TEACHERS' AND STUDENTS' ATTITUDE TOWARDS THE USE OF SATELLITE TELEVISION INSTRUCTION: THE CASE OF SECONDARY SCHOOLS IN HARARI REGION

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Abbreviations and Acronyms

EMA	Educational Media Agency
FDRE	Federal Democratic Republic of Ethiopia
HSSS	Harar Senior Secondary School
HMSSS	Hameressa Senior Secondary School
HTVT	Harar Technical and Vocational College
ICT	Information Communication Technology
ITV	Instructional Television
MOE	Ministry of Information
PDP	Plasma Display Panel
PTV	Plasma Television
SPSS	Statistical Package for Social Science
TGE	Transitional Government of Ethiopia

Abstract

The major purpose of this study is to identify teachers and students attitude towards the use of satellite television instruction. It also aimed to investigate the importance and impact of the satellite-based instruction as perceived by students and teachers. The study further examined the major administrative and technical problems encountered in using the satellite TV in secondary schools of Harari Region.

To achieve the above objectives, data were collected from two sample Government Secondary Schools in Harari region where the teaching learning is carried out through plasma television. Sample was taken from grade 10 students and teachers and data was gathered through questionnaire and interview. In addition to this, classrooms were observed and administrators were interviewed.

The findings revealed that the method used for the instructional design of the plasma TV does not consider the needs and interests of both the students and teachers. The students and teachers demand less televised instruction. Eventhough the Plasma TV has several benefits for both the students and teachers, the disadvantages observed are paramount. This in turn has resulted in unfavorable attitude by most of the teachers.

Moreover, the study disclosed that the implementation and integration of this new technology did not address some of the most basic and critical issues needed for smooth and successful operation of plasma TV. Administrative and technical supports were not provided to the level needed and teachers were not trained and generators unavailable.

To effectively and efficiently employ the satellite TV, the method needs to be redesigned according to the needs and interests of the students and teachers. Providing the necessary resource, particularly supportive materials related to Plasma TV program operation can contribute a lot for the successful operation of the program. Moreover, providing the necessary support and training for teachers could also greatly reduce the resistance and enhance a positive perception.

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

During the past decades there has been an advancement in the use of Information and Communication Technology (ICT) all over the world, which has a great impact both on society and on our daily lives. It is not surprising to find increasing interest, attention and investment being put in to the use of ICT in education almost in all corners of the globe. New technological innovations are integrated to education system to develop and maintain a better, effective and efficient teaching learning method.

Ethiopia, being one of the underdeveloped nations, is faced with several constraints to move into new and modern technologies to the education system. For the past several decades, the Ethiopian education system was under varieties of problems such as relevance, quality, accessibility and equity (TGE, 1994).This reflected in the fact that classes are too crowded, facilities are inadequate, teachers are not well trained and materials such as books are not enough (TGE,1994).

However, the current Government has shown encouraging strides in the expansion and utilization of information and communication technology (ICT) for multi-purposes. The Government's report on the development of education in Ethiopia to UNESCO states:

> ***Information and communication Technology is introduced in the education system to strengthen the expansion of quality education. The introduction of ICT is done phase by phase starting at the secondary level (9-12). Multifaceted programs and major preparations have been under way to reach the goal of implementing ICT in the education sector and improve the quality of education (FDRE, 2004:8).***

One of the various new options offered by ICT, particularly in the educational area is a one-way, presentation only broadcasting system, which is now being employed in all government high schools of the country. The system is also known as satellite-based teaching or satellite televised instruction (Ethiopia Today: 2004).

The satellite-based teaching has already begun since September 2004 in about 458 government secondary schools throughout the country, which have been equipped with 7000 plasma TV screens and dish receivers. The schools have been fed hours of televised lessons via satellite signals from Addis Ababa. The lesson plans are created in Johannesburg, South Africa ,using a curriculum provided by Ministry of Education of Ethiopia (MOE).The system is a joint venture between the Government of Ethiopia and Memar TV, a South African company that is producing customized content and delivers the programme (Ethiopia Today: 2004, FDRE:2004).

Six subjects (English, Mathematics, Biology, Physics, Chemistry and Civic Education) are offered through the new technology, Plasma Display Panels (PDP), where students receive the instruction via the satellite directly into their classrooms. It is assumed that equal education will be provided with this satellite signal to all students found in every corner of the country. It is such an advantage that ".....the entire universe finds place in the school curriculum, many teachers, especially in rural regions are grateful to these techniques of communication for breaking the world into their classrooms" Lefrance (1961:P.34).

The use of ICT in educational system has been well developed in many developed countries. Many researchers have addressed the issue of integrating new technologies in the educational system. For example, Moister (2000), as cited by Summer & Volsky (2001), asserts that the teaching-learning process can be enhanced through the use of a multitude of resources such as electronic libraries, governmental databases, and literature engines, all conveniently offered via the Internet. They further stated that students can have access to faculty and course materials 24 hours a day with e-mail and class web sites. Chat rooms and discussion boards allow faculty and students to interact in real-time settings from any where in the world and paperless classes are now possible with class websites and digital drop-boxes. Moreover, the authors predicted that the electronic classroom will replace traditional teaching as more and more courses and programs are supported by web sites or exclusively via internet.

Eventhough the Ethiopian education system has not so far reached a high standard of implementing variety of modern ICT programs to the education system, it has taken one step forward. Although in its rudimentary stage, the new satellite based instruction is indeed one step forward which is believed to enhance the teaching learning process. To this end, the current study tries to assess the existing or the current utilization of the one-way satellite television broadcasting in relation to teachers and students perspective of a particulate region in the country.

1.2. Statement of the Problem

Nowadays modern digital information technologies including the web combined with satellite broadcasting materials are believed to transform the field of education into new era. Rahman (1977) and Oxford & Yong (1993) state that, in the educational arena the age of information has definitely arrived. Before this age, technological products such as radio, video, tape recorder, television, slide and head projectors, etc are perceived as tools that may have some potential in terms of aiding teaching and learning process. But today information communication technology (ICT) goes beyond that-supporting, facilitating and making more effective the present methodologies of teaching. They have attracted due attention from many countries due to their ability to solve many problems, which retard the teaching learning process such as the shortage of teachers, using unskilled teachers and shortage of materials (Trim, 1979).

In Ethiopia, the educational Media Agency (EMA), which is under the authority of the Ministry of Education (MOE), has launched a new satellite television program broadcast for a total teaching of six subjects to grade levels 9 up to 12. As stated by the present Government in its report to UNESCO, some of the main purposes of implementing this technology are:

- *To present abstract concepts in a simplified manner by aiding the lesson through graphic visual and audio materials;*
- *To transmit uniform education to many students found in different places at the same time;*
- *To demonstrate laboratory equipment to learning classroom;*
- *To enable students to have access to model and competent teachers (FDRE: 2004:9).*

This new technology is believed to enable the country to reach large numbers of learners at different locations. It is used to compensate for factors that are lacking in education mainly quality education, equitable education, service to rural and urban students and well trained teachers. The scheme is also designed to overcome overcrowded schools, poor infrastructure & facilities and lack of trained teachers (Ethiopia Today: 2004). It is assumed that visualizing and listening to the content from Plasma Display Panels (PDP) exposes students to an international experience. It has also great importance for teachers to improve their way of teaching. In the interview session, the general manager of EMA said "...for what the technology cannot offer the teacher is there, for what the teacher cannot offer the technology is there" (Ethiopia Today: 2004:1).

Many researchers in the area of education suggested that the teaching learning process could be enhanced through the use of instructional television. For example, Jones (1999) remarked that the basic function of instructional satellite TV is to enable learners to see and hear, look and listen more fully and discriminatingly and with greater comprehension. Wheelers and Winders (2001) also state that satellite transmission can develop quality learning experiences to remote students, reduce cost of transmission greatly and is extremely versatile.

Even though the current educational policy of Ethiopia has favored and implemented the use of this new technology, it is clear that the new satellite television programme will not be perfect. After all, it is the first attempt to use it as an innovative teaching method. Many scholars have criticized the one-way teaching system through televised instruction. Others still suggest a great deal of criterion to be fulfilled for successful application of this technology. For example, Oxford & Young (1993) argued that when the classroom teacher is substituted by the one-way satellite television, students do not become interested in the classroom since they are passive receivers of knowledge that flows from the channel, which has in turn great impact on students' motivation. Johnston (2001) also remarked that satellite TV has a negative effect in

learning the target language by creating disciplinary problems on students especially if it is a one-way presentation and non-interactive transmission.

Schramm (1997:566) also forwarded the following regarding the use of televised instruction in the classroom:

> *Television has proven to be potentially effective teaching device but providing school televisions is a complex enterprise and success can depend up on a variety of different actors including effective management, reliable equipment, co-operation of teachers, meaningful curricular approach, appealing production technology, distributing of relevant material and valid research efforts with appropriate feedback for project personnel.*

A number of questions were also raised by Hull (1961) regarding the use of television for presenting lessons in the classroom. The following are some of the questions he raised: how should we learn to determine the optimum length of a given lesson and the frequency of presentation. What are the best lengths and relationships of pre-and post television instruction to the televised lesson itself? What are the relationships of television to laboratory work- to discussion session-to individual counseling? What size of class is most useful for a given subject? what are criterion for studio and reception teacher selection and training? We need more basic research on the learning process and on motivation. In addition, Rainsberry (1961) stated that in adapting the television art to educational purpose, one must assume the highest standard of pedagogy. He stated that those who do the actual teaching or performing on the television for in school broadcast must be of the highest caliber since the response of the viewers can not be known immediately.

Generally, although many educational officials, experts and governmental bodies have enthusiastically praised the new technology in Ethiopian high school classrooms, its contribution to the teaching learning process has not been explored. It is not obvious whether the new system is interesting and motivating to students and whether the teachers and student have developed a positive attitude towards its use.

The success of implementing any new technology is directly related to acceptance and adoption by users. Thus, the current study is aimed primarily to identify how

teachers and students perceive and value satellite based TV instruction lessons in secondary schools of Harari region.

1.3. Objectives of the Study

The current study is aimed to achieve the following general and specific objectives.

1.3.1. General Objective of the Study

The general objective of the study is to identify how teachers and students perceive and value satellite based instruction and the various importance and impact of the plasma TV so as to find remedial solution that improve the current method of instruction in secondary schools of Harari region.

1.3.2. Specific Objectives of the Study

The following are the specific objectives of the study:

1. To identify teachers and students attitude towards Plasma television instruction.
2. To find out some of the major advantages and disadvantages of Plasma television instruction.
3. To identify the major problems that are so far encountered in managing the implementation of the satellite-based instruction.
4. To find out the major technical problems that influence students and teachers attitude towards the use of satellite TV.

1.4. Significance of the study

The student researcher believes that the results of the current study are of paramount importance and applicable in various ways to various stakeholders for the following major reasons:

1. By identifying teachers' and students' reaction to the new technology, the study can help to discern awareness among students and teachers, to better understand their perception, and develop their capabilities in using the PDP.

2. The study may shade light on the nature of the problem by exploring some of the practical problems associated with the utilization of PDP in classrooms.
3. The findings of this study could be of some value, as it will provide practical utility for course presenters through plasma screen, classroom teachers and concerned bodies in their attempt to improve instructional methods.
4. The Educational Media Agency (EMA) and other concerned bodies in the area of education can get some facts and figures that will help to strengthen or improve the programme.
5. Since there are very few studies carried on this topic, the current study may add to the review of literature and encourage others to study the subject in detail in the future.

1.5. Delimitation of the Study

The study attempted to asses mainly teachers and students' attitude towards the use of satellite based instruction at regional level. With regard to this, the study is delimited to two government secondary schools where the teaching learning is conducted through satellite television. In these two secondary schools, the study is delimited to grade 10 students and teachers.

Moreover, the study focuses on some of the major advantages and disadvantages of Plasma TV as perceived by the students and teachers. Furthermore, attention has also been given to some of the major problems encountered in managing the implementation of the PTV and technical problems so far observed in the utilization of the medium in the classroom.

1.6. Limitation of the Study

The following are some of the major problems that the researcher wants to point out as limitation to the study. First, lack of adequate financial support severely affected the coverage of the study population. If there were adequate financial support, the study

would have included a wider population which could have made the study more comprehensive. Secondly, the researcher was confronted with lack of adequate literature related to the topic under study, which could have supported the researcher more to enrich the study. Moreover, it is difficult to generalize the findings of the study at national level since it is conducted in two high schools of one region.

1.7. Methods

1.7.1. Research Methods

The study used a descriptive survey approach. This is because this method gives a good picture on the views of the subjects under study and the classroom environment. Koul (1984: 433) is also of the opinion that "at times, descriptive survey is the only means through which opinions, attitudes, suggestions for improvement of educational practices and instruction, and other data can be obtained." The study, thus, found the descriptive method appropriate since it gives a good picture of pupils' reactions to the new technology and other related issues.

1.7.2. Sample Population and Sampling Techniques

i) Sources of Data

Since the implementation of satellite based instruction in Ethiopian education system is very recent, there were no adequate and appropriate secondary data to be included in the study. Due to this, the study used primary or first hand data obtained directly from a representative sample of the population under study and the classroom setting. Accordingly, four primary sources of data from two government high schools of Harari region were included in this study. These are:

A) Grade 10 students who were learning through satellite television.
B) Grade 9 & 10 teachers who were teaching with satellite television.
C) Principals, Vice-principals and unit leaders of the schools.
D) Classrooms where the teaching learning is conducted with PTV.

From the above primary sources, the researcher carefully gathered adequate data to answer the basic question of the study.

ii) Sample Population and Sampling Techniques

There are there government high schools in Harair region. These are:

1. Harar Senior Secondary School (H.S.S.S).
2. Harar Technical and Vocational College (H.T. V.C).
3. Hameresa Senior Secondary School (H. M. S. S).

These three high schools in the region provide lessons to the students through PDP. Harar Senior Secondary School & Hameressa Senior Secondary Schools teach students from grade 9 to 12 where as Harar Technical and Vocational College teaches academic students from grade 9-10 only. For the current study, Harar Senior Secondary School (H.S.S.S) & Harar Technical and Vocational Coleege (H.T.V.C) were purposefully selected. This is because H.M.S.S is in a county side where the majority of students are from neighboring rural areas. Due to lack of adequate resources and ease of access, the study excluded H.M.S.S school and included the two available high schools in the region. This also helped the researcher to obtain a homogenous population since the two schools are situated at the heart of the city. The distance between the two schools is approximately1.8 k.m.

There were a total of 3014 students in H.S.S.S and 2028 students in H.T.V.C. Since it is not appropriate and manageable to include the entire student in each grade level, the researcher purposefully selected grade10 students and teachers from both high schools. This is because, first, there were only grade 9&10 in H.T.V.C where the students in academic field of study learn through PTV. Secondly, Grade 10 is selected to reduce the novelty effect that may arise if grade 9 students were selected. In other words, grade 10 students are more familiar to the new medium and are more matured to reveal authentic data than grade 9 students which are new to the medium.

Simple random sampling method was employed to obtain a representative sample from the total student population. However, the study included all the teachers, principals, vice-principals and unit leaders. This is because the total number of teachers and administrators is relatively small and manageable and hence all are included. The following table gives a description about the total population and samples selected.

Table: I. Total Population and Sample Population

	Total population			Sample population		
	Students	Teachers	Administrators	Students	teachers	Administrators
H.S.S.S	712	32	5	160	32	5
H.T.V.C	880	26	4	150	26	4
Total	**1292**	**58**	**9**	**310**	**58**	**9**

Regarding the selection of respondents for the interview, 12 students, 6 from H.S.S.S and 6 from H.T.V.C were purposefully selected with the assistance of the unit leader to include students from high, low and average academic achievement. In addition to this, students from both sexes (M/F) were equally selected from both schools. As for the teachers, a total of 10 teachers, 5 from each school, were randomly selected for interviewing and all the available administrators from both schools were included for the interview.

Three classrooms from each high school were also randomly selected for observation. That is a total of six classrooms from 18 sections were selected for observation.

1.7.3. Data Gathering Instruments

i) Questionnaire

The main data gathering instrument used was questionnaire. This is because it helps to secure relevant information on opinions and attitudes in a structured frame work from respondents. In addition to this, since the subjects under this study are very large and can read and understand, the questionnaire were found as the most important tools to gather the necessary data.

Two sets of questionnaire were prepared and dispatched to two groups of respondents, that is, one type of questionnaire for students and other for teachers. The questionnaire for the students was translated in to Amharic to reduce misunderstanding and facilitate comprehension. The questionnaire for both the students and teachers contains close ended and open ended items. Most of the items in the questionnaires are close ended type which

asks the respondents to show their agreement or disagreement to statements that are designed in a Likert scale type.

After each questionnaire was checked and approved by the thesis advisor, the questionnaires were pilot tested for reliability, validity, procedure and techniques in some of the representative samples of the two high school population. The results of the pilot study are also presented in this chapter.

ii) Interview

Interview was another instrument used to gather information from students, teachers and administrators. In order to get the feelings, views and beliefs of respondents towards the use of the new medium (PTV), in-depth interviews were carried out. Unstructured interview items were developed for the student, teachers and principals. To ensure effective communication between the interviewer and the respondents, all the interviews were conducted in Amharic and then translated back to English for analysis.

During the interview, responses were tape recorded since taking notes alone in such cases were not sufficient. Using the audio-equipment may create uneasiness and refusal on the part of the interviewees. However, to accomplish the interview without difficulty, a briefing of the purpose of the study as well as the researcher's background were given on all occasions. In addition to this, the researcher assured the participants that their identity confidentially remains anonymous (See Appendix-I).

iii. Observation

The third instrument used in this study was observation. Observation check list that includes items designed to assess the utilization of PTV in the classroom were prepared. The items are scaled to a response rating from excellent to satisfactory and unsatisfactory. The ratings are used to obtain data regarding the audibility and visibility of PTV, the sound and picture quality of PTV, and safety and ventilation of the PTV.

1.7.4. Pilot Testing

Before collecting the main data, a pilot test was conducted to ensure reliability and validity of instruments used. In other words, the aim of the pilot testing was to find out

ambiguities, omissions and misunderstandings of each item in the questionnaire. Copies of the instruments were first given to the study/thesis advisor. After obtaining the necessary feedback, the instruments were given to one psychology graduate student and three high school teachers who were asked to give their reaction on each item. Using the relevant comments and suggestions, some corrections were made.

After the refinement of the instruments, a pilot study was conducted for the students' questionnaire. Representative samples of 45 students from (Grade 10) were randomly selected from both high schools (H.S.S.S & H.T.V.C). The Amharic version of the questionnaire was distributed to these students. The questionnaires were all filled out properly and returned. Since the total number of teachers is small, the pilot testing was conducted only for the students' questionnaire.

The interview items were also pilot tested on some selected teachers and students of the parent population. Accordingly, 3 teachers and 4 students were interviewed. The pilot testing for the interview items didn't include the school administrators, since they were very few in number compared to the teachers and the students.

After the pilot study was conducted, both reliability and validity were established through the internal consistency item analysis method. For example in investigating the over all feature of the students' questionnaire, item analysis for each part of the students' questionnaire was conducted. The total item pool, which helps to correlate each item with the total score minus the score for that particular item was used. After correlating each item, items with strong correlation (>0.65) were retained. Those with low correlation were discarded from the questionnaire.

In order to improve the reliability, all the items of the instruments were made as pertinent as possible to the study problem. Based on the pilot study's result, the content validity of the instrument was checked as follows:

- the items were thoroughly inspected for relevance and clarity

- the content validity of the instruments, the order of the questions, omissions, vague items and terminologies were improved and made the items to measure what they are supposed to measure

1.7.5. Procedure of the Study

Before administering the instruments, the researcher established an appropriate rapport with the subjects. All the respondents were informed about the purpose of the study and how to complete the questionnaire. During the administration of the students' questionnaire, chances for clarification of the questions were given. The researcher was in face-to-face contact situation in the classrooms when the students completed the questionnaire. This was done during Afan Ormo and Harari Language periods where most of the students are free during these periods. The questionnaires for teachers were distributed with the assistance of the vice-directors and unit leaders of the two high schools.

The data collection through interview was conducted by speaking to the respondents face-to face. All the interviews were done by the researcher. Before conducting the interview, necessary rapport was established with respondents by creating conducive atmosphere and explaining the purpose of the study.

1.7.6. Data Analysis

The quantitative data drawn from close-ended questionnaires were fed to an SPSS for windows program and a descriptive analysis was conducted for each item. The data of the two groups of schools were merged together in order to report the results either in percentage or mean scores. The major statistical tools employed were the mean, frequency, percentage and t-test.

The qualitative data drawn from interviews and open ended questionnaires were first transcribed into a separate topic. After these raw data were carefully studied for each item, each expression and view obtained from the respondents was categorized. Then the categories were combined to describe the items both as expressed by respondents and as understood by the researcher. While most of the responses were reported as they were

obtained, the requirements for flavor and heuristic value of qualitative research was preserved through direct quotations from the interviews.

1.8. Definition of Important Terms

- **Attitude**: the predisposition or tendency to react specifically towards an object, situation or values usually accompanied by feelings and emotions (Carter, 1973:49). It is state of readiness, a tendency to respond in a certain manner when confronted with certain stimuli (Oppenheim, 1992:174).
- **Instructional Television (ITV)**: programming that has its primary purpose the achievement of specified instructional objectives by students in school settings. It is a programming that is formally incorporated into a particular course of study and presented to intact classes or group of trainees or students (Jonassen, 1996:363).
- **Communication Satellite:** the transmission and reception of a television signal via a geocentric communication satellite. It involves the transmission of a television signal to a satellite(uplink) and then broadcast the signal back to dish type receiver antenna at other geographic locations(down link)(Jonassen, 1996:363).
- **Perception:** awareness of external objects, condition, relationships, etc as a result of sensory stimulation or awareness of whatever sort, however about (Carter, 1973: 415).

