

ADDIS ABABA UNIVERSITY

COLLEGE OF EDUCATION (SCHOOL OF GRADUATE STUDIES)

**Teaching with and Learning from Electronic Media:
A Case Study on Satellite TV Instruction in Debre Berhan
General Secondary School**



Ali Yassin Ali

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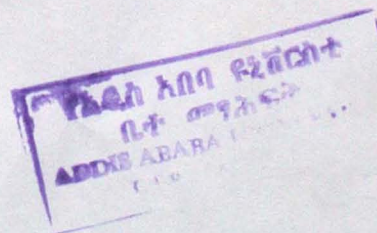
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Submitted for the Partial Fulfillment of the Requirements of Degree
of Masters of Art in Curriculum and Instruction

Ali Yassin Ali



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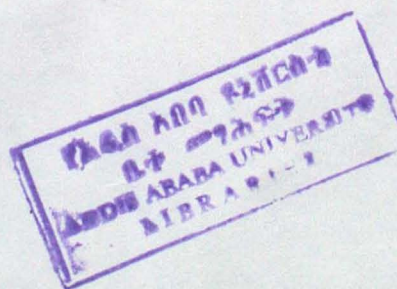
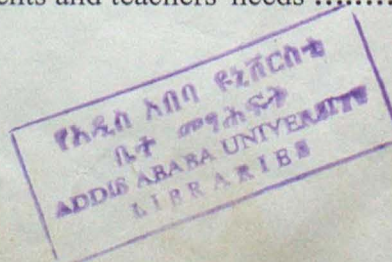


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Abstract

The principal purpose of this case study was to understand the teaching-learning process during the satellite TV instruction. The study further examined students and classroom teachers' roles during televised lessons. Problem areas about the use of the new communication technology were also addressed among other related issues. To achieve these objectives, data were collected from Debre Berhan General Secondary School from Grade Nine students and teachers through a duration of two-month participant-observation, in-depth interviews and related document analysis. The participants were purposely selected based on their roles, concerns, responsibilities and cooperativeness and other related qualities. Some thirteen participants (six students and seven teachers) were interviewed using open-ended and semi-structured questions in the conventional (informal) conversation style. As it is true for most qualitative case studies, the data were presented in narrative and vignette forms based on the participants' understanding and interpretations in addition to my own reflective analysis.

The findings revealed that the satellite TV instruction was predominantly suitable for information transmission. As any traditional schools, teaching appeared to be transmission of information while learning was considered to receive it. As a result, learning was segregated and important educational objectives like understanding, critical and creative thinking skills were barely addressed.

Both teachers and students were disengaged from the teaching-learning activities. Classroom teachers appeared to be de-skilled and de-professionalised in teaching since the planning as well as the execution of the pre-packed school curricula were done principally by the televised teachers.

Thus instead of running to teach all students the same thing at the same time in the same way by the same person(s) through the new communication technology, which is associated commonly with vested interests, context analyses should be conducted to meet the needs of students, the curricula and the society at large. It is not appropriate to homogenize what is actually different in many respects.

1. INTRODUCTION

Education is regarded as one of the major driving forces behind economic, social and cultural development. Savicevic (1998:19) states, "Whatever happens in schools is virtually the reflection of the development of the society since the school does not act in isolation nor is it an isolated social oasis". The major focus of education is on individuals because they are the principal assets of the society.

Nearly one hundred years has passed ever since the modern education was introduced into Ethiopia. However, we are still combating with poverty, disease and hunger. This implies that education particularly its western version by itself cannot solve the problems of under development in our country. Thus our education system has to be sensitive to the economic, social and cultural factors within the country (Amare, 1998). Owing to this fact, the Ethiopian government has launched the Education and Training Policy since 1994. Promising results are emerging with regard to educational access, equity, and relevance despite the fact that too much remains to be done. To ensure further improvements in areas of accessibility, equity, quality and relevance, different reforms are being done at the primary, secondary schools and teacher education systems.

As it is stipulated in the Education and Training Policy (1994:8), secondary school education has been given from grade 9 to grade 12 within two cycles. The first cycle encompasses Grades 9 and 10 as General Secondary Education. The second cycle ranges from Grade 11 to 12 as a preparatory stage for tertiary level.

After the completion of General Secondary School in Grade 10, students have been trained as middle level professionals in industrial technology, agriculture, business, construction and other related fields while other competent students join preparatory schools for colleges or universities. Our country has given special priority for education ever since the New Education and Training Policy has been launched in 1994. There were only 284 secondary schools in Ethiopia in 1991. During the on set of the Education and Training Policy in 1994, the number raised to 330. In 2003, the number of secondary schools raised to 595 as a result of the educational policy

initiatives. Regarding the number of students, it raised from 371, 000 in 1994 to 685, 545. This did not include 94,660 students in Grade 11, and 12 who were attending College Preparatory courses. This shows improvements quantitatively (Abyotawi Democracy, Hidar, 15, 1997).

Before ten years, the gross enrollment ratio was only 6.6 percent in Secondary School. The gross enrollment ratio has been raised to 22.1 percent in 2003. In terms of gender participation, the gross enrollment ratio for females was 5.7 percent in 1994 while it is raised to 15.9 percent in 2003. Out of 94,660 students in the preparatory programme, females cover 26.9 percent in 2003 (Abyotawi Democracy, Hidar 15, 1997).

The Education and Training Policy has also given special priority to technical and vocational training. Hence, the technical and vocational training institutions increased from 16 to 159. To furnish these institutions, the government allocated 300 million birr in 2001. As a result, more than 87,000 youngsters were trained in technical and vocational institutions in 2003/4 academic year only. Other than these technical and vocational trainees, 10, 972 first cycle primary school teachers (10+1) and 18,047 second cycle primary school teachers were trained in 10+3 programme (Abyotawi Democracy, Hidar 15, 1997). All these indicate that the government has given special attention to the expansion of education in Ethiopia.

At present new initiatives are being conducted in view of improving the "quality" of secondary school education through using information and communication technologies (ICT). Although "quality" is a relative term and difficult concept to define, educational quality may rest mainly on the nature of the teaching-learning process in the classroom. In fact, training and qualification of teachers, nature of school curricula, instructional technologies and facilities used, the motivation and attitude of students to learn, teachers level of commitment to the profession and many other related factors will determine the quality of learning (Bridges, 1998). Our education and training policy underpins problem solving and student-centred methods of teaching; however, our school tradition starting from the inception of modern education has been text-book and teacher centred based on transmission model of communication, which is top-down and one-way communication (Amare, 1998). This one-way communication in the words of Friere (1972) results in domination and has the effect of suppressing creativity.

*

Instructional media and technologies have been used in our education system for long. The Audio Visual centre was established in 1953 E.C. The use of electronic media and technologies like educational television and radio were launched in 1957 E.C in view of improving the accessibility and quality of education. The Education and Training Policy (1994:27) also states, "In order to promote the quality, relevance and expansion of education, due attention will be given to the supply, distribution and utilization of educational material, educational technology and facilities." UNESCO (2000:10) further posits, "All governments aim to provide the most comprehensive education possible for their citizens within the constraints of available finance. Because of the pivotal position of ICT in modern societies, its introduction into secondary school will be high on any political agenda." One of the aims of UNESCO is to ensure that all countries both developed and developing have access to the best education and develop ICT necessary to prepare young people to play full roles in "modern" society and to contribute to a knowledge-based nation.

UNESCO (2002) further asserts that educational systems around the world are under increasing pressure to use the new information and communication technologies to teach students the knowledge and skills they need in the 21st century. As a result, the Educational Media Agency (EMA) has launched teaching with ICT (Satellite TV instruction) in 1997 E.C for both General Secondary and College Preparatory Schools (Grades 9-12) under the auspices of the Ministry of Education (MOE). The educational transmission comes from South Africa for six core subject areas, which include English, math, biology, physics, chemistry, and civics and ethical education (Ethiopia Today, 2004). According to the General Manager of EMA, more than 8,800 plasma television sets were distributed up to October 3rd 2004. How did teachers and students find the teaching-learning process during televised situations? Why learning from satellite TV? Did learning from electronic media such as the presently launched satellite TV instruction in our secondary schools match or mismatch with learning for understanding and critical thinking? These and other related issues have been addressed in my study.

1.1 Purpose of the Study

The importance of education for economic and social development of a nation is unquestionable nowadays. Overall development can be achieved if we value our cultural heritages in our schools, as it is true in the larger community. In other words, we should look for mechanisms that enable us to bring development from within ourselves instead of alien ones. Indeed, we know that science and technology, which is the culture of the western world, is not dominantly our culture. However, we can wisely use science and technology as enrichment if we are meticulous in reconciling the domestic culture with the foreign cultural strands (Amare 1998). Who are the people responsible for paving the way to bring development from within our culture? Which institutions are primarily involved for such purposes? Definitely, the people are the educated elites and the community at large and the institutions are educational organizations such as schools. Do our schools work towards enculturation (learning our cultures) or acculturation (learning other cultures)? Of course, I understand that schools are not isolated from the larger community in the world. The so-called globalization seems to be happening at least through geographical proximity due to the invention of electronics systems for exchanging information. Information and communication technologies are influencing the new global economy and producing "changes" in society. Within the past decade, the new ICT tools have influenced the way people communicate and do business. They also have the potential to influence the nature of education – where and how learning takes place – and the role of students and teachers in the learning process (UNESCO, 2002).

In view of improving the educational accessibility and quality, MOE has launched the use of electronic media and technology through what is called Plasma Television for the purpose of educational transmission for secondary schools (Grades 9_12). Why is satellite TV instruction selected over other educational media and technologies? UNESCO (2002:25) asserts that ways in which teachers and students interact and how the school is managed for learning are part of what is meant by "a school's philosophy of learning." These philosophies will necessarily characterise the ways in which ICT is incorporated into a school. A setting that is dominated by the teacher as the main provider of subject content is adopting a teacher-centred philosophy. The teacher controls the case of ICT in such a setting as well. A learner-centred philosophy, by contrast,

desires a setting where content comes from a variety of sources and where projects are chosen and designed by the students. In any case, many educators expound that a complete learning model cannot be achieved through a means that reduces learning to the reference points of its designers due to the fact that such practices enforce learners to focus on knowledge reproduction but not knowledge creation or production. How is the teaching learning process going on in our high schools ever since the new electronic media have been introduced? Are these communication technologies improving the pedagogical skills of schoolteachers in such a way that learners become active instead of passive for their own learning?

I have had an experience regarding the education value of electronic media from Ethiopian Television and FM Addis 97.1 radio particularly from the "General Knowledge" programmes in which people compete to answer questions. The usual questions asked were related to "What", "When", "Who" and "Where". No questions were asked related to "How", "Why" and "What will happen if ...". In other words, the focus of our electronic media broadcast is memorization and information duplication without addressing critical and creative thinking skills and understanding. I have also observed that the time given to answer the question on ETV is only 20 second. How can thoughtfulness be expressed within such short period of time? In short the focus of the electronic media is on information transmission. I am afraid whether such poor ways of setting tasks are intensified by the newly launched plasma TV programmes in our schools.

The quantity of information available in the world is very huge. UNESCO (2002) reports that the new knowledge-based society is one in which the world's knowledge base doubles every 2-3 years; 7,000 scientific and technical articles are published each day; data sent from satellites orbiting the earth transmit enough data to fill 19 million volumes every two weeks. How can our education system help young people in schools to cope up with such changing and challenging situations? What type of pedagogical skills is needed to help students' manage such situations? I recognize that pedagogy, but not business-oriented technologies, should lead our school systems. After all, technologies are the products of the human mind and thus the machines cannot lead the human mind. Otherwise, the proverb, "The cart is before the horse," will come true.

Many teachers acknowledge that audiovisual materials have the capacity to enhance teaching and learning. This idea has such wide currency that many practitioners enquire no further and simply assume that any audiovisual component is of benefit (Jaworski, 1994). Jaworski further expounds that in practice, however, there are many ill-conceived and ineffective uses of what is inevitably expensive technology.

Most practitioners agree that constructive uses of audiovisual technology in education result from sympathetic consideration of the characteristics of the learner and of the content. Regarding the characteristics of the learner, there is a temptation to see audiovisual materials as solving problems for the teacher. However, it is true that the most effective uses of such material occur when the learner perceives the introduction of a new technology solves a learning problem (Jaworski, 1994). How do our high school students perceive the introduction of satellite TV instruction? How about teachers?

Educators suggest that audiovisual material is most successful when:

- The learner perceives the value that is being added by the use of the material;
- The material is well-integrated with the surrounding teaching, and
- Care is taken in production of the material to consider the pace of the students' learning.

Regarding the content, Jaworski (1994) posits that with both audio and visual media available, it is important to make the correct selection of the medium to suit the content.

Many studies were conducted in our country related to educational technologies or instructional media mainly as a course requirement for Masters Degrees in Ethiopia. Most of the studies were done specifically on instructional radios (e.g. Teferra, 2001; Kahsay, 1998; and Abere, 2004); computers in schools (e.g. Desalegn, 2004); IT syllabus implementation, (e.g. Abate, 2004); preparation and utilization of instructional materials (e.g. Abraham, 2001; Betsate, 2000), etc.

Almost all of these studies focus on technical application of the educational technologies without addressing the issues of "why" as such. Most of the new information technologies seem to be accepted for granted. Consequently, most of the findings revealed that:

- Teachers do not have adequate qualification or training (in IT, computers or instructional media preparation and utilization);
- Teachers do not use media even when they are available;
- There is shortage of instructional media in schools;
- There is lack of financial support;
- There is shortage of time and support for classroom teachers;
- There is lack of radio supply and power supply;
- There is failure in coordinating efforts among stakeholders in instructional media, etc.

Most of these findings were obtained through the traditional quantitative research methods using questionnaires and checklists as dominant data-gathering tools. Hence, I have found the studies on information technology and educational technology mainly less deeply analyzed and they were not more critical. The dominant emphasis is on more being inherently better and questions about the relationship of the technology to teaching and learning _the sort of questions, which educationalists have traditionally asked about educational innovations – have not featured prominently on the agenda. Rather, problems and limitations have been played down in the emphasis on technological hard and software (Beynon and Mackay, 1988).

Beynon and Mackay (1988:245) further expound that even more than educational technology, “IT in education is seen as a panacea.” The vast bulk of the literature on IT in education, I shall argue, is prescriptive, uncritical and “techno-romantic” in the words of Beynon and Mackay (1988:245). By “techno-romantic” they meant “the inclination of those involved with new technology to see into the future with blinkers which exclude both those aspects of education which are successful without microcomputers and also the potential pitfalls of new technology.”

I have found out one of the indigenous critical educational research conducted by Amare (1998) on “A Habit of Learning with the Least Effort: Television Method of Learning.” Usually, however, educational research on IT has hardly started to investigate what is happening in the classroom and it lacks a critical dimension. Therefore, there is a need for a paradigmatic shift from its narrow technical emphasis.

