration, and the manipulation of data using productivity tools; use of curriculum-specific applications types such as educational games, drill and practice, simulations, tutorials, virtual laboratories, visualizations and graphical representations of abstract concepts, musical composition, and expert systems; use of information and resources on CD-ROM or online such as encyclopedia, interactive maps and atlases, electronic journals and other references.

Technological literacy is required for learning with technologies to be possible, implying a two-step process in which students learn about the technologies

before they can actually use them to learn. However, there have been attempts to integrate the two approaches.

2.4.2.3 Learning through Computers and the Internet

Learning through computers and the Internet combines learning about them with learning with them. It involves learning the technological skills just in time or when the learner needs to learn them as he or she engages in a curriculum-related activity. For example, secondary school students who must present a report on the impact on their community of an increase in the price of oil for an Economics class may start doing research online, using

spreadsheet and database programs to help organize and analyze the data they have collected, as well using a word processing application to prepare their written report.

2.4.2.4. Computers and the Internet in Distance Education

Many higher educational institutions offering distance education courses have started to leverage the Internet to improve their programme's reach and quality. According to Newhous (2002), the Virtual University of the Monterrey Institute of Technology in Mexico uses a combination of print, live and recorded broadcasts, and the Internet to deliver courses to students throughout Mexico and in several Latin American countries. Similarly, the African Virtual University, initiated in 1997 with funding support from the World Bank, uses satellite and Internet technologies to provide distance learning opportunities to individuals in various English-speaking and French-speaking countries throughout Africa.

Internet- and Web-based initiatives have also been developed at the secondary education level. The Virtual High School is a result of efforts of a nationwide consortium of school districts in the United States to promote the development and sharing of Web-based courses. In Canada, Open School offers a wide range of courses and resources to grades K-12 teachers and students that meet the requirements of the British Columbia curriculum. Course delivery is done through a mix of broadcast and video, while some courses are delivered totally online.

But even in Korea, where infrastructure is among the best in the world, and government has put considerable financial and other resources behind an ambitious ICT-based re-tooling of its educational system, challenges to online education persist.

2.5 Major Issues in the Use of ICTs in Education

Mellar (2007) identified effectiveness, cost, equity, and sustainability as the four broad intertwined issues which must be addressed when considering the overall impact of the use of ICTs in education. These are explained briefly below.

2.5.1 ICT-Enhanced Learning

The educational effectiveness of ICTs depends on how they are used and for what purposes. And like any other educational tool or mode of educational delivery, ICTs do not work for everyone, everywhere in the same way. Thus, under this, two points are raised:-

- Enhancing access: - It is difficult to quantify the degree to which ICTs have helped expand access to basic education since most of the interventions for this purpose have been small-scale and under-reported.
- Raising quality:- The impact of educational radio and television broadcasts on the quality of basic education remains an under-researched area, but what little research there is suggests that these interventions are as effective as traditional classroom instruction. Of the

> many educational broadcast projects, the Interactive Radio Instruction project has been the most comprehensively analyzed. Findings provide strong evidence of the project's effectiveness in raising the quality of education as demonstrated by increased scores on standardized tests as well as improved attendance.

In contrast, assessments of the use of computers, the Internet and related technologies for distance learning have been equivocal. Russell, in his comprehensive review of research, claims that there is "no significant difference" between the test scores of learners taking ICT-based distance learning courses and those receiving face-to-face instruction. However, others claim that such generalizations are inconclusive, pointing out that the large number of articles on ICT-based distance learning does not include original experimental research or case studies. Other critics argue that dropout rates are much higher when instruction is delivered at a distance via ICTs.

There have also been many studies that seem to support the claim that the use of computers enhances and amplifies existing curricula, as measured through standardized testing. Specifically, research shows that the use of computers as tutors, for drill and practice, and for instructional delivery, combined with traditional instruction, results in increases in learning in the traditional curriculum and basic skills areas, as well as higher test scores in some subjects compared to traditional instruction alone. Students also learn more quickly, demonstrate greater retention, and are better motivated to learn when

they work with computers. But there are those who claim that these represent modest gains and, in any case, much of the researches on which these claims are based are methodologically flawed.

It is likewise suggested that the use of computers, the Internet, and related technologies, given adequate teacher training and support, can indeed facilitate the transformation of the learning environment into a learner-centered one. But these studies are criticized for being mostly exploratory and descriptive in nature and lacking in empirical rigor. There is as yet no strong evidence that this new learning environment fosters improved learning outcomes. What does exist are qualitative data based on observations and analysis of student and teacher perceptions that suggest a positive impact on learning.

2.5.2 Equity of Access to ICTs in Education

Given the wide disparities in access to ICTs between rich and poor countries and between different groups within countries, there are serious concerns that the use of ICTs in education will widen existing divisions drawn along economic, social, cultural, geographic, and gender lines.

Ideally, one wishes for equal opportunity to participate. But access for different actors—both as users and producers is weighted by their resources. Hence, initial differences are often reproduced, reinforced, and even magnified…A

formidable challenge, therefore, continues to face planners of international education: how to define the problem and provide assistance for development.

The introduction of ICTs in education, when done without careful deliberation, can result in the further marginalization of those who are already underserved and/or disadvantaged. For example, women have less access to ICTs and fewer opportunities for ICT-related training compared to men because of illiteracy and lack of education, lack of time, lack of mobility, and poverty. Boys are more likely than girls to have access to computers in school and at home. Not surprisingly, boys tend to enjoy working with computers more than girls. As the American Association of University Women reports, "Girls have narrowed some significant gender gaps, but technology is now the new 'boys' club' in our nation's public schools. While boys programme and problem solve with computers, girls use computers for word processing…".

In an evaluation of its program in four African countries, Worldlinks,. an organization that promotes project-based, international telecollaboration activities among secondary school teachers and students from developing countries, it was found that despite efforts to make the program gender neutral, gender inequalities in access persist in Uganda and Ghana. Furthermore, while girls benefited more from the program in terms of improved academic performance and communication skills, boys were able to show their technological skills more.

A complex of economic, organizational, and socio cultural factors account for these differences: “High student-to-computer ratios and first come-first serve policies do not favour girls (typically heavily outnumbered by boys at the secondary level), girls have earlier curfew hours and domestic chore responsibilities which limit their access time, and local patriarchal beliefs tend to allow boys to dominate the computer lab environment.”. Measures proposed to address this gender bias include encouraging schools to develop “fair use” policies in computer labs, conducting gender sensitivity sessions, and advocating for reducing the after-school duties of girls to give them more time to use the computer lab. Girls also need to have female role models to inspire them to participate in technology-related activities.

Providing access to ICTs is only one facet of efforts to address equity issues. Equal attention must be paid to ensuring that the technology is actually being used by the target learners and in ways that truly serve their needs.

2.5.3 Sustainability of ICT-Enhanced Educational Programs

One aspect of development programs that is often neglected is sustainability. The long history of development aid has shown that too many projects and programs start with a bang but all too soon fade out with a whimper, to be quickly forgotten. This is true for many ICT-based educational projects as well. In many instances, these projects are initiated by third party donors such as international aid agencies or corporations and not enough attention is paid to establishing a mechanism by which the educational institution or community

involved can pursue the project on its own or in partnership with other stakeholders after the initiating donor exits. But cost and financing are not the only barriers to sustainability. According to Cisler (2008), the sustainability of ICT-enabled programs has four components: social, political, technological, and economic.

2.5.3.1 Economic Sustainability

This refers to the ability of a school and community to finance an ICT-enabled program over the long term. Cost-effectiveness is key, as technology investments typically run high and in many cases divert funds from other equally pressing needs. Planners should look to the total cost of ownership and build lucrative partnerships with the community to be able to defray all expenses over the long term. The need to develop multiple channels of financing through community participation ties economic sustainability closely to social and political sustainability.

2.5.3.2 Social Sustainability

Social sustainability is a function of community involvement. The school does not exist in a vacuum, and for an ICT-enabled project to succeed the buy-in of parents, political leaders, business leaders and other stakeholders is essential. Innovation can happen only when all those who will be affected by it, whether directly or indirectly, know exactly why such an innovation is being introduced, what the implications are on their lives, and what part they can

play in ensuring its success. ICT-enabled programs must ultimately serve the needs of the community. Thus community-wide consultation and mobilization are processes critical to sustainability. In short, a sense of ownership for the project must be developed among all stakeholders for sustainability to be achieved.

2.5.3.3 Political Sustainability

Political Sustainability particularly refers to issues of policy and leadership. One of the biggest threats to ICT-enabled projects is resistance to change. If, for instance, teachers refuse to use ICTs in their classrooms, then use of ICTs can hardly take off, much less be sustained over the long term. Because of the innovative nature of ICT-enabled projects, leaders must have a good understanding of the innovation process, identify the corresponding requirements for successful adoption, and harmonize plans and actions accordingly.

2.5.3.4 Technological Sustainability

It involves choosing technology that will be effective over the long term. In a rapidly changing technology environment, this becomes a particularly tricky issue as planners must contend with the threat of technological obsolescence. At the same time, there is the tendency to acquire only the latest technologies.

Generally, however, planners should go with tried and tested systems; stability issues plague many of the latest technologies. Again, the rule of thumb is to let

the learning objectives drive the technology choice and not vice versa the latest technologies may not be the most appropriate tools for achieving the desired educational goals. When making technology decisions, planners should also factor in not just costs but also the availability of spare parts and technical support.

2.6 Other Countries Experience in the Use of ICT in Education

Other countries' experiences in using ICTs in education show that they have been used in both formal and non-formal education for more than a half century. Initially, as a project, ICTs such as radio and educational television were implemented in schools after a few years of their innovations. Damtew (2005) has taken India as a good example in experimenting educational broadcasting forum in the rural part of the country to increase the knowledge and skills of the community in 1956. According to him, the evaluation of the project proved that the experimental group made a substantial gain in knowledge and information.

Colombia also used educational television in school instruction to enrich the educational environment of pupils and engage them in purposeful educative experiences; introduce and cause to be introduced into school activities; raise the standard of teaching by exposing teachers to new concepts and techniques directly or indirectly (ibid).