1.9. Organization of the Study

This study has four chapters. Chapter one deals with background of the study, statement of the problem, purpose of the study, significance of the study, the delimitations and limitations of the study, the research methodology, sampling techniques, the instruments used and the pilot testing. The second part looks at the review of related literature. The third part deals with the presentation and analysis of data collected from the sample population. And the final chapter provides the summary, conclusions drawn and recommendations made.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1. ICT and Education

It has been several decades since Information Communication Technology (ICT) is being used in various methods for educational purpose in different countries. It has played an educational role in formal and non-formal settings, in programs provided by governmental agencies, public and private educational institutions, for profit corporations and non-profit groups, and secular and religious communities (Blurton, 1999). Much has been written about the use and role of the various ICTs in education ranging from the "oldest" or most traditional ones such as radio and television to the "new" or modern digital ICTs such as internet, computer based instruction and live video conferencing. Before considering the various applications of ICT for educational purposes, let's first see what is meant by ICT.

ICT has been defined in different ways by different authors. For the sake of simplicity, we will consider a definition provided by Blurton (1999:1). According to him, Information Communication Technologies are "a diverse set of technological tools and resources used to communicate, create, disseminate, store and manage information."

According to the above definition, ICT includes computers, the internet, broadcasting technologies (radio and television), and telephony. All other materials-software and hardware-which are used for the purpose explained above are included as Information Communication Technologies (Blurton, 1999).

2.1.1. Using ICT for Education

Educators all over the world have long looked for the emerging technologies for using as a tool for teaching learning purpose. They have tried to improve the delivery of instruction through the application of various technologies starting from the time of the inception of radio to the advancement of the various modern technologies. They have tried to use the available technologies in different methods to their educational settings.

The reason for the implementation of the various technologies varies from country to country and from one educational setting to other. The various importance of using technologies for education will be discussed in details in other section of this review. However, in this section, some of the common ways through which the available educational technologies are used for educational propose is presented.

Bates (1995) as cited in Yared (2001:3) summarized ICTs that are currently in use in distance education around the world in the following table:

Table: 2. Media Technologies in Distance Education Applications

Text (including graphics) and Print	Course units; Supplementary materials; Correspondence tutoring
Computer	Data bases; Electronic publishing
Audio	Cassette; Radio programs
Telephone	Telephone tutoring; Audio conferences
Television	Broadcasting; Videocassettes; Videodiscs; Satellite; Fiber- optics; ITFS; Microwave; Video conferences
Computing	Computers; Telephone, Satellite; Fiber optics; ISDN; CD-ROM; CD-I, Computer- aided learning (CAT, CBT), Computer conferences; Audio-graphics, Data bases, Multi-media.

Generally, there are two broad application areas of ICT in distance education. These include the using of ICT as primary and supportive learning resources (one-way technology application) and for the two-way communications (two-way technology application) (Yared, 2003). Based on the above table, course units, supplementary materials, cassette programs, broadcast programs, computer assisted learning (CAL), computer assisted instruction(CAI), computer based training(CBT), database and multimedia can be categorized as one-way technology application. On the other hand, correspondence tutoring, telephone tutoring, audio conferencing, interactive television (TV out; telephone in), video conferencing, e-mail, interactive data base and computer conferencing are categorized as two-way technology applications in distance education (Yared, 2003).

It is evident from the above description that educational institutions can select from the various options that ICT can provide and use for the specific purpose they need to achieve.

2.1.2. Learning "from" and Learning "with" Media and Technology

There are two major approaches to using media and technology in schools: students can learn "from" media and technology, and they can learn "with" media and technology (Jonassen & Reeves in Reeves 1998). It is based on these two major approaches that the various technologies available are used in schools or other educational institutions where they are believed to enhance the teaching learning process.

Learning "from" media and technology is often referred to in terms such as instructional television; computer-based instruction, or integrated learning systems (Hannafin, et.al in Reeves, 1998). According to these authors, the foundation for the use of media and technology as "tutors" in schools is "educational communication", i.e, the deliberate and intentional act of communicating content to students with the assumption that they will learn something "form" these communications.

The instructional processes inherent in the "from" approach to using media and technology in schools can be reduced to a series of simple steps:

1. Exposing students to massages encoded in media and delivered by technology,
2. Assuming that students perceive and encode these messages,
3. Requiring a response to indicate that messages have been received, and
4. Providing feedback as to the adequacy of the response (Reeves, 1998:2).

According to these authors, the two primary technologies used in the "from" approach are television and computer.

Learning "with" technology, on the other hand, which is less wide spread than the "from" approach, is referred to in terms such as cognitive tools (Jonassen & Reeves in Reeves, 1998) and constructivist learning environments (Wilson in Reeves, 1998). Cognitive tools refer to technologies, tangible or intangible, that enhance the cognitive powers of human

beings during thinking, problem-solving, and learning. Cognitive tools allow humans to "off-load" memorization or other mental tasks on to an external source (Reeves, 1998).

In the cognitive tools approach, information is not encoded in predefined educational communications which are then used to transmit knowledge to students. Instead of specialists such as instructional designers shaping students' learning via prescribed communications and interactions, media and technology are given directly to learners to use for representing and expressing what they know. Learners themselves function as designers using media and technology as tools for analyzing the world, accessing and interpreting information, organizing their personal knowledge, and representing what they know to others (Reeves, 1998).

Examples of cognitive tools include databases; spread sheets, semantic networks, experts systems, communications software such as teleconferencing programs, online collaborative knowledge construction environments, multimedia/ hypermedia construction software and computer programming languages (Reeves, 1998).

2.1.3. Learning from Satellite Television Broadcast

It took 12 days for the news to reach Europe when the American President Abraham Lincoln was assassinated in 1865. About 100 years later, when John F. Kennedy was assassinated, the world knew it immediately. The news traveled to the farthest corners of the world at the speed of light. This was possible due to one of the most striking inventions, satellite communication systems. Satellite communication systems are considered as the most exiting and efficient means of mass communication created by human endeavor in the field of pure and applied sciences (Pannerselvam, et.al, 1984).

Television, whether in the form of cable or satellite, has been used in different parts of the world for educational purposes. Since it's inception in the 1930s, television has served for many formal and informal educational programs in various methods. During the 1950, the medium was monochrome, restricted largely to "line of sight" reception within a limited geographical area, not recordable, capable of only one-way transmission, and very expensive to produce (Tiene, 1998).

However, by the 1990s, television had developed a high definition signal with accurate color radiation, could be delivered across vast distance by a variety of different technologies in ways that preserved the fidelity of its signal, could be tape-recorded for convenient later use, could provide "interactive" capability on two-way transmission, and could even be produced on very modest budgets (Tiene, 1998).

In addition to the improvements explained above, Wheeler and Winders (2001) stated that in the last two decades of the 20th century, the merging of different technologies to produce a new discipline was made. This new discipline is called "telematics", which is the convergence of several technologies, but notably telecommunications and informatics. Among these, satellite television data transmission aims to use telematics-based technologies to establish network of innovation centers across different areas (Wheelers & Winders, 2001).

Oxford, et.al (2001:27) also stated that:

> ***The technological wave is now driving major changes in the way education is produced and delivered. At the heart of this change is the convergence of the once distinct media of image, sound, books, and computer networks into digital multimedia. This is making the world's knowledge base accessible any where on the planet through satellites, coaxial cable, fiber optic cable and conventional copper wire through new techniques to pump large amounts of information down the "last mile."***

Satellite TV transmission is among one of the recent instructional technologies developed and employed for educational purposes. Wang (1995) states that satellite, as one of major instructional tool, has often been mentioned in higher conferences in only about recent ten or fifteen years. Faculty members, school administrators, researches and students are really excited to have satellite communication systems developed and extend their distance learning programs and other educational programs. He further added that as a developing medium, satellite, especially, telecommunication satellite is rapidly rising on the horizon of education field.

2.1.4. Methods of Using Instructional Television

How can schools and other educational institutions employ satellite television for instructional purposes? What are the possible methods for application? Reeves (1998:11) pointed out that, historically, studies of the large scale implementations of instructional television have shown that three major forms of utilization have been observed;

1. Instances where the total instructional program is delivered via televised teacher,
2. Instances where there is an integration of teacher directed instruction with television programming, and
3. Instances where television is used to supplement teacher-centered instruction, either for enrichment or remedial purposes.

After giving detailed explanation on the various categories of satellite system, their characteristics, their various sections etc, Wang (1995:5) stated what professor Tony Bates of the Open University and others have identified as the five different 'communication configurations' for educational satellite use. These are:

1. One-way video/ receive-only transmission, offering all the advantages and disadvantages of conventional broadcast TV, but at lower cost;
2. One-way video and two-way audio (by telephone), sometimes referred to "Interactive TV";
3. Two-way audio only, as used by the university of the South pacific Britain, to connect different sites;
4. Narrow-Band transmission for graphics and studio, as used by PALAPA, Indonesia;
5. Two-way Video (video conference)-rare in education, because of its expense.

Schools and other educational settings all over the world have used and are still using satellite television for instructional purpose. The method of application, however, varies from one setting to another. The various options available, as stated above, are employed to the needs of a particular educational setting, which of course depends on various elements.

2.2. The Importance of Media and Technology in Education

Various forms of media and technology have been used for educational purposes all over the world. Many countries have attempted to provide the major portion of instruction in one or in a combination of any old and new technologies available and have succeeded in attaining the desired objectives. Governments and other concerned bodies, especially in developing countries, are nowadays giving more focus to the adoption and utilization of different technologies (ICT) in to the educational system. But why so much attention is paid to media and technology in education? What are the main reasons for which educational media have been used especially in developing countries? Under this section, some of the major importance of media and technology in education will be reviewed.

2.2.1. Improving Educational Access

One of the most commonly cited reasons for using media and technology (ICT) has been to increase educational access. ICTs are potentially powerful tools 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 all others who for reasons of cost or because of time constraints are unable to enroll on campus (Tinio, 2002).

Many developing countries have been attempting to provide education for all through the expansion and extension of educational facilities (Teshome, 1998). The main reason for such concern relates to the "belief that education is associated with the nations' high level of social welfare and economic development" (Mike, 1987 in Teshome, 1998:11). As a result, governments have made great efforts to build schools and strengthen the basic elements of their educational system. According to the World Bank (1995) report in Teshome (1998), the efforts are rewarding since the average level of education in developing countries is increasing and 76% of the 538million 6-11 years olds were in school in 1990, up from 48% in 1960 and 69% in 1980. In particular, the increasing ratio of enrollments to primary schooling in the 1980s was spectacular except for countries in Africa.

Despite the above improvements, however, a large segment of the school-aged population has remained, and will continue to remain outside the school system. For instance, in 1990 alone, the total number of children who were not enrolled in schools amounted to 130 million, while this is estimated to increase to 145 million in 2000 and 162 million in 2015. In sub-Saharan Africa, the proportion of children out of school amounted to 50%, in South Asia 27%, in the Middle East and North Africa 24% in the same year (Mike 1987 in Teshome, 1998).

To overcome the above problems, Lockheed, et.al (1991) in Teshome (1998) suggested educational broadcasting as an alternative solution by stressing its potential to mass produce and distribute high quality and expert prepared learning to thousands of learners all over the land, whether they are at work, school, home or even live on the peak of a mountain. Evidences suggest that the trend to universalize primary education by making additional use of media will continue beyond the year 2000 particularly in sub Saharan Africa, South Asia, the Middle East and North Africa as demographic pressure on enrollment will continue to be strong in these regions (Teshome, 1998).

In addition to this, Tinio (2002:6) stated that one of the defining features of ICTs is their ability to transcend time and space which is termed as 'any time' and 'any where'. He further indicated that:

> ***ICTs make possible asynchronous learning, or learning characterized by time lag between the delivery of instruction and its reception by learners. ICT based educational delivery (Educational programming broadcast over radio or television) also dispenses with the need for all learners and instructors to be in one physical location.***

It is evident from the above statements that broadcasting technologies can enhance access to education for those who are not otherwise get the chance of participating in educational programs due to various reasons, especially due to time and geographical location.

2.2.2. Promoting Equity in Schooling

Experiences from developing countries suggest that wide disparities have continued to persist in learning despite the impressive increase of children's participation in primary

education (Teshnome, 1998). This is particularly so in relation to the rural poor, girls, location, ethnic (linguistic) minorities, nomadic populations, street children and disabled children (UNESCO, 1990 in Teshome, 1998).

It is obvious that we can find many disparities in most developing countries with regard to educational equity in gender, ethnic minority; disabled, nomadic populations, etc. To overcome these problems, Bosch, et.al in Teshome (1998) indicated the use of educational broadcasting. For instance, radio lessons could benefit significantly the "poor majority". The authors further demonstrated that studies on radio programs revealed that children with lower ability showed learning gains as impressive as children with higher ability and that it can reach both rural and urban areas at low cost. It can be adjusted for those who are unable to attend school at a regular time by adjusting to their convenience and can be used to instruct pupils in minor languages and offset the disparity in learning attainment. Developing nations, thus, were unanimous at the world conference on education for all in concluding that "all available means and technologies for communications and information must be utilized to disseminate basic learning and to educate the public at large" (UNESCO, 1990 in Teshome, 1998:13).

2.2.3. Promoting Educational Quality/Effectiveness

Perhaps one of the most important rational for the use of media in formal education has been "the potential believed to exist in the medium to improve the effectiveness of teaching and learning" (Teshome, 1998:13). In many countries the services of media for learning includes the improvement of students' academic gain, patterns of promotion, wastage (dropout and repetition), attitudes towards schools as well as the competence of teachers (Block, et.al in Teshome, 1998). Fuller (1986) in Teshome (1998) also pointed out that the focus on quality improvement is not without reason; a cross-national achievement study of 9 and 14 years old students resulted that students' test scores in developing courtiers are significantly lower than the international mean for all countries compared from the industrialized world.

In addition to this, among 23 low-income countries (GNP per capital less than US$ 405) only 60% of all children complete primary school. The problem of teachers in developing

countries is also another area of concern, where the problem is not only quantitative but of quality too. In 1992, for example the average proportion of trained male and female teachers in Haiti was 11% while it was 51% in Zimbabwe and 58% in Nicaragua (UNESCO, 1993 in Teshome, 1998). It is, thus, not surprising that developing nations expect educational broadcasting to improve the quality of their educational system.

Tinio (2002:7) gives additional explanations for the use of ICT to improve educational quality. According to him ICT can enhance the quality of education in that:

> ***It increases leaner motivation and engagement, facilitates the acquisition of basic skills and enhances teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner-centered environment.***

ICTs such as video, television and multimedia computer software that combine text, sound and colorful moving images can be used to challenging and authentic content that will engage the student in the learning process (Tinio, 2002). Interactive radio likewise makes use of sound effects, songs, dramatizations, comic skits, and other performance conventions to compel the students to listen and become involved in the lesson being delivered. 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 (Tinio, 2002).

ICT can also help in the transmission of basic skills and concepts that are the foundations of higher order thinking skills. Creativity can be also facilitated by ICT through drill and practice. For example, Sesame Street television program uses repetition and reinforcement to teach the alphabet, numbers, colors, shapes, and other basic concepts (Tinio, 2002).

Tinio (2002) has also indicated enhancing teacher training as one of the reasons for employing ICT in education which in turn improves educational quality. For example ICT has been used to improve access to and the quality of teacher training in institutions like Cyber Teacher Training Center (CTTC) in South Korea where internet is used to provide better teacher professional development opportunities to in-service teachers.

Moreover, in China, large-scale radio and television-based teacher education has for many years been conducted by the China Central Radio and TV University, the Shanghai Radio and TV University and many other RTVUS in the country (Tinio, 2002).

It has been indicated by many studies that technological tools enhance educational quality. Needless to mention, there are more practical examples and detailed explanations where one can find educational quality being improved due to the application of various media and technology.

2.2.4. Improving Educational Efficiency/Reduction of Cost

In addition to the above mentioned importance of ICT in education, Teshome (1998) pointed out that one of the reasons for the utilization of educational technologies in many developing countries is to decrease educational costs. Lockheed & Middleton (1991) in Teshome (1998) argued that if there were no any resource constraints, most policy-makers would chose good traditional schooling for all students than technology-based instruction. However, they have noted that it is economically difficult to provide good quality schooling for all since face-to-face instruction costs are very high. This initiates technology-based instructions to be employed for educational purposes since their costs are lower than the face-to-face instruction (Teshome, 1998). For example, Nelton (1991) in Teshome (1998) referred to a study that examined the costs of three distance learning projects and indicated that the cost of radio-correspondence systems ranges 35%to 50% of what traditional instruction would have cost.

2.2.5. Other Benefits

There are also other benefits to be gained through the implementation of ICTs in education. It is beyond the scope of the current review to present exhaustively all the benefits described by various authors. However, it is essential to summarize some of the major additional benifits to those already presented.

Nwaboku (1997) in Ali (2005) stated some of the major reasons for the introduction and use of information technologies in education. According to him, ICT serve for dual purposes: for the purpose of acculturation and for more efficient instruction. For

acculturation purpose, a student who is being prepared for a technologically oriented world needs to be immersed in technology environment earlier. Technology by itself is a new culture and requires early life adjustment to acquire all the skills. Thus, the author concludes that by employing the various ICTs available, the school would be facing up to new facts of life that the student/ learner would be functioning in technologically dependent society.

Regarding the second purpose, that is improving instructional efficiency, Newaboku (1997) in Ali (2005:14) stated that technology is about 'machines' and machines make most works easier and achieve more work in less time. Thus, better efficiency in the instructional system is gained by employing ICT. According to him, this efficiency is achieved through the following various ways:

- Expands the possible modalities of learning (redundancy)
- Adds some measure of reality to learning (concreteness)
- Increases the perceptual scope of the learner (immediacy)
- Motivates the perceptual scope of the learner (immediacy)
- Motivates the learner by making learning easier, more interesting and challenging
- Provides the teacher with more reflective time of improving instruction
- Makes record keeping and evaluation easier

In general terms, Nwaboku (1997) in Ali (2005) stated that productive learning systems and equal opportunities are ensured through the implementation of ICT in education. Modern Technologies have created new information at an alarming rate and it is only through technology that this tremendous information can be harnessed or accessed in leaning.

2.3. Key Issues to be Considered in Managing ICT in Schools

It is obvious that the implementation of ICTs in schools requires successful management. The word management, needless to define, is a broad term that encompasses various concepts in it. And all these concepts must be practically embodied and applied in the

implementation and utilization of all forms of ICT in Education. In this section, some of the key issues to be considered in managing ICT will be reviewed.

Many scholars in the area of ICT and education pointed out what they thought as the most important factors to be considered in the implementation and utilization of ICT in education. The various studies carried out by several authors indicate that for successful management of ICT in education, there are key issues to be considered. Even though it is difficult to review all these studies, short and precise factors that must be considered in managing ICT in schools are discussed in the following section.

For example, Fullan (2001) as cited in Chapman, et.al (2004:22) indicated that the adoption of an innovation (the adoption of technology in education) is shaped by the "the characteristics of the innovation and its implementation". For Fullan, six characteristics help shape the extent to which new ideas are adopted: clarity (the understandability of the technology to those being asked to implement it), observation (extent that would be adopters can clearly see the key features of the technology), complexity (extent that would be adopters can quickly learn to use the technology), comparative advantage (the extent the technology offers clear advantage over alternative instructional strategies), cost(lower cost options) and trail (extent that would be adopters can try an innovation in small increments as opposed to making major changes).

Honey, et.al (2001) as cited by Earle (2002) also concluded that six factors must be in place if technologies are to be used to support real gains in educational outcomes. These are: leadership, solid educational objectives, professional development, adequate technology resources, time and evaluation. Norris, et.al (2000) in Earle (2002) also identified the following as critical conditions in implementing ICT for education: access to technology and time on task, adequate teacher preparation, effective curriculum, supportive school administration, and supportive family.

Yared (2001) also adapted a model which was originally developed by Bates (1995) to study access and utilization of ICTs in the case of distance education in Ethiopia. The model is abbreviated as ACTION and comprises of seven variables that determine the use

of technology in Distance education. These are: access, cost, teaching and learning, interactivity and user friendliness, organizational issues, novelty and speed.

In addition to the above factors already discussed, Hoffman (2001) in Abebe (2004) suggested that successful implementation of ICT needs to address five interlocking frameworks for change: the infrastructure, technical and administrative support, attitude, staff development and sustainability and transferability. In this section, an elaboration of each of these elements is made because they are found to be very convenient for the current study and are very broad to encompass other related factors.

2.3.1. Infrastructure

Infrastructure is "the physical equipment (hardware and software) that enables a network to function" Collis (1996) in Abebe (2004:2). It is one of the most necessary elements to be considered before attempting any implementation of ICT for education. In order to have a teaching learning process or education system supported by technology, the availability of suitable infrastructure is essential. In other words, unless schools and other educational establishments are provided with basic technological infrastructure and facilities, it is very difficult to focus on implementation of technology to support learning (Law, et. al, 2000 in Abebe, 2004).

Tinio (2002) believes that a country's educational technology infrastructure sits on top of the national telecommunications and information infrastructure. According to him, before any ICT based program is launched, policy makers and planners must carefully consider the availability of appropriate rooms or buildings to house the technology, availability of basic requirements such as electricity and telephone, availability of proper electrical wiring, heating/cooling and ventilation, and ensure safety and security.