In this regard, the purposes of this case study are:

1. To understand the teaching-learning process in a school where satellite TV instruction is used;
2. To explore the nature of communication within a televised-classroom scenario;
3. To understand the roles of teachers during the satellite TV instruction;
4. To address problem areas of using the new communication technologies;
5. To engage with debates about the nature of education in the "electronic-age" in our country, and
6. To share experiences with other people regarding the nature of learning from television through documenting findings.

In this regard, the leading questions of this study include:

1. How is the teaching-learning process going on during televised instruction?
2. Why learning from the plasma TV?
3. How do teachers and students conceive satellite TV instruction, and how do they behave during the transmission?
4. What are the major constraints of the new communication technology, if any, and why do the problems appear?

1.2 Issues to Be Addressed During the Study

Since I was interested in conducting qualitative case study, I have addressed the following major issues during the research process.

1. Nature of the teaching-learning process in the televised lessons;
2. Teachers' and students' understanding about the use of the plasma TV and their roles during the transmission, and
3. Nature of the transmission lessons and the school curricula.

1.3 Theoretical Framework

I have adapted the theoretical assumptions listed below in the overall research design of this qualitative case study.

- Each individual has a unique system for perceiving and organizing phenomena in the material world;
- Meaning is constructed through social interaction;
- Individuals act on the basis of meanings they perceive;
- Meanings change in the course of interaction because of different perceptions held by participants involved. Thus reality is not a priori given, it is based upon interpretations and it is constructed during interaction between and among individual participants. Reality is not fixed but changes according to the people involved and the context. Knowledge originates from shared understanding, negotiation, and historical and social contexts. Hence, this qualitative case study has been more descriptive than predicative, more inductive than deductive, more subjective than objective, more generative than verificative and more constructive than enumerative (LeCompte and Preissle, 1993).

1.4 Significance of the Study

Any educational research is carried on to meet certain values one way or another. Similarly, I hope this study would contribute:

1. To communicate with curricular experts, education technology designers and other educational bodies at various levels how students' learning is affected by satellite TV instruction so that they can take measures to alleviate the problem areas, if any;
2. To create awareness among elites and the community about the ill-effects of relaying on the so-called modern communication technologies so that our people can treat foreign cultural strands with care;
3. To serve as a base for the research community interested in conducting a particular investigation on the topic since this qualitative research addresses many issues from holistic perspectives.

2. DOCUMENTARY EVIDENCES

I have discussed under this section evidences from various literature related to educational technology; communication theories and research evidences from proponents and critics of electronic media (television).

2.1 Relevance of Educational Technology to Developing Countries

2.1.1 Definition of education technology

Technological innovations enhance performance in all sectors of economic and social activities. Educational technology has also developed over the last three decades ultimately affecting the quality (efficiency) of education, learning, educational management, and research. However, technology is perceived in diverse ways by authors and users (Yapi, 1997 in UNESCO, 1997). Particularly, the general public especially that of the developing countries with a less advanced research culture base knows nothing other than technology as a product on account of the myriad advertising campaigns mounted to that effect.

Non-specialist educationalists generally consider educational technology as the use of microcomputer and audiovisual equipment in particular. Rheame (1993) in Yapi (1997) posits that to certain teachers the term "educational technology" refers to materials or equipment. But Thomas and Kobayashi (1987) in Yapi (1997) maintain that educational technology is a complex integrated process whereby problems connected with all aspects of learning are conceptualised, analysed, established and resolved through interaction between people, techniques, ideas and resources within an organizational framework. Let us now consider what is meant by technology as a product and technology as a process.

2.1.2. Technology as a product

Yapi in UNESCO (1997) expounds that technology as a product is the end result of the systematic application of scientific knowledge in finding practical solutions to specific problems.

As a product, educational technology can include teaching procedures, practices and materials. Consequently, the inputs from technological development comprise, non-physical products (programmed learning, individualized learning, computer assisted education and the like). They also include physical products such as computers, videocassette recorders, radio and television sets, tape recorders, overhead projectors, etc. Some authors add to the list things like pencils, papers, books, newspapers, and films.

2.1.3. Technology as a process

Viewed from the angle of process dynamics, educational technology is an approach geared towards finding and improving solutions. So it should not be associated with products of such technology. It, therefore, includes functions connected with the management of organizations and human resources, research, rational methods and practices related to the techniques of education and learning, logistics, the use and establishment of systems. In other words educational technology is:

- (1) Systematic: in the sense that it uses a rationalized and structured techniques as opposed to activities organized haphazardly or without proper management.
- (2) Communicative – due to the fact that any medium used is oriented towards the objectives of the educational design to guarantee the efficiency, economy and enhanced output of the selected model.
- (3) Scientific_ since it is based on the most proven results of the learning process and,
- (4) Systemic, because it allows for the constant analysis of the problem of learning in its entirety (Yapi, 1997 in UNESCO, 1997).

With respect to methodology Stolovitch and LaRocque (1988) in Yapi (1997) consider the systemic approach as a process connected with the planning and operation of a system as identified and analysed. The main concepts of this approach are:

- The phenomenon of self-regulation or feedback
- The control unit which takes account of information, and
- The energy required operating the system and facilitating its adaptation to the surrounding environment.

Consequently, any inappropriate interaction between the control unit and the feedback mechanism or any inconvenient readjustment deregulates and disintegrates the system. Moreover, educational technology requires three operational phases to establish a given system: analysis, design and evaluation (Yapi, 1997 in UNESCO, 1997).

1. The analytic phase precedes the model design phase and comprises seven stages of which five cover the analysis itself (preliminary analysis, target clientele analysis, contextual analysis) while two cover summary operations.

(a) The preliminary analysis covers the phase during which the technologists determine the difference between the real needs of the target clientele in relation to the knowledge acquired and the knowledge to be acquired.

(b) In studying the target audience, the technologist tries to acquaint himself/ herself with the learner through his/her aptitudes and features that are most likely to interact with the other components of the model.

(c). In the contextual analysis phase, the technologist identifies not only the contextual and environmental conditions underscoring the educational situation he/she also presents a better enlightenment through the data collected to examine the manner in which the model to be designed is harmonized correctly and naturally.

(d) The job analysis enables the technologist to make an in-depth study of instructional information to be imparted to the learner.

(e) The concept analysis consists of examining the content so as to identify the underlying concepts.

(f) The preparation of a summary programme, plan of action and results of all the analyses conducted previously;

(g) Where it is intended for a course or training session, before preparing the appraisal report, the technologist should systematically prepare in a graphic form, a list of all the principal activities to be accomplished together with the duration, site and the agent involved.

2. During the design phase, the technologist specifies the objectives of learning, prepares criteria tests, determines the teaching method, strategy and framework, selects the media and system of presentation, prepares a draft design, determines the set-up and production plan of the prototype.

3. The evaluation phase: The design phase precedes the design, evaluation, set-up and monitoring phase during which the possible anomalies are detected and necessary corrections are made before the system is put into operation. It is because, to prevent potential failures, the technologist should check his/her prototype with the help of experts, learners and colleagues and make possible adjustments before the final product is adopted, distributed and set-up (Yapi 1997 in UNESCO, 1997). To ensure the smooth execution of this phase, all the preceding phases have to be implemented.

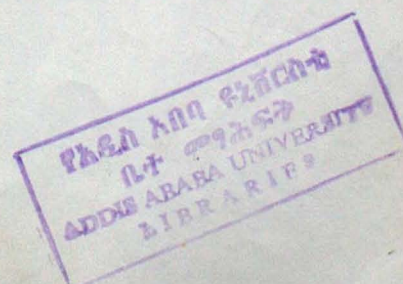
2.2 New Information Technologies in Education

The whole purpose of an education system is efficient communication through the instructional subsystems, that is the transmission and transformation of information, knowledge, skills, values, and attitudes through bridging the gap between generations of learners.

Nwaboku in UNESCO (1997) posits that technology is a factor, which has constantly changed the future of societies in usually unforeseen directions. It is the single factor whose advancement makes the difference in development for all the nations in the world. Recent development in technology (e.g. computer) has set the pace of development at "fast forward" in all spheres. The educational sector is, therefore, in danger of losing contact with world realities in the very near future in Africa. Nwaboku (1997) further states that the rate of advances in computer technology and the transformation it brings in its wake for communication and "work" cannot be ignored by the educational sector for two reasons: education involves and depends on communication systems and education prepares the future society for a world of work.

2.2.1 Why use information technologies in teaching?

The introduction and use of information technologies in teaching in the schools would serve a dual purpose; for the purpose of acculturation and for more efficient instruction (Nwaboku, 1997 in UNESCO 1997). For acculturation purposes, a learner who is being prepared for technologically oriented world needs to be immersed in technology early. Technology is a new world culture and like all cultures it is best acquired in early life. This would ensure that schools do not produce technologically maladjusted adults. By employing the information technologies (new or old), the school would be facing up to new facts of life that the learners would be



functioning in a technologically dependent society. The use of the new information technologies has become inevitable for survival.

Technology is about "machines". Machines make most works easier and achieve more work in less time. It can, therefore, be expected that employing technology in teaching would introduce better efficiency in the instructional system. This is achieved in many 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 learner by making learning easier, more interesting and challenging
- Provides the teacher with more reflective time for improving instruction.
- Makes record keeping and evaluation easier.

In general terms, the introduction of new technologies in education would provide education with more productive learning systems, ensuring equal opportunities for learners. Technology itself has generated new information at an exponential rate and it is only through technology that the tremendous amount of available information can be harnessed and accessed in learning (Nwaboku, 1997, in UNESCO, 1997).

2.2.2 Introduction of the new information techniques into the school system in Africa

Taylor (1995) and Nwaboku (1997) contend that in the school system, the computer can serve as a subject, as media and as a tool for creative work. As a subject, the pupil learns about computers. This is computer literacy. The argument for computer literacy is that in the future the inability to use computers would be as limiting as the inability to read and write. It has therefore become important at this age to learn the basic uses of computers, to learn to use different computer software and to learn to develop computer software for various purposes.

As media, the computer is used for teaching and learning like computer-assisted instruction. The knowledge of computers and programmed instruction are used to produce computer programmes that teach. It becomes possible to tailor instruction to individual needs. Learners can advance at

their own pace, or use the programmes at school or their homes. Teachers can utilize packed lessons or produce their own courseware.

As a tool for creative work, the learner uses the computer to advance her/his ideas, typing out new methods or projects and experimenting with and creating concepts. In this format, to use the computer also serves as a problem-solving tool, calculating, manipulating and analyzing data.

In the Sub-Saharan Africa formal school systems, these three applications of computers are yet to gain much ground. But computer schools are being introduced in countries like Nigeria and Senegal. A major constraint in the introduction of computer programmes into the school systems is financial limitations. It is already claimed that a high proportion of any nation's budget goes to education. The older technologies of learning have not been employed much in our public school systems. It would therefore seem presumptions to expect that computers can be provided in schools. One might just consider closing all discussions on this subject but the problem is that, like all other problems facing our educational systems today there is no longer much choice in the matter. If the educational systems do not advance at the same pace as developments in all other socio-economic sectors, education in the region will become irrelevant to the societal needs (Nwaboku, 1997 in UNESCO, 1997).

Countries in the Africa region should consolidate on the technologies already introduced in their educational systems. Studies have shown that educational radio and educational television have been used in almost all the countries in the developing world as a means of reaching remote learners and cutting the cost of education. Any measure to reduce the cost of education should be supported and exploited fully. Unfortunately, most of these technological innovations have not been sustained. Reasons for the breakdown of the systems are largely related to technical know-how in both utilization and maintenance. Most of these technologies were established through external aids, which provided the initial technical support. It is necessary to precede the installation of technology with provision of local experts. In other words, what the African continent needs most as precondition for a technological take-off in education and other social sectors are seasoned indigenous specialists. Unfortunately, while other sectors of the economy

make effort to provide these, educational sector is contended with ad hoc training programmes and half-baked specialists or no specialists at all (Nwaboku, 1997 in UNESCO, 1997).

2.2.3 Old and new technologies

In the past two decades, there has been a significant expansion in the availability of a wide range of technologies with the potential to improve the quality of teaching and learning. Apart from the more traditional technologies such as print, broadcast television and radio, the following new technologies provide opportunities for enhancing the quality of teaching: audio tapes, videotapes, computer-based learning packages, interactive video, audio-teleconferencing, audio graphic communication systems and video conferencing. In recent times, these technologies have been supplemented by the advent of the opportunities for interactivity and access to instructional resources provided by the computer communications networks popularly referred to as the "Internet".

Delivery technologies simply package information to give students access to educational experiences. The problem is the quality of the instructional messages rather than the inherent characteristics of the instructional medium used. Clark (1983:445) points out that educational technologies are "mere vehicles that deliver instruction but do not influence students' achievement any more than the truck that delivers our groceries causes changes in our nutrition." Taylor (1995) extends this view by taking the position that a teacher can be surrounded by a team of audiovisual technicians, graphic artists and computing specialists to vary the style of the delivery of the educational messages without producing a significant increase in pedagogical efficiency. The key process for improving the quality of teaching and learning is instructional design, which has received a significant boost from recent advances in instructional science, cognitive science and artificial intelligence, particularly expert systems. The process of instructional design entails a systematic fine-grained analysis of the knowledge base and associated cognitive skill that provide the foundation of professional expertise in a particular discipline. This approach entails the application of such techniques as cognitive task analysis, concept mapping and knowledge engineering (Nwaboku, 1997 in UNESCO, 1997).

Okebukola in UNESCO (1997) classifies all sorts of technologies into four: first, second, third and fourth generation technology. First generation technology is also called the pre-computer age model. This includes print and board; it is characterized by being flexible in time, place and pace but not interactive.

Second generation technology is also called the multimedia model. It includes print, board, audiotape, videotape, computer based learning and interactive video. This model is characterised by being flexible in terms of time, place, and pace. However, it is not interactive except computer based learning and interactive video.

Third generation technology is also called the telelearning model. This includes audio teleconferencing, videoconferencing, audio graphic communications, broadcast TV or radio. These are characterized by being inflexible in time, place and pace but interactive.

Fourth generation technology is also called the flexible learning model. This includes interactive multimedia, and computer mediated communication (e.g. E-mail). These are characterized by being flexible in terms of time, place, and pace and interactivity.

Okebukola (1997) contends that the flexible access technologies allow the student to turn the teacher on or off at will, as lifestyle and time permit. Such flexibility has the pedagogic benefit of allowing students to progress at their own paces. While this trend towards "technology-mediated" flexible learning is inexorable in a variety of education and training contexts, it is crucial that the use of a range of instructional media does not automatically enhance the quality of teaching and learning.