Besides, a unique and successful television based education program, enabled Mexico to address rural education demands. It expands to a full complement of

grade 7 to 9 as students move through the program. Students attend schooling for 30 hours per week, 200 days per year that is the same as the regular school system (Tewodros, 2006 as cited in Aragaw, 2007).

Each lesson consists of a 15-minutes televised program followed by a carefully guided 35 minutes teacher-student dialogue and a 10 minutes break before the next television lesson begins. The program is supported by rich curriculum materials. A specially designed text book is provided for students to refer after watching a televised segment. And also a teacher and student satellite guides assisted the program (Aragaw, 2007).

In Africa, even though Ghana has taken the lead in radio broadcasting in 1956, Nigeria for example, began educational television in 1959 aiming at the reduction of teaching deficiencies in certain syllabus courses such as science; providing examples of good teaching to upgrade the general quality of classroom instruction; and the enrichment of content for certain syllabus such as geography, providing visual material not available in the classroom (Bishop, 1986 as cited in Damtew, 2005). With this regard, Ethiopia was also one of the beneficiaries of the technology at that time despite getting a weak performance of using it properly at last (Head, 1974).

Using satellite communications in education was also experimented in India from 1975-1976 to carry out Satellite instructional Television Experiment (SITE) to reach millions of people in rural and isolated areas who could not be accessed to education by the traditional methods of teaching (Tewodros, 2006). In this project the aim of the education program was to make the children

sensitive to and learn community skills; improve their basic skills and concepts in numeracy, language and technocracy; instill habits of hygienic and healthy living; promote aesthetic sensitivity; and make them aware of the process of modernization of the life and society around them (Bishop, 1986).

The South African Tele Tuks school project is also another initiative that utilizes an audio and video broadcast technology to assist the formal education. The intention of the project is not to replace educators at schools rather assisting the learners with quality education in the more difficult aspects of the subject matters. The South African Tele Tuke project is unique in that it uses an advanced technology bi-directional audio and video broadcast technology to make the lesson interactive. The learners can ask any questions at any time during the broadcast using a microphone to which the presenter will then respond to the questions immediately (Evans, 2005 as cited in Aragaw, 2007).

The innovations of computer technology and internet, on the other hand, have further revolutionized various sectors. Education has not been exceptional. Computers have been used in schools since 1979. They were introduced at secondary levels in USA, Canada, France, Belgium, Israel, Portugal, Italy, The Netherlands and Japan (Delors, 1998). The use of ICT in education in Africa is also increased with the passage of time. And now according to Demissew (2006), perhaps the most popular development use of ICT in Africa is in education.

The mode of teaching is now being changed due to the use of ICT in education. Moreover, the use of ICT enables the school communities to get worldwide information and exchange various messages among themselves and outside their boarder. Apart from these, the use of ICT in education help schools especially found in developing countries to use their meager educational resources very wisely and assist them to narrow the gap that can be brought due to the digital divide between the haves and have not of the technology.

The use of ICT in education changes, not only today's education but also makes a promise for a good delivery of lessons in the future. Educators from Malaysia, Australia and India foresee a future in which digital books, hybrid mobile computers and touch-screen writing tablets will replace the text book, chalk and blackboard.

Anderson, (2007) predicts that knowledge in the form of books and printed matter will rapidly become digitized. Today, full text of over seven million books can be accessed through Google Books. This number is growing quickly as Google expands its digitization effort with international associations, publishers and authors.

Many libraries in Asia Pacific are aggressively digitizing content. The National Library in Colkata the largest library in India is going through a massive digitization effort and converts close to 9140 books and 180,000 records into machine-readable formats (ibid).

2.7 The Use of ICT in Education in Ethiopia

Though Ethiopia developed its own nationwide ICT policy in 2002, the historical attempts made to incorporate ICTs in education dates back to the 1960s, when the first educational broadcasting was launched in 1969. According to Damtew (2005) the country has been using radio and television in supplementing both the formal and non-formal education at different levels and in developing the knowledge and skills of the rural community.

In 1950s, there was an attempt in using radio to support the teaching-learning process which was aided by US Agency for International Development, but soon failed (Head, 174 as quoted in Damtew, 2005). However, there was a pilot radio project for literacy using classroom tapes (Demissew, 1991). According to Educational Television Research Unit, together with British Council, ". . . it was realized that television presentation conventions developed and proved successful in one country or culture are not necessarily intelligible in another country or culture" (Head, 1974 as cited in Damtew, 2005).

Having these intentions, the country developed its own ICT policy. Among the major issues discussed, education is one of the sectors which has been given due emphasis in the policy document. Some of the objectives of this policy address the sector as follows.

- Develop ICTs human resource requirements through education and training programs in the national education system;
- Speed up mass ICTs literacy through internet connected schools and higher education institutions; and

- Develop educational standards, practices and guidelines for the deployment and exploitation of ICTs in schools, colleges and universities (pp. 4-6)

More specifically, under ICTs in education, the following are some of the foci area in the education system developed in the policy:

- Promote the acquisition of ICTs equipment by the educational institutions;
- Develop national school net project;
- Improve the educational delivery system through the application of ICTs:
- Develop national programs to encourage computer literacy at all levels;
- Develop and implement a technology responsive ICTs national curriculum for primary, secondary and high schools as well as training institutes; and
- Program to train a critical mass of computer literacy teachers (pp. 17-18)

All these decisions show the timely pressure to use ICT in the teaching learning process at this information age.

Moreover, even though there has not been a huge gap in the education policy of the country concerning the use of ICT in education, the package that was developed in 2006, has given a great emphasis for the immediate implementation of ICT in the sector (MOE, 2006). Among the six programs that the package contains, ICT expansion program is the one without which it becomes impossible to address the challenges of the education sector of the country. This also depicts the interests of the country to use ICT in education.

In doing these, Ethiopia has been trying to implement the ICTs policy statements in education at different level of the education system. For instance, information technology (IT) has been given as a subject both theoretically and practically at second cycle secondary schools (MOE 2001). This prepares students to have the how of using computer and searching information from the internet at university and college level.

However, Abate (2004) found that even teachers who teach IT at secondary level were trained inappropriately and inadequately for teaching IT. He also found out that all high schools in this study did not have internet access. Wakshum (2001) also discussed the main difficulties in implementing it in schools particularly in developing countries due to cost of hardware and software as well as shortage of trained teachers and equitable distribution.

Yared (2006) quoted in Damtew (2005) also underlined that educators are not concerned with the introduction of ICT projects in schools and the related teacher professional development programs in ICT. He further pointed out that the present attempt of training teachers to develop their ICT knowledge and skills have been hindered by political, theoretical and practical problems as opposed to stated in the policy document.

Plasma Television has been introduced in secondary schools for the teaching-learning process in some subjects like English, mathematics, biology, chemistry, physics and civic and ethical education since 2002/3. This has been performed by transmitting recorded information of each subject from a center through satellite communication. Moreover, Lishan (1999) cited in

Damtew, (2005) indicates that although satellite communication provides full motion video and audio, it has been implemented in Ethiopian high schools in one way video and audio which lacks interactivity.

In addition to these, the internet service is also provided in preparatory schools. According to Demissew (2006), some 191 preparatory schools (grade 11 and 12) have started using internet with 3,200 computers, 196 printers and 12 laptops. He further states that within that year (2006), more computers would be supplied to serve over 600 secondary schools.

Chapter Three

3. Research Methodology

3.1 Method of Research

The study focuses on asssessing the implementations of ICT program in the selected preparatory schools in the city. To this end, a descriptive survey method was employed with the assumption that it could help to get a description of the current state of the implementation of the program by examining its achievements, challenges and prospects. According to Kotheri (2004), the major purpose of descriptive research method is description of the state of affairs as it exists at present.

3.2 Sources of Data

The study covered four preparatory schools found in three sub-cities of the capital. Thus, the data needed for the study were gathered from two sources, primary and secondary. As primary sources, data were collected through questionnaires, interviews and direct observations. Two different sets of survey questionnaires for both teachers and students were developed based on basic questions to secure factual information, opinions and attitudes on the subject area under study.

Audio visual and documents related with the study such as ETP, GEQUIP, ICT training manuals and guidelines were also thoroughly reviewed, checked and analyzed as secondary sources.

3.3 Sampling Technique

A total of four preparatory schools found in three sub-cities were included in the study. Purposive sampling was employed to select them. On the other hand, it was projected that out of the total population, 140 students and 60 teachers were randomly selected to complete the questionnaires. And indeed, in order to provide an equal chance of being represented in the sample, simple random sampling technique was employed. Besides, purposive sampling technique was employed to select and interview those 11 key informants like experts and professionals at ICTECWP and AACAEB. This technique was used because of the fact that it permitted the researcher to identify key informants on the basis of the research objective and the intended outcome.

3.4 Tools for Data Collection

In this study, both quantitative and qualitative data were collected using different tools. Basically, the researcher used four data collection instruments such as questionnaires, interview, direct observations and document analysis. These methods enabled the researcher to obtain adequate information for the study. The questionnaires were designed and made to include both closed-ended and open-ended items. And they were distributed to students randomly selected in the four preparatory schools.

The interviews were held with experts from ICTECWP and AACAEB, who have especially taken part in the formulation of the package and responsible to the implementation of the ICT. Staff members from the four Preparatory Schools

were also interviewed and gathered information that may help to portray the current statues of the program's implementations.

Direct observations were also made in the ICT and plasma Television classrooms. The researcher held the observations in the teachers and the students' internet rooms. These activities allowed the researcher to see and internalize the impacts made on the education sector due to the implementations of ICT. In addition to this, it enabled the researcher to analyze and reach fair conclusion about the real challenges of ICT created in the education sector. And it provided a room to suggest ideas that should be done in order to improve the use of ICT in education.

Document analysis on ETP, GEQUIP, ICT policy of the country and other training manuals and guidelines were made as part of the study. In general, the researcher tried his best to gather information that showed the state of the implementations of ICT Program in those preparatory schools.

3.5 Procedures of the Study

As stated in the preceding section, closed and open-ended questionnaires had been set. Then, the questionnaires were pilot tested on potential respondents to make the data collecting tools objective, relevant, suitable to the problem, and reliable. Moreover, the questionnaires were checked and rechecked by the colleagues of the researcher for further improvement. Based on the feedback, the necessary corrections were carried out on the questionnaires. And the final ones were translated into Amharic (only the students' questionnaire) and duplicated, stapled and administered to the appropriate respondents. The

objective and significance of the study were explained to respondents to maximize questionnaires returns.