Related to infrastructure, Abebe (2004) also added that the national ICT infrastructure with respect to connectivity and accessibility may also affect the implementation of ICT in education policy. The educational system and policy in the areas of budget, curriculum, professional development and research may facilitate or hinder a country's ICT program. And all these elements are within a larger environmental context that may

include the need to develop a competitive work force regionally and globally, the economic cycle that a country or the world is undergoing, economic solicits budget cut or expansion of fiscal policy, political and social stability, the bureaucracy of the system and so on. All these policy investments have impact on the spread and utilization of the basic infrastructures necessary in ICT based education (Abebe, 2004).

2.3.2. Support in Technology Implementation

The other key issue to be considered in implementing ICT in education is support both administrative and technical support. Abebe (2004:3) stated that "putting ICT tools in schools alone is not enough to get instructors' and students' attention to use technology for teaching and learning". A supportive school environment is important for successful technology implementation and these are administrative and technical support (Zaho, et. al, 2002 in Abebe, 2004). Lets' elaborate on each of them.

2.3.2.1. Administrative Support

Support from different levels of the school organization is one of the key elements needed for successful implementation of technology in education (Abebe, 2004). He further added that Administrators can provide the conditions that are needed, such as school-wide policy, incentives and resources. Administrative support and involvement is critical to the successful integration of technology. A study by Bloemen, et. al (1991) as cited by Abebe (2004) shows that commitment and interest of the principal is the most critical factor for successful implementation of any school innovation-especially technology. The provision of support for all of their personnel and involving them in various aspects of technology usage is critical both at school and every level of office.

Tinio (2002:23) also stressed that leadership playas a key role in ICT integration in education. Many teacher or student initiated ICT projects have been undermined by lack of support from above, and he thus, suggested that:

> ***For ICT integration programs to be effective and sustainable, administrators themselves must be competent in the use of the technology, and they must have a broad understanding of the technical, curricular, administrative, technical and social dimension of ICT use in education.***

Duyeretal (1997) as cited in Abebe (2004) also suggested that colleagues as well as school and district administrators must provide ongoing support for long-term and encouragement from the school leaders and other concerned bodies is important in the implementation and integration of technology in education.

2.3.2.2. Technical Support

Technical support is one part of the implementation and integration of ICT in education system. It should be considered as integral part of a school's over all ICT procurement strategy and responsibility for ensuring that good support systems are in place with school leaders (Abebe, 2004). He further added that effective technical support enables the implementation and integration of ICT to function effectively and efficiently. Such ICT support can range from installing hardware to setting up and maintaining the over all activity and even to providing support in the school to other colleagues, without which the confidence of the teachers to use ICT in their teaching deteriorates (Abebe, 2004).

Whether it is provided in-school staff or external service providers, or both, technical support specialists are essential to the continued viability of ICT use in a given school (Tien, 1998). While the technical support requirements of an institution depends ultimately on what and how technology is deployed and used, general competencies that are required would be in the installation, operation, and maintenance of technical equipment (including software), network administration and network security. Without on-site technical support, much time and money may be lost due to technical break downs (Tien, 1998).

2.3.3. Staff Development

Administrative and technical support may be a necessary condition for successful ICT integration in education; however, it is not an end by itself. Implementing ICT in education should consider teacher training. Farrell (1999) as cited in Abebe (2004) described that training and workshops are needed to improve the skills of the instructors and as a means of getting them evolved in the process of implementing and integrating technology in teaching and learning.

Providing hardware in a classroom without training teachers is not enough for successful implementation of ICT. Teacher training is very essential if the technology introduced to school to be used effectively (Abebe, 2004). With respect to capacity building, Tien (1998) pointed out that various competencies must be developed throughout the educational system for ICT integration to be successful. Among these competencies, the author mentioned teacher professional development as one of the crucial element needed for effective implementation of ICT in education. Teacher professional development should have five foci: "skills with particular application, integration into existing curricula, curricular changes related to the use of ICT including changes in instructional design, changes in teacher role and underpinning educational theories" (Tien, 1998:23).

Focusing on how the faculty uses the technology provided than simply putting the machines in the classrooms is the approach in implementing ICT in education. The end-user of the technology should be taken into consideration, and training should be provided before the technology is to be used. If this is not the case, many teachers lack the opportunity, training, or motivation to use the technology. It is thus, very important to change the focus from providing technology first to training teachers first for a teacher to use the technology successfully (Ali, 2003 as cited in Abebe, 2004).

Teachers are not the only groups that need professional development; however, they constitute the largest group for the provision of staff development in any country that has ICT in education staff development policy. One important aspect of staff development concerns the building up of leadership capacity at the school level. Leadership is important in this case, not just to support the introduction of ICT in to the school curriculum, but also to determine the goals and direction of change (Abebe, 2004).

2.3.4. School Leaders and Teachers Attitude

The extent to which school principals promote the use of ICT in their schools and the teachers' positive attitude towards the technology being implemented affects the successful implementation and use of technology (Bosch & Visscher, 1999 in Abebe, 2004). Woodrow (1992) in Abebe (2004) also indicated that positive teacher attitude towards technology is widely recognized as a necessary condition for effective use of

information technology in the classroom, eventhough the amount of confidence a teacher possessed in using technology may greatly influence his/her effective implementation in classroom.

The same study by Woodrow (1992) as cited in Abebe (2004) on teachers' attitude towards technology identified that there are several teachers who said that ICT unquestionably raised standards cited, improved presentation of work and consequently increased self-confidences, while teachers in many other schools suggested that the same use might be considered as ineffective and time wasting use of ICT. This highlights discrepancy in approaches to teaching and learning from school to school. It does seem to depend largely on the expectations of the teacher, according to their opinion of the capabilities and attitudes of their students (Abebe, 2004).

Another study by Christensen & Knezek (2000) in Abebe (2004) reveals that the task of getting teacher's positive attitude in the integration of technology in the classroom should begin with an assessment of teachers' need. This enables initial training to be targeted at the most appropriate level. Initial training should be followed up by focused sessions with smaller groups of teachers with return visits at regular intervals. Will, skill and access to technology tools are probably all the necessary components for the successful integration of technology into the classroom as well as to have a positive attitude from those who implement any technology (Abebe, 2004).

2.3.5. Sustainability and Transferability of ICT Implementation

A report of the second information technology in education study which was undertaken by a project team of the international association for the evaluation of educational achievement (IEA) identified two major categories of condition for any innovation to be sustained and transferred in schools (Abebe, 2004). According to him, the IEA (2003) named these two major categories as essential conditions and contributing conditions.

Essential conditions include teacher professional development, student support, perceived value of innovation, administrative support and teacher support. These were defined as conditions they found necessary, but not sufficient, for innovation to be sustained. By

contributing conditions, they meant those which facilitated the sustainability of innovation and these are: support within school, support from outsides school, funding, and supportive plan and polices and innovative champions (Abebe, 2004).

Regarding sustainability, Tinio (2002) remarked that the sustainability of ICT enabled programs has four components: social, political, technological, and economic. By economic sustainability he meant the ability of a school and community to finance an ICT enabled programme over the long term. With regard to this, planners should look to the total cost of ownership and build lucrative partnership with the community to be able to defray all expenses over the long term. Developing multiple channels of financing through community participation ties economic sustainability and thus needs particular attention (Tinio2002).

Social sustainability refers to the function of community involvement. Tinio (2002) described that schools do not exist in a vacuum, and for ICT enabled project to be 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 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 (Tinio, 2002).

When we look at the last two sustainability issues, Tinio (2002) explicitly referred to political sustainability as issues regarding policy and leadership. According to him, one of the biggest treats to ICT enabled projects is resistance to change. Because of the innovative nature of ICT related projects, leaders must have a keen understanding of the innovation process, identify the corresponding requirements for successful adoption, and harmonize plans and actions accordingly (Tinio, 2002).

Technological sustainability involves choosing a technology that will be effective over the long term. In a rapidly changing technology environment, this becomes particularly tricky issue as planners must contend with the threat of technology obsolescence. At the same time, there is the tendency to acquire only the latest technologies (which is understandable in part because these are the models which vendors are likely to push

aggressively) (Tinio, 2002). Generally however, planners should go with tried and tested systems and need to adhere to the rule "learning objectives drive the technology choice and not vice versal". The latest technology may not be the most appropriate tool for achieving the desired educational goals. Planners should not only consider just costs when making technology decision, but also the availability of spare parts and technical support (Tinio, 2002:20).

2.3.6. Other Issues to be considered

As it has been already explained at the start of the sub topic of this review, there are a lot of factors or key issues to be considered in managing the implementation and use of ICT in education. Broad and detailed explanation of all the issues to be considered is beyond the scope of the current study. However, in addition to the above discussed factors/key issues, there are some other important issues that need not be ignored. In this subtopic, thus, we will see those elements that some authors forwarded as a potential that need to be considered in the implementation and integration of ICT.

For example, Balker & Paatrick (1989) in Wang (1998) indicated that educators and other officials who are interested in the satellite technology to their educational programs need to consider factors such as cost, maintenance, upgrading of equipment, extent of course offerings, limitations on class size, frequency of instructional staff to 'force interaction' with students, etc. In addition to this, they emphasized that it is important to know whether or not students at all receiver site class locations are able to telephone their instructors during the broadcast or just receive site classes which are 'on-line'. Another related factor which they pointed out is whether or not students at one receive site location would be able to be online with students at other receiver site location at the same time which enables student-student interactions.

Another factor that needs critical focus is cost-related issues. According to More (1990) & Spark (1984) as cited in Yared (2003), cost is the most crucial determinant for using any technology in a distance education program. All cost- related problems that are found to affect the use of ICT in distance education must be examined in greater detail. In depth analysis of cost leads to the heart of economics, however, Bates (1995) as cited in Yered

(2001:7) raised one question that need to be put in mind always: "What is the average cost per study hour for a particular technology for a given number of students over the expected life of courses to be delivered and supported by the technology?"

It has been evident from all the discussions so far mad under the subtopic of key issues to be consider in managing ICT that planners, manages and other concerned bodies need to consider all the elements before and after the implantation and integration of ICT for its successful use.

2.4. Critics on the Use of Television for Instruction

Many scholars have written on the utilization of television as instructional tool. Their findings regarding its effectiveness vary considerably and the results obtained seem to be particular to specific subjects and method of study. In addition to this, there is a considerable difference on their approach and method of study. That is, the statistical treatments, control, design, content and problem, etc vary greatly. It is thus, difficult and beyond the scope of the current review to present these studies and views extensively. In this section, therefore, some of the major findings and views of important authors to the current study are presented.

To begin with, Amare (1998:6) examined the sources of television strengths and weaknesses from three different perspectives. These are: source attribution (content attribution), audience attribution, and technology (or media) attribution. Those who ascribe television's characteristics to how it is used and who uses it, argued that the source, the nature and content of the program determine the effects of television on students. According to Amare, these groups of researchers are called 'content or source determinists' to the effects of television.

On the other hand, researchers who deal with how the audiences (students) themselves affect their own perception of the requirements of the media which intern affects their own method of learning are called audience determinists. These researchers argue that students' predisposition to the requirements of television-method of learning affects how students learn from it. The third perspective, technology determinists, according to him,

argue that the technology used has more impact in learning than the content, audience, environment, etc as the technology employed in the teaching-learning process also teaches the method of learning.

After giving detailed description and analysis of each of the perspectives stated above, Amare (1998:1) concluded that:

> *Television experience leads to learning of a method- of- learning, which is characterized by shallowness, simplicity, visuality, fun, entertainment, etc. and due to transfer of learning, students would consequently avoid to learn materials that require high amount of invested mental effort* (AIME), *and seek information that fits the requirements of television method.*

The view of various scholars, according to Amare (1998), ranges from positive advocacy to a total elimination of Television. As such, scholars like Shramm (1997), MC Luchan (19640) and Dale (1969) could be taken as positive to television where as Mander (1978), Hayes (1978), William (1973) and Salmon & Leigh (1984) could be taken as negative to television. Some of the arguments of these authors are presented in the following paragraphs since they are found to be important to the current review.

One of the proponents of television, for example, Dale (1969) in Amare (1998:1-2) listed 9 positive major attributes of television. These are:

- Concretizing human experiences
- Providing up-to- date information
- Distributing information to target masses of people
- Creating the access to models of excellence
- Equalizing educational opportunities
- Bringing the world of reality to the classroom
- Distributing all instructional media and school laboratories to every classroom
- Eliminating human physical limitations of time, space, motion etc.
- Creation of sustained attention

Shramm (1962:156) also stated that "There can no longer be any doubt that students learn efficiently from instructional television." He further said, this fact has been demonstrated

in hundreds of schools, by thousands of students, in every part of the United States and in several other countries. Schools and colleges have been able to teach virtually every subject effectively by television. The conclusion is that the average student is likely to learn about as much from a TV class as from ordinary classroom methods; in some less, but the over all verdict has been "no significant difference".

An analysis of 425 cases with apparently adequate design, controls and statistical treatment were assembled by Schramm (1962), among which 393 are comparative studies that compare instructional television with other classroom teaching and 32 in which home instruction by television has been compared with classroom teaching. He concluded from the study of the first 393 cases that when the usual tests of achievement used by schools to measure student progress are employed, it may be said with considerable confidence that in 65% of a very large number of comparisons between televised and classroom teaching there is no significant difference. In 21% of the comparisons, students learned significantly more from television; in 14% they learned significantly less (Schramm, 1962).

Reeves (1998) also shares most of the descriptions and findings presented by Shramm (1962), the 'no significance difference'. Most studies show that there are no significant differences in effectiveness between live teacher presentation and videos of teacher presentation (Seals, et.al, 1996 in Reeves, 1998). He further noted that ever since the first educational television broadcast began in Iowa in 1933, there have been decades of research focusing on the educational effects of television, and yet controversies about the impact of television in schools and society as a whole persist. The seemingly contradictory findings reported in educational research literature fan the flames of the ongoing controversy about media and technology (Reeves, 1998).

Particularly when we consider research in television, Dorr (1992) and Seals, et.al, (1996) in Reeves (1998) pointed out that the most positive research news about learning 'from' television could be found in the classroom where 40 years of research show positive effects on learning from television programs that are explicitly produced and used for instructional purposes. More importantly, according to Johnston (1987) in Reeves

(1998:10), "there is strong evidence that television is used most effectively when it is intentionally designed for education and when teachers are involved in its selection, utilization, and integration into the curriculum."

Another interesting summary concerning the overall findings of the impact of television is presented by Reeves (1998:10) as follow:

- There is no conclusive evidence that television stultifies the mind.
- There is no consistent evidence that television increases either hyperactivity or passivity in children.
- There is insufficient evidence that television viewing displaces academic activities such as reading or home work and there by has a negative impact on school achievement.
- The preponderance of the research evidence indicates that viewing violence on television is moderately correlated with aggression in children and adolescents.
- Television is not widely in classrooms because teachers experience difficulty in previewing videos, obtaining equipment, incorporating program in to the curriculum, and linking television programming to assessment activities.

On the other hand, Mander (1978) in Amare (1998:4) advocates a total elimination of Television. Mander believes that television is educationally and socially harmful and attributes all the weaknesses of television to its nature and to its users. Four arguments are given by him to justify its elimination. These are: environmental (theoretical), economic (political), neuro- physiological and technological.

Clark (1983:445) on the other hand, seems to have totally a different view from most of the above researchers and their findings. He claimed that "there is consistence evidence for the generalization that there is no learning benefit to be gained from employing any specific medium to deliver instruction." According to him, researches showing performance or time-saving gains from one or another media are shown to be vulnerable to compelling rival hypotheses concerning the uncontrolled effects of instructional method and novelty.

Most current summaries and Meta analyses of media comparison studies clearly suggest that media do not influence learning under any conditions (Clark, 1983). The author further argued that, even in the few cases where dramatic changes in achievement or ability have followed the introduction of medium, it was not the medium that caused the change but rather a curricular reform that accompanied the change. Media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes change in our nutrition. Basically the choice of vehicle might influence the cost or extent of distributing instruction, but only the content of the vehicle might influence achievement (Clark, 1983). He further added that, while research often shows a slight learning advantage for newer media over more conventional method, this advantage is shown to be vulnerable to compelling rival hypotheses -the evidence of artifact and confounding in existing studies and biased editorial decisions which may favor research showing larger sizes for newer media.

2.5. The Experiences of Using Educational Television from other Countries

Television, since its inception, has been used for educational purpose in various parts of the world. Whether in form of cable, which is now referred as 'old' method or in the form of satellite, which is now referred as the 'new' method, television served as a supplementary, complimentary or as a total teaching method in various educational settings. It is obvious that early users and implementers of educational television are among the most developed countries such as USA and Europe. The vast majority of other developing countries also made an attempt and used television for educational purpose.

However, Wang (1998:1) stated that with the exception of programs like Seasam Street, the educational potential of television has not been fully explored. Mostly, television has been a stranger in the classroom contributing little to the teaching learning process. He further added that:

> ***The vision that television would offer the means for a spectacular transformation of educational quality and access, held by so many in the sixties and seventies, has clearly not been realized. Especially, in developing countries, where the task of***

modernization loomed large, television was seen as a potentially important agent of educational reform.

During the sixties and seventies, several bold experiments were launched to bring the power of television to the agenda of educational reform. Among the most notables were those of American Samoa, Ivory Coast, El-Salvador, and Niger (Wang, 1998). The results proved disappointing. For the most part, television added little or noting to improve student achievement. Costs proved higher than expected. Opposition was encountered from teachers and sometimes from students. The boldness of the experiments made them highly visible and the failure were not soon forgotten (Wang, 1998).

In the 1980s and 1990s, television continued to be left out of the international repertoire of educational reform options. However, the use of television was not entirely abandoned. Applications were tried in several countries and successful results were obtained (Wang, 1998).

In this section, we will glance at the experience of some of developing countries who have employed television for educational purpose. Since it is beyond the scope of the current study, the review presents the experience of two countries which are found to be important and available at the course of the current study.

2.5.1. Satellite Television Education in China

In 1986, China began to use satellite television communication to train secondary and primary school teachers on a large scale. The country proclaimed the implementation of compulsory education and regarded a qualified teaching force of adequate quantity as a key to the advance of popularization of compulsory education. The initiation of the program, according to Chunje & Yuxia (1994), was to overcome the country's teacher shortage. According to these authors, in 1986, there were 1.5 million primary teachers among which 5.54 million did not meet the states' educational requirements, and the proportion of the unqualified teachers was even higher in poor rural and minority areas. To overcome these challenges a satellite TV project was designed.

The project was endorsed by the Chinese government and UNICEF, which is named as teacher training through distance education (TTDE). The initiation of the project was based on a proposal request for co-operation by UNICEF that distance education would be employed to train Chinese pre-school, primary and secondary in-service teachers which was incongruent with the education policy of the Chinese government (Chunje & Yuxia, 1994).

The specific objectives of the project were to upgrade the qualification of 25,000 unqualified primary school teachers in the 26 counties in four years, to support 26 counties which were backward in economy and minority areas in their development of educational TV stations for distance teachers training and to improve the teaching abilities of qualified teachers (Chunje & Yuxia, 1994).

A four-level system of management led by the central government constitutes the administration. These are the State Education Commission (SEDC), the Province, the County and Township, with the County as the main body. SEDC is the highest administrative organization of the project management and the project leading group of County which is led by the Country government is responsible for the implementation and management of the project (Chunje & Yuxia, 1994). County teacher continuing education schools, township receiving stations and village teaching centers are responsible for the pedagogical activities, while the students watch training programmes at a convenient site. The county's policy states that the local government who sets up the TV station will mange it and be benefited. The power and the responsibility to initiate educational TV lies with the local government.

Between January 1990 - June 1992, a total amount of 28.4 million Yuan (RMB) was invested by the 26 project Counties; 4-44% of the total investment is extra- budgetary fund raised by communities (Chunje & Yuxia, 1994). A total of 36 relay stations, 160 receiving stations and 821 video playback centers have been built in the 16 project counties. Most of the equipment was aided by UNECF and investment from local governments. The vitalization of the equipment adheres to the principle of training operating personnel before use and all the 26 counties have formulated regulations on

equipments usage and assigned competent technicians for maintenance (Chunje & Yuxia, 1994).

China TV Teachers' college (CTVTC) formulates the syllabus and teaching plan, develops the curriculum and teaching materials and the relevant educational TV programs are also performed by CTVTC (Wang, 1998). The SEDC works out the over all plan to develop educational TV programmes and supervises the contents and the quality of the programmes. China education TV station (CETV) broadcast 31 hours of educational programmes every day which are transmitted on two channels. The county education TV stations relay and transcribe the TV programmes and the township receiving stations record the TV programs (Wang, 1998).

Students taking part in the program are divided into different classes based on their town or region and again into different groups based on their village or primary school they belong to. The town's TV education tutorial centers organized the students to watch TV course and to take part in tutorial sessions, which helps the students to get access to interactive tutorials. Each student will attend centralized tutorial session for 25-30 days per term (Chinju & Yuxia, 1994). Further more, the authors pointed out that the project was very effective and successful. First, the scope of the training has expanded and enrollment increased enormously. Second, the proportion of full-time primary school teachers with qualification in the 16 project counties increased from 69.02% in 1989 to 78.93% in 1991.

In addition, it would take 11.21 million Yuan (RMB) and 16 years to qualify all the primary and junior secondary school teachers in Ao HanQi, while with the means of satellite TV, the goal would be attained in 5 years on funds 81.1 million Yuan (RMB) only. Moreover, 86.1% of the trainees found their in- class teaching abilities raised after training, about 50% of the trainees through that their professional knowledge and teaching abilities had been raised and 48.4% of the 310 trainees considered that the pupils they taught did better than before.