2.3 Communication Theories

2.3.1 The transmission - belt theory

Traditional communication theories (Bruke, 1945, Lasswell, 1948; Shannon and Weaver, 1949 in Amare, 1998) have always defined communication as "acts of transmission" of information, ideas and attitudes. They formulated models that reveal a linear-flow process. The audience was assumed to receive communication messages provided that a high-fidelity source encodes these

messages (Amare, 1998). For many decades the "Bullet Effect" theory dominated theorization of communication. The audience was assumed as easy target of the fidelity message. In this theory, intellectual people who were orators were selected to dominate others. Thus the focus of this theory was on transmission of information but not meaning. Amare, (1998:40) posits, "Under such assumptions the major concern became the creation of high fidelity sources and high fidelity messages in order to gear communications to target audiences."

2.3.2 Two-way communication

The two-way communication theory asserts that both the sender and receiver of information have got roles for communication to take place. This model was highly advocated by Friere (1972), and political critics of the mass media (UNESCO, 1980 in Amare, 1998). They believe that communication is naturally two-way. Hence people have the right not only to receive information but also to impart it. They argued for a participatory and democratic communication systems based on dialogue or negotiation between the two parties.

2.3.3 Theory of audience-determinism

As opposed to the information transmission theory, further studies (Berelson, Lazarsfeld and McPhee, 1954; Klapper, 1960, in Amare, 1998), find that the audience of communications has resistance to the information they receive due to their "powers" in determining communication effects. Amare (1998) expounds that such audience "powers" arise out of the active functioning of what are called "selective processes", selective perception and selective retention. Amare suggests that selective exposure or selective attention refers to the tendency of people to expose themselves to communications in accord with their existing interests, wants, and needs, opinions and values and thereby avoiding unsympathetic issues. As cited in Amare (1998), Cannell and Mac Donald (1956) discover that in a study on health, including those dealing with the possible relationship between smoking and cancer, the articles were constantly read by 60 percent of the non-smoking males among a probability sample of adults, but the same article was read only by 32 percent of the male smokers, to whom the material presented more of a threat.

Schramm and Carter (1959), in Amare (1998), also find out that Republicans were about twice as likely as were Democrats to have watched a Republican sponsored campaign telecast.



Amare further expounds the selective perception is the tendency to interpret communication messages on the criteria of interest, individual experiences, moods and purposes. Cannel and Mac Donald (1956) in Amare (1998) asked 228 adults whether newspaper and magazine reports had convinced them that smoking was a cause of cancer. The relationship was perceived by 54 percent of the non-smokers but by only 28 percent of the smokers for whom it presumably constituted a considerable threat. Selective retention refers to the tendency for recall of information to be influenced by wants needs, attitudes, and other psychological factors (Amare, 1998).

Many studies (Hyman and Sheatselcy, 1947; Sealman, 1941, Zimmerman and Bauer 1956 in Amare, 1998) have demonstrated audience selectivity in retention. Amare mentions a study where Levine and Murphy (1948) presented both a pro-communist and anti-communist prose passages to five Pro-communist and five anti-communist college students. After a while, the subjects were asked to reproduce the passage as accurately as possible and the whole procedure was repeated at weekly intervals for five weeks. Memory of the selection was tested without submitting the paragraph to the subjects. "The pro-soviet group consistently recalled more of the pro-soviet material than did the anti-communist group and the gap between them increased overtime. During the five weeks of forgetting, the anticommunist group forgot the pro-soviet group and the gap again increased overtime" (Levine and Murphy, 1948 in Amare, 1998:41). The studies on selective exposure, selective perception and selective retention typically depict that one or more of these processes occur among all people in all communication (Klapper, 1960, in Amare, 1998).

2.3.4 The theory of media-determinism

This theory asserts that the mode of information reception determines the mode of thinking and information processing. The famous proponents of this theory are McLuhan (1968) and Mander (1978). McLuhan (1968) argues that "the medium is the message" i.e. the way people think, their roles and associations have been always shaped more by the kind of medium they use than the content. He classified the human history into three: the pre-literate, literate and the electronic age. McLuhan is convinced that the mode of information reception provided by the electronic media such as television, video and computer is "all-at-once" or holistic whereas print provides

what he calls a "lineal" way of information reception; that is, word- by -word along a linear path, which finally created one-dimensional man.

Mander (1978) is also a media or technology determinist. Unlike McLuhan, Mander advocates a complete elimination of the electronic media, particularly television. Mander's (1978) reasons for the elimination of television include:

1. Television destroys the neutrality of the environment.
2. Television is a mechanism for economic and political domination
3. Television hinders the psychological development of the mind since it facilitated passivity and sleep learning and
4. Television is undemocratic since it confines the content of information.

To Mander, print is serious and challenging inducing high Amount of Invested Mental Effort (AIME) during a learning process and thus the print is more important since learning is the Amount of Invested Mental Effort (Amare, 1998).

From all the communication theories cited above, audience centred communications have been suggested as more effective than others. The audience has been discovered as having more "power" determining communication effectiveness (Amare, 1998). Of course, Friere (1972) confirms the need for two-way communication system by coining the term "dialogue" in education and strongly argued against the dominant educational system in which only the teacher played an active role and the learners kept in roles of passive receptions, "vessels to be filled in" with the "teaching package" of an education planner or classroom teacher. He advocated a shift from pedagogy of the oppressors (which is one way and anti-dialogical) to the pedagogy of the oppressed which is two way and participatory (Amare, 1998).

2.4 Research Evidences from Proponents of Media and Technology in General and Electronic Media in Particular for Improving the Teaching – Learning Process in Schools

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 and Reeves, 1996). Learning "from" media and technology is often referred to the use of instructional

television, computer-based instruction or integrated learning systems (Hannafin, et al.1996 in Reeves, 1998). Learning "with" technology, less widespread than the "from" approach is referred to the use of cognitive tools (Jonassen and Reeves, 1996) and constructivist leaning environments (Wilson, 1996). These days, so much attention is paid to media and technology for the following reasons.

- People are curious to know if new technologies are more effective for teaching and learning than traditional classroom approaches for students' cognitive and moral development.
- People want to know whether new technologies increase education accessibility or reduce educational costs
- Commercial or corporate interests have started to influence the use of new technologies in schools and
- The existence of sharp disagreement about the value of media and technology in education (Reeves, 1998).

Research examining the effectiveness of media and technology in schools can be traced back almost eighty years (Cuban, 1986) and yet many questions about the value and impact of these approaches remain unanswered. Reeves (1998), believes that the seemingly contradictory findings often reported in educational research literature fan the flames of the ongoing controversy about media and technology in education.

For example, Greenfield (1984 in Reeves, 1998) asserts that bringing electronic media into school capitalize on strong motivation qualities for students, which lead to greater success. On the other hand Clark (1982) posits that media such as computer do not influence whether someone learns from instruction since learning results from factors such as task differences, instructional methods and learner traits including attitudes but not the choice of media for instruction.

There have been decades of research focused on the educational effects of television and yet controversies about the impact of television in schools and society as a whole persist. For example, well-known social critics (e.g., Postman, 1995; Winn, 1985 in Reeves, 1998) contend that television viewing is cognitively debilitating. Others blame such claims to be subjective and

argue that there is no conclusive evidence that television stultifies the mind (Seels, et al, 1996 in Reeves 1998). Dorr (1992 in Reeves, 1998) also argues that there is no consistent evidence television increases passivity in children.

Detrimental effects of television to the academic achievement of school age children and teens were also reported. As a result a negative correlation between amount of television viewing and school performance was found but others blame such statistics are susceptible to misinterpretation because of intervening variables such as intelligence and socioeconomic status (Seels et al, 1996). Neuman (1995 in Reeves, 1998) provides an in-depth review of research examining the relationship between television and achievement. She concludes that there is insufficient support for the hypothesis that television viewing displaces academic activities and thereby has a negative impact on school achievement.

Comstock and Paik in Reeves (1998) conclude that the relationship between the amount of time spent viewing television and achievement test scores is curvilinear with achievement actually rising with 1-2 hours of television per day, but gradually falling with longer daily viewing periods. The most positive research news about learning from television can be found in the classroom where 40 years of research show positive effects on learning from television programmes that are explicitly produced and used for instructional purposes (Dorr, 1992, Seels et. al, 1996 in Reeves, 1998). Moreover, most studies show that there are no significant differences in the effectiveness between live teacher presentations and videos of teacher presentations (Seels, et. al 1996). More importantly 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 (Reeves, 1998).

Reeves (1998), suggests that, historically, studies of the large-scale implementations of instructional television have shown mixed results. Three major forms of utilization have been investigated.

1. Instances where the total instructional programme is delivered via televised teachers
2. Instances where there is an integration of teacher directed instruction with television programming and

3. Instances where television is used to supplement teacher-centred instruction either for enrichment or remedial purpose.

Cuban (1986) reports that total instructional television programs in countries like El Salvador have met with initial enthusiasm, but declined in popularity after the novelty wore off and both students and teachers demanded less television and a return to regular classroom activities. Some studies indicate that students in rural schools, where quality teachers were less likely to be available, benefited the most from televised instruction (Seels et al, 1996 in Reeves, 1998). However, television has been rarely used to totally replace teachers in any country and it is usually used in coordination with or to supplement the regular curriculum (Cuban, 1986).

So far we have discussed the learning “from” approach. Let us see the learning “with” media and technology. Reeves (1998), suggests that cognitive tools refers to technologies, tangible or intangible that enhance the cognitive powers of human beings during thinking, problem-solving and learning. Today, computer software programmes are examples of powerful cognitive tools. Specific examples of cognitive tools include; databases, spreadsheets semantic net works, expert systems, communication software such as teleconferencing programmes, on-line collaborative knowledge construction environments, multimedia construction software and computer programming languages (Reeves, 1998). He states that 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 interaction, media and technologies 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 analysis the world accessing and interpreting information, organizing their personal knowledge and representing what they know to others (Reeves, 1998).

The learning “from” media and technology approach originates from behaviorist psychology and refers to teacher-directed, text dominated, using instructivist pedagogy whereas the learning “with” media and technology view originates from cognitive psychology and refers to

constructive pedagogy where learners are active participants for their own intellectual development (Goodlad, 1984 in Reeves, 1998).

A recent research project conducted by British Educational Communication and Technology Agency investigated the effects of ICT on educational attainment, based on evidence from the published research literature. This study found positive effects of ICT on pupils' attainment in almost all national curriculum subjects, particularly regarding mathematics and English. The authors concluded that ICT has a positive impact on pupils' learning when the use to ICT is closely related to learning objectives and when the choice of how to use ICT is relevant to the teaching and learning purposes (Cox, et al, 2004).

Passey et al (2004) further investigates the effects of ICT on pupils' motivation. A sample of 17 schools from across England was surveyed. This study found that ICT positively impacted in motivation, particularly in relation to engagement, research, writing and editing and presentation. There is also evidence that ICT positively influence attitudes towards schoolwork and school behaviour (Passey, et al, 2004 and Wilson, 2004). Stark et al (2000) also find out that ICT improved motivations, enhanced learning and teaching, improved communication and access to information. Such successful research results are obtained when ICT is used in the constructivist but not from instructivist situations (Stark, et al, 2000).

Some of the notable scholars that advocate the use of electronic media (e.g. television) include Schramm (1977); McLuhan (1964) and Dale (1969). Dale (1969) for example mentions the following advantages of television.

- Concretizing human experiences
- Providing up to date information
- Distributing information to large masses of audience 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
- Creation of sustained attention (Dale, 1969, in Amare, 1998).

Schramm (1977) conducts research to answer the question "Is one medium more effective than others?" He examined experimental studies, pedagogical theories, economic evidences and field studies. The results of these studies are inconclusive. He contends that no one medium is pedagogically more or less important than others. Media effectiveness is to be explained more or less by the utilization procedure (methodology) than by the choice of the medium. Schramm (1977:14) concludes, "It depends on the performance of the teacher, the content of the media, what is being taught and to whom."

Schramm (1977) still contends that most experimental studies compare television instruction with classroom (conventional) instruction. For him the more carefully such comparisons are designed and controlled, the more likely they are to show no significant difference in learning from the two sources.

Chu and Schramm (1967) in Schramm (1977) tabulate 421 television versus classroom comparisons and find out that 308 of the studies show no significant difference, 63 of the studies come out in favour of television, 50 of them come out in favour of classroom teaching.

Similarly, Dubin and Hedley (1969) in Schramm (1977) examine 381 such studies and find out 191 showing no difference, 102 in favour of television, and 89 in favour of classroom instruction. Not all these differences were statistically significant. Schramm (1977) concludes as follows:

We conclude from the evidence that, overall, there is no basis in the research for saying that students learn more or less from television than from classroom teaching. This does not mean that under some conditions of teaching some students do not learn more of certain subject matter or skills from one medium or channel of teaching than from the other. But the result of the broad comparisons say that there is, in general, no significant difference (Schramm, 1977:28).

According to Schramm (1977), there is no evidence that students learn more from the Big Media such as television and film.

Regarding the use of different media to be equally effective with different learners, Schramm (1977) states that there is insufficient evidence as yet to conclude that some individuals are "print-minded", some "picture-minded" or some "audio-minded" and consequently better able to make use of a particular medium. Needless to say, if a person cannot see well, he/she is likely to learn less from a visual medium than from an auditory one. Similarly, if the person is somewhat deaf, he/she is likely to do better with picture or print than with radio. However, beyond these physical conditions, there is little reason to expect a differential media capability in individuals. Findings, however, show that abler students, other things being equal, tend to learn more from any medium than less able students (Schramm, 1977).

However, Schramm posits that media including television can serve four important purposes, particularly in developing countries. These includes:

- Accomplish National Education reforms
- Supplement the school
- Extend the school and
- Provide non-formal education (Schramm 1977, in Amare, 1998).

Amare (1998) contends that although Schramm was unable to make comparisons of the roles of the media on the basis of their internal nature of the technology, McLuhan is a pioneer as a "technology-determinist" and asserts that "The medium is the message" (McLuhan, 1964). That is to say the medium used has more impact in information reception and thinking-pattern than the content of what is communicated through it. For this reason, McLuhan argued that television as a medium is compatible with the present electronic age which is more concerned with pattern identification than fragmentation or recall thinking which is lineal (McLuhan, 1964 in Amare 1998). McLuhan (1967) further says that television is a "cool medium" contrary to print, which is a "hot medium". The term "cool" refers to having the characteristics of more student-involvement and participation in learning. It also refers to information flowing in multiple senses leading to create a more intelligent person who has the ability to deal with high-level abstractions such as configurations and patterns (McLuhan, 1967). The print medium is often associated with a "hot medium." Prior to the print press, man received information all-at-once in 'patterns' or 'configurations'. In contrast, print transmits information "lineally and sequentially" McLuhan

argues in Amare (1998:3). Holistic thinking, analysis and synthesis instead of recall of facts therefore, characterize the result of television society, from McLuhan's perspective.