Observations in the selected schools and unstructured interviews with experts were made before the questionnaires. In doing this, prior contact was performed with all the concerned bodies to ensure willingness to share their views on the area under study. This allowed the researcher to include more issues in the questionnaire.

3.6 Method of Data Analysis

Depending on the nature of the data collected, different data analysis methods were employed. After the questionnaires were returned from the respondents, the process of tabulation was carried out. Different statistical tools namely mean and percentages were employed for analysis to examine and describe differences and similarities between the views of different respondents. Data obtained through open-ended interviews, observations and documents were also analyzed in the interpretation part.

Chapter Four

4. Data Presentation, Analysis and Discussions

This chapter deals with data presentation, analysis and interpretation. The data presented afterwards have been collected from respondents through questionnaires, interviews, observation and document analysis. The questionnaires were prepared for 60 teachers and 140 students across the four schools such as Bole, Derartu Tulu, Dejazimach Wondirad and Medihanialem preparatory schools found in Addis Ababa.

However, out of the total distributed questionnaires, 48 of the teachers and 126 of the students' questionnaires were collected and organized in tabular form and analyzed using percentage, and mean scores to see the differences between mean scores. In additions to these, 8 staff members of the four schools and 3 experts from ICTECWP and AACAEB were interviewed. The data gathered through interview and observations were also analyzed in relation to the answer obtained through the questionnaires. Moreover, the implication of the results of the analysis has been discussed in brief. Thus, the basic questions which were raised in the study have been given relevant responses.

4.1 Characteristics of the Respondents

Table-1(a) Teachers Respondents N=48

No.	Item	Teachers	
		No.	%
1	Sex		
	Male	29	60.42
	Female	19	39.58
2	Age		
	21-30	19	39.50
	31-40	15	31.25
	41-50	6	12.50
	Above 50	8	16.66
3	Qualification		
	Diploma	7	14.58
	First Degree	32	66.67
	Above First Degree	9	18.75

As indicated in table-1(a), out of the 48 teachers' respondents 60.42% were males and 39.52% were females. This indicates that almost nearly equal number of both sex have taken part in the study although still the number of females' teachers was less than that of males'. This also shows that great attentions should still be needed to maximize the number of females' teachers in the sector.

Moreover, as table-1(a) is evidence for their age, out of the total number of teachers, both 39.50% and 31.25% of teachers belonged to an age group of less than 40. This proves that the young generation has participated in the education sector. And the rest of the teachers were grouped above 40 years. This is important for experience sharing among the different ages.

Apart from these, the table also demonstrates that the education level of 14.58% of the teacher is diploma level and 85.42% of the teachers is first degree and above. This illustrates that there are still teachers with diploma. And of course, there is a need of an immediate action that has to be done in order to upgrade diploma's holder qualification.

Table-1(b) Teachers Respondents N=48

No.	**Item**	**Teachers**	
		No.	%
1	Teaching Experience		
	1-5	13	27.10
	6-10	12	25.00
	11-15	8	16.66
	Above 15	15	31.25
2	Level of Teaching		
	Grade-11	13	27.08
	Grade-12	19	39.58
	Both Grades 11 and 12	16	33.33
3	Subject Area		
	Mathematics	6	12.50
	English	6	12.50
	Physics	7	14.58
	Chemistry	5	10.42
	Biology	6	12.50
	Civic and Ethical Education	4	8.33
	Information Technology	13	27.10
	Economics	1	2.10

As table-1(b) shows that teaching experience is also another indicator. 27.10% and 25.00% of the total had less than 10 years of experience. As outlined above, almost more than half of the teachers were young in the field of teaching. And the rest of the teachers had more than 10 years of experience.

This shows that still a lot has to be done in order to make the teachers technology oriented. This is due to the fact that teachers with more years of experience may not use and encourage their students to exploit the benefits of ICTs.

A survey conducted by the US Department of Education (1999) as cited in Caircros (2005), revealed that 47 percent of those who had been teaching for between four and nine years reported that they used computers or the Internet a lot to get information and create instructional materials, compared with 35 percent of those who had been teaching for 15 or more years. And, of teachers with three or fewer years of experience (the newest of all), 31 percent reported feeling well prepared to use computers and the Internet, compared with only 19 percent of those who had been teaching for 10 years or more.

According to the data gathered through interviews made with respondents held on April 11, 2010 also showed that nowadays having long years of experience in teaching becomes a drawback for using ICT. This is due to the fact that most teachers having more experiences are with a heavy background of unfriendliness to technology and assume that the technology would replace them. Thus, this is a big challenge in the implementations of ICT in the school.

In addition to this, as it is indicated in the above table, teachers of both grade (i.e. Grade 11 and 12) have been involved in the study. And the subject matter of the teachers also illustrates that almost appropriate proportion of the teachers across their subject area were made to participate in the study. This

allows the researcher to have the perceptions of the teachers concerning the implementation of information and communication technology in both grades.

Table-2 Students' Respondents N=126

No	Items	Students	
		No.	%
1	Sample Schools		
	Bole	31	24.60
	Dejazimach Wondirad	31	24.60
	Derartu Tulu	34	26.98
	Medihanialem	30	23.81
2	Sex		
	Male	66	52.38
	Female	60	47.62
3	Age		
	15-17	44	34.92
	18-20	79	62.10
	21-23	3	1.60
	Above 23	1	0.79
4	Grade level		
	Grade-11	66	52.38
	Grade-12	60	47.62

Out of the 140 students, 126 responded to the all questionnaires. As table-2 indicates that an appropriate number of students from each school got involved in the study. And their sex also shows that 52.38% of the total students were males and the rest 47.62 students were females. This finding illustrates that almost equal number of both sex were made to participate in the research.

Moreover, the data also provides sufficient information about age, out of the total number of those students, both 34.92% and 62.10% belonged to an age group of 20 and less than 20. This confirms that almost all of the students

were young and helped them to acquaint themselves with the new technology called information and communication technology.

Apart from this, their grade level also matters a lot for the study. And both students who belonged to grade 11 and 12 participated. And 52.32% of grade 11 and 47.62% of grade 12 students were made to share their views concerning the implementation of Information and Communication Technology in their schools so that it helps us to have a consensus outlook about it.

4.2 Educational Benefits and Challenges of using Integrated ICT in the Schools

Table 3 (a): Teachers Perceptions on the implementation of ICT in their Schools

No	Items		SA	A	U	D	SD	Total	X
			5	4	3	2	1	-	-
1.	The use of ICT in education promotes quality education	f	26	17	1	3	1	209	4.35
		%	54.2	35.4	2.1	6.3	2.1	100	
2.	There have been attempts to promote the use of ICT in the school	f	19	21	3	4	1	197	4.10
		%	39.6	43.8	6.3	8.3	2.1	100	
*3.	There is no responsible staff that handles the implementations of ICT in the school	F	1	4	5	23	15	97	2.02
		%	2.1	8.3	10.4	47.9	31.3	100	
4.	Computer labs are opened in the scheduled hours.	f	12	24	1	5	6	178	3.65
		%	25.0	50.0	2.1	10.4	12.5	100	
5.	Attempts have been made in order to avoid misconceptions about the use of ICT in education among teachers	F	17	16	3	8	4	178	3.71
		%	35.4	33.3	6.25	16.7	8.3	100	

∗ Represents scores that are reversed

As shown in table-3 (a), the agreement (strongly agree plus agree) of teachers respondents on items 1, 2, 4, was relatively high (i.e. above 75%). 89.6% and 83.4% of the students accepted items 1 and 2 respectively. Item 4 was also accepted by 75.7% of the students.

The mean rating value of items 1 and 2 is above 4 (i.e. 4.08 and 4.10 respectively). The mean rating value of all of the three items is greater than the expected average mean (i.e.3). This shows that most of the teachers had positive attitudes towards the implementations of ICT in their respected schools. And also, they believed that, using ICT in education help to provide quality education.

In addition to these, the teachers agreed on the attempts performed by the schools in order to use the ICT technology effectively such as opening the computer labs in their scheduled hours. And also, 68.7% of the teachers accepted item 5. These illustrates that the teachers had a positive response to the endeavor made in the schools to avoid the misconceptions concerning the use of ICTs such as plasma television, computer and Internet Services among teachers.

On the other hand, 79.2% of the teachers rejected (disagree and strongly disagree) item 3. The mean rating value of item 3 is less than that of the expected average mean (i.e.3). This indicates that more than three-fourth of the teachers did not accept the absence of responsible staff that handles the implementations of ICTs in the schools.

Table-3 (b): Teachers Perceptions on the implementation of ICT in their Schools

No	Items		SA	A	U	D	SD	Total	X
			5	4	3	2	1	-	-
1.	Actions have been made to develop the capacity of the teachers concerning ICT	F	11	19	4	11	2	167	3.48
		%	22.9	39.6	8.3	22.9	4.2	100	
2.	Teachers very often encourage their students to use computers.	f	8	17	12	8	3	158	3.29
		%	16.7	35.4	25.0	16.7	6.3	100	
*3.	There are no adequate equipments in the school that help the implementations of ICT in the school	F	21	15	3	7	2	190	3.96
		%	43.8	31.3	6.3	14.6	4.2	100	
4.	There are external bodies (such as ICTECWP and AACAEB) that support the school to implement ICT effectively	f	15	22	4	3	4	185	3.85
		%	31.3	45.8	8.3	6.3	8.3	100	
*5	There is no relationship with stakeholders such as ETC,EELPA and ICTDA that are assumed to support the schools to implement ICT	f	2	5	11	20	10	113	2.35
		%	4.2	10.4	22.9	41.7	20.8	100	

As shown in table-3 (b), the agreement (strongly agree plus agree) of teachers respondents on items 8, and 9 was relatively high (i.e. above 75%). And 75.1% and 77.1% of the students chose agree or strongly agree as their response for items 8 and 9 respectively.