One of the major reasons cited for the above achievements is that the Chinese experience underlines the importance of sustained government support and commitment. Support from the ministries ensured that the CCTV had the necessary equipment, personal, and funding to get underway and the national policy was also instrumental in involving local governments as well as encouraging trainees to enroll in the CTVTC program (Wang, 1998).

Generally, Wang (2000) summarized the reasons for the success of the project by pointing out that collaboration between the national and local level of government was a significant feature of the project. The CTVTC took advantage of existing resources and the projects reputation for quality.

2.5.2. Telesecundaria -the Mexico Experience

Telesecundaria is a program produced in Mexico by the Ministry of Education. It is one of the notable examples of direct class teaching that uses broadcast television. The program was launched in Mexico in 1968 as a cost effective strategy for expanding lower secondary schooling in small and remote communities. The program uses teachers who have higher education diplomas but are not necessarily career teachers. The teachers receive some short training before they are being put in charge of classroom. As of 2000, the programme enrolled about a million students and other countries in Central America began to use it as well (Haynes & Heyneman in Chapman, et. al, 2004; Tinio, 2002).

Centrally produced television programs, which were aimed to provide quality education, are beamed via satellite throughout the country on scheduled basis (8:00am to 2:00pm and 2:00pm to 8:00pm) to telesecuandaria schools. They were covering the same secondary curriculum as offered in ordinary schools. A twenty minute televised session is transmitted when a teacher in a classroom turns on the TV. After the satellite program was over, it is followed by a discussion and teacher-led or book-led activities (Tinio, 2002).

Telesecundaria schools are established on a demand basis, the community must request the creation of one with the promise that they will provide the physical space. It has been

long since the program was put in practice; however, the program has undergone many changes shifting from teacher centered approach to more interactive and dynamic programming that links the community to the programme around the teaching method. Community issues are combined into the programe and the community at large is involved in the organization and management of the school (Tinio, 2002).

Evaluation of telesecundaria revealed higher promotion rates, fewer dropouts and respectable results in student achievement tests. The assessment of telesecundaria have been encouraging: dropout rates were slightly better than those of general secondary school and significantly better than technical schools (Tinio, 2002).

CHAPTER THREE

3. RESULT AND DISCUSSION

3.1. Overview of Analysis

This section deals with the presentation, interpretation and analysis of the major findings of the study. Data was gathered from grade 10 students and teachers of the two sampled secondary schools through interview and questionnaire. Out of the 58 questionnaires distributed to the teachers, 47 (81%) were filled out and returned. And out of 310 questionnaire distributed to students, 266 (85%) were filled out correctly and returned. In addition to this, administrators were interviewed and classrooms were observed from the two sampled high schools.

The data obtained through questionnaire and observation are presented in tables. Each table is followed by a description about the data. These data are interpreted and analyzed quantitatively on the basis of the computed statistical figures. For each variable, the percentage and mean value is computed based on the responses of the participants to each item. The degree of agreement or disagreement to each item is calculated and the results are analyzed and discussed.

The responses to interview items are presented and discussed qualitatively. The responses of teachers, students and principals to the interview items are presented following the presentation of each table.

This chapter begins with the presentation and analysis of students' response to questionnaire items. The responses obtained from the interview are also discussed under each table. This will be followed by the presentation and analysis of teachers' response to the questionnaire and interview items. Interview responses obtained from principals is also included in the discussion of each table. Finally, the data obtained through observation is presented and discussed.

3.2. Presentation and Analysis of Questionnaire Data

3.2.1. Presentation and Analysis of Students' Questionnaire

3.2.1.1. Students Attitude Towards Plasma Television.

The first section of the students' questionnaire contains 12 items designed to assess students' attitude towards plasma television. The data obtained from the questionnaire is presented in the following table.

Table: 3.Frequency and Percentage of Students Response on Attitude Towards PTV.

No.	Response Item		SA 5	A 4	UD 3	D 2	SD 1	Total	∑	X
1.	P TV transmits standardized and quality education.	*f*	76	71	40	50	29	266	913	3.43
		%	28.6	26.7	15.0	18.8	10.9	100		
2.	PTV brings the realities of the world to the classroom.	*f*	100	73	26	39	28	266	976	3.66
		%	37.6	27.4	9.8	14.7	10.5	100		
3.	PTV facilitates the teaching learning process.	*f*	64	83	32	50	37	266	885	3.32
		%	24.1	31.2	12.0	18.8	13.9	100		
4.	PTV produces a better outcome.	*f*	41	50	51	74	50	266	756	2.84
		%	15.4	18.8	19.2	27.8	18.8	100		
5.	I like and enjoy PTV.	*f*	36	61	50	68	51	266	761	2.86
		%	13.5	22.9	18.8	25.6	19.2	100		
6.	PTV employs a convenient method of teaching.	*f*	55	55	51	53	52	266	806	3.03
		%	20.7	20.7	19.2	19.9	19.5	100		
7.	PTV is difficult and requires great effort.	*f*	11	33	27	79	115	266	1054	3.96
		%	4.1	12.4	10.2	29.7	43.6	100		
8.	PTV is not useful.	*f*	68	75	50	33	40	266	700	2.63
		%	25.6	28.2	18.8	12.4	15.0	100		
9.	PTV craters disciplinary problems.	*f*	55	84	31	43	53	266	753	2.83
		%	20.7	31.6	11.7	16.2	19.9	100		
10.	PTV should be avoided for it has a lot of problems.	*f*	34	89	67	38	38	266	755	2.84
		%	12.8	33.5	25.2	14.3	14.3	100		
11.	The classroom teacher is far better than the PTV.	*f*	38	64	51	32	81	266	852	3.20
		%	14.3	24.1	19.2	12.0	30.5	100		
12.	PTV is not comfortable.	*f*	37	80	50	63	36	266	779	2.92
		%	13.9	30.1	18.8	23.7	13.5	100		
							Grand Mean		37.55	

NB: The mean range indicates - <2.50=Low; 2.50-3.50=Average; >3.50=High

As it can be seen from the above table, the frequency, percentage and mean scores of each item is presented. The first six items are positive statements which are scored from (5) strongly agree to (1) strongly disagree. The rest six items are negative statements which are scored in a reversed direction from (1) strongly agree to (5) strongly disagree.

The sum of each item and the Grand mean score is also computed and presented in the table.

The mean score of item 1, 2 and 3 is 3.43, 3.66 and 3.32 respectively, which is above the average value on the scale, that is, 3. More than half of the students (above 50%) have shown their agreement (strongly agree plus agree) to the statements. This shows that the students have recognized the importance of PTV for it transmits standardized and quality education. It also indicates that the majority of the students have recognized that PTV brings the realities of the world to the classroom and facilitates the teaching learning process. The mean score of item 6 is 3.03 which is almost equal to the average value on the scale. This shows a neutral position to the statement.

On the other hand, the mean scores of item 4 and 5 are 2.84 and 2.86 which is below the expected average. The majority of the students (above 70%) have shown their disagreement (strongly disagree plus disagree) to the statements. This indicates that the students do not believe in the use of PTV to produce a better out come. It also shows that the students do not seem to like and enjoy learning with PTV.

When we see the response of the students to the negative statements, most of the items mean score (item 8,9,10 and 12) is below the expected average, that is, 3.Since the statements are reverse coded, low mean score on these items shows that the students have shown their agreement to the statements. The students showed their disagreement only on item 7 and 11 where the mean score of these items is above the expected average.

According to table 1 above, the Grand mean (total mean score) of the students is 37.55. This score is above the average total score value of the 12 items, that is, 36. This shows that the students have a positive attitude towards PTV.

The ratings were further examined to see if the total mean score of the students (37.55) significantly differs from the average total mean value of the 12 items (i.e.36).To find out this, one sample t-test is carried out to compare the total mean score with the expected total mean score. Hence, the expected total mean (36) is taken as a test value.

The mean and standard deviation of students response on perception towards learning with PTV is presented in table 4. Following the description of the statistics, t-test was carried out to check whether the total mean score significantly differs from the expected total average score on the scale.

*Table: 4.*T-test of the Mean Difference of Students' Responses

Test value = 36					
Mean	St.devation	t	df	Sig(2-tailed)	mean difference
37.55	5.605	4.52	265	0.00	1.55

*Significant at $\alpha = 0.05$

The t-test shows that there is significant difference between the total mean score (37.55) and the expected total mean score (36). t =4.52, df =265, and ∞=0.05(refer to table3). The mean difference is significant at 0.05 level. This indicates that the students have a positive attitude towards learning with PTV. It also shows that the students seem to perceive the importance and value of the innovative and modern way of teaching through PTV.

The result obtained from the interview responses of the students were basically the same as the ones already obtained through the questionnaire. The students' attitude and perceptions towards the PTV was mildly positive. This can be inferred from the response of the students to the question "how do you get learning with PTV?" (See appendix-VI). As a reaction, most of the students replied that they found the lesson from PTV to some extent attractive, interesting and participatory. In addition to this, the students who liked the PTV expressed that learning with PTV is funny, exciting and creates an opportunity to learn in a new way.

However, some of the students showed unfavorable attitude towards the technology. The response obtained from these students reveals that the students perceived the leaning experience to be foreign, strange or beyond their grasp. The response of these students also indicates that the students seem to perceive the technology as something which is unfamiliar and uncomfortable. Some of these students used a metaphor to explain their

negative feeling towards the PTV. Some of the typical negative metaphors extracted from direct quotation of students' response can be cited as example:

> ***When I learn with PTV, I feel as if I am having a long journey in an old bus. It is something that you can't change or control but simply accept it.***
>
> ***When you sit infront of the PTV for successive periods, you get tired and confused. It is just like a small kid trying on an adult shoose.***

The response obtained from teachers and principals' interview about students' attitude also reveals the same result. The majority of teachers and principals responded that more than half of students have a favorable attitude towards PTV. However, they mentioned that still a large number of students do not like to learn with PTV. They stated that inability to cope up with the pace of PTV and failing to understand the language of the PTV are the two prominent reasons that makes the students to hate the PTV.

The result obtained from this study is also similar to previous studies. For example, Schramm (1962:60) made a Meta analysis of several studies that assessed students' attitude towards instructional television. The result obtained from the overall meta analysis indicates that "in general, elementary school children are enthusiastic over TV classes, high school students are much less so; and college students are equivocal or even, in some cases, unfavorable."

The students' attitude towards learning with PTV is likely to be influenced by the characteristics of the PTV, as well as the instructional method applied. According to Technology Acceptance Model (TAM), users' acceptance of a new technology depends on how one perceives the technology to be useful and easy to use (Davis, 1989 as cited in Cho, et.al, 2003). According to this model, perceived usefulness (Pu) and perceived ease of use (PEou) are primary motivational factors for accepting and using new technologies. Thus, Pu is the degree to which a person believes that the use of technology will produce better out come- capable of being used advantageously. And PEou is the perception about the degree of effort needed to use a particular system (freedom from difficulty or great effort). Therefore, if students have high Pu and PEou, the likelihood of accepting and using the technology will be high. The method in which the PTV is used for classroom instruction has its own advantage and disadvantage to the students and teachers (which is

discussed in the next section). And this seems to reinforce the students' attitude towards learning with PTV.

3.2.1.2. Students Response on the Advantages of PTV.

The use of TV for classroom instruction has several benefits. This section investigated the perception that the students have regarding the advantages of learning with PTV. To attain this specific objective, the subjects were required to respond to statements as indicated in the following table.

Table: 5. **Frequency and Percentage of Students Response on the Advantages of PTV.**

No	Item		SA 5	A 4	UD 3	D 2	SD 1	Total	∑	X
1.	Uses plenty of visual aids.	*f*	119	84	32	21	10	266	1079	4.05
		%	44.7	31.6	12.0	7.9	3.8	100		
2.	Presents abstract concepts in a simplified manner.	*f*	72	77	48	45	24	266	926	3.48
		%	27.1	28.9	18.0	16.9	9.0	100		
3.	Presents complex laboratory demonstrations easily.	*f*	118	76	35	17	20	266	1053	3.95
		%	44.4	28.6	13.2	6.4	7.5	100		
4.	Helps to cover the content on time.	*f*	76	83	48	34	25	266	949	3.56
		%	28.6	31.2	18.0	12.8	9.4	100		
5.	It has many attractive features.	*f*	52	52	58	57	47	266	803	3.01
		%	19.5	19.5	21.8	21.4	17.7	100		
6.	It makes available to all learners the best teacher with rich experience.	*f*	83	53	71	37	22	266	936	3.51
		%	31.2	19.9	26.7	13.9	8.3	100		
7.	Improve students' language ability.	*f*	33	100	12	66	55	266	788	2.98
		%	12.4	37.5	4.5	24.8	20.6	100		

NB: The mean range indicates - <2.50=Low; 2.50-3.50=Average; >3.50=High

According to table 4 above, the total number of students who showed their agreement (strongly agree plus agree) to the first item is 203 (76.3%). Only 31 (11.7%) showed their disagreement (disagree plus strongly disagree) and the rest 32 (12%) remained undecided. Thus, the majority of the respondents believe that PTV is important because it uses plenty of visual aids. This indicates that the students have positive perception of the PTV for its use of visual aids.

Item 2 on the above table tried to assess students' perception on the importance of PTV for its presentation of abstract concepts in a simplified manner. A total of 149 (56%) showed their agreement, about 48 (18.0%) have not decided and the rest 69 (25.9%)

showed their disagreement. This shows that more than half of the students recognize the importance of PTV for its presentation of abstract concepts in simplified manner. The students seem to like PTV for understanding abstract concepts in a more simplified and easy way than otherwise.

On item 3, 194(73%) of the students agreed that PTV is useful because it presents complex laboratory demonstrations easily. The rest 37(13.9%) showed their disagreement and 35 (13.2%) were undecided on the item. This indicates that costly and complex laboratory demonstrations are presented easily for students though PTV. This makes the students to have a positive perception towards PTV since they have recognized the benefit of watching costly and complex laboratory demonstration easily in their classrooms.

According to table 4 above, 159(59.8%) of the students showed their agreement, 48 (18.0%) remained undecided and 59 (22.2%) showed their disagreement on the importance of PTV to cover the content on time. This shows that more than half of the students like the PTV because it helps them to learn all the contents of the subject in the curriculum on the specified period of time.

In response to item 5, only 104 (39%) of the students showed their agreement on the importance of PTV for its attractive features that helps to get students attention. The rest 104 (39%) showed their disagreement and 58(21.8%) remained undecided on the item. This shows that the students have not recognized some of the attractive features of PTV such as the color, picture, motion and background music. The students seem to ignore some of the attractive features of PTV and seem to focus only on the content of the lessons presented.

When we see the response of the students to item 6, 136 (51.1%) showed their agreement, 59(22.2%) showed their disagreement and the rest 71(26.7%) remained undecided. Making available the best teachers with rich experiences to all learners is believed to be one of the importance of using PTV for classroom instruction. However, only half of the students perceived the importance of PTV to present the best teachers to all learners. This

indicates that half of the students believed that the PTV teachers are the best and rich in experience who share their ability and skills to all learners.

In item7, the subjects were asked whether the PTV helps them to improve their language ability or not. Only half 133 (50 %) of the students showed their agreement to the item. The rest 121 (45.4%) showed their disagreement and 12(4.5%) remained undecided on the item. This indicates that only half of the students think that the PTV exposes them to native speakers of the medium of instruction (English) from which they can develop their language skills.

The results obtained from students interview also supports the above response obtained from the questionnaire response. The majority of the students interviewed have recognized some of the major advantages of learning with PTV. The response obtained from the interview item and the open ended questionnaire (See appendix-VI) which asked the students 'what are the major advantages of learning with PTV?', shows that PTV is important for many students in various ways.

The following are selections of representative interview quotes from students' response on some of the advantages of learning with PTV:

- PTV is important because it is aided by visual pictures (ample visual aids).
- PTV is important because the contents are not based on theory alone, but with live practice.
- PTV teaches difficult concepts easily.
- PTV creates image in the mind of the students.
- PTV uses time effectively and covers the course as scheduled.

It is thus possible to infer from the overall result that PTV has several advantages. It is also possible to conclude that the majority of the students have recognized and accepted the various importance of PTV for learning.

3.2.1.3. Students Response on the Disadvantages of PTV.

In this section, students were asked to show their agreement or disagreement on some of the major disadvantages of learning with PTV. The responses obtained from the items are displayed in the following table.

Table: 6. Frequency and percentage of Students Response on the Disadvantage of PTV.

No	Item		SA 5	A 4	UD 3	D 2	SD 1	Total	Σ	X
1.	PTV is too fast to follow.	*f*	128	61	35	22	20	266	1053	3.95
		%	48.1	22.9	13.2	8.3	7.5	100		
2.	It doesn't give adequate time to take notes and do tasks.	*f*	94	53	37	48	34	266	923	3.46
		%	35.3	19.9	13.9	18.0	12.8	100		
3.	It doesn't allow for revision and repetition.	*f*	130	63	29	27	17	266	1060	3.98
		%	48.9	23.7	10.9	10.2	6.4	100		
4.	It doesn't give adequate time for classroom teacher.	*f*	87	71	38	39	31	266	942	3.54
		%	32.7	26.7	14.3	14.7	11.7	100		
5.	It doesn't address students' problem immediately.	*f*	101	59	46	31	29	266	970	3.64
		%	38.0	22.2	17.3	11.7	10.9	100		
6.	The schedule is not flexible.	*f*	62	51	60	58	35	266	845	3.17
		%	23.3	19.2	22.6	21.8	13.2	100		
7.	It doesn't allow students to participate actively.	*f*	118	79	26	33	10	266	1060	3.98
		%	44.3	29.6	9.7	12.4	3.7	100		

NB: The mean range indicates - <2.50=Low; 2.50-3.50=Average; >3.50=High

According to table 5, the responses of the students to the first item shows that most of the students 189 (71%) showed their agreement (strongly agree plus agree) that the PTV lessons are too fast to follow. Only 44(15.8%) of the students showed their disagreement and the rest 35 (13.2%) remained undecided. This shows that the majority of the students do not like the speed of the presentation. It also indicates that the PTV presents the lessons in a very fast way which the students could not cope-up with.

In response to item 2, 147 (55.2%) of the students showed their agreement, 82 (30.8%) showed their disagreement and the rest 37(13.9%) remained undecided. This shows that more than half of the students stated that the PTV does not give them adequate time to take notes and do tasks. This shows that the time given to the students by the PTV is not adequate for the students to take notes and do other class tasks such as class work, group work, discussion and others.

Items 3 on table 5 tired to assess the students response on whether the PTV allows for revision and repetition or not. According to the response obtained, most of the students 192(72.6%) showed their agreement, 44 (16.6%) showed their disagreements and the rest 29 (10.9%) remained undecided. This shows that there is no revision and repetition of the lessons by the PTV for the students. The students have no second chance of viewing or repeating the lessons once they are transmitted. This is because the broadcasting times are the times at which students view the programmes. The contents of the programme are not stored to allow for second time viewing. The nature of the transmission does not allow the schools to decide their own schedules. It does not allow for on-demand access either for individual viewing or time- tabling in group sessions.

When asked about whether the PTV gives adequate time for the classroom teacher or not, more than half 158 (59.4%) showed their agreement, 70 (26.4%) showed their disagreement and the rest 38 (14.3%) remained undecided. This indicates that the PTV does not give adequate time for the class room teacher to communicate with the students. It also shows that the classroom teacher has no adequate time to introduce, discuss and summarize the day's lesson.

In responses to item 5, 106 (60.2%) of the students showed their agreement that the PTV does not address students problem immediately. The rest 60 (22.6%) showed their disagreement and 46(17.3%) remained undecided to the item. This shows that the PTV does not address students' problems immediately. It also indicates that the students are not able to interrupt the lesson and ask for clarification. Since there is no two-way communication between the PTV teacher and the students, it is not possible for the students to get immediate feedback and individual assistance.

When asked about the flexibility of the PTV schedule, 113 (42.5%) of the students showed their agreement, 93(35%) showed their disagreement and 60(22.6%) remained undecided. This shows that the feeling of the students on the flexibility of the schedule is some what mixed. Some find it convenient, others find it inconvenient and few are undecided. However, Dorr (1992) in Reeves (1998) pointed out that the biggest barrier to the integration of television programs into the classroom is the fixed-time limitation of

broadcast. According to him, flexibility of scheduling and ease of access to equipment and programmes are the biggest factors promoting classroom use of television. So if the schedule is not flexible enough to accommodate students' needs, preferences and convenience, it will probably create a negative perception.

According to table 5, 197 (74.0%) of the students showed their agreement to item 7. only 43 (16.1%) showed their disagreement and the rest 26 (9.7%) remained undecided. This shows that the majority of the students stated that the PTV doesn't allow them to participate actively during PTV transmission. This also indicates that the nature or manner of presentation is a one-way, transmission only, which does not give adequate time for the students to participate.

The results obtained from students interview and open-ended question, which asks the students 'what are the major disadvantages of learning with PTV?' supports the above result obtained from the questionnaire. The majority of the students interviewed revealed that learning with PTV has several disadvantages. The following are a representative sample of responses quoted from the interview and open ended responses:

- We are not able to cope up with the speed of PTV (it is too fast).
- We can not understand the language and accent of PTV teachers.
- Our classroom teachers do not get time to help us clarify vague concepts.
- PTV runs from page to page and from unit to unit without giving us enough time to understand.
- PTV helps only students who are fluent in English.
- PTV favors those students who are from rich family and who can pay privately for additional tutorial classes.
- When you begin to take notes from the PTV, it immediately disappears or gets replaced.
- We are not able to stop the PTV any time we want and ask for clarification, revision or ask the teacher to slow its presentation.
- We are not able to participate actively in the classroom.

- Some students disturb while watching PTV and this harms other students because they can not get the lesson repeated.