2.5 Research Evidences from Critics of Use of Electronic Media (e.g. TV) for Learning

Salomon and Leigh (1984) expound the interiority of television as a medium of learning but they attribute this problem not to the medium or technology itself but to the people who learn from it. They assert that people have predispositions or beliefs of the requirements of any communication technology to various means of learning including teachers, books, television and the like. In a study conducted in USA, students do not take television as a serious medium of learning. They view it as a fun medium even when it is transmitting a serious educational material. The result is less learning or shallow understanding from it. In this case, the researchers argued that it is not the technology that is inhibiting learning but rather the predisposition of the learners which acts as a barrier to their own learning (Salomon and Leigh, 1984 in Amare, 1998). Salomon and Leigh's argument is based on the assumption that any learning depends on the Amount of Invested Mental Effort (AIME) by the learner. The more mental effort the students invest in learning a material from a given medium, the more the students learn from the medium. It is, therefore, true that students tend to invest less mental effort when learning from television and as a result learning less since they perceive it as a fun medium.

One of the extreme critics of television, Mander (1978), advocates a total elimination of television. He believes that television is educationally and socially harmful. He attributes all weaknesses of television to its technology and not to its users. Mander contends that the technology of television is not re-formable and should be eliminated altogether. Four arguments are given by Mander to justify the elimination of television. These are environmental (theoretical), economic (political), neuro-physiological and technological factors (Mander, 1978). The latter two factors are more related to education as discussed below by Amare (1998).

Mander quoted a research on television conducted in 1975 by a team of researchers at the Center for Continuing Education, Australia National University. Mander (1978: 42) quotes the assertion that "it is tantamount to scandal that there has been so little research on the neuro-physiology of

television viewing." According to the finding, the process of thinking and discernment become semi-functional at best when watching television. The researchers argued, while television appears to have the potential to provide useful information to viewers and is celebrated for its educational functions the technology of television and the inherent nature of the viewing experience actually inhibit learning. "Very little cognitive, recallable, analyzable thought-based learning takes place while watching television," they reported. The same report also says that television not only destroys the capacity of the viewer to attend, it also by taking over a complex of direct and indirect pathways, decreases vigilance, the general state of arousal which prepares the organism for action. "The individual, therefore, may be looking at the unexpected or interesting but cannot act upon it in such a way as to complete the purposeful gestalt" (Mander 1978:42). The continuous trance-like fixation of the television viewer is then not "attention" but "distraction", argued the authors.

These authors also presented a brain research (Mander, 1978:43) to trace the effects on the mind of a simple, constant, repetitive and ambiguous visual stimulus particularly up on the left side of the brain, the area where language, communication abilities and cognitive thought are organized. The results showed that human beings "habituate" to repetitive light-stimuli (flickering light, dot patterns, limited eye movement, etc). If habituation occurs, they argued, then the brain has decided that there is nothing of interest going on and virtually quits processing the information that goes into a kind of "holding" pattern (Mander, 1978:43).

On the basis of the psychological evidences, Mander concluded by saying that "television is a communication medium that effortlessly transmits huge quantities of information not thought about the time of exposure" (Mander, 1978:51). Television information is not available for conscious analysis, understanding or learning. It is sleep teaching and very dangerous to the society and, therefore, must be eliminated. The technology of television is, therefore, fit only to information that is confined. The effect is, says Mander, "to confine the information filled within the very narrow, hard-edged and objective form which the medium can convey, creating in turn hard-edged narrow minds" (Mander, 1978:51). Amare (1998) also posits that television method of learning is the antithesis of learning with hard work ethic due to theory of competition for attention, automation and reduced visual distance.

Regarding the theory of competition for attention, Amare states that in communication, any method of message presentation involves two things: Content and form (art). Books have their own content and form. Lectures (speeches) too combine both. He says that students enjoy a funny lecturer more than the ordinary lecturer_who focuses on giving the content. Students give more attention to the former than the latter. If the former is accentuated, then students are highly entertained, perhaps at the expense of learning. This leads to the wrong conclusion that the teacher is right and good. If, however, the latter is accentuated, the subject becomes dull, and the instructor gains no attention. Anyhow, one should know the proper "mix" of the two. Excessive seriousness could lead to inattention while excessive fun could lead to a waste of time. Learning requires a proper combination of art (form) and content by the medium (Amare, 1998).

Amare contend that television involves motion; color, drama, appearance so much so that the content itself is anesthetized leaving the brain to wonder with emotions than with the critical domain. The art becomes noise, a message not intended by the source but rather competing with intended one. The brain shifts to entertainment, inactive consumption of information without application of any mental effort necessary for critical thinking (Amare, 1998).

Regarding automation_ the negation of hard work ethic_ Amare (1998), also argues that the present development stage of the Western culture (including science and technology) is the result of hard work. Until a certain stage of the development process, human labour and mental-inputs played crucial roles for "modernization". During the Industrial Period, for instance, workers have toiled for long hours to earn their means of survival (Rosenberg and Bridzell, 1987; Shirkove and Creighton, 1980 in Amare, 1998). Industrialists and businessmen must have stayed long hours at places of work to manage their business. They had little time to spare. Entertainment facilities, as we know them today, were hardly available. There was no television nor was there video to compete with hard work. Not even was there the mental readiness to indulge in entertainment and luxury. Hard work was the order of the day. During this period, students had to spend long hours examining their books. According to McLuhan (1967), readership was the order of the day and reading the dominant mode of communication. Students gave much attention (concentration) to the ideas they read. This period was characterized by discovery, exploration and proliferation

of scientists that, in turn, facilitated the process of modernization and development (Finkelstein, 1968 in Amare, 1998).

The process of technification finally leap-frogged into a higher stage called automation. This rendered the ethic of hard work obsolete (Mohammed, 1984 in Amare, 1998). The process of automation, Amare argues, is a turning point in the history of the development process. Man that can only push buttons was most needed. Muscular man that twists metals and that spends long hours in work places was least important (Mohammed, 1984 in Amare, 1998).

According to Amare, one of the unique cultural consequences of automation is the accentuation of the "least-effort" principle, the over-dependence of man on technology rather than on one's self (mind or body). Amare still argues that when this dependence is further accentuated, naturally, the body and the mind continue to be deprived of the experience and the very nutrition that serve to develop them. The whole process creates a kind of person who depends on technology even when he/she is dealing with little things (Amare, 1998). One lacks confidence in one's mind and technology develops its own myth. Power shifts from man to technology and consequently man starts to worship the products of technology (Amare, 1998). In the light of the realities of doing things easily, a man develops the habit and the orientation of doing things with the least-effort. This principle gains a status of being a "value" ("norm") of the society. All human innovations that are only consistent with this ethic enjoy popular acceptance. Television is one of the institutions that must have come mainly to reflect this societal need (Amare, 1998).

According to Amare, greater exposure to television creates the learning of a television method of learning. Students lean to learn materials that have simplicity, entertainment, fun, etc. Consequently, students find it difficult and unentertaining to read the serious books. Hard work and a curiosity for knowledge are the requirements of reading serious books. Understanding their content and intent requires application of high AIME. Television has, however, eroded this habit, the habit of hard work in education (Amare, 1998).

Finally, Amare points out the issue of visual distance during televised instruction. When language is used in learning, the mind moves from words to pictures or images, then to meaning.

It paints its own picture, depending on its own experiences and understanding. If, however, pictures are provided (as in television) instead of painted by the mind, the mind moves only from the picture to meaning. The visual distance of the latter is shorter, implying less mental engagement, nearly approximating automatic processing of information. The disadvantage of television according to this logic is that it discourages mental engagement making short thinking spans and ultimately inducing this habit of using automatic processing while trying to engage in thinking (Amare, 1998).

3. METHODOLOGY

I have designed my research in the form of qualitative case study in view of understanding the teaching-learning process in the context of electronic media: satellite TV instruction. Gall et al (1996: 67), posit qualitative research is an inquiry that is founded in the assumption that "individuals construct social reality in the form of meanings and interpretations and these constructions tend to be transitory and situational." The dominant methodology in a qualitative research is to "invent" these meanings and interpretations in natural settings and by subjecting the resulting data to analytic induction. Best and Kahn (1999) also contend that qualitative research is the antithesis of the logical positivistic approach _ quantitative research_ which insists on that research be based on hypotheses generated from theory, prior research or experience. Stoyanoff (1990) in Gall et al (1996) expounds that qualitative researchers consider social reality as constructed by participants depending on local situations; are personally involved with research participants with caring attitude; study cases; discover concepts or theories after data has been collected; generate verbal and pictorial data to represent social environment; use analytic induction to analyse data and prepare interpretive reports that reflect researchers constructions of data and an awareness that readers will form their own constructions from what is reported.

Best and Kahn (1999) further expound that the in-depth and detailed description of events, interviews and others make qualitative research very powerful. The richness of the data permits a fuller understanding of what is being studied than could be derived from experimental or survey research methods. The two authors contend that the reason why qualitative data are so powerful is that they are sensitive to the social, historical and temporal contexts in which the data are to be collected. For them, the importance of context sensitivity is that the data cannot be generalized to other contexts that are different socially, spatially or temporally. Best and Kahn (1999:186) still state, "Just because something occurs in one classroom at a particular school and at a particular time does not mean that similar occurrences should be expected else where or even in the same classroom at another time." The logical positivistic paradigm, however, purposefully pursues research findings that can be generalized to the universe through studying the "objective" reality

by collecting numerical data on observable behaviours of samples and subjecting these data to statistical analysis (Gall et al 1996; Best and Kahn, 1999).

Many educators suggest the following characteristics of qualitative research and I have attempted to address these features in my study.

1. Qualitative design is holistic. It looks at the larger picture and begins with a search for understanding of the whole. It is not constructed to prove something or control people. It favours open-ended and unstructured research design.
2. Qualitative design looks at relations with systems or cultures in a particular setting or group. It is concerned with the personal. It is focused on understanding given social settings, not necessarily making predictions about those settings.
3. Qualitative design demands that the researcher stay in the natural setting overtime. It also demands time in analysis equal to the extensive time in the field.
4. Qualitative design requires the researcher to become the research instrument.
5. It incorporates informed consent decisions and is responsive to ethical concerns.
6. It incorporates room for description of the role of the researcher as well as description of the researcher's own biases and ideological preference.
7. It requires the construction of authentic and compelling narratives of what occurred in the research site among participants and
8. Qualitative design requires ongoing analysis of the data (Denzin and Lincoln, 2000, Silverman, 1995; Hammersley, 1990; Creswell, 1998 in Amare, 2004).

Constructivists assert that knowledge is constructed (made or invented) as learners interact with the environment. Hence social reality is constructed, indeed. It cannot have any existence without the human agency (Schuandt, 1994; Chalmers, 1999 in Amare, 2004). By the same token, communication is not knowledge transmission; rather communication is meaning exchange and inter-subjectivity between the source and the audience. (Osgood, 1976; Light and Cox, 2002 in Amare, 2004). Amare (2004) also contends that there is unity between communication theories and qualitative research methodologies due to the fact that the aim of qualitative inquiry is understanding and interpretation (Guba and Lincoln, 1994). As the essence of communication is to create a mutual understanding between the self and others, social science

research cannot be any much different from this. There is little or no possibility that an understanding can be established by a dichotomous activity, observing others and being observed by others. Amare (2004) posits that the self_other dichotomy constrains research as much it does communication.

Research and communication, therefore, demand virtual convergence. Observing others does not produce facts, but “statement of facts, which are only mirrored perceptions” Chalmers 1995 in Amare, 2004:45). Hence, no two normal observers viewing the same object under the same physical circumstances can necessarily have identical observations; neither can an observer see the same thing in the same way when time and space is changing (Amare, 2004).

Qualitative research implies an emphasis on the qualities of entities and on processes and meanings that are not experimentally examined or measured in terms of quantity, amount, intensity or frequency (Denzin and Lincoln, 2003). In view of these arguments, I have preferred to study the teaching-learning processing in a classroom setting where satellite TV instruction was applied through qualitative inquiry designed as a single case study. Several features have marked my study as a single case study:

- The case was a bounded system, bounded by time (two months of data collection) and place (a single classroom in a single school).
- I used multiple sources of information in data collection to provide the detailed in-depth picture of the case, and
- I spent a considerable time describing and understanding the context, situating the case within a classroom in a school building along with detailed events that emerged throughout the study.

3.1. My Role as a Researcher

Since I have designed the research as a qualitative case study, I was not in favour of positivist thoughts that sought researcher-proof methods and techniques. Hence, I was the major data collecting “instrument” by being sensitive observer, storyteller and descriptive writer through recording as faithfully as possible the phenomena I saw, heard and felt. As post-positivists do, I

have admitted the subjective perception of mine and of the research participants for the following purposes.

1. To obtain further analysis from the clues observed from affective reactions, and
2. To establish intimate relationship with participants that can enable trust and confidence.

In addition to this I played the role of an insider in Debre Berhan General Secondary School by conducting a tutorial session for Grade Nine students on English once per week for about an hour and a half. I have understood the nature of teaching-learning process by comparing and contrasting my face-to-face tutorial lessons with the televised lessons.

Since in-depth understanding of human interaction requires near-native fluency in the language of the research-participants, I used Amharic, which is the vernacular language of the participants and mine. In short, as a participant observer, I watched what the participants did, I listened to what they said, and I interacted with them.

3.2 General Context

As I have pointed out earlier, EMA has launched a new satellite TV (ICT) programme for educational purpose in most Ethiopian Secondary Schools (except private ones) under the auspices of MOE. The MOE announced on the mass media that the ICT programme was to be launched last year for all high schools. But due to financial constraints, the programme was postponed to the present academic year (1997E.C). MOE announced that the use of ICT for educational purpose in Secondary Schools was piloted in Addis Ababa and promising results were reported. The Minister reported that the trial transmission of ICT in selected Secondary Schools in Addis Ababa was used to:

- Convey similar educational access and standard for all schools;
- Help students to observe laboratory experiments from screens, and
- Convey quality educational standards in secondary schools.

EMA has distributed over 8,800 television sets that have a size of 42 inch each. These television sets were distributed to more than 460 secondary schools. The Manager reported that most of the Secondary Schools in Ethiopia have got electric lines except 190 schools. According to the report, generators were bought, distributed and installed for such schools to launch ICT

education. Moreover, the report indicated that in case there were blackouts, standby generators were distributed for the schools to ensure uninterrupted live transmission. Similarly, video servers were also ready to down load and save lessons to use further when necessary.

During the first semester, the live transmissions lasted for about 30 minutes for each subject area. There was also an additional 10 minutes to be used by the classroom teacher i.e. the first five minutes of each period was used for introducing the daily lesson on face-to-face basis by the classroom teacher and the last five minutes for summarizing the daily lesson. A period lasted for 40 minutes, which was similar to the duration of the traditional period allocation in our country in Secondary Schools. However, the time allotment has been arranged during the second semester in such a way that only two minutes was given for opening the TV; thirty minutes for the televised instruction and ten minutes for concluding the daily lesson by the classroom teacher. The language of transmission is English since it is the language of instruction stipulated in the Education and Training Policy (1994).