The mean rating value of items 8 and 9 were 3.96 and 3.85 respectively. The mean rating value of the two items is greater than the expected average mean (i.e.3). This shows that the teachers had a positive perception concerning creating linkages to the external bodies such as Information and Communication Technology Core Process structured under the Ministry of Education and Addis Ababa Educational Burea and so on to get their support.

However, 62.5% of the respondents rejected item 10. And its mean rating value is less than that of the expected avarage mean (i.e 3). This shows that almost

more than three-forth of the teachers perceived that the schools had no adequate equipments that would help the implementations of ICTs.

This also illustrates that the schools had links with those stakeholders such as ETC, EELPA and ICTAD. They supported the schools by providing ICT equipments such as computers, network service and electricity to the schools that support the implementations of ICT although it is not sufficient

Table-4 Students' Perceptions on the Implementations of ICT in their Schools

No	Items		SA	A	U	D	SD	Total	X
			5	4	3	2	1	-	-
*1.	There are inadequate computers in the computer classrooms	f	58	41	18	16	2	542	4.30
		%	46.0	32.5	14.3	12.7	1.6	100	
2.	There are enough classrooms reserved only for computer lesson	f	4	10	11	56	45	250	1.98
		%	3.2	7.9	8.7	44.4	35.7	100	
3.	There are adequate ICT teachers in the school like other subjects	F	2	3	18	59	44	238	1.89
		%	1.6	2.4	14.3	46.8	34.9	100	
*4	Computer classrooms are not available for students to practice in their free time	f	54	41	21	7	3	514	4.07
		%	42.9	32.5	16.7	5.6	2.9	100	
5.	Every computer is networked to each other so that lessons can be accessed from the center (server)	F	2	11	6	55	52	234	1.86
		%	1.6	8.7	4.8	43.7	41.3	100	
6.	The computers are quite often attacked by virus so that they are usually out of use	F	71	34	6	13	2	537	4.26
		%	56.3	27.0	4.8	10.3	1.6	100	
*7.	There are no personnel inefficiency to solve computer problems in the school	F	7	3	21	46	49	251	2.00
		%	5.6	2.4	16.7	36.5	38.9	100	
8.	There are attempts made by the school community to promote the use of ICT in the school (forming ICT club and so on)	F	39	60	6	10	11	484	3.84
		%	31.0	47.6	4.8	7.9	8.7	100	

* Represents scores that are reversed

Table-4 contains the responses of student perception on the implementations of ICT in their respected school. The students' agreements (strongly agree plus agree) on items 1, 4, 6 and 8 was relatively high. And each of the items was supported by mean rating value of greater than 4: i.e. 4.30, 4.07 and 4.26 respectively except item 8 that was 3.84. This indicates that though the implementation of ICT had been undertaken, there were a lot of challenges that hinder the attempts. The challenges were lack of adequate computers in the computers classroom, unavailability of computer classes for students to practice in their free time and disabled computers due to virus attack.

On the other hand, the students did not accept (disagree and strongly disagree) item 2, 3, 5 and 7. There was 80.1%, 81.7%, 85.0% and 75.4 of the students rejected the items respectively. These imply that the students were in a position to agree on the shortage of computer classrooms and manpower that handle the implementations of ICT in the schools.

4.3 Concerning the Use of Plasma Television (Instructional Television) in the schools

Table-5 (a) Teachers' Perception on the use of Plasma Television in the schools

No	Items		SA	A	U	D	SD	Total	X
			5	4	3	2	1	-	-
1.	The use of Plasma Television enables to provide quality education	f	25	16	3	3	1	205	4.27
		%	52.1	33.3	6.3	6.3	2.1	100	
2.	There is a conducive environment in the school that initiates the teachers to use plasma television in their daily lessons	f	29	12	2	2	3	2.06	4.29
		%	60.4	25.0	4.2	4.2	6.3	100	
*3.	There are no interruptions such as electric break, network or inability to operate while lessons are being given through plasma television	F	-	3	8	14	23	87	1.81
		%	-	6.3	16.7	29.2	47.9	100	
4.	Now improvements have been made on the plasma television lessons contrarily to the past	f	16	18	9	2	4	187	3.89
		%	33.3	37.5	18.8	4.2	8.3	100	
*5.	The misconceptions concerning the use of plasma television by the teachers have been totally eliminated	F	4	5	4	20	15	107	2.23
		%	8.3	10.4	8.3	41.7	31.3	100	

*represents the scores that are reversed

Table-5 (a) contains questions focusing on some of the achievements and challenges that have been gained because of the implementations of Plasma television in preparatory schools. According to the responses gathered, relatively high number of the teachers (above 80%) accepted item 1, and 2 with mean rating of 4.27 and 4.29, respectively. These mean that most of the teachers highly take that the use of plasma television enable the schools to provide quality education and also believed that the existence of conducive environment in the schools that initiate the teachers to use plasma television.

On the other hand, item 3, and 5 were rejected (disagree and strongly disagree) by the majority of the respondents. 77.1% and 73.0% of the teachers' respondents did not accept items 3, and 5 respectively. These illustrate that

most of the teachers believed the occurrence of interruption such as electric break, network or inability to operate while lesson were give through plasma television. Moreover, the misconceptions regarding to the use of plasma television by the classroom teachers were not yet eliminated. According to the interviews held on April 11, 2010 indicated that there were still teachers who did not want to use plasma television in the classroom even though they had to. The reasons were many in numer and also needed further investigations.

Table-5 (b) Teachers' Perception on the use of Plasma Television in the schools

No	Items		SA	A	U	D	SD	Total	X
			5	4	3	2	1	-	-
1.	It is possible to get all of the six plasma television lessons on CD/DVD outside the classrooms	F	-	4	5	17	20	85	1.77
		%	-	8.3	10.3	35.4	41.7	100	
2.	The use of plasma television in the classroom enables the teacher to get teaching aids that may not be accessed very easily in the school	f	21	20	2	2	3	198	4.13
		%	43.8	41.7	4.2	4.2	6.3	100	
3.	The advantages of the use of plasma television weigh far the disadvantages	F	20	15	8	-	5	189	3.94
		%	41.7	31.3	16.7	-	10.4	100	
4.	There are problems in using the plasma television faced by the teachers	f	17	20	7	-	4	190	3.96
		%	35.4	41.7	14.6	-	8.3	100	
5	There is an assigned staff that is responsible to solve the problems concerning the plasma television in the school	f	22	18	1	4	3	196	4.08
		%	45.8	37.5	2.1	8.3	6.3	100	

*represents the scores that are reversed

Table-5 (b) also contains the second part of the previous table-5 (a) concerning the use of plasma television in the schools. According to the responses gathered, relatively high number of the teachers (above 80%) accepted item 7 and 10 with mean rating of 4.13 and 4.08 respectively. These mean that most of the teachers highly take that the use of plasma television in the schools help to get various teaching aids that may not be accessed very easily in the

schools. And also out of the total respondents, 83.30% of the teachers accepted item 10. This implied that the schools had an assigned staff that was responsible to solve various problems regarding plasma television.

On the other hand, item 6 was rejected (disagree and strongly disagree) by the majority of the respondents. 77.1% of the teachers' respondents did not accept items 6. This illustrates that most of the teachers believed that it was difficult to get all of the plasma television lessons on CD/DVD outside the classrooms. The package developed by MOE in 2006 states that the all of the plasma television lessons could be accessed outside the classrooms like in the schools' library and in the market.

Table-6 (a) Students' Perception on the use of Plasma Television in the schools

No	Items		SA	A	U	D	SD	Total	X
			5	4	3	2	1	-	-
1.	The use of Plasma Television enables to provide quality education	f	39	41	7	13	26	432	3.4
		%	31.0	32.5	5.6	10.3	20.6	100	
2.	There is a conducive environment in the school that initiates the teachers to use plasma television in their daily lessons	f	41	50	12	15	8	479	3.80
		%	32.5	39.7	9.2	11.9	6.3	100	
*3.	There are no interruptions such as electric break, network or inability to operate while lessons are being given through plasma television	F	9	10	17	46	44	272	2.16
		%	7.1	7.9	13.5	36.5	34.5	100	
4.	Now improvements have been made on the plasma television lessons contrarily to the past	f	7	9	20	38	52	259	2.06
		%	5.6	7.1	15.9	30.2	41.3	100	
*5.	The misconceptions concerning the use of plasma television by the teachers have been totally eliminated	F	-	15	7	65	39	250	1.98
		%	-	11.9	5.6	51.6	31.0	100	

*represents the scores that are reversed

In the same categories with the same items, table-6 (a) also indicates students' responses. Item 1 and 2 were accepted by the majority of the students. 63.5% and 72.2 of the respondents of the students accepted item 1 and 2. This

indicates that most of the students believed that plasma television could help to impart quality education. And they had a positive perception on the attempts made by the schools in order to implement the effective use of plasma television such as creating conducive environment for the teacher to use the plasma.

On the other hand, item 4 and 5 were rejected (disagree and strongly disagree) by the majority of the respondents. 71.5% and 82.6% of the students' respondents did not accept items 4 and 5 with mean rating values of 2.06, and 1.98 respectively. This illustrates that most of the students disagreed on the improvements made on the plasma television programs such as the attempts to remove misconceptions, speed and pronunciations of the presenter.

Moreover, according to the interview made with the respondents on April 08, 2010, during the transmission, the presenters' pronunciation and their accent as well as their speed still produced a lot of challenges for the local students of both rural and the cities dwellers.

Table-6 (b) Students' Perception on the use of Plasma Television in the schools

No	Items		SA	A	U	D	SD	Total	X
			5	4	3	2	1	-	-
1.	It is possible to get all of the six plasma television lessons on CD/DVD outside the classrooms	F	8	5	13	35	65	234	1.86
		%	6.3	3.9	10.3	27.8	51.6	100	
2.	The use of plasma television in the classroom enables the teacher to get teaching aids that may not be accessed very easily in the school	f	43	37	18	10	17	454	3.60
		%	34.1	29.4	14.3	7.9	13.5	100	
3.	The advantages of the use of plasma television weigh far the disadvantages	F	41	47	12	21	5	476	3.78
		%	32.5	37.3	9.5	16.7	4.0	100	
4.	There are problems in using the plasma television faced by the teachers	f	43	42	18	17	6	477	3.78
		%	34.1	33.3	14.3	13.5	4.8	100	
5	There is an assigned staff that is responsible to solve the problems concerning the plasma television in the school	f	38	44	17	10	17	454	3.60
		%	30.2	34.9	13.5	7.9	13.5	100	

In the same categories with the same items, table-6 (b) also indicates students' responses. Item 7 and 10 were accepted by the majority of the students. 63.2% and 65.1% of the respondents of the students accepted item 7 and 10 respectively. This implies that the students had a positive perception on the use of plasma television in the classroom for the teachers to get teaching aids that may not be accessed otherwise.