It is thus possible to conclude from the above discussions that PTV has several disadvantages. Quite significant number of students have complained about the pace of PTV presentation. They have explained that the PTV presents its lesson in a very fast way, which is beyond their ability. In addition to this, most of the students have complained about the time given by the PTV to the students and to their classroom teachers. They did not have adequate time to take notes, do class work, discuss with each other and with their classroom teacher. They have also complained about the short time given to their classroom teachers. They need their classroom teacher to have more time than the PTV. The students demanded less televised lesson due to its unmanageable pace.

3.2.2. Presentation and Analysis of Teachers' Questionnaire

3.2.2.1. Teachers' Response on Attitude Towards Plasma Television.

This section deals with teachers' perception towards teaching with Plasma Television. The teachers were asked to show their agreement or disagreement to 12 items which are designed to assess the respondents attitude towards teaching with PTV. The frequency and percentage of each item is presented with its mean. The first six items are positive statements which are scored from (5) **strongly Agree** to (1) **strongly disagree**. The rest six items are negative statements which are scored in a reversed direction from (1) **strongly agree** to (5) **strongly disagree**. The following table presents the obtained results with the total sum of each item and the total grand mean Score.

Table: 7. Frequency and Percentage of Teachers' Response on Attitude Towards PTV.

No	Item		SA 5	A 4	UD 3	D 2	SD 1	Total	∑	X
1.	PTV transmits standardized and quality education.	f	19	23	2	2	1	47	198	4.21
		%	40.4	48.9	4.3	4.3	2.1	100		
2.	PTV brings the realities of the world to the classroom.	f	22	19	3	3	-	47	201	4.27
		%	46.8	40.4	6.4	6.4	-	100		
3.	PTV facilitates the teaching learning process.	f	13	24	5	3	2	47	184	3.91
		%	27.7	51.1	10.6	6.4	4.3	100		
4.	PTV produces a better out come.	f	9	20	9	7	2	47	168	3.57
		%	19.1	42.6	19.1	14.9	4.3	100		
5.	I like and enjoy PTV.	f	11	23	5	6	2	47	176	3.74
		%	23.4	48.9	10.6	12.8	4.3	100		
6.	PTV employs a convenient method of teaching.	f	10	15	11	10	1	47	164	3.48
		%	21.3	31.9	23.4	21.3	2.1	100		
7.	PTV is difficult and requires great effort.	f	11	24	3	5	4	47	108	2.29
		%	23.4	51.1	6.4	10.6	8.5	100		
8.	PTV is not useful.	f	15	22	9	1	-	47	90	1.91
		%	31.9	46.8	19.1	2.1	-	100		
9.	PTV creates disciplinary problems.	f	10	24	9	2	2	47	103	2.19
			21.3	51.1	19.1	4.3	4.3	100		
10.	PTV should be avoided for it has a lots problems.	f	14	17	7	4	5	47	110	2.34
		%	29.8	36.2	14.9	8.5		100		
11.	The classroom teacher is far better than the PTV.	f	6	25	7	7	2	47	115	2.44
		%	12.8	53.2	14.9	14.9	4.3	100		
12.	PTV is not comfortable.	f	7	25	4	8	3	47	116	2.46
		%	14.9	53.2	8.5	17.0	6.4	100		
Grand Mean									36.87	

NB: The mean range indicates - <2.50=Low; 2.50-3.50=Average; >3.50=High

According to table 6, the mean scores of item 1, 2 and 3 is above the expected average, that is, 3.0. The majority of the teachers (above 75%) showed their agreement (strongly agree plus agree) to the statements. This reveals that the teachers have recognized the importance of PTV because they find it helpful for it transmits standardized and quality education. In addition to this, the teachers seem to like PTV since it brings the realties of the world to the classroom and facilitates the teaching learning process.

When we see the response of the teachers to items 4, 5 and 6, more than half of them showed their agreement to the statements. 61.7% of the teachers believed that the use of PTV for Instruction produces a better out come. 72.3% of the teachers expressed that they like and enjoy teaching with PTV. When we see the response to item 6, more than half of the teachers 53.2% prefer to continue teaching with PTV.

When we see the response of the teachers to items 7, 8 and 9, more than half of them (74.5% for item 7, 78.7% for item 8 and 72.4% for item 9) showed their agreement to the statements. This reveals that quite significant number of teachers believed that teaching with PTV is difficult and requires great effort. In addition to this, the teachers do not seem to like teaching with PTV because they perceived it as not useful. They also expressed that teaching with PTV is boredom and creates disciplinary problems.

According to table 6, more than half of the teachers showed their agreement to items 10, 11 and 12. According to the data, 66% of the teachers believed that teaching with PTV has a lot of problems and should be avoided totally. When we see the response to item 11, 66% of the teachers did not like teaching with PTV because the classroom teacher is far better than the PTV. The response to item 12 also shows that more than half of the teachers 68.1% did not feel comfortable when they teach with PTV. Since the items from 7 up to 12 are scored in a reverse direction, low mean score (below the expected average) on these items shows that the majority of teachers have showed their agreement to the statements.

According to table 6, the total mean score of the teachers (Grand mean) is 36.87. This figure shows that the total means score of the teachers is almost equal to the expected

total mean score, that is, 36. This indicates that the teachers are indifferent about the new, modern and innovative way of teaching (PTV). In other words they have neither favorable nor unfavorable attitude towards PTV.

The ratings were further examined to see if the total mean score of the respondents significantly differs from the expected total mean. To find out this, one sample t-test is carried out to compare the total mean score (Grand mean) with the expected total mean score on the scale. The expected total mean (36) is taken as a test value.

The mean and standard deviation of the total teachers response on perception towards teaching with PTV is presented in table7. Following the description of the statistics, t-test was carried out to check whether the total mean significantly differs from the expected test value (average mean).

Table: 8.T-test o the Mean Difference of Teachers' Response.

Test value=36					
Mean	**St.devation**	**T**	**df**	**Sig(2-tailed)**	**Mean difference**
36.87	**3.14**	**1.90**	**46**	**0.064**	**.87**

* Significant at $\alpha = 0.05$

The t-test shows that there is no significant difference between the total mean score (36.87) and the expected total mean score (36). t=1.90, df =46, ∞ =0.05 (see table 8). The mean difference is not significant at 0.05 level. The result of the t-test reveals that the teachers' total mean score is the same as the expected total average. This implies that the teachers' are indifferent towards teaching with PTV. The result shows that the teachers have neither a positive nor a negative attitude toward teaching with PTV.

The result obtained from the response of the teachers' interview, however, shows that the majority of the teachers have unfavorable attitude towards teaching with PTV. The response of the teachers to the first item of the interview question (See appendix III) 'how do you see teaching with PTV?' revealed a negative attitude by the majority of the

teachers. However, some of the teachers have shown a positive attitude while still some others held a neutral position.

Most of the teachers who did not like teaching with PTV explained that PTV makes them feel incompetent and unsupportive to their students. They also stated that PTV has devaluated their profession since it carries out almost the entire weight of teaching. The teachers further added that they are not able to control the overall environment of teaching in the classroom and what happens there because it is all controlled by the PTV. They also stated that the PTV made them to perceive it as a master, not as a servant. Most of the teachers who have had a negative attitude towards teaching with PTV stated that they did not like it because of the ways in which it is implemented and used. They have mentioned some of the major disadvantages of teaching with PTV (which is discussed in the latter section) as a reason for reinforcing a negative attitude.

Some of the teachers who liked to teach with PTV replied that teaching with PTV is a modern way of teaching which has resulted due to advancement in technology. They stated that new, updated and important information (contents) is taught to the students with the help of PTV. They have also stated that it is very supportive to what they teach. They also added that PTV helps to disseminate detailed and complex subjects to all students in easy, suitable and uniform way.

The response obtained from the students' interview also indicates that the majority of the teachers have unfavorable attitude towards teaching with PTV. Most of the students interviewed replied that the majority of their teachers are not happy when they teach with PTV. The students stated that the teachers themselves have become students; they come to the class, watch the long uninterrupted PTV lessons and finally say good bye and go to the next class. They also stated that most of their teachers lack motivation and interest to teach with PTV.

The response obtained from the principals about teachers attitude also shows that the majority of the teachers do not seem to like teaching with TPV. Most of the principals interviewed responded that most teachers feel as if they were replaced by the PTV. They

have also indicated that most of the teachers have initially resisted the implementation of the new PTV; however, as time passed the resistance has decreased. Most of the teachers also failed to take responsibility as a teacher and get to the class unprepared. In addition to this, most of the principals interviewed replied that the majority of the teachers lack commitment, courage and motivation to teach with PTV.

The result obtained from this study, however, does not support the majority of previous studies. According to a Meta analysis conducted by Schramm (1962) on teachers' attitude towards instructional television, the majority of the teachers showed a positive attitude towards teaching with Television. For example, In Hagerstown, Maryland, the most extensive experiment in closed circuit instructional televisions has been conducted and teachers were asked whether they would prefer to teach the class they were teaching with or with out the aid of television. The result indicated that 83% of the teachers preferred to do it with television. And the over all conclusions reached from the extensive meta analysis revealed that high-school teachers seem to be, on the average, a bit less favorable and more resistant than elementary school teachers (Schramm, 1962). The instructional design in which the PTV is integrated into the Ethiopian education system seems to be different with the overall findings revealed by different authors in different educational settings

It is thus possible to conclude from the overall discussion that the teachers have unfavorable attitude towards teaching with PTV. This might be due to several reasons. However, the most probable reason could be due to the methods in which the TPV is used in the classroom, which perhaps reinforced a negative attitude. Teaching with PTV may cause the teachers to confront their established beliefs about instruction and their traditional role as a classroom teacher.

3.2.2.2. Teachers Response on the Advantages of PTV.

The second part of teachers' questionnaire contains 7 items designed to assess teachers' perception on some of the major advantages of teaching with PTV. Percentage, frequency and mean score of each item are presented in the following table.

Table: 9.Frequency and Percentage of Teacher's Response on the Advantages of Teaching with Plasma Television.

No	Item		SA 5	A 4	UD 3	D 2	SD 1	Total	∑	X
1.	It uses plenty of visual aids.	f	23	20	2	2	_	47	205	4.36
		%	48.9	42.5	4.2	4.4	_	100		
2	It presents abstract concepts in a simplified manner.	f	12	30	_	4	1	47	189	4.02
		%	25.5	63.8	_	8.5	2.1	100		
3	It presents complex laboratory demonstrations easily.	f	20	19	5	3	_	47	197	4.19
		%	42.5	40.4	10.6	6.3	_	100		
4	It helps to cover the content on time.	f	15	24	1	5	2	47	186	3.95
		%	31.9	51.0	2.1	10.6	4.2	100		
5	It has many attractive features.	f	12	19	4	9	3	47	109	3.59
		%	25.5	40.4	8.5	19.2	6.4	100		
6	It makes available to all learners the best teacher with rich experience.	f	12	17	5	8	5	47	164	3.48
		%	25.5	36.1	10.6	17.0	10.6	100		
7	Improves students' language ability.	f	7	8	9	13	10	47	130	2.76
		%	14.8	17.0	19.1	27.6	21.2	100		

NB: The mean range indicates - <2.50=Low; 2.50-3.50=Average; >3.50=High

As it can be seen from table 9, quite significant number of teaches 43 (91.5%) showed their agreement (strongly agree plus agree) to item 1.Only 2 (4.3%) showed their disagreement (strongly disagree plus disagree) and 2 (4.3%) remained undecided. This shows that almost all of the teachers have recognized the importance of PTV for its use of plenty of visual aids. This indicates that using plenty of visual aids to teach students is very necessary and due to this, the teachers seem to like the PTV.

In response to item 2, the majority of the teachers 42 (89.3%) showed their agreement and only 5(10.6%) showed their disagreement to the statement. This reveals that most of the teachers perceived the importance of PTV for it presents abstract concepts in a simplified manner. It also indicates that the PTV helps the classroom teacher by presenting abstract concepts in a simplified manner which the teacher could find it difficult.

According to table 9, 39 (83%) of the teachers agreed that teaching with PTV is useful because it presents complex laboratory demonstrations easily. Only 3(6.4%) disagreed and the rest 5(10.6%) remained undecided to the statement. This shows that the teachers have found PTV very useful for it presents complex laboratory demonstrations easily. It

also indicates that the teachers liked PTV since it presents complex laboratory demonstrations to their students which other wise they could not. They also seem to understand the importance of live practical demonstrations to students, which is believed to enhance the students' level of understanding.

In response to item 4, quiet significant number of teachers 39 (83%) showed their agreement. Only 7(14.9%) showed their disagreement and the rest 1(2.1%) remained undecided. This reveals that the PTV helps the classroom teachers to cover the content of what they teach on time. This also seems to show that the PTV presents the lessons to the students based on the schedule and timetable, which helps the teachers to teach their lessons smoothly.

The response to item 5 on table 9 shows that more than half of the teachers 31(65.6%) showed their agreement on the importance of PTV for it helps to get students attention with its attractive features. The rest 12(25.6%) showed their disagreement and 4(8.5%) remained undecided. This indicates that some of the attractive features of the PTV such as the background music, color, picture and sound help the teachers to get the students attention since it is attractive.

According to table 9, 29(61.7%) of the teachers found PTV useful for it makes available to all students to learn from the best PTV teachers with rich experience. The rest 13(27.6%) showed their disagreement and 5(10.6%) remained undecided. This indicates that more than half of the teachers have found PTV useful for it makes available competent and experienced teachers to all learns.

In response to item 7, 20 (42.5%) of the teachers believed that PTV helps to improve students language ability. The rest 17(36.1%) showed their disagreement and 10(21.2%) remained undecided to the time. This shows that less than half of the teachers believed that PTV helps to improve students' language ability. This also indicates that the medium of instruction (English) which is presented by native speakers seems not helpful for students to develop their language skills.

The response obtained from the above questionnaire is also consistent with the response obtained through interview. The teachers were asked 'what are the major advantages of teaching with PTV?' both during the interview and open-ended questionnaire. The following items are a summary of a representative quotes obtained from most to the teachers in response to the interview and open-ended item:

- PTV greatly supports the class room teacher.
- PTV Presents tedious laboratory experiments easily to the classroom.
- I learn so many things form PTV, for example in my subject English; I learned how to split words and how to teach words in many ways.
- PTV is very good for it uses plenty of visual aids
- Students will have additional teacher in addition to the classroom teacher.
- PTV is punctual, if administered well; you will cover the content as the schedule on time.
- PTV makes students feel real about the story in text.
- The teachers in PTV apply the teaching methodology correctly.
- PTV gives relief (reduces work load) to the classroom teacher.
- PTV presents abstract concepts in a simplified manner.
- PTV saves time and energy.

It is thus possible to conclude from the above discussion that the majority of the teachers have recognized and mentioned the importance of PTV for the teaching learning process.

3.2.2.3. Teachers Response on the Disadvantages of Plasma Television.

This section tries to assess some of the major disadvantages that the teachers perceive when teaching with PTV. Eight items are presented in which the teachers showed their agreement or disagreement. The results obtained from the items are presented in the following table.

Table: 10. Frequency and percentage of Teachers Response on the Disadvantages of PTV.

No	Item		SA 5	A 4	UD 3	D 2	SD 1	Total	Σ	X
1.	PTV is too fast to follow.	F	18	26	3	-	-	43		
		%	36.2	55.3	6.4	-	-	100	203	4.31
2.	It does not give adequate time to take notes /do tasks.	F	12	24	6	5	-	47		
		%	25.5	51.0	12.7	10.6	-	100	184	3.91
3.	It does not allow for revision/ repetition.	F	15	29	3	-	-	47		
		%	31.9	61.7	6.4	-	-	100	200	4.25
4.	It does not give adequate time for classroom teacher.	F	20	27	-	-	-	47		
		%	42.5	57.4	-	-	-	100	208	4042
5.	It does not address students' problems immediately.	F	21	24	2	-	-	47	207	4.40
		%	44.6	51.0	4.2	-	-	100		
6.	It does not allow students to participate actively.	F	18	22	2	5	-	47	194	4.12
		%	38.2	46.8	4.3	10.6	-	100		
7.	It doesn't employee appropriate method to assesses students achievement.	F	16	19	7	5	-	47	187	3.97
		%	34.0	40.4	14.91	10.6	-	100		
8.	The schedule is not flexible.	F	19	20	4	4	-	47	195	4.14
		%	40.4	42.5	8.5	8.5	-	100		

NB: The mean range indicates - <2.50=Low; 2.50-3.50=Average; >3.50=High

According to table 10 above, quite significant number of teachers 44(93.5%) showed their agreement (strongly agree and agree) to the first item which states that PTV lessons are too fast for students to follow. The rest 3(6.4%) remained undecided and none of them have neither disagreed nor strongly disagreed to the item. This reveals that the pace of PTV lesson presentations is too fast for the students to follow. It also indicates that the students are not able to cope up with the pace of PTV Presentation.

In response to item 2, 36 (76.5%) of the teachers showed their agreement on the disadvantage of PTV for it does not give adequate time for students to take notes and do tasks. Only 5 (10.6%) showed their disagreement and the rest 6(12.7.7%) remained undecided to the item. This shows that the PVT deprives the students from taking notes and to do other classroom tasks such as class work, group work, and discussion with classroom teacher etc.

When asked about whether the PTV allows for revision and repetition or not, most of the teachers 44(93.6%) showed their agreement. The rest 3(6.4%) remained undecided and none of them have disagreed or strongly disagreed to the item. This reveals that PTV lessons are incapable of being repeated or revised for the second time. That is, the

lessons, once broadcasted, are not possible for the students to view for a second time and there is no summary or revision made by the PTV at the end of a chapter or a semester.

According to table 10, all of the teachers 47 (99.9%) showed their agreement on the disadvantage of PTV for it does not give adequate time for the classroom teacher. None of the teachers have shown their disagreement to the item. This shows that the classroom teacher is not given adequate time to carry out its daily task. The classroom teacher is given only 6 minutes before the transmission of PTV and 6 minutes after the PTV transmission. The rest 30 minutes are given to the PTV teacher.

In response to item 5, quite significant number of teachers 45 (95.6%) agreed that the PTV does not address students problem immediately. None of the teachers showed their disagreement and only 2(4.2%) remained undecided. This indicates that the PTV does not address students' problem. The students are not able to interrupt the PTV teacher and ask for clarification. There is no two-way communication between the PTV teacher and the students, which abandons the students to get immediate feedback.

In response to item 6, 40 (88%) of the teachers agreed that the PTV lessons do not allow students to participate actively. Only 5(10.6%) showed their disagreement and the rest 2(4.3%) remained undecided to the item. This indicates that the students do not actively participate during PTV lesson presentation. This is possibly due to inadequate time given for the students to do the various tasks given by the PTV teachers.

According to table 10, 35 (58%) of the teachers agreed that the PTV does not employ appropriate method to assess students achievement. Only 5 (10.6%) of the teachers showed their disagreement and the rest 7(14.9%) remained undecided to the item. This shows that appropriate methods are not used by the PTV to assess students' achievement.

When asked about the flexibility of PTV schedule, 39 (82.9%) of the teachers agreed that the PTV schedule is not flexible. Only 4 (8.5%) showed their disagreement and the rest (4)8.5% remained undecided to the item. This indicates that the program of PTV transmission is not adjustable to the need of the students, teachers and the school.

The response obtained from teachers' questionnaire about the major disadvantages of plasma TV is also similar to what was revealed thorough the interview. The responses of the teachers to the interview and open-ended items 'what are the major disadvantages of teaching with PTV?' show that the majority of the teachers have identified and pointed out several disadvantages regarding PTV. The following are a summary of representative quotes from the responses:

- PTV contradicts with the pedagogical principles because the programs are designed only for active learners (ignores medium and slow learners).
- PTV decreases my interaction with students. I don't even know the names of my students.
- It does not consider individual difference and does not help students with their immediate problem.
- The speed of presentation of PTV is very fast, it is just like a journalist in BBC.
- PTV considers students as if they are fluent native speakers of English, which the students could not understand.
- It does not give adequate time for the students to think, to write and to answer questions.
- The time given to the classroom teachers is too short, which is a barrier to active teaching learning process.
- You can not control it, you can not pause it, you can not slow it and you can not repeat it.
- Since I started to teach with PTV, I don't know the potential, the difficulties, the problems and abilities of my students.
- It made me idle; I enter to the class without preparation.
- Most of the students do not understand and follow the PTV attentively, and due to this they disturb.
- You can not assess your students' progress continuously; you have no time to correct class work, assignment and home work.

- PTV makes both the students and teachers passive since there is no time for active participation.

The results obtained from principals' interview also supports the above teachers' response. The majority of the principals' response to the disadvantages of plasma TV centered on the speed of presentation, inadequacy of the time allotted for the teachers and students and the difficulty of the language used by the PTV teachers. It is thus possible to conclude from the above discussion that PTV has indeed several disadvantages as the majority of the teachers have recognized and identified.

As it is already stated in the literature review of this study, instructional television has so many advantages. However, to realize these advantages, one needs to look at the various ways in which the instructional television is used. According to Tanner (1961), Television as medium of instruction can be used effectively or ineffectively. Its' influence for good or evil depends on what goes into the medium and how it is used. We need to ascertain the advantages of using television to supplement and enrich the classroom program. We should be looking for ways of using this medium to extend and enrich the teaching learning process by providing experiences that transcend the confines of the conventional classroom. In other words, television will be more advantageous when it is used to provide learning experiences that are not possible under conventional conditions of classroom instruction (Tanner, 1961). Tinio (2003:17) also pointed out that "it is not the technology but how you use it! Put another way: how you use the technology is more important than if you use it at all."