Computers were introduced to Ethiopia in the early 1960's in few organizations such as Ethiopian Airlines, Ethiopian Telecommunications and Addis Ababa University for the purpose of preparing payrolls and financial reports initially (Ethiopia Today, 2004). In recent times, the country has shown very encouraging strides in the expansion of utilizing computers for multi-purposes, particularly for Internet services. Currently, Ethiopia is among the few African countries that have successfully geared efforts toward the utilization of ICT. Prime Minister Meles Zenawi, presenting the performance report for the year 2003/04 asserts,

One of the activities that will be given priority, as far as capacity building is concerned is to extend telecommunications and information technologies and to make it possible for secondary schools and districts to access the Internet. The task of equipping all districts and secondary schools with modern technology had proved to be very complex indeed, requiring much time, and resources. As this work was given very high priority the problems that cropped up were successfully tackled and the necessary infrastructures were extended to more or less all secondary schools (Ethiopia Today, 2004:3).

General Manager of the EMA with the MOE, Demissew Bekele, reported that in this time of globalization where the competition for economic superiority is getting sharper and education

playing an important role of competitive advantage, which is closely linked with economic growth, ICT has become a major tool for social and economic development.

Demissew in Ethiopia Today (2004) also said that Ethiopia is now moving towards the advanced and emerging new "instructional paradigm". The focus of the country is on how ICT can be used to compensate the factors that are lacking in education, mainly quality education, equitable service to the rural and urban students and well trained teachers in order to produce productive and competitive citizen in the international arena.

To attain the goal of implementing ICT in the education sector, various activities were carried out. The budget allocated for the full implementation of the programme was some 600 million birr. Moreover, production of 2,978 educational TV programmes was possible in six subjects: English, mathematics, civil education, biology, chemistry and physics. Pertinently the purchase of recording and transmitting equipment has been carried out with subsequent studio construction under way while supply of 455 generators to schools and weredas without the electricity was carried out. Meanwhile, eight educational channels and one public channel were put in place and transmission equipment was installed and transmission has already been started. Satellite Receiving Devices known as plasma Display Panels and Satellite Dish Receivers were installed in schools and wereda Centers (Ethiopia Today, 2004). More than 450 secondary, vocational and higher education institutions across the country would benefit from direct transmission of Satellite TV programmes and internet through the school net (Ethiopia Today, 2004).

According to the report of the Head of EMA, secondary school teachers were trained on how they should utilize satellite programmes and plasma displays with one technical person from every region attended the training in Japan i.e. on the use, handling and maintenance of plasma displays. Moreover, 21 members from regional and central technical staffs have graduated from Addis Ababa Industrial and Electrical College. Similarly, three EMA staff members have graduated in Bachelors degree.

In addition, in order to align the efforts of networking, dish installation, plasma box adjustment, signal reception and transmission test were carried out in May and June/2004 and conceptual orientation test on transmission and the tuning of signals was given to Grades 11 and 12 last August. Programme familiarization was also offered to grades 9 and 10 (Ethiopia Today, 2004). According to the General Manager, the benefits of ICT are enormous in the teaching-learning process. The introduction of ICT to schools is believed to "expand students' knowledge, improve self-confidence, enhance creatively, and develop sense of responsibility, teamwork and sharing of knowledge." In the past, the manager still argues, there was inequitable distribution of educational provisions among urban and rural schools. There were also similar disparities among different regions of the country.

"Usually urban students have a lot of exposure to the media; as a result, they have been able to have three parents: their families, teachers and the media. The rural students up to the advent of satellite broadcast were devoid of the media parent. Today, rural students have been compensated with the initiation of Satellite TV, by which every corner of the country or school can be reached as satellite is like sunlight through which signals can be received any where, be it down the valley or on mountain tops," (the General Manager of EMA in Ethiopia Today, 2004:6-7).

Asked about the contribution of ICT in the delivery of quality education, the Manager states that the new pedagogical paradigm offers teachers time to be creative, identify students' need, and foster them with the necessary attention and guidance. ICT also saves time spent in drawing diagrams and simple practices that can affect the overall teaching-learning process, enables them to carry out experiments, minimizing local language interference in English medium and also offers to cover the gap that may appear during the transmission. At the same time ICT entertains and motivates students for it incorporates visual and sound programmes enabling them to develop their skill and knowledge. The Manager of EMA briefly explains the role of the technology as "For what the technology cannot offer, the teacher is there. For what the teacher cannot offer, the technology is there. This enables us to produce highly qualified, skilled and productive citizens for the country tomorrow" (Demisew in Ethiopia Today, 2004).

The Ethiopian Science and Technology Commission was the highest decision making and coordinating body as far as giving impetus for the application of the technology is concerned.

The Ethiopian Telecommunication Corporation, USAID, Irish Embassy and other governmental and private sectors have also participated in financing, consultancy, capacity building, supplying equipment, and networking endeavors (Ethiopia Today, 2004).

The future task will focus, according to the Manager of EMA, on the sustainability and interaction of ICT. This would be made phase by phase first by expanding the instructional TV from priority subjects to all subjects, then, to computer based teaching and internet online including multi- modal; teaching to primary level of education (Ethiopia Today, 2004).

3.3 Research Setting: Debre Berhan General Secondary School

I have conducted this study in Debre Berhan town, the capital city of Northern Shoa Administrative Zone, which is located at a distance of 130 Kms north of Addis Ababa in the Amhara Regional State. It is one of the oldest towns in the Ethiopia highlands, which is very cold. The then ruler of the country _Atse Zara Yakob_ founded it in the fifteenth century approximately in 1446(Derese, 1992).

The town has got 2 higher and nine Kebeles. The total population in the town is estimated to be over 40,000. There are two governmental secondary schools in the town. The first and the oldest one is Hailemariam Mamo preparatory school that was upgraded from primary to secondary school in 1950 Eth.C. Up until 2004/05 academic year, Hailemariam Mamo Secondary School was the only governmental school to teach students from Grade 9 to Grade 12. As the student population rose, the people and the government together with a Non-Governmental Organization called Christian Children Fund have built a new school at the southern outskirts of the town within an area of approximately 50,000 square metres to serve as General Secondary School (Grades 9 and 10). This new school has been inaugurated in July/2004. There were 2400 students of which 1352 are males and 1048 are females enrolled in Grade Nine for the first time in the school. Though the new school is meant for both Grade Nine and Ten, students in the latter Grade level have remained in Hailemariam Mamo Preparatory School up until enough classrooms are built that are still under construction.



The school has got ten big buildings comprising three unfurnished laboratory rooms for biology, chemistry and physics; one big auditorium, one library, one administrative block and four classroom blocks each consisting of four classrooms. Hence, there are sixteen classrooms in the school at present. Since the school has been working full time in double shift (morning and afternoon), there are 32 sections (from section 9 one to section 9 thirty-two). At an average, there were 75 students in each section. Usually three or four students sat on a single desk. There are also five small buildings, two of which serve for the school guards, the other two serve as latrines and the remaining one is the room for a generator which can serve as a standby power source if there appear blackout during the satellite TV instruction. Actually, the generator was not yet functional up until I completed my study. The construction of classroom buildings has been continued since the school should serve for both Grades 9 and 10 as any General Secondary School in the region.

The seating arrangement was in the traditional way i.e. in rows where all students faced the blackboard and the satellite TV screen and each student could see the back of other students. What makes the classroom different from my old high school days was that there was a 42- inch television set in each classroom covering half of the size of the blackboard^d. There was also a plasma box and a TV case to keep in the TV screen. Each TV screen had also a curtain to serve as a cover to protect any dust particles whenever the TV was not functioning particularly when the students were learning conventionally on face-to-face basis during the period of non-televised subjects.

There were 40 subject teachers in the school (who were teaching in Grade Nine only) of which thirty-three are males and seven are females. There were also seven administrative workers of which two were school principals, one was school secretary and the other one was record officer and the remaining three were school guards. This newly established school has posted its vision and mission right at the entrance of the school that read as follows.

3.3.1 Vision and Mission of Debrè Berhan General Secondary School

A). *Vision*

1. To ensure that the young generation has got access to general education and general knowledge;
2. To enable them to be creative and respectful to the human and democratic rights, and
3. To enable them to struggle for ensuring good governance and development in the country through active participation to upgrade the national economic development through the use of new products of science and technology.

B). *Mission*

1. To provide quality and efficient education for students who come from the urban and rural districts;
2. To prepare students to be effective for technical and vocational training in different fields to lead their future life;
3. To provide general knowledge education to enable the students to be effective and competent in higher education.

3.3.2 Subjects offered in the school

Ten different subject areas were offered in Grade Nine as any other General Secondary School in the region. These subjects include biology, chemistry, civics and ethical education, English, mathematics, physics, and Amharic, history, geography and physical education. The first six subjects were offered through the satellite TV instruction while the rest four subjects were taught on face-to-face bases without being televised.

3.3.3 A description of satellite telecommunication

Barker and Patrick (1989) explain that satellite communication systems employ microwave terminals on the satellite transponder (a combination of receiver, converter and transmitter) as well as on ground or earth stations commonly referred to as downlink or up-link dishes. The

result is a highly reliable and high capacity communications circuit. The satellite itself is positioned in geosynchronous orbit over equator about 22,000 miles above the earth. The rotation of the satellite thereby matches the rotation of the earth causing it to appear motionless above earth stations. Barker and Patrick (1989) further state that three equally spaced satellites could send and receive signals over the entire world. The satellite's transponder acts as both a receiver for up-link transmissions and a transmitter for downlink transmissions. Earth stations can be fixed or mobile. A positive characteristic of satellite communication is that the cost of transmission is insensitive to distance. This is not true in the case of telephone or other landline communication systems. Satellite technology is also capable of reaching a large number of students spread over an extensive geographical area (Barker and Patrick, 1989).

The authors posit that live TV broadcasts are beamed from the host site classroom or studio via an up-link dish to the satellite transponder. The signal is then beamed back to downlink dishes at the various receiver site locations. In this configuration, satellite technology permits one-way transmission of voice, data and full motion video. Students can both see and hear their instructors over the classroom television but they cannot pose questions to the televised instructors. The televised teachers cannot see students, nor can they respond to questions from students.

The technology is also capable of electronic copy distribution to create hard copy, handouts, exams and course administration materials sent via satellite directly to the receiver sites if necessary.

The novelty of course delivery via satellite has grown so rapidly that few questions relative to programme quality or student performance has been asked. That position must change. It is both inappropriate and dangerous to fully embrace or accept a new approach without ongoing evaluation (Barker and Patrick, 1989).

Educators and other school officials who are interested in purchasing satellite reception equipment for their school and subscribing to an instructional network need to be aware of differences between vendors. According to Barker and Patrick (1989), factors to be considered include cost, maintenance, upgrading of equipment, extent of course offerings, limitations on

class size, frequency of instructional broadcast, quality of instruction provided by the teaching staff, skill of the instructional staff to "force interaction" with students, etc. To look for interactive satellite TV, it is also important to know whether students at all receiver site locations are able to telephone their instructor classes, which are "on-line". This is not possible in our country at present.

Barker and Patrick (1989:31) further contend that "A classroom facilitator who may be either an aid, volunteer, or another teacher usually sits in with the students to operate the equipment distribute materials, and provide assistance as appropriate." In our secondary schools, each subject teacher played the role of coordinating the televised lessons within the available ten minutes on conventional bases.

3.4 Rationale for Selecting the Research Setting

As I have pointed out earlier, Debre Berhan is the capital city of Northern Shoa Administrative Zone. I have had unforgettable experiences as a teacher in this place since it was my first area where I was assigned to teach. I had served for four years as an English teacher here before my transfer to Dessie College of Teacher Education. As a result, I have had a special acquaintance to the educational administrative bodies as well as teachers in the Zone since we used to meet during different training sessions. Some of my former staff colleagues have been still teaching in Desbre Berhan General Secondary School. I was also working as a secondary school vice director in the Zone. Moreover, I used to work as a member of the electoral board in the former two national election periods in two different Woredas in the Zone.

Besides that, I am working as an instructor in Debre Berhan Teacher Education, Vocational and Technical College as a part-timer during the present academic year. I have met many teachers here from Debre Berhan General Secondary School who have been working as part-timers in the college. All these factors have facilitated my entry and access to the research setting and thereby develop confidentiality among the research participants.

I have also preferred to conduct my study only in grade nine for the following reasons.

1. Out of the two Grade levels (Nine and Ten), in the General Secondary School only Grade Nine students have started learning from satellite TV in the town. Grade Ten students did not start to learn from the new technology even up to the completion of my study. Hence, Grade Nine students were the only available research participants on the issue from the first cycle Secondary School level.
2. I have taught English in Grade Nine for two years based on the new curriculum but I have never taught in the upper Grade level except during the phased out (old) curriculum. My experience as a teacher has helped me to compare and contrast the face-to-face and the satellite TV instructional processes as a whole.
3. I believed that Grade Nine students have encountered two novel classroom atmospheres simultaneously. First, the medium of instruction has been changed from the native language (Amharic) to the foreign language (English) for the first time in the students' school life. Second, students have experienced learning from satellite TV for the first time. I was very interested in understanding how students and their teachers cope up with such novel classroom situations.
4. Finally, Grade Nine students in Debre Berhan Genearl Secondary School have started satellite TV instruction late in November, 2004 due to technical drawbacks. This has helped me to conduct my observation right from the onset of the use of the new technology and to understand how students' engagement and interest wore off as the novelty of the medium reduced. For these reasons, I limited my study only in Grade Nine in Debre Berhan.

3.5 Data Collection Strategies

3.5.1 Conducting the observation

Participant-observation has been the primary data collection techniques used by qualitative researchers. A participant observer should live as much as possible with the individuals he/she is investigating trying to blend in and taking part in their daily activities (LeCompte and Preissle, 1993). As a result, I-the researcher – lived for about two months with the research participants in

the natural setting where the investigation was taking place. Thus, as a participant observer, I watched what the participants did, I listened to what they said, and I interacted with them.

One of the problems researchers encounter is that participants' report of activities and beliefs may not match their observed interactions. Participant-observation is a check, enabling the researcher to verify that individuals are doing what they believe they are doing (LeCompte and Preissle, 1993). I attempted to follow the general guidelines listed below for direct observation proposed by the two educators.

1. Who are in the group or scene? How is membership acquired?
2. What is happening here? What are the people doing? What are they saying to one another?
How do they behave to one another? What is the nature of interaction and participation?
3. Where is the group (scene) located? What is the physical setting? What natural resources, what technologies are created or used? What sight, sound, smell, or taste is found in the group?
4. When does the group meet and interact and for how long? How do they view the past, present and future?
5. What rules or norms govern the social organization?
6. Why does the group operate as it does? What meanings do participants attribute to what they do? What values, symbols, traditions and worldviews can be found in the group? (LeCompte and Preissle, 1993).