And also they accepted the attempts made by the schools in order to implement the effective use of plasma television such as creating a conducive environment for the teacher to use the plasma and assigning a responsible staff that handle the problems concerning plasma.

On the other hand, item 6 was rejected (disagree and strongly disagree) by the majority of the respondents. 79.4% of the students' respondents did not accept items 6 with mean rating values of 1.89. This illustrates that most of the students disagreed on the attempts done by the concerned bodies to access plasma television lessons on CD/DVD outside the clasrooms.

Hence, both the teacher and the students were in a position that plasma television could be important to provide quality of education. Even though it may not be sufficient to firmly express the extent to which and how it could improved quality of education. For instance, summary of research findings explained in USAID (2004) indicates that ICTs are mainly effective when used to improve educational quality, where there are shortages of qualified teachers and teaching materials.

A study conducted by Burton (1999) also indicates that the advantages of ICT-use in education could be assessed by the improvement it enables. Examination of the study in this case revealed that provision of the plasma television program is important to improve quality of education. Most of the respondents believe that plasma television program use for classroom instruction enable the students to get the educational resources that can foster quality of the instruction; enable the students access to knowledgeable and skilled teachers; access to different specialists to clarify abstract content; and it can also develop critical learning experience, problem solving ability of the students.

Above all, they also believed that plasma television lesson has more motivating potential than the ordinary face-to-face education. Hence, the positive perceptions the students acquired towards the technology could have major impact on their learning outcomes. Nevertheless, there are still other issues to be taken into account to create more conducive environment for the learners.

4.4 The Use of Internet Services in the Schools

Table-7 (a) Teachers' Perception on the use of Internet Service in the schools

No	Items		SA	A	U	D	SD	Total	X
			5	4	3	2	1		-
1.	It is possible for the teachers to get an internet service in the school compound.	f	18	21	1	5	3	190	3.96
		%	37.5	43.8	2.1	10.4	6.3	100	
*2.	There are inadequate computers in the internet room that are accessible for the teachers	f	24	20	2	2	-	210	4.38
		%	50.0	41.7	4.2	4.2	-	100	
*3.	There are not scarcity of personnel in the school that facilitate the internet service in the school	F	6	3	4	11	24	100	2.08
		%	12.5	6.3	8.3	22.9	50.0	100	
4.	There are usually technical problems encountered the internet services	f	19	18	8	2	2	197	4.10
		%	39.6	37.5	16.7	4.2	4.2	100	
5.	The internet service in the school enables the teachers to get different information and widen their knowledge that in turn benefits themselves as well as their students	F	24	19	3	-	2	207	4.31
		%	50.0	39.6	6.3	-	4.7	100	

*represents the scores that are reversed

As shown in the above table-7 (a), it contains questions that focus on the availability of internet service in the schools. According to the data gathered as outlined in the table, relatively most of the respondents (above 80% except items 4) accepted items such as 1, 2 and 5, with mean values of 3.96, 4.38, 4.31 and 3.92 respectively which were more than of the expected average mean (i.e. 3). This indicates that almost the majority of the teachers have a positive perception on the internet service provided by their respected schools. And also, the teachers' respondents agreed that the internet service in the school enables them to access different information and help them widen their knowledge that in turn benefits their students as well. Besides, the

respondents perceived the internet service in the schools as a means that enables them to communicate with their colleagues through e-mail.

However, the respondents perceive that the schools do not possess the necessary number of computers that help them to give an internet services efficiently. In addition, the respondents pointed out the existence of scarcity of manpower that manages the issues concerning the internet service provided in the schools.

Table-7 (b) Teachers' Perception on the use of Internet Service in the schools

No	Items		SA	A	U	D	SD	Total	X
			5	4	3	2	1		-
*1.	Teachers do not motivate their students to use internet service	F	6	4	2	15	21	103	2.14
		%	12.5	8.3	4.2	31.3	43.8	100	
2.	The internet service in the school enables the teachers to exchange information through e-mail with their students	f	-	3	4	21	20	86	1.79
		%	-	6.3	8.3	43.8	41.7	100	
3.	Students usually use internet service that is available in the school	F	15	24	4	-	5	188	3.92
		%	31.3	50.0	8.3		10.4	100	
4.	Having the internet services in the school help the teachers communicate with their colleagues	f	23	18	5	2	-	206	4.29
		%	47.9	37.5	10.4	4.2	-	100	
5	Internet services can be accessed in the scheduled hours	f	12	20	9	5	3	180	3.75
		%	25.0	41.7	18.8	10.4	6.3	100	

*represents the scores that are reversed

In Table 7 (b), the majority of the respondents reflected their disagreement (strongly disagree and disagree) for item 6 and 7 with mean value of 2.14 and 1.79 which is less than the expected average mean value of 3. This illustrate that most of the teachers do not motivate their students to use an internet

service available in the school. This could be by direct telling or exchanging assignments through internet with their students.

Table-8 Students' Perception on the use of Internet Service in their schools

N=126

No	Items		SA	A	U	D	SD	Total	X
			5	4	3	2	1		-
*1.	It is not possible for the students to get an internet service in the school compound.	f	12	13	10	44	47	277	2.20
		%	9.5	10.3	7.9	34.9	37.3	100	
2.	Students are usually motivated to use an internet service by their teachers	f	9	12	22	31	52	213	1.70
		%	7.1	9.5	17.5	24.6	41.3	100	
3.	There are adequate computers in the internet room that are accessible for the students	F	6	11	9	43	63	250	1.98
		%	4.8	8.9	7.1	34.1	50	100	
4.	The internet service room is not opened in the scheduled hours	f	53	33	22	12	6	493	3.91
		%	42.1	26.2	17.5	9.5	4.8	100	
*5.	The internet service room is fairly enough to deliver the service	F	15	4	9	41	57	347	2.75
		%	11.9	3.1	7.1	32.5	45.2	100	
6.	There is scarcity of personnel in the school that facilitate the internet service	F	57	35	20	13	3	514	4.08
		%	45.2	27.8	15.9	10.3	2.4	100	
7.	There is usually technical problems whenever the students try to use an internet service	F	69	43	8	6	2	555	4.40
		%	54.8	34.1	6.3	4.8	1.6	100	
8	The internet service in the school enables the students to widen their knowledge by providing information from every corners of the world	F	14	12	10	53	37	291	2.31
		%	11.1	9.5	7.9	42.1	29.4	100	

*represents the scores that are reversed

Here, table-8 contains questions that stress on the perceptions of the students' respondents regarding the use of internet service in their respected schools. On the basis of their responses, only items such as 4, 6 and 7 were accepted

(above 75% except item 6, 71.0%) with mean value of 3.91, 4.08 and 4.40 respectively. This implies that though most of the respondents agreed on the opening of the internet room in their scheduled hours, the computers were out of use because of technical errors and also there exist scarcity of manpower that operate the internet services.

On the other hand, out of the total respondents, 72.2%, 65.9%, 84.1%, 77.7% and 71.5% rejected (disagree and strongly disagree) items 1, 2, 3, 5 and 8 respectively. Their mean values were 2.20, 1.70, 1.98, 2.75 and 2.31 which ware less than the expected average mean of 3. This portrays that most of the students believed that the schools had no sufficient internet service and motivations from their teachers to use internet services. In addition to these, the internet rooms found in the schools possessed inadequate number of computers so that the respondents could not get important information to widen their knowledge and subject matters.

4.5 Infrastructure of ICT across the Schools

Table-9 Plasma Television across the Schools

No	Sampled Preparatory schools	Total Students (grade 11-12)	Total sections	Average class size	Total P. Television	Classroom with disabled P. Televisions	Plasma Television to Students Ratio
1	Bole	1776	32	58	30	2	1:59
2	Dejazimach Wondirad	1493	28	60	27	1	1:55
3	Derartu Tulu	1106	29	40	29	-	1:38
4	Medihanialem	2665	60	50	57	3	1:47

As clearly shown in tabl-9, the schools have too many sections of both grades. Among them, the number of sections of Medihanialem Preparatory school is

double compared to the other schools which contain an average section of 30. And also, Student class rations of all the preparatory schools are ranging from 40 to 60 students per class or an average of 52 which could be nearly larger than the suggested holding capacity of a section as prescribed in the new education and training policy of the country. Hence, it needs minimizing the number of sections and students for the teachers to manage and enhance quality education.

In addition to these, the table is evidence that each section has one plasma television except those classes with disabled plasma televisions. And most of the sections had plasma television with average plasma to student ratio of 1:50. This indicates that still a lot has to be done in order to reduce the gap between the numbers of plasma television to students' ratio. This in turn helps the students to have an appropriate view of the plasma television screen.

On the other hand, the table illustrates that, there was variation in the availability of the infrastructures among the preparatory schools. For example relatively Derartu Tulu seemed better than others holding less number of students per class for Plasma Television.

Table-10 Computer and Internet Service across the Schools

No	Sampled Preparatory schools	Total Number of Students (grade 11-12)	Total sections	Average class size (Average number of students)	Total Number of Computer Rooms	Average Number of Computers Available in each room	Computer to student ratio in Computer Rooms	Total Number of Internet Rooms	Number of Computers to students Ratio in the Internet rooms
1	Bole	1776	32	58	3	15	1:4	1	1:118
2	Dejazimach Wondirad	1493	28	60	3	13	1:4	2	1:115 (each)
3	Derartu Tulu	1106	29	40	3	15	1:3	2	1:74 (each)
4	Medihaniale m	2665	60	50	5	14	1:4	1	1:190

Table-10 indicates the infrastructure development that has been done to implement ICT across the sampled preparatory schools. According to the data outlined in the table, the ratio of the computer to student in a computer rooms is 1:4 except Derartu Tulu preparatory school which is 1:3. This indicates that one computer is surrounded with four students. And there are a number of students who leave the computer room without even touching the computer mouse in each computer class. This is due to the fact that the computer rooms of the schools as the researcher observed follow the procedure of 'first come, first served' approach. This means out of the average class size of the schools, only one-fourth of the students get the mouth of the computer in each of the computer classes scheduled two periods in a week for each section and exist a number of students who do not even touch a computer mouth. There was no adequate infrastructure that was supplied to adopt the technology and improve quality of education for which innovation of these technologies were intended.