The method used by the PTV in the sample schools reveals that there are certain advantages that both the students and teachers have recognized and mentioned. However, the study found out that the advantages are not fully realized to the extent desired. There were so many disadvantages pointed out by the students and teachers on the use of PTV, which possibly occurred due to the method of utilization. It is thus possible to conclude that if the methods used to operate the PTV are made conducive to the needs of the students and teachers, the disadvantages observed will be greatly minimized.

The results obtained from the overall responses of teachers and students on some of the major disadvantages of one way television teaching is also consistent with what many scholars have pointed out in the various literatures. It is needless to mention here again what many scholars have found about the disadvantages of teaching with one-way television. However, it is mandatory to remind some of the most critical drawbacks of one-way television teaching.

One of the most critically cited disadvantage of the one-way television instruction is that, for the student, "it is all take and no give, a passive, unchallenging process, a sitting before viewing sets, merely looking and listening a sterile absorption of facts and opinions" (Zorbaugm, 1958:343). The author further stated that during televised instruction, class participation and students teacher interaction are severely reduced due to the barrier placed by the medium.

The second most critically cited disadvantage of televisions is its impersonality. Most of the problems that arise during televised instruction revolve around this problem of impersonality (Frantz, 1965). According to this author, in Pennsylvania State University, over 70% of respondents surveyed on instructional television cited lack of personal contact between student and teacher as a serious limitation. In addition to this, Wayne state university students revealed that one way television was not conducive to the development of critical thinking (Frantz, 1965).

It is thus possible to conclude from the over all discussion of the major disadvantages of PTV that the current utilization of the instructional television in the two sampled high schools has several disadvantages. The most notable ones are lack of interaction between the classroom teacher and the students, inability of the students to cope up with the speed of PTV presentation, difficulty of the language used by the PTV, lack of adequate time to take notes, do class work and other tasks and inability to ask for clarification or to get immediate feedback.

3.2.2.4. Teachers' Response on Managing the Implementation of PTV

This section tried to assess some of the major problems encountered in managing the implementation of PTV. Ten items were designed for teachers to find out whether the necessary conditions are fulfilled or not for smooth and successful operation of PTV. The response obtained from the yes/no questions and rating scale are presented separately in the following tables.

Table: 11a. Frequency and Percentage of Teachers' Response on Administrative and Technical Operation of PTV.

No	Item		Yes	No	Total
1.	Have you taken any training regarding the use of PTV?	f	8	39	47
		%	17.0	83.0	100
2.	Is there adequate administrative support for smooth operation of PTV?	f	29	18	47
		%	61.7	38.2	100
3.	Is there on going support and encouragement from administrators for the successful operation of PTV?	f	34	13	47
		%	72.3	27.7	100
4.	IS there technical support for the smooth operation of PTV?	f	35	12	47
		%	74.5	25.5	100
5.	Do you have a teachers guide?	f	18	29	47
		%	38.2	61.7	100

As it can be seen from table 11 above, 83% of the teachers have not taken any training regarding the use of PTV. Only few 17% of the teachers have received training on the use of PTV. This implies that the majority of the teachers have no any prior knowledge on various importance of PTV. It also indicates that the teachers have no adequate knowledge on how to use PTV for teaching the students effectively.

The result obtained from teachers and principals interview also show that only few teachers were given training regarding PTV at the beginning of the programme. The majority of the teachers interviewed replied that there were no any workshops, seminars or short-term training given to them regarding the use and operation of PTV. And this will have its own impact in the effectiveness of PTV on the teaching learning process. With regard to teachers training, Tinio (2003) pointed out that the major barrier to successful use of ICT in education is the inability of teachers to understand why they should use ICT and how exactly they can use ICT to help them teach better. In addition to this, Jhonston (1987) in Reeves (1998) pointed out that television is used most effectively when it is intentionally designed for education and when teachers are involved in its

selection, utilization and integration into the curriculum. It is thus very mandatory to focus on teacher training before the adoption of any ICT to the educational system

In response to item 2, more than half of the teachers 61.7% replied that there is adequate administrative support for the smooth operation of PTV. Only some of the teacher 38.2% replied that there is no adequate administrative support. Moreover, the response to item 3 shows that the majority of the teachers, 72.3%, replied that there is on going support and encouragement from administrators for the successful operation of PTV. This shows that the administrators are able to provide the necessary assistance to the teachers when using PTV for teaching.

The response obtained from teachers' interview also shows that there is adequate administrative support and ongoing encouragement from administrators. Most of the teachers interviewed replied that the principals, vice principal and unit leaders help them in controlling and following the over all teaching and learning process of the PTV. They also added that the principals help them by maintaining order in the school environment, make sure that all the students are in class to follow the lessons and assure that the transmission is functioning smoothly. The principals also help them in solving technical problems arising during PTV teaching by providing the necessary assistance. This will help teachers to teach their subjects in smooth way. As Earl (2002) pointed out, the school leaders and principals should play an important role in supporting and encouraging teachers to effectively utilize available ICT. According to this author, principals must prepare teachers by building relationships of trust, by helping them feel and recognize the power of teaching with ICT, by giving them training and by finding out their needs, interests and concerns.

In response to item 4, more than half of the teachers 74.5% replied that there is technical support for the smooth operation of PTV. Only 25.5% of the respondents replied that there is no technical support. This shows that there is technical support to work on matters regarding plasma operation. It also shows that if technical problems occur, they are solved immediately since there are on site technicians.

The response obtained from the interview also supplements the response obtained to item 4 above. Most of the teachers interviewed replied that there is technical support for the smooth operation of PTV. However, almost all of the teachers and principals interviewed revealed that the most critical technical problem that often occurs is power interruption which automatically stops the PTV transmission. Most of the respondents pointed out that there is no generator in their schools which could replace the main power when there is interruption. The researcher also observed that there is no any generator in the two sampled high schools.

When asked abut whether they have teachers guide or not, more than half of the teachers (61.7%) replied that they have no teachers guide. The rest 38.2% replied that they have a teachers guide. This shows that there is a very high scarcity of teachers guide. This will have its own impact on the effectiveness of the teaching learning process.

Regarding the availability of teachers guide, most of the teachers and principals interviewed stated that there is a very high shortage of teachers guide. Most teachers complained that they do not get prepared before they come to class due to lack of teacher's guide. The principals also stated that there is no adequate teachers guide due to lack of resource.They pointed out that they are not able to print and copy all the teachers guide since there is no adequate printing machine and papers to print. However, according to the condensed teacher's guide (2003, p.2) "a television teacher's guide is so important that, without it classroom teacher may not utilize any educational television programme effectively." It is thus mandatory for teachers to have a teacher's guide for effective and efficient instruction.

Table: 11b. Frequency and Percentage of Teachers' Response on Administrative and Technical Operation of PTV.

No	Item		Respondents Rating					Total
			5	4	3	2	1	
1	How do you rate the adequacy of the training?	f	1	3	4	---	---	8
		%	11	39	50	_	_	100
2	The commitment and interest of administrators to work for successful operation of PTV?	f	_	17	13	15	2	47
		%	_	36.1	27.7	31.9	4.2	100
3	Teachers' involvement on matters regarding plasma TV?	f	_	4	14	19	10	100
		%	_	8.5	29.7	40.4	21.3	47
4	The adequacy of technical support for the smooth operation of PTV?	f	2	11	13	16	5	47
		%	4.3	23.4	27.7	34.0	10.6	100
5	The appropriateness of PTV installation?	f	8	20	12	7	---	47
		%	17.0	42.6	25.5	14.9	---	100

NB: The rating numbers represent: **5**= very high, **4**= high, **3**= moderate, **2**= low and **1**= very low

According to table 12, only 11 % and 39% of the teachers who have taken the training have rated the training they got as very adequate and adequate respectively. And the rest 50% of the teachers have replied that the training is averagely adequate. Only eight teachers have responded to the question since the rest have not taken any training. This shows that the training given to the teachers is adequate on average. This implies that the teachers demand extensive and detailed training on the overall use of PTV.

In response to item 2, 36 .1 % of the teachers replied that the school administrators are highly committed and interested to work for the successful operation of the PTV. The rest 27.7 %, 31.9% and 4.2% rated average, low and to a very low extent respectively. This shows that the commitment and interest of the school leaders is some how good.

According to table 12, only 8.5% and 29.7% of the teachers replied that they are involved on matters regarding PTV to high extent and averagely respectively. The majority of the respondents 40.4% replied that they are involved to a low extent and the rest 21.3% stated that they are involved to a very low extent. This shows that the teachers do not participate on the various issues concerning the PTV.

In response to item 4, 4.3% and 23.4% of the teachers have replied that the technical support is very highly adequate and highly adequate respectively. The rest 27.7%, 34% and 10.6% rated average, low and very low respectively. This shows that there is no adequate or sufficient technical assistance, which helps the PTV to function smoothly. This will have impact on the teaching learning process because transmission failure will stop the students from learning their daily lessons if not immediately maintained.

When asked about the appropriateness of PTV installation, 17.0% and 42.6% of the teachers replied that it is very highly appropriate and highly appropriate respectively. The rest 25.5 % and 14.9% have rated its appropriateness as average and low respectively. This shows that the PTV is installed in appropriate way to the majority of the teachers. The teachers seem to like the way the PTV is installed in the classroom. The response obtained from the teachers' and principals interview also shows the same result. However, some of the teachers have complained about the inappropriateness of PTV installation. They said that the PTV has occupied a large space and covered almost half of the blackboard.

3.3. Presentation and Analysis of Observation Data.

In this study classroom observation was made to find out how the educational facilities /equipment are utilized during the operation of the PTV. Accordingly, six observation items that focus on the utilization of plasma TV were constructed. A three point rating scale is used to rate the items. Three classrooms from both high schools were randomly selected and observed. Since the sampled classrooms were observed by two co-observers, excluding the researcher, each of the items were analyzed out of 18. The frequency and percentage of the responses of each item for the specified rating scales are listed in the following table.

Table: 12. Frequency and Percentage of Observation Result of the PTV Utilization.

No	Observation Item	Rating Scales							
		Excellent		Satisfactory		Unsatisfactory		Total	
		Fr	%	Fr	%	Fr	%	Fr	%
1.	The visibility of the PTV to all students	15	83	3	17	_	_	18	100
2.	The audibility of the PTV to all students	16	88.8	2	11.1	_	_	18	100
3.	The ventilation of the classroom	7	38.8	4	22.2	7	38.8	18	100
4.	The picture quality of the program	16	88.8	2	11.1	_	_	18	100
5.	The sound quality of the program	16	88.8	2	11.1	_	_	18	100
6.	The safety of the PTV	3	16.6	4	22.2	11	61.1	18	100

The observation result of item 1 in table 13 shows that 83% of the observers rated the visibility of the PTV to all students as excellent. The rest 17% of the respondents rated the item as satisfactory. This shows that the plasma TV is visible to all students which help them to watch easily what is presented in the screen. The responses obtained from teachers and students' interview also supports the above observation result. None of the students and teachers interviewed complained about the visibility of the PTV to all students.

The response obtained from observation item 2 shows that 88.8% of the observers rated the audibility of PTV to all students as excellent. The rest 11.1% rated the item as satisfactory. This shows that all the students can hear the PTV since it is audible to the whole classroom. The response obtained from the interview of students and teachers also reveals the same result. None of the teachers and students complained about the audibility of PTV to all students.

The response obtained to item 3 shows that 38.8% rated excellent, 22.2% rated satisfactory and the rest 38.8 % rated unsatisfactory. This indicates that there is certain problem on the ventilation (circulation of adequate air) of the class. The interview response from teachers and students also shows that there is no adequate ventilation in the classroom. Some of the teachers replied that especially in the afternoon, during the first 3 periods, the classroom gets very hot due to the hot sunshine. They also indicated that there are no adequate windows to allow the hot air out. The sophistication created by

the hot air from the outside together with the heat released by the PTV crates a dull and sophisticated atmosphere in the classroom.

Regarding the picture and sound quality of the program, 88.8% of the observers rated the items as excellent. Only 11.1% of the observers rated the item as satisfactory. This shows that the PTV set employs a high quality sound and picture which has maintained it standard. However, some of the teachers and students interviewed replied that sometimes there is channel disorder that occurs from the main transmission center.

Regarding the safety of the PTV, only 16.6 % the observers rated the safety of PTV as excellent. The majority of the observers 61.1% rated as unsatisfactory and the rest 22.2% rated as satisfactory. This shows that the PTV is not in a safe condition. The response obtained from students and teachers' interview also reveals that the PTV is not in a safe condition. Most of them explained that the PTV is susceptible to dust and the wires at the back of the screen are not covered. Students sometimes touch the wires and cause the transmission to breakdown. They have also added that some times there is direct sunlight falling on the PTV that comes through the window. It is thus possible to infer from the above results that at present condition, the PTV is susceptible to many damages which need immediate re-adjustment.

It is thus possible to conclude from the above results that the PTV is visible and audible to all students in the classroom. The image and sound quality of the PTV is also good which most of the students and teachers seem to like it. However, the safety and ventilation of the PTV is not in a good condition. The equipment needs adequate care and ventilation to utilize it for long years.

CHPTER FOUR

4. SUMMARY, CONCLUSION AND RECOMMENDATIONS

4.1. Summary

The current study attempted to assess how students and teachers perceive and value satellite television instruction. Some of the major advantages and disadvantages of plasma television as perceived by teachers and students are also assessed. Moreover, administrative and technical problems that are so far encountered in managing the implementation and utilization of PTV in the two sampled secondary schools were also given attention.

Adequate data was gathered from grade 10 students and teachers through questionnaire and interview. Principals, vice- principals and unit leaders were also interviewed to supplement the data obtained from teachers and students. Moreover, classrooms were observed to obtain the necessary data regarding the utilization of PTV.

The data obtained from both high schools were merged together for analysis and interpretation. The major findings of the study are summarized as follows:

1. The over all result obtained from students, teachers and administrators questionnaire and interview reveals that the students have a positive attitude towards learning with PTV.
2. The over all result obtained from teachers, students and principals shows that the teachers have a negative attitude towards teaching with plasma Television.
3. The majority of the students (over 55%) and most of the teachers (over 80%) have recognized the various advantages of PTV. The following are some of the major advantages that both the students and teachers perceived.
    - PTV is helpful because it uses plenty of visual aids
    - PTV is important because it presents abstract concepts in a simplified manner.
    - PTV is important because it presents complex laboratory demonstrations to the classroom.
    - PTV creates image in the mind of the students

- It is not based on theory alone but with live Practices.
- Reduces workload of the teacher
- It makes students feel real about the story in text
- Updates teachers' competence on subject matter they teach.

4. The majority of the students (over 70%) and most of the teachers (over 80%) have recognized some of major disadvantages of PTV. The following are the major disadvantages:
    - It is too fast for the students to follow
    - It does not give adequate time for the students to take notes and do other class works
    - It does not give adequate time for the classroom teacher to interact and communicate with the students.
    - It does not allow students to participate actively
    - Favors students who are fluent in English and have strong educational background.
    - It does not allow for revision and repetition
    - It makes the classroom teacher idle
    - It does not allow the classroom teacher to know the potential, the difficulties, the problems and abilities of the students.
5. Most of the teachers (over 80%) indicated that they have not taken any training regarding the use of PTV. And among those who have taken the training, less than half (40%) rated the adequacy of the training as high.
6. The majority of the teachers (60%) stated that they have no teachers guide.
7. The majority of the teachers (over 60%) pointed out that there is adequate administrative support and on-going encouragement from the school administration for the smooth and successful operation of PTV.
8. Some of the teachers (36%) rated the extent of administrators' commitment and interest to work for successful operation of PTV as high. The rest 27.7% rates as average and 36% as low.

9. Only 8.5% of the teachers expressed that they are highly involved on matters regarding PTV. Only 29.7% rated as average and the rest 40.4% rated as low.
10. The majority of the teachers (over 70%) replied that there is a technical support for the smooth operation of PTV. However, only 8.5% and 23.4% of the teachers rated the adequacy of the technical support as very high and high respectively.
11. Less than half of the teachers, 17% and 42.6% rated the appropriateness of PTV installation in the classroom as very high and high respectively. The rest 25.5% rated average and 14.9% rated below average.
12. The majority of the observers (83%) rated the visibility and audibility of PTV to all students as excellent. In addition to this, most of teachers and students interviewed (over 80%) explained that PTV is visible and audible to all students.
13. More than 80% of the observers rated the picture and sound quality of the PTV as excellent. The result obtained from students and teachers interview also shows the same result.
14. Less than half of the classrooms observed (40%) were rated as excellent regarding the safety of the PTV and the ventilation of the classrooms. The result obtained from the majority of the students and teachers (over 60%) also revealed that most of the classrooms were not adequately ventilated and that the PTV was not in a safe condition.

4.2. Conclusion

From the overall analysis and discussion made from the responses obtained in the two sample secondary schools, the study disclosed the following points as the major conclusion:

- The introduction and implementation of the new satellite-based instruction (PTV) did not address the needs and interests of the actual change-agents, the teachers and students. And this has resulted for the unfavorable attitude by of most of the teachers.

- The introduction and implementation of the new satellite TV is carried out without the involvement of key stakeholders, especially teachers. Teachers are not involved on matters regarding the importance and utilization of Plasma TV.

Teachers are not also involved in the process of selection, implementation and integration of the technology (PTV) in teaching and learning.

- Even though the new satellite TV has several importance in the teaching learning process, the impacts seem to outweigh the benefits. This is most probably due to the method in which the instructional television is integrated in to the classroom.
- The operation of the new satellite TV did not take in to consideration the available resource needed to run the program effectively. In other words, lack of adequate finance severely hampered the successful operation of the program. This is reflected in the fact that the schools have no adequate teachers guide, generators and other supportive materials.

4.3. Recommendations

The following points are the major recommendations made to overcome the problems identified in the study.

1. Any innovation is fraught with promises and challenges. Therefore, involving key stakeholders is often the way to achieve the potential promises while addressing and overcoming the related challenges. To this end, the MOE together with EMA and regional education bureau need to carry out various forums and discussions with students and teachers at local, regional and national level to create awareness and to discuss on the various issues concerning the satellite based instruction. .
2. The importance of teachers and students attitude towards the technology used in the classroom is of paramount. How students and teachers perceive the technology (PTV) will greatly impact the overall teaching learning. Thus, PTV content developers and program designers need to spend energy, time, and thought so that they carefully developed and design effective instructional methods. And to do this, they need first to understand how learning occurs in the actual local classroom environment and what factors influence it.
3. Television is not a medium for total teaching. Television should be used to provide learning experiences that are not possible under conventional conditions of classroom instruction. Therefore, the EMA should make minor changes on the

nature of transmission or method of instruction currently employed by the PTV so as to make the instruction more effective and minimize the observed disadvantages. The following suggestions are recommended:

i. To lower the pace (Speed) of PTV presentation so that all the students can catch up.
ii. To allow or give the classroom teacher more time than the PTV or to at least share the period equally or
iii. From the total five transmission days, 2 days could be totally devoted to the classroom teacher alone so that he/she will be able to clarify, repeat and revise the lessons which are presented previously by the PTV. This will also help to allow for more student-student and student-teacher interaction.
iv. To make the medium of instruction (English) which is used by the native speakers of the PTV teachers simple easy and appropriate to students level and background.
v. To record the programs so that it will be possible for second viewing.

4. Accepting and learning to operate with new educational paradigm may be great challenge for teachers and students as they strive to make the most efficious use of the new technology (PTV). Therefore, EMA together with regional ICT experts and school administrators need to find out factors that create barriers to learning with PTV so that it is possible to redesign the method or get the appropriate solutions.
5. The pertinent question is no longer whether a televisions can teach effectively, but rather how, when, for what subjects, and with what articulation in to the classroom activities instructional television can most effectively be used. Therefore, to increase the efficacy of the PTV, the regional education bureau should carry out a need assessment at classroom level so as to make the necessary adjustment on the current method of PTV utilization.
6. There may be no generalizable best approach to using media and technology in schools. The best one may be able to hope for is creative application and informed practices. Therefore, EMA and other concerned bodies need to carryout

Empirical studies to determine the most effective approach to use PTV for classroom instruction. Thus, the regional education bureau together with the school administration need to find out and implement the most effective instructional design as demanded by both teachers and students.

7. Administrators in regional education bureau and schools should explore a variety of methods to increase teachers and students attitude towards the use of PTV. With regard to this, a due emphasis should be given to the training of teachers about the technology (PTV).
8. The school administrators should provide the necessary support and encouragement to prepare the teachers by building a relationship of trust, by helping teachers feel and recognize the power of teaching with PTV and by finding out teachers needs, interests and concerns.
9. The regional education bureau should device a mechanism to allocate the necessary budget to the schools for obtaining the most crucial and necessary resources needed to smoothly carryout the teaching learning through PTV. With regard to this, teachers and students guide, generators and competent on site technicians are the top priorities that call for immediate attention.
10. The regional education bureau, EMA and school administrators need to work closely to ensure that the equipment (PTV) and the necessary spare parts are replaced before they wear out or become out date. In this regard, the safety of PTV and the ventilation of the classroom need a due emphasis to ensure long lasting function.

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Appendix-I

DATA GATHERING INSTRUMENTS

To be discussed orally before any date is gathered

Dear students/Teachers

Thank you for accepting to participate in this research, Teachers and students attitude towards the use of satellite television instruction. My purpose is to undertake research as a requirement for MA qualification for a better understanding of how you as a student and your teachers perceive and value satellite television instruction.

Through this research, I want to understand how you feel about learning with Plasma Television (your attitude), what are the major advantages and disadvantages of PTV, and on problems so far encountered on the utilization and management of satellite TV instruction.