The overall fieldwork study lasted from November 15th, 2004 to January 15th 2005. During my field study I observed classroom interactions while students were learning from the satellite TV instruction. As a participant-observer, I was attending the televised lessons with students in Grade 9 in section two.

3.5.2 Conducting the interview

The second data collection technique was in-depth interview. This interview was undertaken in the form of person-to-person encounters, using unstructured, open-ended and semi-structured questions. Interview protocols were prepared to direct the discussion and conduct the interview. Specific questions emerged from the discussion in addition to the semi-structured questions. Some of the key terms that were considered in the development of the questions were learning,

teaching, curriculum, teachers and students' roles and their understanding about satellite TV instruction, evaluation, etc.

I conducted the interview on an intermittent basis with separate sessions that lasted about thirty minutes each in order to reduce fatigue and boredom. The interview was in the conventional style of everyday interaction since this mode communicated empathy, encouragement and understanding instead of court like or police investigation style. The conversational style of interview also allowed participants to feel that what they are saying is acceptable and significant. Moreover, the conversational model was so familiar and comfortable to all participants and thus was most likely to elicit the trust, confidence and ease among participants necessary for yielding elaborate, subtle and valid data (LeCompte and Preissle, 1993). Open-ended question were forwarded to the participants focusing on a particular issue at a time. I recorded the interview based on the assent and consent of the participants. The taped interview was helpful not to miss participants' ideas and interpretations to a particular issue. Then I transcribed the taped interview carefully before I translated the information into English.

The third technique of data collection that I employed was analysis of documents such as a part of televised lessons, and students' text and notes, and assessment records.

3.5.3. Purposeful sampling

Sampling in qualitative research is conceptually different from surveys. I was not sampling for representativeness and generalizability to the universe, which follow probabilistic procedures. Sampling in this study was purposeful and it was a process activity seeking those highly informed persons and those that provide fresh perspectives. I conducted the observation in Grade Nine (section two). This section was selected purposely based on students' politeness, discipline, cooperativeness, and concern for their own learning as it was witnessed by the homeroom teacher and the academic director of the school. This was also applied to the selection of participants for the in-depth interview. Selection was rather a process in the field than a pre-planned activity. Participants in the interview also helped me in suggesting a possible candidate. The selection process was not, however, arbitrary but proceeded selectively until I ensured that

no new perspective or data was obtained from every added participant. The number of interviewees was, therefore, determined by the extent to which additional perspective or data was obtained. I personally hunted for individuals with a possibility of dissenting views.

I interviewed thirteen participants comprising seven high school teachers including the vice director (a female and six males) and six students (three males and three females). Teachers whose subject areas were transmitted on TV were interviewed. Teachers' additional roles and concern for their students learning was also considered during the selection. Student-participants were selected by considering their punctuality, class participation, expressiveness and academic concern. Classroom teachers helped me to select the student-participants besides my own selection based on my observations in the class.

3.6 Data Analysis

Data analysis consists of categories, tabulating, testing or otherwise recombining both qualitative and quantitative evidence to address the initial propositions of the study (Yin, 2003). Stake (1995) advocates four forms of data analysis and interpretation in case study research. These are (1) categorical aggregation _ the researcher seeks a collection of instances from the data, hoping that issues or relevant meanings will emerge; (2) direct interpretation—case study researcher looks at a single instance and draws meaning from it without looking for multiple instances; (3) establishing patterns _ looking for a correspondence between two or more categories; and (4) develops naturalistic generalization _ generalizations that help people learn from the case either for themselves or for applying it to a population of cases.

In one case study, Asmussen and Creswell (1995) have aggregated the data into 20 categories and later collapsed them into five patterns. Their generalization then were compared and contrasted with published literature on the same topic. Yin (2003) stresses the need for adopting a general analytic strategy to define priorities for what to analyze and why. He gives three possible strategies: relying on theoretical propositions; setting up a framework based on rival explanations; and developing case descriptions. Any of these strategies use such tactics as pattern matching, explanation building, time series analysis, logical models and cross-case synthesis.

It is the timing of analysis with other tasks that distinguishes a quality design from traditional positivist research (Merriam, 1998). Analysis in qualitative research is an ongoing activity that takes place during data collection, devising of categories and the building of theory. Data that have been analyzed while being collected are both parsimonious and illuminating (Merriam, 1998). Breakthroughs in insight develop when the researcher is making sense of the data; while moving back and forth between concrete bits of data and abstract concepts; between inductive and deductive reasoning; and between descriptions and interpretations.

In dealing with cross-case displays, data ordering and explaining, Miles and Huberman (1994) identify a long list of what they called tactics in analysis of qualitative data. These are: counting, noting patterns, seeing plausibility, clustering, making metaphors, splitting variables, summarizing, factorizing, noting relations between variables, building logical chains of events, finding intervening variables and making theoretical or conceptual coherence.

In my study, I used a single case analysis strategy where I made a comprehensive analysis of a case. This would lead to a generalizable understanding about how the new satellite TV instruction was used in Secondary Schools.

Tesch (1990) in Gall et al (1994) reviews various approaches that have been used to analyze case study data. She classifies them into three types: interpretational analysis, structural analysis and reflective analysis. Interpretational analysis is the process of examining case study data closely in order to find constructs, themes and patterns that can be used to describe and explain the phenomenon being studied. Gall et al (1994) contend that one of the most critical steps of interpretational data analysis is developing a set of categories that can adequately encompass and summarize the data. The researcher must decide what is worth taking note of in each segment of the database. Structural analysis is the process of examining case study data for the purpose of identifying patterns inherent in discourse, text, events or other phenomena with little inferential meaning.

Interpretational analysis and structural analysis involve explicit procedures that are performed in a somewhat, prescribed sequence. In contrast, reflective analysis is a process in which the researcher relies primarily on intuition and judgment in order to portray or evaluate the phenomena being studied. Terms other than intuition and judgment have been used to describe this process: introspective contemplation, tacit knowledge, imagination, artistic sensitivity and "examining with a sense of wonder". It involves decision by the researcher to rely on his/her own intuition and personal judgment to analyze the data rather than on technical procedures involving an explicit category classification system (Gall et al, 1994).

In my research analysis I have used units such as narratives, sentences, phrases and vignettes to create categories. In addition to interpretational analysis, I have employed reflective analysis by using my own personal judgment to evaluate the case.

3.7 Standards of Quality and Verification

The terms, standards and verification are used here only to deconstruct the positivist terms, validity, objectivity and reliability (Amare, 2003). The researcher strives for quality and verification in the research process while trying to understand the problem by personally engaging with research participants (informants) and spending extensive time in the field (Creswell, 1998). The general procedures that were followed for maintaining standard in my study were effort, honesty and triangulation in addition to ethical principles.

3.7.1 Effort

I attempted to understand teaching with and learning from the electronic media (Plasma Television) in Secondary Schools (Grade 9) by making every effort in conducting participant-observation, talking to people, consulting documents, spending as much time as possible in the field and search for justification to establish whatever truth-claims would be made by me. I also asked my research advisor, professor Amare, and my colleagues to comment on my draft reports.

3.7.2 Honesty

I was motivated in this topic due to my inquisitiveness to understand learning from electronic media (satellite TV), an issue I experienced while I was taking the course Communication and Media Studies in Curriculum and Instruction. I conducted a case study on ETV Broadcast last year. That was my first experience on the issue. I had also taken a course on Instructional Media Preparation and Utilization while I was attending undergraduate programme in Pedagogical Sciences. However I still believed that I had little understanding of learning from electronic media. I believe that the need for understanding learning from electronic media (satellite TV) was intrinsic and with my qualitative research, I tried to understand as much as I could.

3.7.3 Triangulation

The use of observation, interviews, documents, and recorded materials (in addition to bridging in evidence) was very helpful in assessing convergence of information. The use of a single case analysis in a site helped me for in-depth understanding of the issues in the study. I viewed verification as a process that occurs throughout the data collection, analysis and report writing of the study; and standards as criteria imposed by the researcher after a study was completed (Creswell, 1998). Howe and Esenhardt (1990) identify five standards to be applied to all research. These are; (1) Assess a study in terms of whether the research questions derive the data collection and analysis rather than the reverse being the case; (2) examine the extent to which the data collection and analysis techniques are competently applied in a technical sense; (3) whether or not the researcher's assumptions are made explicit; such as, the researchers subjectivity; (4) whether or not the study has overall warrant, such as, whether it is robust, uses respected theoretical explanations and discusses disconfirmed theoretical explanations and (5) the study must have value both in informing and improving practice and in protecting confidentiality, privacy, truth telling of participants (the ethical question). Lincoln (1995) adds the criteria of fairness (a balance of stakeholder views) and the tradition of rigor communication and ways of working for consensus as virtues of a good research. By trying to answer the questions of making

an exemplary study, Yin (2003) uses the standards, significance, completeness, evidencing and reader-engaging as being useful in qualitative research.

3.7.4 Ethics

Focusing only on quantity of knowledge that we produce is inadequate because truth is not all that counts (Miles and Huberman, 1994). Miles and Huberman argue that one needs to consider the rightness as well as wrongness of one's actions as a qualitative researcher in relation to people whose lives one is studying to his/her colleagues, and to those who sponsor one's work. A qualitative researcher must give the fullest attention to moral and ethical considerations. Denzin and Lincoln (1994) have outlined five major ethical considerations in qualitative research:

1. The relationship between what is observed (behaviors, rituals, meanings) and the larger cultural, historical and organizational contexts within which the observations are made (the substance);
2. The relationship among the observer, the observed, and the setting (the observer);
3. The issues of perspective (point of view), whether the observers or members used to render an interpretation of the ethnographic data (the interpretation);
4. The role of the reader in the final product (the audience);
5. The issue of representational, rhetorical or author(s) to render the description and /or interpretation (the style).

Best and Kahn (1999) further suggest that ethics refers to any set of rules or guidelines or human discretion on the part of the researcher that directs the appropriate treatment of persons participated in the research. They expound that in planning a research project involving human participants, it is important to consider the ethical guidelines designed to protect the participants. I, therefore, have given a particular consideration to ethical principles developed by Best and Kahn (1999), Gall et al (1996), and Denzin and Lincoln (1994) and others particularly regarding ensuring informed consent and assent; developing confidentiality and other related ethical issues. I adhered to the ethical principles indicated in Appendix 1(adapted from Amare, 2003) while seeking the willingness of the research participants through discussing the guidelines orally. More explicitly, I discussed below how I addressed these ethical issues in my case study research.

3.7.4.1 Research participants

In addition to observation of a classroom setting where students learn from televised instruction, the research involved interviews with three groups of people (students, teachers and administrators) that have different roles and powers in the system. The students were from Grade Nine and the rest two groups were bachelor holders in their qualifications and were important actors in the school system. The inquiry could be sensitive to them due to their interest, responsibility or other related factors.

During my research process, however, I was sensitive to their views and perspectives. Their identities were kept anonymous and their views confidential. The security and integrity of information collected from the research participants was also problematic which demanded careful handling. I did all my best to handle their information with care by protecting it from being accessed by intruders.

Before I started my fieldwork, I requested school officials for a formal permission to get access to the study sites. Consent was secured from participants as a result of a common understanding reached after describing the purpose and nature of the study in addition to my commitments in ethical principles and procedures (Appendix 1), which was negotiated with them.

The most relevant ethical issues with regard to the participants of this research were confidentiality and anonymity, a highly regarded requirement in the Ethiopia culture. The views people express in Ethiopia could easily be abused by distortion, attribution or even accusation (Amare, 2003). Thus, all needed care was taken to protect the participant and to maintain the security of the views of all my participants. Any information (from them) was used only when there was full consent. The recorded materials were played back to respective participants for any possible changes, including deleting, editing or total withdrawal. But none of them required for any alterations.

3.7.4.2 Interpretation

By spending much time in the field, I tried to grasp the beliefs, understanding and ideas of the participants, which lead to an honest representation of their views. My independent interpretation of the data depended on this evidence. I had no conflict of interest that misguided my interpretation that was not representational. I also believe that it is a professional taboo to make unwarranted interpretations that may lead to obustications rather than illumination in an effort to understand society and us (Amare, 2003). A theory that was developed from this study, therefore, was based on my personal interpretation of the evidence that I collected rigorously.

3.7.4.3 The reader

The primary reader of the research report would be the educational research community. Ethiopian higher education instructors, researchers, secondary school managers, governmental bodies, graduate and undergraduate students are also another group of significant audience of the document. The document might provide useful knowledge that could contribute to the rethinking of televised instruction in secondary schools and improvement in Ethiopian education.

In addition, the general reader might have some interest in reading. But the research community has a curiosity for knowledge that is convincing. I have tried to support all my truth claims with adequate evidence and provide vicarious experience to the readers. Anecdotes and important quotes, which I extensively used in the narratives, might enhance the readability of the material. I have made the research methodology and research context very explicit in order to arouse the interest of the reader. I have written the report with extensive use of nouns and pronouns by limiting the use of the third person, which could make reading dull, and by using pseudonyms when it was necessary.



3.7.4.4 The self

I contend that a brief description of my autobiography can help the reader to understand my subjectivity as a researcher. My interest in research on learning from electronic media such as instructional television is initially triggered while I was taking the course communication and media studies when I was a first-year postgraduate-student in Addis Ababa University, College of Education, Department of Curriculum and Instruction.

The course mainly deals about communication theories in general and the power of the audience to determine communication effectiveness in particular. To consider communication as the transmission of information only is least effective since it denies the determinant roles of the other party to arrive at common understanding through negotiation.

Due to my interest in media and technology, I have also conducted a small study on analyzing the Ethiopia Television Broadcast in the form of a case study as a course requirement. All that motivated me to scrutinize the nature of teaching with and learning from satellite TV in Secondary Schools.

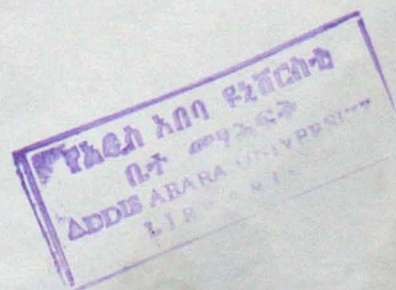
The lesson from my first year postgraduate programme helped me to learn much about qualitative research including its methodologies and philosophical underpinnings. Since taking a course on qualitative research design and reading its ontological and epistemological frameworks, I felt convinced to conduct my present thesis in a thoroughly qualitative nature. I understand that qualitative research emphasizes on understanding a particular context with the active involvements of research participants. So does communication. The convergence of qualitative inquiry and communication strengthens my motivation to proceed on this study.