The data concerning the internet services in the four preparatory schools show that only Dejazmach Wondirad and Derartu Tulu preparatory schools had 2 internet room each and the rest, one. And also, the number of computers to student ratio in the computer classroom of these preparatory schools was also greater than those of Bole and Medihanialem.

Hence, there is inequity of infrastructure distribution among the schools. In addition to these, all the teacher and student respondents claim that there is frequent disconnection of Internet. Thus they criticized that the computers and the Internet line provided is not giving sufficient services neither to enhance the quality of education nor to enable the users to access global knowledge services.

In order to maximize the potential advantage of a technology use in education there should be ICT enabled learning environment. Creating ICT-enabled learning environment again calls for development of adequate and sufficient infrastructure. However, findings of the study revealed that, there is no adequate number of learning sections, proportionate number of Plasma Television with available sections, sufficient number of computer and lines for the internet. The available Plasma Television and computer itself were distributed unevenly among the schools. Hence, it makes the schools produce many students with much knowledge gap between the have and have not.

4.6 Self Evaluation of Knowledge and Skills of Computer and Internet use

Table-11(a) Teachers and Students' Knowledge and Skills on Computer and Internet

No	Items	Teacher		Students	
		F	%	F	%
1	How often do you use a Computer? .....in a week				
	Three Times and Above	26	54.2	7	5.56
	Twice	10	20.8	83	65.2
	Once	7	14.6	29	23.0
	I may not use	2	4.2	7	14.6
2	Knowledge of computer hardware and their functions				
	Excellent	15	31.3	12	9.5
	Very Good	9	18.8	19	15.1
	Good	4	8.3	22	17.5
	Poor	17	34.7	46	35.5
	Very poor	3	6.3	27	21.4

Students and teachers self rating on their knowledge and skills that could enable them to effectively use computer and internet is summarized and depicted. Knowledge and skills supposed to be achieved for computer and internet use, adopted from ICT training manual, was classified into four major components. These are: knowledge and skill on basic computer system; network; and knowledge and skills of using Microsoft internet explorer.

As shown in table-11, 54.2% of the teachers used a computer more than three times in a week. 20.8% and 14.6% of the teachers had a habit of using a computer twice or once in a week. This implies that most of the teachers tried to familiarize themselves with a computer. The students, on the other hand, were given the same questions and responded that 5.56% of the students had an experience of using a computer more than three times regarding the first item. Besides, 23.0% and 65.2% of the students utilized a computer one and

two times a week respectively. This indicates that the majority of the students did not use a computer more than two times in a week.

For item-2, 22.9% of the teachers rated themselves "excellent" in their knowledge of computer hardware and their functions. And for the same item, 18.8% of the teachers ranged "Very good" while the other 16.7% of the teachers rated "good". However, the rest of the teachers such as 34.7% and 21.4% of the total gave "Poor" and "Very Poor" for their knowledge of computer hardware and its function. This show that most of the teachers were not acquainted with the necessary knowledge of the computer hardware which is the major parts of computer. The same is also true concerning the knowledge of computer hardware and their function of the students. 35.5% of the students rated themselves "Poor" category.

Table-11 (b) Teachers and Students' Practical Knowledge and Skills on Computer and Internet

No	Items	Teacher		Students	
		F	%	F	%
1	Rate your Knowledge of basic Computer such as Microsoft word, excel and Access…				
	Excellent	17	35.4	18	14.3
	Very Good	5	10.4	20	15.9
	Good	9	18.8	31	24.6
	Poor	15	31.3	46	36.5
	Very poor	2	8.3	11	8.7
2	Knowledge on Printer Sharing				
	Excellent	14	29.2	9	8.7
	Very Good	3	6.3	13	10.3
	Good	1	2.1	20	15.9
	Poor	19	39.6	49	38.8
	Very poor	11	22.9	35	27.8
3	How often Do You Use an Internet Service				
	Three Times and Above	24	50.0	16	12.7
	Twice	17	35.4	11	8.7
	Once	4	8.3	34	27.0
	I may not use	3	6.3	65	51.6
4	Skills of Receiving, creating and Sending e-mails				
	Excellent	21	43.8	22	17.5
	Very Good	15	31.3	13	27.1
	Good	3	6.3	21	16.7
	Poor	7	15.9	34	27.0
	Very poor	2	4.7	39	31.0

20.8% of the teachers rated themselves "excellent" in their knowledge and skill of basic computer system. On the same major categories, 10.4% and 33.3% of the teachers categorized themselves in "Very good" and "Good" groups respectively. On the second category, 30.2% (excellent plus very good) of the students rated themselves above the moderate (i.e. "good") average knowledge and skills to be acquired. Majority of the students (45.2%) rated themselves below the moderate scale. Thus, most of the teachers as well as the students did not acquire the basic knowledge and skills of computer such as Microsoft word, excel and access.

Knowledge of the teachers on printer sharing that allows them to use one printer among a number of computers in the school compound. Regarding to this item, 35.5% of the teachers rated themselves in "excellent" plus "Very good" 'where as 65.5% of the teachers rated themselves in "poor" plus very poor" scale. This shows that almost more than half of the teachers had below the moderate knowledge and skills of sharing a printer among computers. The same is true for the students. The same was also true like the teachers response. 19.0% of the students grouped themselves in "excellent" plus "Very good" category. And 66.7% of the students rated themselves in "Poor" plus "Very Poor" that is below the moderate knowledge. This illustrates that most of the students could not share one printer with as many computers as possible.

Item-3 in table-11 (b) rates the habits of using internet services among the teachers and students respondents. On the basis of the data, 85.5% of the teachers had a good habit of using internet service. This indicates that most of

the teachers used an internet service. However, more than 75.0% of the students were not internet service user. This indicates that most of the students did not use the service so that a lot has to be done in order to increase the number of internet users of students.

In addition, regarding to their skills of receiving, creating and sending e-mails, 52.1% of the teachers were above the percentage of moderate. This shows that nearly more than half of the teachers had the soft skills as outlined in item 4. And there were still teachers behind, 39.6% of the teachers belonged to the group that had the skills below the value of moderate (i.e. 50%). This also indicates that a lot has to be done in order to upgrade and narrow the gap between those who have the skills and have not. Concerning the students' skills of receiving, creating and sending e-mails, only 27.8% of the students had the skills. However, 58.0% of the students were behind the value of moderate. This means that more than half of the students did not have the basic skills. This illustrates that how far the schools were behind the moderate value.

4.7 The Values of ICT use in Promoting Quality Education

Teachers' respondents were asked to share their views on the value of ICT use in education. Out of the total respondents, 92.86% of the teachers answered "Yes". And in their explanation, they mentioned that the use of ICT in education supports the lessons with different teaching aids including audio-visual materials that may not easily be accessed in the school, makes the teaching method more students-centered which is our target, improve their

language skills and allows both the teacher and the students to get relevant information they need for their subject matter and develop the computer skills and enable the schools to deliver education regardless of time and space. These promote quality education.

However, 7.14% of the teachers rejected that the use of ICT does not help the schools to deliver quality education. According to them, unless and otherwise, ICT is implemented and used properly, it damages the generation by dumping bulky information that is not helpful for life, and hampers culture and is also very expensive.

On the Other hand, interviews were held with teachers and professionals of (ICTECWP) who were asked to share their views on the values of ICT in education. According to the respondents, ICT can justify equity, access and quality of education. Apart from this, ICT can bring the world into the classroom and enables the teacher to get various teaching aids and ideas that may not be accessible otherwise. And it avoids the chock and talk approach that makes the teaching learning environment traditional. And also it equips the lessons with audio and videos aids that help spread life in to the classroom. Moreover, it can make the education sector not get limited in the classroom only. It enables those who do not get education to access it without going to school.

4.8 The Benefits of ICT Gained due to Its Implementations in the schools

The other question asked for the teachers was to explain the major activities that have been done by the schools to implement ICT. Almost 93.8% of the

teacher's respondents answered this question. Their views, which were also supported with the information gathered through interviews, can be categorized into three major groups.

4.8.1 Exposing the School Community to Use ICT

On the basis of the information gathered, the major development in the schools is now that the school community has already been exposed to the use of ICT although there are a number of constraints few numbers of computers and computers rooms, electricity break very weak network capacity of the schools' internet and shortages of accessories and so on. In addition to this, the misconceptions that were in the past have been eliminated with the passage of time. And most of the schools' community understands the values of ICT even for the work place.

4.8.2 Forming ICT Related Issues Handling Committees

Almost all of the four schools have established an ICT related issues handling committee that is responsible to the effective implementations of the technology in the respected schools. This condition allowed the students' parents and community outside the school to get involved in the implementations of ICT in the schools. These ICT committees consist of 5 to 10 members composed of staff and IT teachers of the respected schools including students' parents. Their major tasks are to follow the progress of the implementations of ICT especially, computer and internet use as well as the effective use of plasma television. According to the data, the major task of ICT committees of the schools are to increase the number of computers in

collaboration with donors and provide both IT and internet service effectively for the school community.

4.8.3 Obtained Experiences due to the Use of ICT in the Schools

The respondents agreed that the schools have already obtained a lot of experiences and drown lessons that can have major contributions to other school in which ICT has not been started yet. And they have now the potential to share the merits and demerits of the use of ICT in education with other schools of the country. The teachers and other professionals of ICT interviewed by the researcher reached a consensus that the schools have tried to implement ICT and faced the major challenges such as scarcity of ICT equipments and man power that manages and so on so that the schools will become the real place for experience sharing.