Informational /data/ will be collected through questionnaire, interview and observation. The information you supply is not part of your examination. It has no any relation with your classroom test and has no any marks. The information you share with me will be secured with the at most confidentiality and your personal identity will be kept anonymous. There are no known risks and discomfort associated with this study. The expected benefits associated with this study are the end results that may be helpful to improve our education system. I would be happy to share the findings with you after the study is completed or even while in process. I assure you again, your names will not be associated with the research findings in any way, and your identity as a participant will be known only to me.

Thank You

Appendix-II

Questionnaire for students

Dear Students:

This Questionnaire is designed to assess your attitude towards satellite TV instruction. It also contains items designed to identify some of the major advantages and disadvantages of PTV. The answers will be kept in confidence and feel free to answer all the questions frankly. Thus, I kindly request you to give your answers on the space provided. Your contribution is highly important for the success of the study. You don't have to write your names.

Thank you for your co-operation

The researcher

Instruction 1

Before you respond to the statements given below, please complete the following information.

1. Name of the School _____
2. Grade & Section_____
3. Sex ___

Instruction 2

Below are items about your learning through plasma TV. Respond to these items by putting a tick (✓) mark against your choice in only one of the five spaces in the response column under 'strongly agree' (5), 'agree' (4), 'No opinion' (3), disagree (2), or 'strongly disagree' (1).

NB: If you are not certain about any statement please don't hesitate to ask.

PART –I

No.	Item	SA 5	A 4	UD 3	D 2	SD 1
1.	Learning with plasma TV is helpful because it transmits standardized and quality education.					
2.	Learning with PTV is important because it brings the realities of the world to the classroom.					
3.	Learning with PTV is important because it facilitates the teaching learning process.					
4.	The use of PTV for instruction produces a better outcome.					
5.	I like and enjoy learning with PTV.					
6.	I prefer to continue learning with PTV because it employs a convenient method of teaching.					
7.	Learning with PTV is difficult and requires great effort.					
8.	I don't like learning with PTV because it is not useful.					
9.	Learning with PTV is boredom and creates disciplinary problems.					
10.	Learning with PTV has a lot of problems and should be avoided totally.					
11.	I don't like learning with PTV because the classroom teacher is far better than the PTV.					
12.	I don't feel comfortable when I learn with PTV.					

PART –II

No	Item	SA 5	A 4	UD 3	D 2	SD 1
1.	Learning with PTV is important because it uses plenty of visual aids.					
2.	Learning with PTV is important because it presents abstract concepts in a simplified manner.					
3.	Learning with PTV is useful because it presents complex laboratory demonstrations easily.					
4.	Learning with PTV is important because it helps to cover the content on time.					
5.	PTV helps to get students attention because it has many attractive features.					
6.	PTV is useful because it makes available to all learners the best teacher with rich experience.					
7.	PTV helps to improve students' language ability.					

Part-III

No	Item	SA 5	A 4	UD 3	D 2	SD 1
1.	PTV lessons are too fast to follow.					
2.	PTV lessons do not give adequate time to take notes/do tasks.					
3.	PTV does not allow for revision and repetition.					
4.	PTV does not give adequate time for classroom teacher.					
5.	PTV does not address students' problem immediately.					
6.	The schedule of PTV lessons is not flexible.					
7.	PTV does not allow students to participate actively.					

Part-IV

Please answer the following questions on the space provided.

1. What are the major advantages of PTV?

_____

_____

_____

_____

_____

2. What are the major disadvantages of PTV?

_____

_____

_____

_____

Appendix-III

Questionnaire for Teachers

Dear Teacher:

This questionnaire is designed to assess your attitude towards satellite TV instruction. It also contains items designed to identify some of the major advantages and disadvantages of PTV. In addition to this, there are items which deal about the utilization & management of satellite TV in you school. Your answers will be kept in confidence and feel free to answer all the questions frankly. Thus, I kindly request you to give your answers on the space provided. Your contribution is highly important for the success of the study. You don't have to write your names.

Thank you for you co-operation

The researcher

Instruction1.

Before you respond to the statements given below, please complete the following information

1. Name of the school _____
2. Grade & sections you teach _____
3. Sex ___
4. Subject you teach _____

Instruction 2

Below are items about your teaching through plasma TV. Respond to these items by putting a tick (✓) for part I, part II and part III against your choice in only one of the five spaces in the response column under: 'Strongly agree' (5), 'agree' (4), 'No opinion' (3), 'disagree' (4) or 'strongly disagree' (5).

Part-I

No.	Item	SA 5	A 4	UD 3	D 2	SD 1
1.	Teaching with plasma TV is helpful because it transmits standardized and quality education.					
2.	Teaching with PTV is important because it brings the realities of the world to the classroom.					
3.	Teaching with PTV is important because it facilitates the teaching learning process.					
4.	The use of PTV for instruction produces a better outcome.					
5.	I like and enjoy teaching with PTV.					
6.	I prefer to continue teaching with PTV because it employs a convenient method of teaching.					
7.	Teaching with PTV is difficult and requires great effort.					
8.	I don't like teaching with PTV because it is not useful.					
9.	Teaching with PTV is boredom and creates disciplinary problems.					
10.	Teaching with PTV has a lot of problems and should be avoided totally.					
11.	I don't like teaching with PTV because the classroom teacher is far better than the PTV.					
12.	I don't feel comfortable when I teach with PTV.					

Part-II

No	Item	SA 5	A 4	UD 3	D 2	SD 1
1.	Teaching with PTV is important because it uses plenty of visual aids.					
2.	Teaching with PTV is important because it presents abstract concepts in a simplified manner.					
3.	Teaching with PTV is useful because it presents complex laboratory demonstrations easily.					
4.	Teaching with PTV is important because it helps to cover the content on time.					
5.	PTV helps to get students attention because it has many attractive features.					
6.	PTV is useful because it makes available to all learners the best teacher with rich experience.					
7.	PTV helps to improve students' language ability.					

Part-III

No	Item	SA 5	A 4	UD 3	D 2	SD 1
1.	PTV lessons are too fast to follow.					
2.	PTV lessons do not give adequate time for students to take notes/do tasks.					
3.	PTV does not allow for revision and repetition.					
4.	PTV does not give adequate time for classroom teacher.					
5.	PTV does not address students' problem immediately.					
6.	The schedule of PTV lessons is not flexible.					
7.	PTV does not employ appropriate method to assess students' achievement.					
8.	PTV does not allow students to participate actively.					

Instruction 3

In this section try to answer the questions by putting a tick (√) mark on one of the choices provided. Some items request you to provide your responses with your own words on the space provided. Please attempt all the questions and provide the necessary answers freely. If the space provided is not adequate you can request for additional space.

PART –IV

1. Have you taken any training so far regarding the use of satellite television? ☐ Yes ☐ No

2. If your answer to item 1 is yes, how do you rate the adequate of the training?

   ☐ Very high ☐ high ☐ Average

   ☐ Low ☐ Very low

3. Is there adequate administrative support for the operation of the plasma TV program?

   ☐ Yes ☐ No

4. To what extent do your administrators are committed and interested to work for the successful operation of the plasma TV program?

   ☐ Very high ☐ Low

   ☐ High ☐ Very low

   ☐ Average

5. Is there on going support and encouragement from school administrators for the successful operation of the plasma TV program?

☐ Yes ☐ No

6. To what extent are you involved on matters regarding plasma TV program operation?

☐ Very High ☐ Average

☐ High ☐ Low ☐ Very low

7. Is there technical support for the smooth operation of plasma TV program?

☐ Yes ☐ No

8. If your response to item 10 is yes, how do you rate its adequacy?

☐ Very high ☐ Average ☐ Low

☐ High ☐ Very low

9. How do you rate the appropriateness of equipment/plasma TV installation?

☐ Very high ☐ Average ☐ Low

☐ High ☐ Very low

10. Do you have a teachers guide?

☐ Yes ☐ No

11. Can you specifically mention some of the advantages of PTV?

_____

_____

_____

_____

12. Can you specifically mention some of the disadvantages of Plasma TV?

_____

_____

_____

_____

Appendix-IV

Interview Question for Teachers

1. How do you get teaching with plasma TV?
2. Why do some students prefer the plasma TV and why do others hate it?
3. Can you tell me the advantages and disadvantages of plasma TV?
4. How do you see the commitment and support of the school administrators regarding the program operation?
5. How do you see the utilization of equipments and management of program operation?

   For example: -Technical support/maintenance

   - Teacher training
   - Availability of equipments
     - Electricity /Generator
     - Spares parts and others
   - Coordination of program and staff
   - Schedule of the program? e.t.c

Appendix-V

Interview Questions for principals /Administers/

1. How do you see the teaching-Learning process through satellite TV?
2. How do students and teachers perceive and value satellite TV?
3. Why do some students and teachers prefer the plasma TV and why do others hate it?
4. What advantages and disadvantages do the plasma TV has for students and teachers?
5. What are the major problems so far encountered in the utilization of plasma TV?

   For example: Adequacy of equipment

   - No of students and plasma TV
   - Power supply /continuity
   - Spare parts
   - Teachers and students guide
   - Classroom atmosphere
     - -Installation
     - - Ventilation and safety
   - Program quality
     - -Sound and picture
   - Schedule
   - Co-ordination, e.t.c
6. How do you see the effectiveness of management in operating the program?

   For example: Availability of Administrative and technical support

   - Teachers training
   - Leadership and teachers commitment
   - Co-ordination of programme and staff ,e.t.c

Appendix-VI

Interview Questions for Students

1. How do you get learning from satellite TV?
2. How do you compare and contrast the plasma TV with the conventional face-to face instruction?
3. Why do some students prefer the plasma TV and why do others hate it?
4. How do your teachers perceive and value plasma TV?
5. How do you perceive plasma TV in relation to its time allotment, pace and program suitability?
6. Can you specifically mention some of the advantages and disadvantages of learning from plasma TV?

Appendix-VII

Observation Checklist

1. Name of the school: _____
2. Class observed _____ section ___Date _____Time_____
3. Observer _____

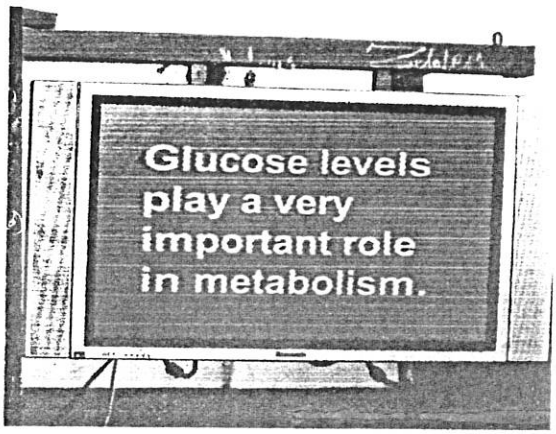
Direction: Indicate your response by putting a tick (✓) mark with respect to each statement in only one of the three alternatives indicated in the response column (i.e.3= excellent, 2= Acceptable, 1= unsatisfactory).

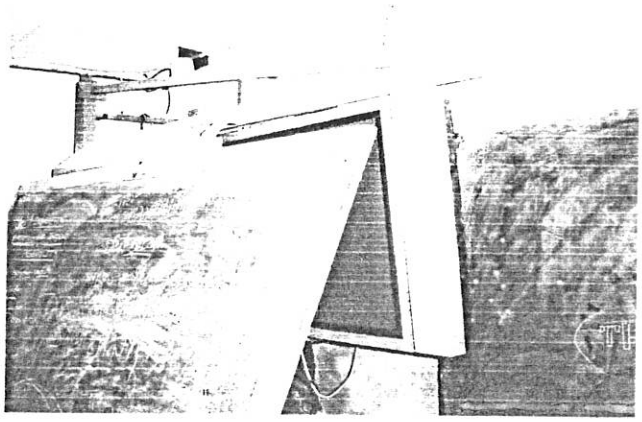
No	Observation Item	Rating Scales		
1	The visibility of the plasma TV to all students	3	2	1
2	The audibility of the plasma TV to all students			
3	The ventilation of the classroom			
4	The safety of the plasma TV			
5	The picture quality of the programe			
6	The sound quality of the programe			

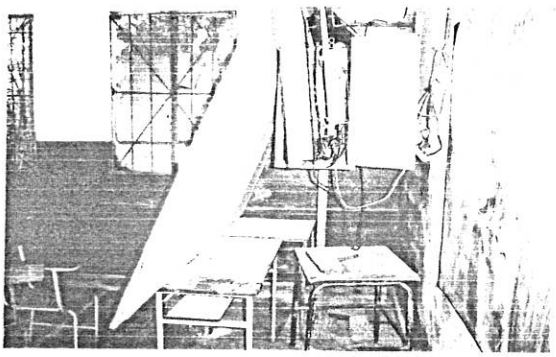
Appendix-VIII

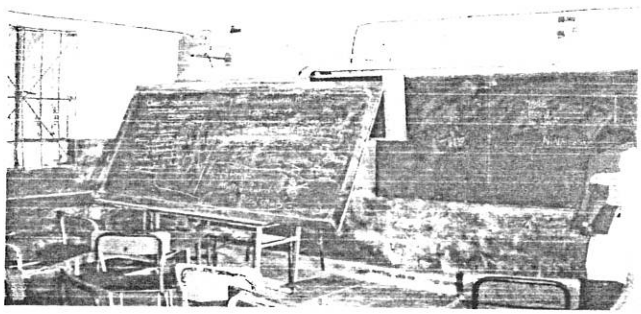
Plasma Television Utilization

HARAR TECHNICAL AND VOCATIONAL COLLEGE





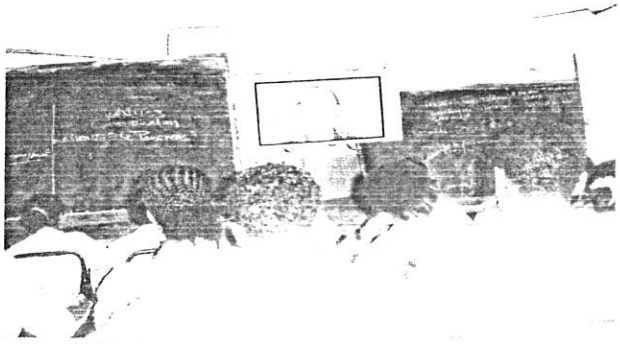


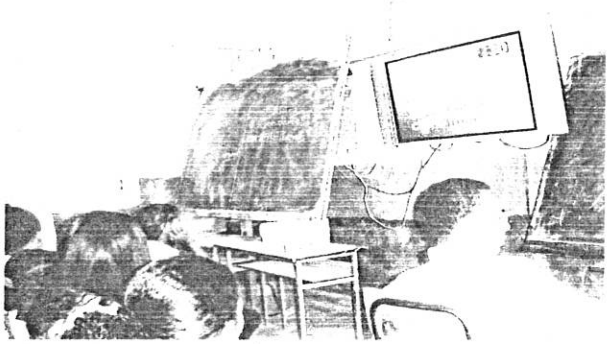


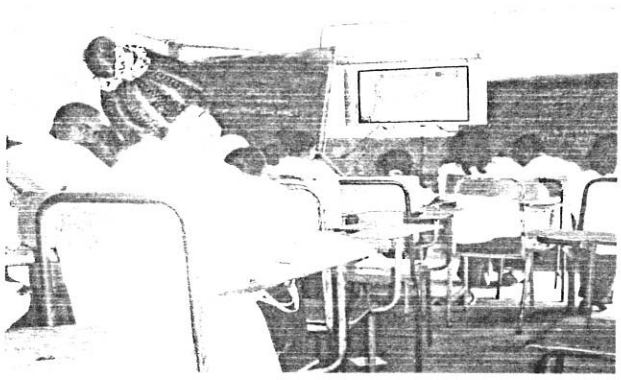
Appendix-IX

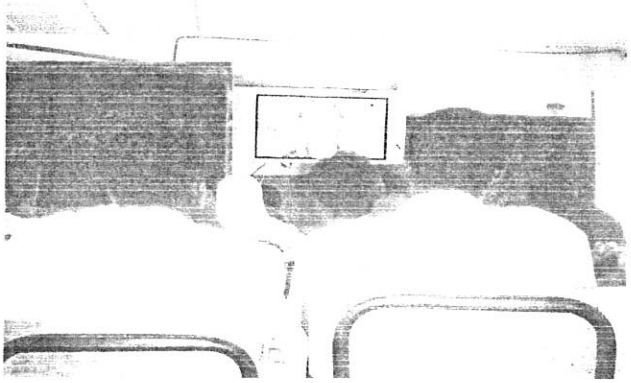
Teaching and Learning With Plasma TV

HARAR TECHNICAL AND VOCATIONAL COLLEGE









Appendix-X

በተማሪዎች የሚሞላ መጠይቅ

ውድ ተማሪዎች

የዚህ መጠይቅ አላማ በአዲሱ የቴሌቪዥን ትምህርት ተማሪዎች በፕላዝማ ቴሌቪዥን ትምህርት አሰጣጥ ላይ ያላቸውን አመለካከት ለመረዳትና የፕሮግራሙን አዎንታዊና አሉታዊ ገጽታዎችን በመለየት በግንቱ የመፍትሔ ሀሳብ ለመሻት ነው። የጥናቱን አስተማማኝነትና ትክክለኛነት የሚወስነው እናንተ ለእያንዳንዱ ጥያቄ በምትሰጡት ምላሽ በመሆኑ መመሪያዎችን በጥሞና በማንበብ ጥያቄች ትክክለኛ መልስ በመስጠት የበኩላችሁን አስተዋጾኦ እንድታደርጉ ከወዲሁ በትህትና እጠይቃለሁ።

በዚህም መሠረት

- በመጠይቁ በትኛወም ቦታ ላይ ስም መጻፍ አያስፈልግም።
- በመጠይቁ የምትሰጡት ምላሽ በሚስጢር ተጠብቆ ለጥናቱ ውጤት ብቻ የሚውል መሆኑን እየገለጽኩ ለምታደርጉልኝ ቀና ትብብር ሁሉ በቅድሚያ አመሰግናለሁ።

መመሪያ -1

ከዚህ በታች ለተጠቀሱት ጥያቄዎች አጠቃላይ መረጃ በተሰጠው ክፍት ቦታ ላይ አስፍር

1. የትምህርት ቤቱ ስም _____
2. የክፍል ደረጃ _____ ሴክሽን _____
3. ዕድሜ _____
4. እድሜ _____

መመሪያ -2

ከዚህ በታች በክፍል አንድ፣ ሁለት እና ሦስት ውስጥ የቀረቡትን ጥያቄዎች በጥሞና ካነበባችሁ በኃላ ለእያንዳንዱ ጥያቄ ፊት ለፊት ከቀረቡት ድርሻዎች መካከል ለእያንዳንዱ ጥያቄ የአንተን (የአንቺን) ስምምነት ደረጃ ይበልጥ ይገልጻል ብለህ/ብለሽ በምታምንበት/ኚበት ላይ የ(✓) ምልክት አስፍር/ሪ

ድርሻዎች:- 5 በጣም እስማማለሁ

4 እስማማለሁ

3 መወሰን አልችልም

2 አልስማማም

1 በጣም አልስማማም

ክፍል አንድ

ተ.ቁ	ዓረፍተ ነገር	በጣም እስማማለሁ	እስማማለሁ	መወሰን አልችልም	አልስማማም	በጣም አልስማማም
1	ፕላዝማ ቲቪ ጥራቱን የጠበቀ ብቁ ትምህርት ስለሚያስተላልፍ ጠቃሚ ነው					
2	በፕላዝማ ቲቪ መማር ተመሪውን ለበለጠ ውጤት ያደርሳል።					
3	ፕላዝማ ቲቪ መማር ጠቃሚ ነው ምክንያቱም የመማር ሂደትን ያቀላጥፋል።					
4	በፕላዝማ ቲቪ ነናር ተማሪውን ለበለጠ ውጤት ያደርሳል።					
5	ፕላዝማ ቲቪ ስለሚያስደስተኝ እወደዋለሁ					
6	ትምህርቴን በፕላዝማ ቲቪ መቀጠልን እመርጣለሁ					
7	በፕላዝማ ቲቪ መማር አስቸጋሪና ብዙ ጥረትን የሚጠይቅ ነው					
8	በፕላዝማ ቲቪ መማር ጠቃሚ ስላልሆነ አልወደውም					
9	በፕላዝማ ቲቪ መማር አሰልቺ ስለሆነ አልወደውም					
10	በፕላዝማ ቲቪ መማር ብዙ ችግሮች ስላሉበት ባጠቃላይ ቢወገድ ይሻላል።					
11	በፕላዝማ ቲቪ መማርን አልወድም ምክንያቱም የክፍል መምህሩ ከፕላዝማ ቲቪው የተሻለ ስለሆነ					
12	በፕላዝማ ቲቪ ስማር ምቾት አይሰማኝም።					

ክፍል ሁለት

ተ.ቁ	ዓረፍተ ነገር	በጣም እስማማለሁ	እስማማለሁ	መወሰን አልችልም	አልስማማም	በጣም አልስማማ
1	የፕላዝማ ትምህርት በብዛት በምስል የተደገፈ ስለሆነ ጠቃሚ ነው።					
2	የፕላዝማ ትምህርት ረቂቅና ውስብስብ የሆኑ ጽንሰ ሐሳቦችን ገልጽ በሆነ ምንገድ ያቀርባል					
3	የፕላዝማ ትምህርት ከክፍል ውጪና በቤተ-መከራ የሚሰሩ ውስብስብ ድርጊቶችን በቀላሉ ለተማሪው ስለሚያቀርብ ጠቃሚ ነው።					
4	የፕላዝማ ትምህርት የተፈለገውን ትምህርት በታቀደው ጊዜ መሠረት ለመሸፈን ይረዳል					
5	የፕላዝማ ትምህርት ሥርጭት የተለያዩ የሚስቡ ነገሮች ስላሉት ተማሪው በንቃት እንዲከታተል ያደርጋል።					
6	የፕላዝማ ትምህርት ብቁ የሆኑና ጥሩ ልምድ ያላቸውን መምህራን ለሁሉም ተማሪዎች ስለሚያቀርብ ጠቃሚ ነው።					

ክፍል ሦስት

ተ.ቁ	ዓረፍተ ነገር	በጣም እስማማለሁ	እስማማለሁ	መወሰን አልችልም	አልስማማም	በጣም አልስማማ
1	የፕላዝማ ትምህርት በጣም ፈጣን ስለሆነ ለመከታተል አስቸጋሪ ነው					
2	የፕላዝማ ትምህርት ተማሪዎች ስለትምህርቱ ማስታወሻዎችን እንዲይዙና የተለያ መልመጃዎችን እንዲሰሩ እድል አይሰጥም					
3	የፕላዝማ ትምህርት በድጋሚ ለመከታተልና ለመከለስ አይመችም					
4	የፕላዝማ ቲቪ ለክፍል መምህሩ በቂ ጊዜ አይሰትም					
5	የፕላዝማ ቲቪ ትምህርት የሚሰጡ መምህራን የተማሪዎችን ችግር አይረዱም።					
6	የፕላዝማ ቲቪ ትምህርት ተማሪውን በንቃት አያሳትፍም					

ክፍል አራት

መመሪያ 3

ከዚህ በታች ላሉት ጥያቄዎች በተሰጠው ባዶ ቦታ ላይ የራስህን/ሽን ምላሽ ሰም ስጥ/ጪ.