My other personality in the context of this research is my involvements in teaching in Ethiopia Secondary Schools for more than four years. I was employed as an English teacher after I received my first Degree in Pedagogical Sciences (and English) from Bahir Dar Teachers College _ the present Bahir Dar University. I have also earned a postgraduate certificate from the

University of Exeter (UK) in the field of English Language Training conducted as part of the English Language Improvement Programme (ELIP) in Ethiopia in 2004.

Before my transfer to Dessie College of Teacher Education, I was working as an English teacher in Secondary Schools in Northern Shoa Administrative Zone. Some of the teachers in Debre Berhan General Secondary School_ the actual research site –are my former colleagues. This facilitated my entry into the research site. I also served as an English language tutor for Grade 9 students in order to be an insider to the school community. The school welcomed me even to invigilate students whenever there was shortage of teachers. Besides that, I collected the data by staying in the actual research site for long as a participant observer.

When the New Education and Training Policy (NETP) was launched in 1994, I was teaching English in a high school. We were informed about the nature of the new education policy in a conference prepared for teachers in the woreda. I personally found it very fascinating due to its decentralized nature; its focus on teachers and their training; its emphasis on girls' education and disadvantaged regions, nations and nationalities. I perceived the new Education and Training Policy more promising as compared to the previous educational systems during the feudalist and socialist governments. Particularly, I am happy at the dichotomy between the academics (College Preparatory) and the technical and vocational education. I am one of the victims of the non-dichotomous educational plan during the socialist system. I was trained in General Mechanics (Metal Work) in the then 10 +3 programme in Woizero Sihin Comprehensive, Vocational and Technical School but I have ended up by becoming an English teacher through joining Teacher Education College. My academic growth, I believe, had been stunted down due to my preference to vocational and technical schools as a result of lack of guidance and counseling. As a result, I failed to score the minimum requirement for a degree programme. It was through advanced programme that I earned my first degree. I have also some friends who were trained in General Mechanics or Electricity and later joined the field of Office Management and Secretarial Science. I feel that such mismatches are reduced at the present education system. Of course, the issues of labeling students who join the vocational and technical schools at present as less competent or failures in the academic areas should deserve some remedies.



After more than a decade ever since the NETP has been launched, I believe that promising results are being achieved in terms of educational expansion from primary to tertiary levels but still with disparities among regions. Equally important is the issue of improving the quality of education. Indeed, the case of the need for training in Higher Diploma for all teacher educators can be one step among others towards standard education. The English Language Improvement Programme given for teachers is also promising. However, I still feel that context sensitive educational research should be conducted to address the issue of quality.

Regarding the current politics in Ethiopia, I cannot be neutral to it unlike many teachers in Ethiopia who think that education (teaching) and politics are separate entities. I believe that education is an instrument for the development of the physical skills as well as intellectual capacity of young people who will be responsible citizens of the future generation and thus I believe that education and politics are interrelated.

At present, there are several types of political opposition parties that still advocate a unitary state just like the previous Ethiopian States that had lived for several millennia. The present government believes that Ethiopia is multi-ethnic with multiple languages and cultures that have legitimacy for independent development and autonomous governance. I favour such type of federal governance so long as there is unity within diversity and agreement with disagreement. I contend that any type of political measure that deprives our peoples, nations and nationalities of their present rights will end up with endless conflicts and disintegration. Thus I wish the present day type of wise political governance to continue to maintain stable and united Ethiopia since I believe that democracy, good governance and equality is a priority for peaceful existence.

4. SATELLITE TV INSTRUCTION IN DEBRE BERHAN GENERAL SCONDARY SCHOOL

The major purpose of this qualitative case study was to understand how satellite TV instruction was affecting the teaching-learning process in one of the high schools in Ethiopia. In this section, I have presented the data in narrative and vignettes forms. I have also shown my own interpretation and understanding of the issues in addition to participants' own interpretations and understandings.

4.1. My First Day Experience

At the beginning, I was very enthusiastic to see how satellite TV teaches. My first day experience regarding the context of the satellite TV instruction was on an English lesson in Grade Nine. By the time the classroom teacher put on the plasma TV, a native televised English teacher appeared with a broad smile and warm greetings. However, the audience (students) showed no responses.

The televised teacher introduced the daily lesson on "word family" and rushed to presentation. Sitting at the back of the classroom, I started to attend the daily lesson enthusiastically. The televised teacher explained the parts of speech (nouns, verbs, adjectives, etc). As she explained concepts, she also put the text on the screen simultaneously. Whenever she asked a question, she encouraged students to do it and whenever she imagined students attempted to answer a question, she praised them repeatedly. Everything on the textbooks seemed to be transferred through pictures.

As I started to write down what the televised teacher said, a screen full of notes appeared. Again, as I began to take the note down from the screen, it disappeared or got replaced before I completed even half of it. I was very confused due to my failure to attend the televised English lesson. I mesmerized in the novel context for a while. Then, I stared at the rest of the students to understand what they were doing. Many of the students simply gazed at the screen passively

without any attempt to take down notes. Some other students peered at the screen first and then tried to take down the note. However, they constantly frowned their faces, showed a sign of anger and inconvenience. Others even punched the desk and stamped their feet and cursed the televised women and uttered words in Amharic such as “ያጥፋሽ” (to say, Go hell) to show incompetence and hopelessness. Still some others were busy talking sides issues. During all this time the classroom teacher was standing arms folded leaning to the wall and gazing mostly at the screen.

In the mean time, the classroom teacher left to the next section since he had to manage two different sections at the same time. Now I started to understand the challenge that students had faced. Let alone the students, even I myself failed to cope up with the pace of the televised instruction. Surprisingly enough, I had even taught the lesson (parts of speech in English) nearly in the same way as the televised teacher did (through explanation and definition of nouns, verbs, adjectives, etc). But I was not as fast as she did, nor did I use colours and pictures. At present, I could not even cover half of the given questions as class work due to shortage of time. The televised teacher simply jumped from page to page while we failed to take down important notes. We also failed to attempt one third of the given questions.

What would happen if I were a student in Grade Nine? For sure, I imagined that I would have dropped out and joined the cowboys. I told someone in my work place about my failure to cope up with the pace of the televised lesson. He told me that the way we adults were brought up was very sluggish and that was why we failed with the new communication technologies. I disagreed with such viewpoints. How could I, a postgraduate student, be more sluggish than a Ninth Grader? In addition, how could the pace of a human being be compared with the pace of a machine (TV)? If, otherwise, I was found to be unfit to learn in a grade-nine-context, those who saw the technology as a panacea might degrade my degrees.

During my first day lesson from the satellite TV, nearly similar incidents happened in biology, chemistry, physics and mathematics lessons. Hence, it was not my failure to learn from the medium, but it was the failure of the machine to be set at the pace ^{of} the human mind. Whenever I used to teach Grade Nine students or others, I used to control my pace of presentation according

to my students' need. My eyes watched out what my students did; my ears listened to what my students said and I used to even repeat concepts orally or rewrite ideas on the blackboard in a more stable manner than the television did. I did not turn my deaf ears to my students as the televised teachers did even when I used teacher-centred methodology. In the context of televised instruction, whenever the students showed a sign of anger, hopelessness and dissatisfaction, the classroom teachers could not manage the situation. The televised teachers could neither see, listen nor hear their audience due to the nature of the technology. Unlike the televised teachers, the classroom teachers actually saw how students behave and heard what the students say. However, the conventional teachers hardly have any time to deal with the scenarios. The classroom teachers were concerned with putting on and off the plasma TV. The only important task they did was asking students, "What did you learn yesterday?" at the beginning and asking the students, "What have you learned today?" at the end of the lesson. Thus from my first day experience, I understand that the instruction in the school had been shifted from teacher-centred method of teaching to machine (TV) centred one. I wondered why the trust shifted from people (teachers) to technology (satellite TV). I dared to say so because the former was given only ten minutes while the latter was given as much as thirty minutes to lead each lesson.

With the above introductory data and my own reflection, let us see how the research participants understand the context in the ensuing sections.

4.2. Description of the Case

I have discussed different issues in this section based on my own observation and research participants' own understanding. All the names given in this research are pseudonyms.

4.2.1. Students and teachers demand less televised lessons

At the beginning, students were very eager to learn from the new satellite TV that is installed in the classroom. The students urged teachers and school administrators to set the function of the plasma TV soon. They were waiting for the opening of the transmission enthusiastically. Due to technical problems, the transmission was delayed for a month and a half. The school

administration somehow facilitated the connection of the satellite communications and the plasma TV started.

Now students began to attend the televised lesson eagerly. They started to enjoy watching. As a novel medium, it was very attractive in its colours, pictures, arts, instrumental or background music and native people's English accent. A student participant, fictitiously named Marta, said,

At the beginning we were very interested to know what the plasma TV is all about. As the transmission is introduced, we began to laugh, enjoy and make fun. Two or three days passed in such ways. The periods seemed shorter than before. During the second week 'የኀላዝማው ጉድ መጋለጥ ጀመረ' i.e. its weak sides began to appear. It gives little time for us to take down notes. 'እንደ ባቡር መኖሩ ብቻ ሆነ' i.e. it started to run as fast as a train. Within the second week of the transmission, we became bored. We regretted a lot for urging the school administration to start the plasma TV. If only we did not push the school. If only the plasma TV remained closed forever.

The students began to request for more face-to-face instruction and less televised lesson as early as the second week of the transmission. However, the school administration has no mandate and power to fulfill the demands of the students. A student-participant, pseudonym Belachew, reported,

During the second week of its transmission, we told our classroom monitor to report to the homeroom teacher to closedown the plasma TV and teach us in the conventional way since we fail to understand the televised lesson. The monitor did so. Then the teacher reported about our refusal to learn from the plasma TV to the director. The director came and told us that it is out of their control to close down the plasma TV that is transmitting lessons in secondary schools all over the country. Moreover, he told us that we have to cope up with the modern technologies to combat our backwardness.

Here the director reflected the views of the higher officials who perceive the plasma TV as a panacea i.e. to solve not only the problems of the teaching-learning process in our schools but also the problems of our underdevelopment. As an employee and implementer in the education system, what the school director said seemed acceptable at least in a hierarchical administrative context (Cheng, 1996). The school and its constituencies also feared one another to take any measure regarding the teaching-learning process. Whenever any decision took place in the

school, teachers feared directors and the directors feared the woreda officials and the woreda officials feared higher regional authorities in the sector (Obanya, 1999). Belachew further said,

We repeatedly told classroom teachers to put off the plasma TV and teach us on face-to-face basis. Nevertheless, the teachers have refused to do so. They fear the school administration and the school administration is cruel to us.

Belachew still continued on the issue as follows:

At its present status, the plasma TV does more harm than good to us. In order to develop its good side, the classroom teacher and the plasma TV should share the available time equally on a fifty-fifty basis i.e. twenty minutes for the plasma TV and twenty minutes for the classroom teacher. The plasma TV should be supportive. Otherwise, allowing the plasma TV to take all the available time is not good for us.

Of course teachers were also interested to teach their own subjects on conventional basis without the plasma TV. However, they did not have the autonomy to do so. Indeed, they should abide by the rules and regulations of the school as any civil servant. As a result, they have to follow the "standardized and pre-packed" curricula transmitted through the plasma TV. However, giving priority to the 'artificial intelligence' (plasma TV) de-motivated classroom teachers since they possess live-consciousness (Beynon and Mackay, 1988). A teacher-participant pseudonym, Bedilu, described the situation as follows:

I am here as a teacher. I am here to help students learn. But I cannot do this nowadays. There is no interaction between the students and me. There is a huge gap between us. The plasma TV has reduced my service. It also devalued my teaching profession. These days, I am more annoyed and worried than ever before. If our government allows considering the plasma TV as a supportive media, I will feel happy. It should be arranged in such away that students learn more from me and less from the televised lesson. But I do not believe in the complete avoidance of the plasma TV from the classroom.

- Both teachers and students demanded less televised lesson due to its unmanageable pace. Students and teachers have also recognized the supportive value of the plasma TV. That was why they did not demand for the complete removal of the plasma TV from the classroom. What they

really disliked is the allocation of nearly seventy-five percent of the school lesson for the plasma TV and only twenty-five percent of the period for the classroom teacher. It looks as if the classroom teacher were supportive to the plasma TV. Unfortunately, the administrative system did not allow a room for flexibility to meet the needs and interests of the change-agents_ teachers and students (Fullan, 1999). This intensifies their level of dissatisfaction. This in turn can wash away their commitment, courage and motivation to strive towards the very goal of educational technology itself i.e. quality education.

4.2.2. The plasma TV does not address students and teachers' needs

It is a common agenda in education that any curriculum should fulfill the needs of the society, the needs of the learner and the needs of the subject matter though this is easier said than done (Allan and Francis, 1988). I understand such needs analysis should be conducted at any level of educational technologies such as the plasma TV as well. However, research participants revealed that no needs analysis has been done in their context regarding the use of the plasma TV for instructional purposes. It all happened suddenly by external school experts. Consequently, the pace of its transmission, its time allotment for the classroom teacher, its wait-time for questions and note taking were found to be inconvenient to the audience. Participants also did not have any orientation on how to manage the plasma TV lessons. They did not know whether the plasma TV was a substitutive, supplementary or supportive medium to the classroom teacher. Bedilu said,

We teachers are not given any training. We have no idea about how the plasma TV can be managed. It is introduced suddenly. Two teachers were sent to be trained on how to open and close the plasma TV. That is all.

A student-participant, pseudonym Geletaw, described the situation as follows:

No one asked us about our need for the plasma TV. Its presence has no benefit for us. The government must be innocent to spend a lot of money for the plasma TV that transmits only vague lessons. We need the face-to-face instruction because we understand the lesson better than the televised one. We used to score good results in the conventional way. However, we have started to score shameful results from the plasma TV. 'አንገት የሚያስደፋ ውጤት አያገኝን ነው።' (See Appendix 5).

A teacher participant, fictitiously named Girma, also reported,

“I do not know whether needs analysis was conducted at national level. However, no one has ever asked us whether we need the plasma TV or not. Officials commonly try out new practices in schools. ‘መሞከሪያ አደረጉን።’ However, any layman can understand that the plasma TV is less effective than classroom teachers. If we report this to the concerned bodies, they will turn their deaf ears as usual. ‘በአንገታቸው ገመድ ቢገባም ከወሰኑት ነገር ፈቀቅ አይሉም’ i.e. even if you put a rope around their necks, they never stop from doing what they have decided. But schools are educational institutions concerned with bringing up the future generations. Hence any decision should be done thoughtfully, not in haste.”

You can understand from here that despite teachers’ awareness about the demerits of any school practice, they commonly tend to be permissive and do jobs as they are told to do so. For example, teachers did not report officially about the problem areas of the plasma TV so far. Such educational administrative style, which is top-down, is less likely to address the needs of the majority at the grassroots level. We are at the state of beginning to practise democratic values even through the election of our own political leaders at national level. Before a couple of decades, our kings and governors were considered to be God-given. Now too much flexibility is taking place. However, the school fails to exhibit a sign of such flexibility. Context sensitivity is hardly given priority in our school particularly regarding the use of the plasma TV for instructional purposes.