Chapter Five

5. Summary, Conclusion and Recommendations

5.1 Summary

The research has attempted to scrutinize the attitudes of students and teachers and different professional from ICTECWP towards the educational benefits- of integrated ICT use in education in general, and towards the importance of ICT program implementation to improve quality of education in particular. The study also tried to identify perception of the teachers on the implementations of ICT in the sampled preparatory schools; opinion of the teachers and students on the use of plasma television, computer and internet service and their appropriateness that they have for providing quality education. And the infrastructure development level to create ICT- enabled teaching and learning environment; and the major challenges that were hinder the implementation of ICT in education.

To sum up, the study was designed by the researcher to have a general view of the current status of ICT use in education from 126 selected sample students, and 48 selected sample teachers from the four preparatory schools in Addis Ababa. Thus, a look in to the analysis and discussions conducted in this paper based on the data secured from preparatory school teachers, students and documents indicated the following summary.

- On the basis of the objective set in the package along with the findings of this study, the implementations of ICT in education can

successfully bring change in the education sector and enable the schools to provide quality education.

- The perception of the respondents for the advantage computer and internet using ability has and for the potential integrated ICT use has to secure their competency, to extend new education opportunities and widen their knowledge and skills for future career is beyond expected.
- Regarding to the educational quality development, the ICT program seem to have relatively better importance in light of providing critical learning and make the classroom interactive in which the students are the dominating the classrooms. In this case, attitude of the students and teachers reveal that the program enabled access to various information and talents of qualified teachers and adequate teaching materials that may not be accessed otherwise.
- The major challenges extracted from the analysis of the findings, however, were the insufficient provisions of educational inputs that determine the achievements of the technology. These include shortages of ICT equipments and accessories such as number of plasma television and computers, manpower and ease of internet access and so on.
- And also, the basic part of the implementation that has not been yet addressed is upgrading the necessary knowledge and skills of both the

teachers and the students who are the main agents of the implementations in using computer and internet.

5.2 Conclusion

There have been a lot of attempts made to implement the package of ICT in education by providing plasma television, personal computer and internet service for especially preparatory schools of the country. That means innovation of the technology into the countries Education system has been tried to address the objectives for which it was established. However, the implementation of the package has not been yet addressed and faced a lot of challenges that may turn the promising attempts into chaos unless it is given the necessary attentions to manage it properly. Hence, from the findings, the following could be concluded

- The use of ICT in education enabled both the teachers and students to get the benefits of the technology. That is ensuring the provision of quality education by providing qualified teachers, teaching materials and information needed for their lessons.
- The implementation of ICT in education enables the schools to provide improved and quality education with plasma television program using the same education inputs from a center at a time to equally instructed students located at different areas of the country. Thus, one could recognize that the technology has potential of minimizing inequity of quality education provisions that may result from scarce and expensive educational inputs. In addition to this, the use of ICT in education can

provide ways in which the education sector uses its very costly resources very wisely and efficiently.

- To some extent, the classroom teachers supported their students to minimize the gaps that might have been created if they were left without teachers in understanding the lessons presented through the plasma television. This is because of the fact that it could be difficult and make the use of the technology meaningless if plasma television was used to replace the teachers rather it was being implemented to support the knowledge gap of the classroom teachers so that the misconceptions regarding plasma television has been removed.
- Computer student ratio, plasma television student ratio, and average class size are above the standard prescribed in education system of the country. Hence, it might be such problems that contributed to insignificancy of students' achievement in relation to the high potential of ICTs over the ordinary face to face instruction.
- One of the objectives of Ethiopian government was to complement the talents of qualified and experienced educators to the knowledge the classroom teachers share for the learners and access all the lessons transmitted through plasma television on CD/DVD outside the classroom for both the teachers and students. This has not been done yet. Moreover, the challenges such as electric disconnection, the speed of as well as the pronunciation the presenters have not still been improved.

- In addition to these, what could be concluded is that students and teachers lack sufficient ability of using computer/internet. Thus, it may not be difficult to understand that most of the factors pointed as mostly hindering implementation of ICT in education were related to inadequate supply of infrastructures and lack of necessary human resource development. Therefore, this could lead to incurring high opportunity cost of the investment made on the technology if its potential is not harnessed to the maximum by providing the above basic factors to mitigate such problems.

5.3 Recommendations

The use of ICT in education and set in the package is intended to improve quality of education provided in the schools which have no adequate number of qualified teachers, scarce resources of teaching materials and information that are needed for their subject matters. Besides, the use of ICT in education enables those in the remote to access to education. Practically also different research studies show that, teachers, students and school communities believe that the potential and effective use of ICT improve quality of education. However, some educational technologies could be sensitive to inadequacy of other complementary equipments including lack of technical support, manpower, lack of infrastructure development and budget supplies. Thus, unless sound and urgent measures are taken on such issues, the negative impact far weighs the benefit expected. Therefore, recommended possible solutions for the challenges of the implementations identified are:

- In order to implement the use of ICT in education close supervision and continuous assessment should be made to identify and take corrective measures as soon as problems occur during the implementation process.

- The use of ICT in education has a lot of benefits such as it prepares current generation for the work place as ICTs using is becoming more and more expanding; creates conducive situation for the long term objective of the country- to enable new ways of teaching and learning through computer and internet use. However, this could be realized slowly when there is adequate and sufficient amount of developed human resources and infrastructures. Thus, to alleviate the current existing problems related to these issues, the government must provide adequate number of computers, plasma display televisions and internet lines. In such away, the government of Ethiopia must address this problem through initiative of the community, religious, NGOs and external donors.

- To implement and use ICT effectively in the education sector, all the communities of the schools such as especially teachers and students' knowledge and skills should be developed. Otherwise, it becomes difficult for them to exploit the advantages ICT could offer to increase their current performances and for their future career. Therefore, the Ethiopian government has to take short term and log-term measures. As temporary solution in developing the necessary basic skills of using ICT

for both the students and teachers training and retraining should be given for the teachers and staff members that manage the implementation of the package.

- And also, in order to implement ICT in the education sector of the country successfully, the government and the concerned body should give great attentions for the necessary budget allocations for he schools.

- Finally, to make sustainable and institutionalized the use of ICT in education, the schools should also be empowered both financially and administratively so that they manage the implementation successfully.

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Appendices

Addis Ababa University

Institute of Educational Research

Department of Educational Research and Development

Questionnaire for Teachers

The aim of this questionnaire is to gather information in the form of data from teachers on the implementation of ICTE program in education particularly on instructional Television (Plasma Television), Computer and internet. The effectiveness of the questionnaire relies on your genuine and reliable response to each of the questions. Thus, you are kindly requested to be open to share your feelings and ideas. And be informed that your response to each of the questions will be kept confidential. Thank you in advance.

General Direction

- You do not need to write your name on anywhere in the questionnaire
- When you respond for the questions in the box, use only a tick mark (√)
- For open-ended questions, write your responses in the space provided

Section One: - Background of the respondents

1.1 Name of the school _____

1.2 Age ☐ 21-30 ☐ 31-40 ☐ 41-50 ☐ 50 and above

1.3 Sex ☐ Male ☐ Female

1.4 The subject you teach _____

1.5 Level of teaching ☐ 11 ☐ 12 ☐ Both 11 and 12

1.6 Educational Qualification _____

1.7 Teaching experience _____

Section Two:- In this part, there are items that describe the current statues of the Information and Communication Technology in the school particularly the use of Plasma Television, Computer and Internet Services. And indeed, here are scales that show your degree of agreement or disagreement. Thus, please write only the tick mark (√) in the box that represents your response.

5=Strongly Agree 4=Agree 3=Uncertain 2=Disagree 1=Strongly Disagree

2.1 Regarding the Implementations of ICT in the School

No.	Items	Degrees of Agr.				
		5	4	3	2	1
2.1.1	The use of ICT in education promotes quality education					
2.1.2	There have been attempts to promote the use of ICT in the school					
2.1.3	There is no a responsible staff that handles the implementations of ICT in the school					
2.1.4	Computer labs are opened in the scheduled hours.					
2.1.5	Attempts have been made in order to avoid misconceptions about the use of ICT in education among teachers					
2.1.6	Actions have been made to develop the capacity of the teachers concerning ICT					
2.1.7	Teachers very often encourage their students to use computers.					
2.1.8	There are no adequate equipments in the school that help the implementations of ICT in the school					
2.1.9	There are external bodies (such as EMA and AACAEB) that support the school to implement ICT effectively					
2.1.10	There is no relationship with stakeholders such as ETC,EELPA and ICTDA that are assumed to support the schools to implement ICT					

2.2 Concerning Applications of Plasma Television

No.	Items	Degrees of Agr.				
		5	4	3	2	1
2.2.1	The use of plasma television enables to provide quality education					
2.2.2	There is a conducive environment in the school that initiates the teachers to use plasma television in their daily lessons					
2.2.3	There are no interruptions such as electric break, network or inability to operate while lessons are being given through plasma television					
2.2.4	Now improvements have been made on the plasma television lessons contrarily to the past					
2.2.5	The misconceptions concerning the use of plasma television by the teachers have been totally eliminated					
2.2.6	It is possible to get all of the six plasma television lessons on CD/DVD outside the classrooms					
2..2.7	The use of plasma television in the classroom enables the teacher to get teaching aids that may not be accessed very easily in the school					
2.2.8	The advantages of the use of plasma television weigh far the disadvantages					
2.2.9	There are problems in using the plasma television faced by the teachers					
2.2.10	There is an assigned staff that is responsible to solve the problems concerning the plasma television in the school					

2.3 Concerning the Accessibility and Availability of an Internet Service in the School

5=Strongly Agree 4=Agree 3=Uncertain 2=Disagree 1=Strongly Disagree

No.	Items	Degrees of Agr.				
		5	4	3	2	1
2.3.1	It is possible for the teachers to get an internet service in the school compound.					
2.3.2	There are inadequate computers in the internet room that are accessible for the teachers					
2.3.3	There are no scarcity of personnel in the school that facilitate the internet service					
2.3.4	There are usually technical problems encountered the internet services					
2.3.5	The internet service in the school enables the teachers to get different information and widen their knowledge that in turn benefits themselves as well as their students					
2.3.6	Teachers no not motivate their students to use internet service					
2.3.7	The internet service in the school enables the teachers to exchange information through e-mail with their students					
2.3.8	Students usually use internet service that is available in the school					
2.3.9	Having the internet services in the school make the teachers communicate with their colleagues					
2.3.10	Internet services can be accessed in the scheduled hours					

2.4 Knowledge and Skills on Computer and Internet use, use a tick (√) **mark.**

2.4.1 How often do you use a Computer? .....in a week

☐ Once ☐ Twice ☐ Three Times and Above ☐ I may not use

2.4.2 Knowledge of computer hardware and their functions

☐ Excellent ☐ Very Good ☐ Good ☐ Poor ☐ Very poor

2.4.3 Rate your Knowledge of basic Computer such as Microsoft Word, Excel and Access…

☐ Excellent ☐ Very Good ☐ Good ☐ Poor ☐ Very poor

2.4.4 Knowledge on Printer Sharing

☐ Excellent ☐ Very Good ☐ Good ☐ Poor ☐ Very poor

2.4.5 How often Do You Use an Internet Service

☐ Once ☐ Twice ☐ Three Times and Above ☐ I may not use

2.4.6 Skills of Receiving, creating and Sending e-mails

☐ Excellent ☐ Very Good ☐ Good ☐ Poor ☐ Very poor

Section Three: Here there are open-ended questions that need to be explained. Thus, please write your responses to each of the questions in the space provided.