1. በፕላዝማ ቲቪ መማር ያሉትን አዎንታዊ ገጽታዎች ግለጽ/ጪ.

_____

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2. በፕላዝማ ቲቪ መማር ያሉትን አሉታዊ ገጽታዎች ግለጽ/ጪ.

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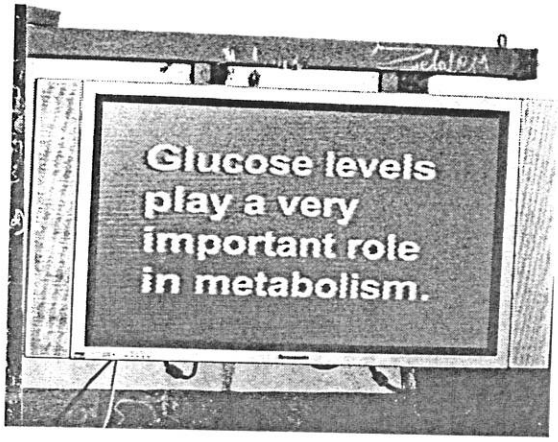
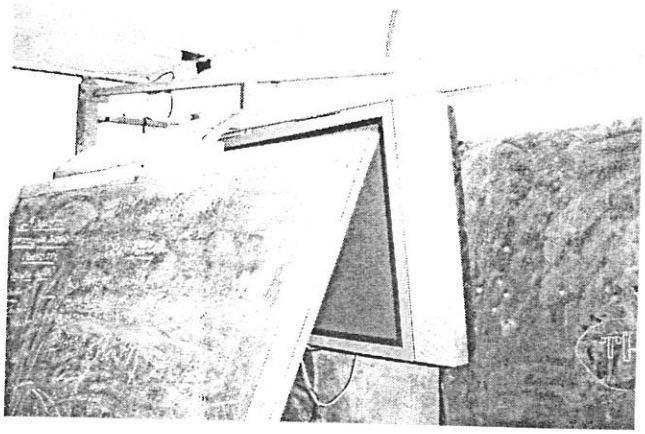
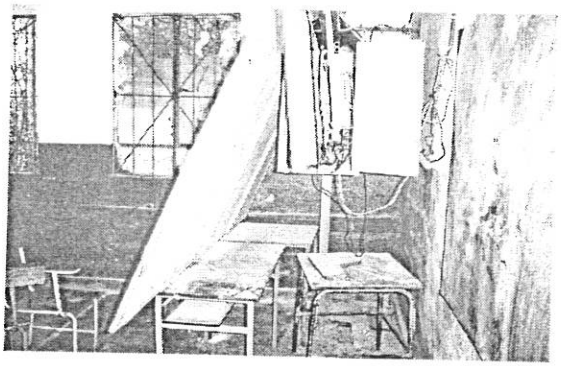
Appendix-VIII

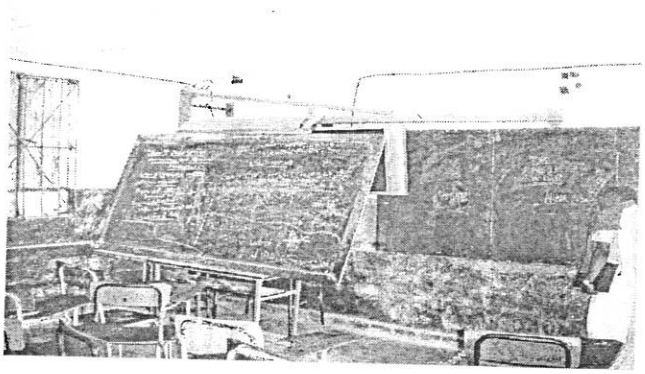
Plasma Television Utilization

HARAR TECHNICAL AND VOCATIONAL COLLEGE





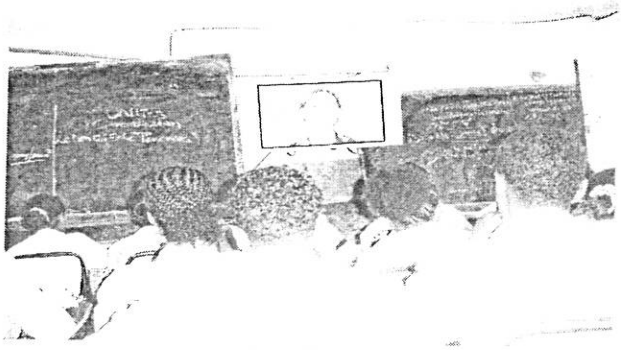


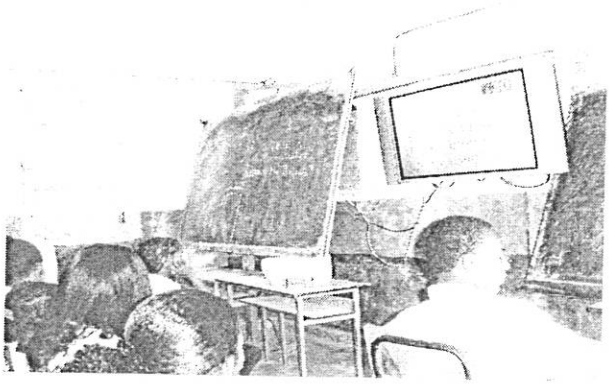


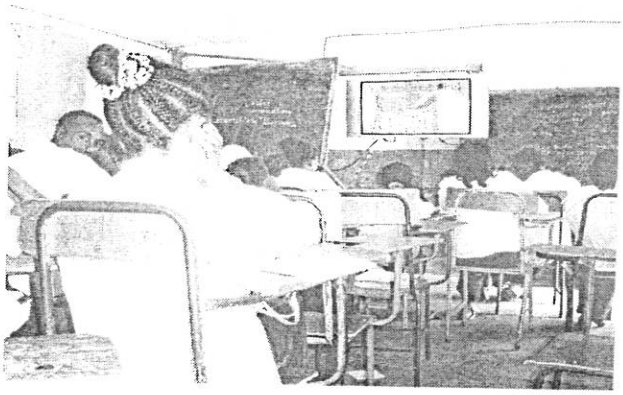
Appendix-IX

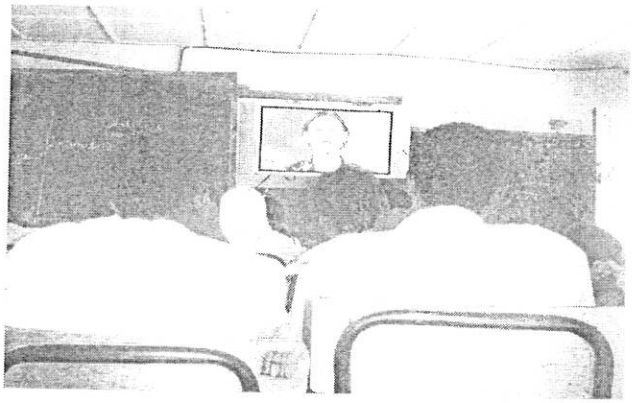
Teaching and Learning With Plasma TV

HARAR TECHNICAL AND VOCATIONAL COLLEGE





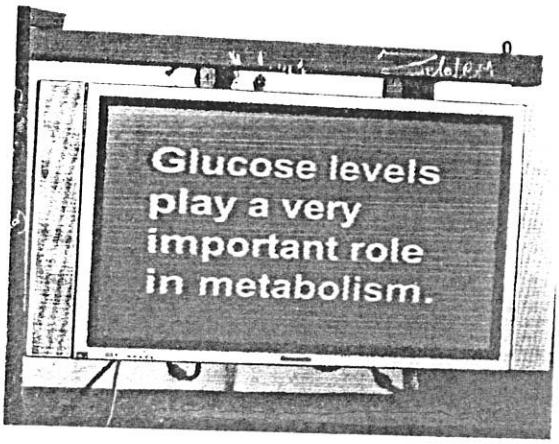


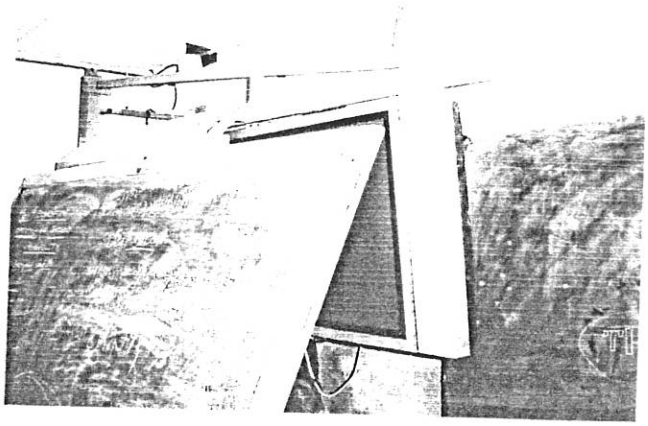


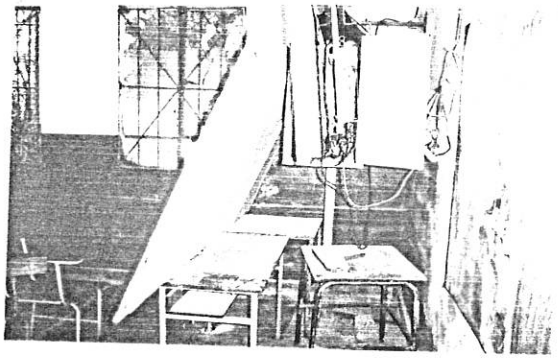
Appendix-VIII

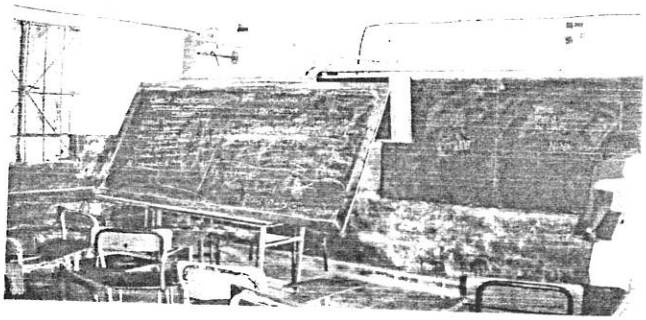
Plasma Television Utilization

HARAR TECHNICAL AND VOCATIONAL COLLEGE





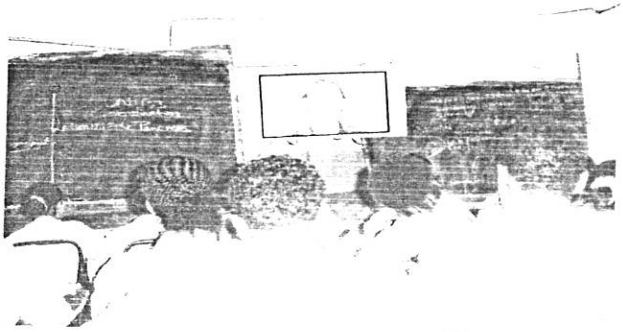


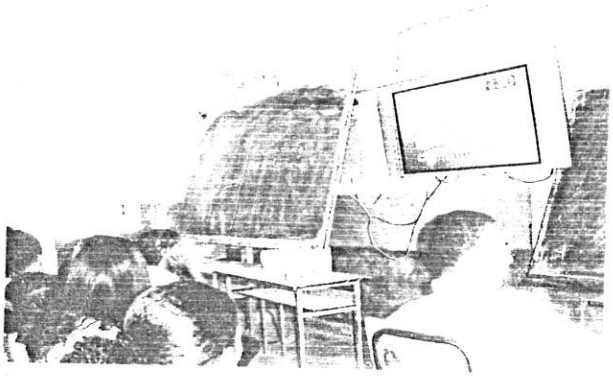


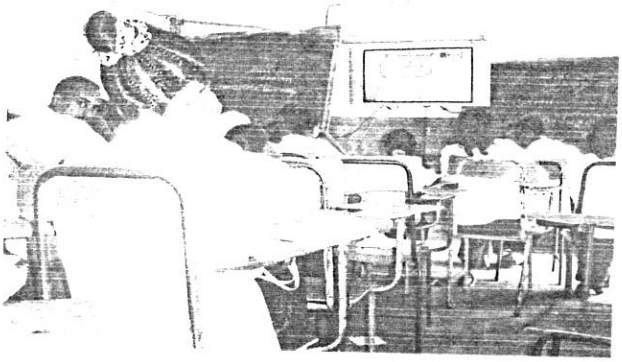
Appendix-IX

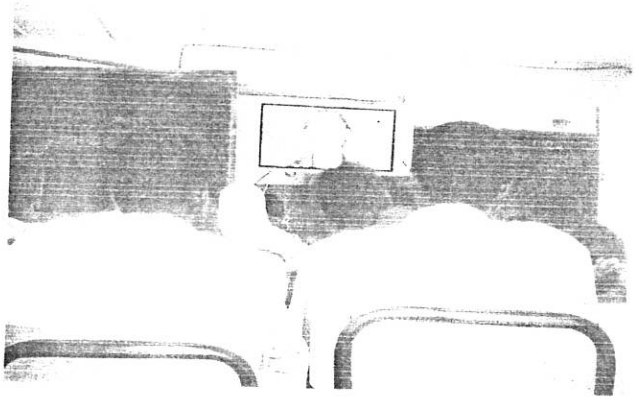
Teaching and Learning With Plasma TV

HARAR TECHNICAL AND VOCATIONAL COLLEGE





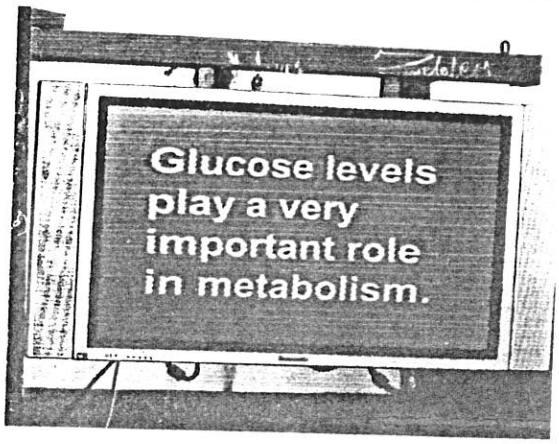


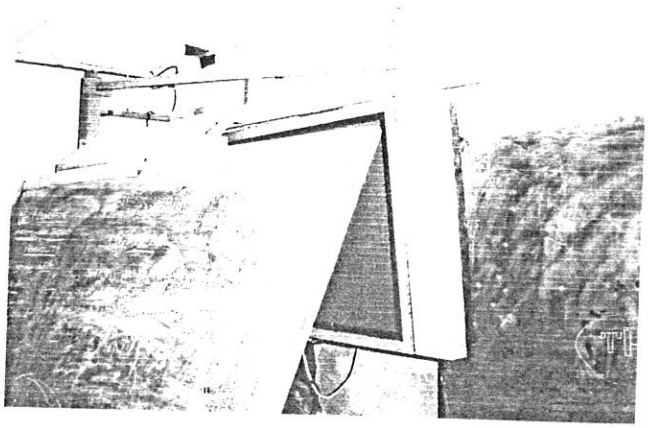


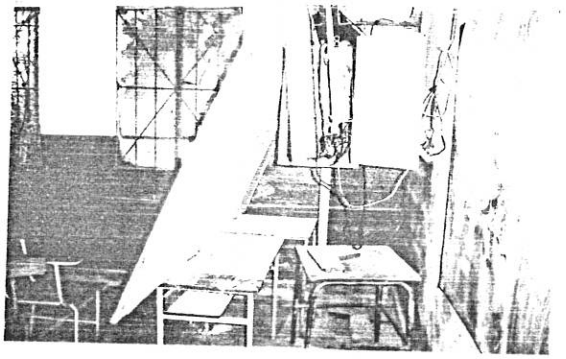
Appendix-VIII

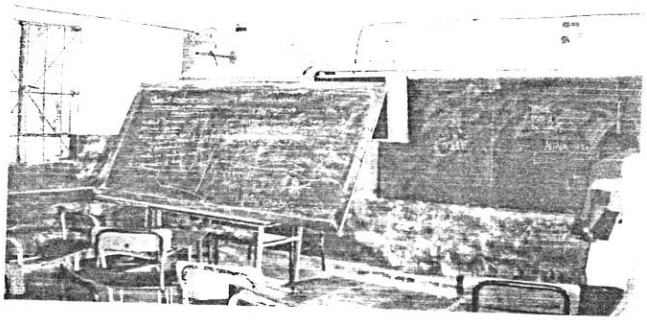
Plasma Television Utilization

HARAR TECHNICAL AND VOCATIONAL COLLEGE





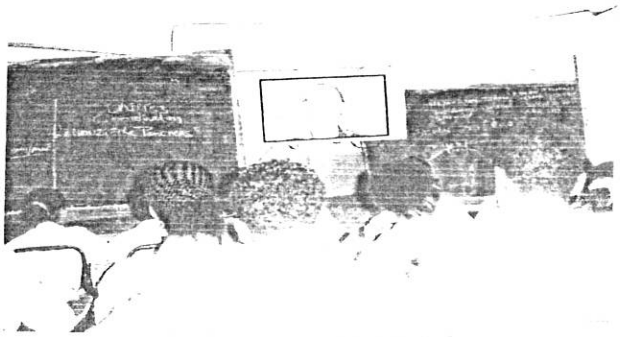


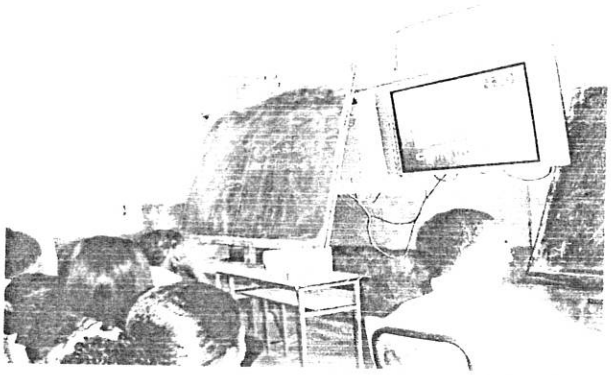


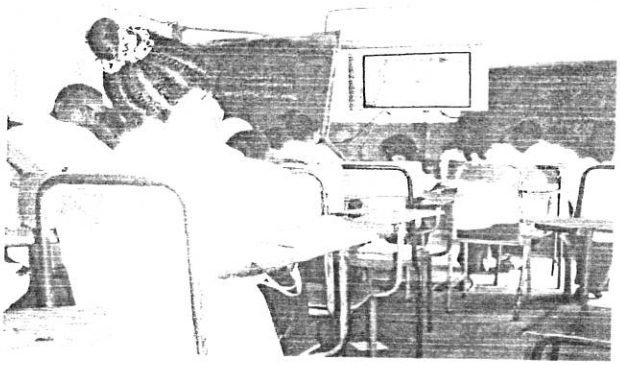
Appendix-IX

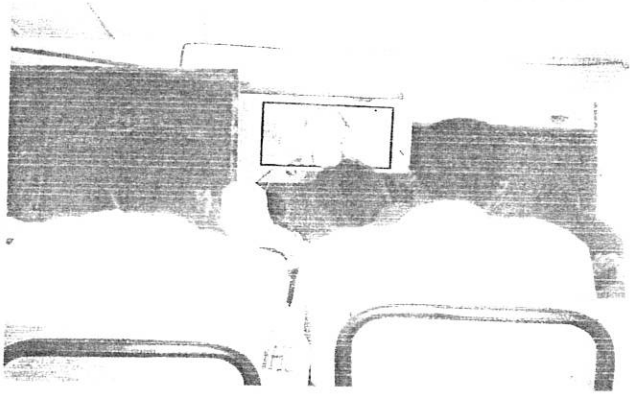
Teaching and Learning With Plasma TV

HARAR TECHNICAL AND VOCATIONAL COLLEGE









Declaration

This thesis is my original work and has not been presented for a degree in any other University and that all sources of material used for the thesis has been duly acknowledged.

Name: Fathe Mahdi

Signature: 

Date: 09/04/07