3.1 Do you think that the use of ICT in education enables the school to deliver quality education?

A. Yes B. No

3.2 If 'yes', ho_____

_____

3.3 If 'No', why not? Please write you reasons _____

3.4 What major activities have been performed by the school to implement ICT in the school?_____

_____

3.5 Have you ever taken any capacity building trainings given by the school that helps you use plasma television, computer and internet services effectively?

A. Yes B. No

3.6 If 'yes', please write them_____

_____

3.7 For what purposes do you use a computer?

A. To exchange massage with students and colleagues through e-mail

B. To prepare assignments, evaluate and record the students results

C. To browse an internet and get information

D. any other (specify)

3.8 Do you use plasma television quite often?

A. Yes B. No

3.9 If 'No', why not? Specify your reasons_____

_____

3.10 What are the major advantages of using Plasma Television? _____

_____

3.11 What about the major disadvantages of using Plasma Television?

_____

_____

3.12 Do you face a problem whenever you use plasma television in the classroom?

A. Yes B. No

3.13 If 'yes', please specify your problems_____

_____

3.14 What do you suggest as a strategy that should be done to use Plasma Television effectively in your school _____

_____

3.15 Do you have anything to say concerning the use of ICT in the school?

_____

_____

Thank You!

Addis Ababa University

Institute of Educational Research

Department of Educational Research and Development

Questionnaire for Students

The aim of this questionnaire is to gather information in the form of data from students on the implementation of ICTE program in education particularly on instructional Television (Plasma Television), Computer and internet. The effectiveness of the questionnaire relies on your genuine and reliable response to each of the questions. Thus, you are kindly requested to be open to share your feelings and ideas. And be informed that your response to each of the questions will be kept confidential. Thank you in advance.

General Direction

- You do not need to write your name on anywhere in the questionnaire
- When you respond for the questions in the box, use only a tick mark (√)
- For open-ended questions, write your responses in the space provided

Section One: - Background of the respondents

1.8 Name of the School _____

1.9 Age ☐ 15-17 ☐ 18-20 ☐ 21-23 ☐ 24 and above

1.10 Sex ☐ Male ☐ Female

1.11 Grade level ☐ 11 ☐ 12

Section Two:- In this part, there are items that describe the current statues of the Information and Communication Technology in the school particularly the use of Plasma Television, Computer and Internet. And indeed, here are scales that show your degree of agreement or disagreement. Thus, please write only the tick mark (√) in the box that represents your response.

5=Strongly Agree 4=Agree 3=Uncertain 2=Disagree 1=Strongly Disagree

2.1 About the Implementation of Plasma Television

No.	Items	Degrees of Agr.				
		5	4	3	2	1
2.2.1	The use of plasma television enables to provide quality education					
2.2.2	There is a conducive environment in the school that initiates the teachers to use plasma television in their daily lessons					
2.2.3	There are no interruptions such as electric break, network or inability to operate while lessons are being given through plasma television					
2.2.4	Now improvements have been made on the plasma television lessons contrarily to the past					
2.2.5	The misconceptions concerning the use of plasma television by the teachers have been totally eliminated					
2.2.6	It is possible to get all of the six plasma television lessons on CD/DVD outside the classrooms					
2..2.7	The use of plasma television in the classroom enables the teacher to get teaching aids that may not be accessed very easily in the school					
2.2.8	The advantages of the use of plasma television weigh far the disadvantages					
2.2.9	There are problems in using the plasma television faced by the teachers					
2.2.10	There is an assigned staff that is responsible to solve the problems concerning the plasma television in the school					

2.2 Concerning the Accessibility and Availability of an Internet Service in The School.

5=Strongly Agree 4=Agree 3=Uncertain 2=Disagree 1=Strongly Disagree

No.	Items	Degrees of Agr.				
		5	4	3	2	1
2.2.1	It is not possible for the students to get an internet service in the school compound.					
2.2.2	Students are usually motivated to use an internet service by their teachers					
2.2.3	There are adequate computers in the internet room that are accessible for the students					
2.2.4	The internet service rooms is not opened in the scheduled hours					
2.2.5	The internet service room is fairly enough to deliver the service					
2.2.6	There is scarcity of personnel in the school that facilitate the internet service					
2.2.7	There is usually technical problems whenever the students try to use an internet service					
2.2.8	The internet service in the school enables the students to widen their knowledge by providing information from every corners of the world					

2.3 Regarding the Statue of the Implementation of ICT in the School

5=Strongly Agree 4=Agree 3=Uncertain 2=Disagree 1=Strongly Disagree

No.	Items	Degrees of Agr.				
		5	4	3	2	1
2.3.1	There are inadequate computers in the computer classrooms					
2.3.2	There are enough classrooms reserved only for computer lesson					
2.3.3	There are adequate ICT teachers in the school like other subjects					
2.3.4	Computer classrooms are not available for students to practice in their free time					
2.3.5	Every computer is networked to each other so that lessons can be accessed from the center (server)					
2.3.6	The computers are quite often attacked by virus so that they are usually out of use					
2.3.7	There are no personnel inefficiency to solve computer problems in the school					
2.3.8	There are attempts made by the school community to promote the use of ICT in the school (forming ICT club and so on)					

2.4 Knowledge and Skills on Computer and Internet use use a tick (√) Mark.

2.4.1 How often do you use a Computer? …….in a week

☐ Once ☐ Twice ☐ Three Times and Above ☐ I may not use

2.4.2 Knowledge of computer hardware and their functions

☐ Excellent ☐ Very Good ☐ Good ☐ Poor ☐ Very poor

2.4.3 Rate your Knowledge of basic Computer such as Microsoft Word, Excel and Access…

☐ Excellent ☐ Very Good ☐ Good ☐ Poor ☐ Very poor

2.4.4 Knowledge on Printer Sharing

☐ Excellent ☐ Very Good ☐ Good ☐ Poor ☐ Very poor

2.4.5 How often Do You Use an Internet Service

☐ Once ☐ Twice ☐ Three Times and Above ☐ I may not use

2.4.6 Skills of Receiving, creating and Sending e-mails

☐ Excellent ☐ Very Good ☐ Good ☐ Poor ☐ Very poor

Section Three:-Here there are open-ended questions that need to be explained. Thus, please write your responses to each of the questions in the space provided.

3.1 For what purposes do you use a computer?

A. To exchange massage with friends and teachers through e-mail

B. To do an assignment

C. To browse an internet and get information

D. any other (specify)

3.2 Do you face any problems whenever you use a computer?

A. yes B. No

3.3 If 'yes', please specify them_____

_____

3.4 Do you think the use of an internet service can add value in your Education?

A. yes B. No

3.5 If 'yes', in what way? Please specify your reasons _____

_____

3.6 Do you face any problems whenever you use an internet service?

A. yes B. No

3.7 If 'yes', please specify the problems _____

_____

3.8 How do you solve? _____

_____

3.9 Do teachers use Plasma Television in the classroom?

A. yes B. No

3.10 If 'No', what do you think are the reasons? Specify them_____

_____

3.11 Do you see any problems whenever the teachers use Plasma Television in the classroom?

A. Yes B. No

3.12 If 'yes', please specify your problems _____

_____

3.13 What kind of activities has been taken by the school in order to promote the use of ICT in the school? _____

_____

3.14 Do you have anything to say concerning the use of ICT in the school?

_____

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Thank You!

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Interview Questions

This interview will be held with experts at Educational Media Agency (EMA), Addis Ababa City Administration Educational Bureau ICT work process coordinator and Principals at the selected schools

1. What are the values of the use of ICT in education?
2. What major activities have been taken to implement ICT in general and plasma television, Computer and internet services in particular in the schools?
3. Could you tell me those major achievements you think have been attained so far?
4. What major challenges have you been facing while implementing ICT such as plasma television, Computer and internet services in the schools?
5. How do you compare the use of plasma television in the classroom? Does it contribute to that improvement comparing to the past?
6. What has been done so far for the teachers to access plasma television lessons on CD/DVD outside the classroom?
7. What about to the students?
8. Can you mention the measures that have been taken to solve the problems?
9. Can you tell me the relationship you have with the stakeholders concerning ICT such as Ethiopian Telecommunication Corporation, Ethiopian Electric Light and Power Authority and Ethiopian Information and Communication Technology Development Agency?
10. To what extent is the gap between the program at hand and the reality at the ground?
11. What should be done in the future in order to implement ICT in the schools effectively?

Observation Checklist

Observations will be made at the selected school plasma and internet classrooms

Plasma Television Classroom

1. Date and Time
2. Subject
3. The roles of the teacher
4. The starting time for the plasma lesson
5. The roles of the students while the presentation
6. The time for the end of the plasma lesson
7. Personal comment

Internet Classroom

1. Date and Time
2. The Ratio of the Number of the students to the computers
3. The time allowed for the service

Declaration

The thesis, my original work, has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged.

Name: Leoulseged W/Hanna

Signature: _____

Department: Educational Research and Development, Institute of

Educational Research, Addis Ababa University

Date of Submission: _____