Actually, the introduction of plasma TV in secondary school is directed to fulfill the needs of the subject-matter i.e. too many contents can be covered within a very short period of time since TV is characterized by its automation. Tadesse, reported,

“The plasma TV is suitable to cover contents and finish the textbook within the academic year. This is difficult to be done by teachers since the textbooks are very large. Whenever we teach, we deal with very specific concepts and we set our pace according to the students’ level of understanding unlike the plasma TV.”

Giving priority to finish the bulky curricular materials by emphasizing less on students’ needs and learning ability negates quality education. Learning for understanding, critical thinking and

creativity are less likely to take place (Temechegn 2001; Thomas and Albee, 1998). The plasma TV is suitable to meet the needs of information accessibility in a very large quantity.

We are at the stage of knowledge boost. Hence, curriculum developers should be aware of the fact that bulky textbooks loaded with information to be memorized by learners can help little for the learners to develop mentally. The schools should focus on helping the students to learn how to learn and handle new situations in such changing and challenging world.

At present, textbooks with large volumes filled with “facts” are transmitted through the plasma TV with little or no room to engage students in active learning. Single correct answers based on convergent thinking are being encouraged at the expense of divergent and higher-order thinking skills (Temechegn, 2001; Thomas and Albee, 1998).

In short, the needs of external curriculum developers seemed to be addressed through the plasma TV since its focus was on information transmission without considering the learning needs of students. Teachers’ need for teaching and helping students learn at a humane pace was not addressed, either.

4.2.3. To cover the content and to help students learn are not the same

The intent of the plasma TV was the transmission of the lesson in a prescribed manner. The very nature of the plasma TV did not allow the televised teacher to see, listen to and understand students and their learning difficulties (Barker and Patrick, 1988). Belachew reported,

“We are at the worst situation now. We cannot inform the plasma teachers to slow down the pace; we cannot ask for repetition or revision. We have also no chance of second viewing. ‘ነገሩ ሁሉ ንጉሥ አይከሰስ ሰማይ አይታረስ ሆነብኝ::’ i.e. it is not manageable at all.”

Such unmanageable pace of the plasma TV forced the students to watch the televised lesson passively without even trying to take down notes from the screen. Marta said, “From now on wards, I will not take down notes from the screen. I have wasted so many papers so far but I

could not read it. I will simply watch the TV and take down notes from the textbooks at home. The pace is too challenging.”

To help students learn something, the school should have developed a sense of acceptance, respect and dialogue with the students in order to meet their needs. This is hardly possible in the school traditionally. The situation is worsened ever since the plasma TV is introduced. Belachew described the scenario as follows:

“The televised teachers are unsympathetic to us; they do not bother whether we understand concepts or not; they simply rush from page to page and from unit to unit without giving us enough time even to write down key concepts, let alone to understand the concepts.”

Even worse, the televised situation disturbed students’ concentration (Mander, 1978). As the students tried to focus on what the televised teacher said, texts appeared immediately on the screen. Again as the students focused their attention on the text, it was replaced soon by another text. Students missed televised teachers’ explanation as they concentrated to take down notes and they missed notes as they concentrated on what the televised teacher said. Meanwhile, students were invited to refer to their textbooks, which were distributed on one-to-two bases. Besides that, the motion, arts, pictures, colours, noises, sounds and music of the plasma TV robbed off students’ attention (Amare, 1998). There was little or no time to stop and think attentively. Students tried to take down notes in a hurry. As a result, their notes were unorganized, illegible and meaningless even for themselves. That is why a student-participant said,

“Although I take down notes from the TV screen on a separate notebook, I cannot read it. I miss many concepts. I simply pretend to write down notes just to appear ‘active’ and ‘attentive’ to the classroom teacher. I have got other exercise books to copy down notes from books at home.”

In addition to wastage of students’ time and material, the pace of the plasma TV even spoiled students’ handwriting skills (See Appendix 2). Who knows what is happening in their mental development? Of course, I have observed that students were passive during the plasma TV lessons (Mander, 1978; Amare, 1998). They did not ask questions most of the time; they did not give answers whenever asked and most of them also scored below average on classroom tests.

As long as students did not communicate using English, their language development and communication skills could be crippled (Beynon and Mackay, 1988). Belachew reported, "Whenever I gaze at the screen, I feel asleep. I cannot attend the lesson. I used to score nine out of ten when teachers taught me but now I scored eight or nine out of twenty based on the televised lessons."

Bedilu also reported, "Most of my students have scored less than the average on a test based on the plasma TV lesson. During the transmission, most of the students remain passive. We are also busy waking them up from their short naps. _ 'ሽለብታ ሲወስዱ'"

All these indicate that students were being disengaged from active participation. A student-participant reported, "Whenever a classroom teacher teaches me, I become attentive. I can understand key concepts. I can also take down notes confidently. I cannot do all these during the plasma TV transmission." That is why Bedilu concluded,

"To cover the content and to help students learn are opposite concepts. To cover the contents is easier while to help students learn something is more challenging. Since its focus is on content coverage, I found the plasma TV to be even more rigid than the teacher-centred methodology. As a result, the plasma TV is far from initiating active learning."

Once upon a time, the televised English teacher greeted the class and introduced the daily lesson and said, "We have a lot to do today". Keeping her promise, she started to present the lesson in a faster pace than ever before. She covered all the contents from page 145 to page 156 within thirty minutes. All the students were inurmuring against the inconvenience of the pace of the plasma TV. In the end, the classroom teacher asked the students two questions based on the televised lesson. The students could not solve the problems. The teacher left the class shaking his head with a pity since he had no time to deal with the problem any further.

Since my role was as a participant-observer, I tried to cover that portion during the weekends through tutorial sessions. Those pages covered within thirty minutes by the televised teacher took me ninety minutes! Even so, many students still failed to understand many concepts. Hence, students need time for concentration. They need also to practice school tasks in order to

understand and learn a given concept. Otherwise, rushing to cover contents can be as simple as putting on the plasma TV just to display the material to the audience. However, sending messages cannot be the guarantee for the messages to be understood by the group since they have their own will or power to accept or reject any ideas (Amare, 1998). I believe that students have their own affective-filter to enable any input to strike deeper.

4.2.4. The classroom teacher facilitates learning better than the plasma TV

Whenever students learned from the plasma TV, they failed to listen attentively; they failed to jot down key concepts; they failed to ask questions and they failed to complete exercises given by the televised teacher, too. The televised teachers usually asked students to do exercises but the time was too short to do so. The televised teachers instantly revealed the answers for the questions before students attempted even one-third of the exercise. Such practices discouraged the students to be engaged in solving the given problems because students were aware of the fact that the answers will be told after a minute. They did not bother to solve problems.

Assume that you are in an examination room as a candidate. As you start to struggle to solve the problems, you are suddenly told that the answers for the questions are attached at the top of the last page of the booklet by mistake. What do you do? If you are honest, you will first attempt the questions in a hurry but not with too much concentration. However, finally you will refer to the given answers and take down corrections. In the meantime, if you face a challenging question, you will be less likely to be engaged in thinking and solving that problem. This situation is reflected during every televised lesson. Whenever questions were asked, the solutions were told immediately before students attempted the problems.

A teacher-participant, pseudonym Mesfin, described the situation as follows:

“The manner of asking questions and then telling the answers to the students before they attempt to solve the problem is even less challenging than solving mathematical problems using a calculator since it does not demand too much engagement in thinking.”

During the televised lessons, students were less likely to be engaged in the learning tasks provided by the televised teacher. Unless students were engaged in the learning tasks, and solve problems by their own, they would less likely be creative and critical. Such a situation tends to enhance rote-memorization. Learning is an active process. It is the learners' activities and not their televised teachers that result learning (Amare, 2000). Belachew also reported,

"I consider learning from the plasma TV like watching news_ 'ወሬ'. Nothing is clear to me. If a teacher teaches me writing with a piece of chalk, I think I can get better results. I prefer learning from the classroom teacher. The plasma TV is like a film to me. It is good for joking. Hence I dislike the talking mirror [plasma TV] 'ሰፋላፊ መስታዎት::'"

Most students were disinterested in the plasma TV since its pace was not compatible with their learning ability in a foreign-language-medium context. Unlike the televised teachers, classroom teachers could present lessons in a humane manner. They could manage the pace of their presentation in accordance with their learners' ability. The teachers could also ask the students questions, check students' class work and revise problem areas, if any. Teachers could understand their students' problems even by a simple eye-contact based on students' facial expressions.

The students could also share their views with their teachers as well as with their own peers. They could also take down notes clearly and with confidence, not with confusion since the notes written on the blackboard were stable until all students complete the notes. This was hardly possible during the plasma TV due to its transient and unstable nature (Kozma, 1996).

During face-to-face instruction, both teachers and students became active. Lively classroom interaction is observed when classroom teacher led the whole sessions during the interruption of the transmission or during the tutorial sessions. When comparing and contrasting the plasma TV with the classroom teacher, Belachew reported as follows:

"There is a huge difference between the two. 'የሠማይና የምድር ያህል ይለያያል::' The plasma TV does more harm than good to me. The interruption of the televised instruction due to blackouts has given me a lesson that learning is most successful through classroom teachers. No matter how poor, unprepared and less



knowledgeable the teacher is at teaching; he [she] is better than the best satellite TV instruction."

Belachew still continued,

"The reason is that whatever challenging questions we asked the teacher, he [she] can come to the class well prepared through reading or asking other people the following day and he [she] can discuss with us in a better way. Therefore, I believe that there is nothing that can facilitate learning better than a teacher. If at all there is, I do not believe it."

Thus students preferred learning from the classroom teacher to plasma TV instruction. Of course, teachers in the school focused on the talk-and-chalk method. Even so, classroom teachers were more concerned for their students' learning than the televised teachers. Mesfin reported on the issue as follows:

"Although I focus on the talk-and-chalk method, my students prefer my manner of presentation. I feel also happy whenever I conduct the lesson by myself. However, I do not mean I am better than the plasma teacher."

Here teachers were also interested in teaching their own subject-areas based on their specialization. As students have internal needs to learn, teachers also have internal urges to share their expertise with their students. To fulfill such internal needs, both teachers and students perceive the conventional classroom atmosphere conducive to facilitate the teaching-learning process. I also agree with such views generally.

A student-participant, fictitiously named Fikru, has a very great interest to the plasma TV instruction unlike many other students. However, he himself witnessed the incompatible nature of the plasma TV for students' learning. He said,

"Before the introduction of the plasma TV, you can simply attend the classroom teacher and understand concepts. You can even pass classroom exams without any further preparation if you want to. Gone are the days to do so. You cannot understand basic concepts from the plasma TV due to its speed. That is why my family pays for me to learn privately at night, as well."

Teachers and students who even considered the plasma TV as an attractive medium confirmed that at its present status the plasma TV was not as conducive as the classroom teachers to enhance students' learning. It is only appropriate to cover contents.

4.2.5. Both students and teachers become passive during the televised lessons.

As it is implied in the previous discussion, students were not seriously engaged in learning tasks due to different reasons. First, the pace of the televised lesson was unmanageable. Hence, students passively stared at the screen without attempting to take down notes. I have seen three students struggling to copy down the text on the screen co-operatively. They divided the number of lines equally among themselves to copy down by leaving spaces so that they could rewrite the skipped portions out of school hours. However, they usually missed concepts, too. Let alone for an individual learner, even the three students failed to finish the text. 'በደቦ እንኳ አልተቻለም::'

Second, students considered the plasma TV as a fun medium (Salomon and Leigh, 1984). Whenever they watched an experiment or picture, they inclined to be busy talking irrelevant issues instead of focusing on the concept being transmitted. A student participant, described the situation,

"We simply enjoy the plasma TV like a film. It is a joke. We usually make fun and talk about the beauty, posture, dressing, hairstyle, make-up, eye-brow-cuts and other manners of the televised teachers. Our classroom teachers do not notice this due to the noise of the TV."

Students' called the plasma TV as "ETV2", "Collection Music", and "Video-film". In such a situation, students failed to concentrate on the messages of the lesson.

Third, students did not ask for clarification even if the lesson was vague to them. The situation has discouraged the development of the art of questioning (Amare, 2000). Students had also great tolerance even to many other unbearable and inconvenient scenarios. Belachew said,

"Let alone me. There is a clever girl in our class who used to ask teachers challenging questions. We used to benefit from the explanation given to her. However, after the plasma TV started, she never asked questions. Her task is chewing gum and making a popping sound with it 'ስራዋ ማስቲካ ማንክና ማጮህ ሆኗል::' We never ask questions. To ask a question, you need to understand something but we fail to do so."

The classroom atmosphere was not suitable for engagement. Rather, it encouraged passivity and permissiveness (Mander, 1978; Amare, 1998). It was not suitable for concentration.

Fourth, students did not understand the language and accent of the televised teachers. Unless the classroom teacher rephrased the concepts or translated the words into students' mother tongue, they usually failed to recognize even what tasks were given, let alone to understand the gist of the lesson.

Finally, the classroom atmosphere was depressive. It was not uncommon to see students feeling asleep in the middle of the transmission of the lesson. The suffocation of the large-class together with the heat from the sun in the afternoon and the heat, picture, motion, sound, and noise from the plasma TV created a stuffy room. Bedilu reported that "students prefer sleeping to learning during the transmission time [Mander, 1978]". Hence, the televised lesson made the students more passive than the teacher-centred methods. Students' role was reduced to simply watching the televised lesson without being engaged in note-taking or attentive listening.

The role of classroom teachers was also reduced too much during the plasma TV lessons. During the televised situations, teachers usually did not prepare for longer presentation of a lesson since they were given only one-fourth of the period. They did not usually lecture, nor demonstrate a lesson to their students. They did not even write on the black board except two or three lines. They did not also prepare lesson plans since the daily lesson plans have been sent to them in the form of CD, which is accessible through the two computers found in the school. Like their students, the teachers also became passive. Whatever the classroom teachers used to do was done by the televised teacher. One of my student participants said, "Classroom teachers never prepare to teach these days; they totally depend on the plasma TV 'ሀሳባቸውን ሁሉ ለፕላዝማው ሠጥተዋል::' Their job is to switch on and off the plasma TV only."

Being dissatisfied by the passive role of her teachers, Tarikwa said, "Nothing is surprising to me except the classroom teachers who simply stand arms-folded during the televised lessons. What are they doing? Are they school guards? 'ዘበኞች ናቸው እንዴ?'"

Students also nicknamed their classroom teachers as DJs. Students constantly claimed about the unsupportive and passive role of their teachers due to their limited time during the transmission and their workload as full-time teachers. The teachers were also not interested in their reduced roles. Bedilu described the situation as follows:

"When I was teaching without the plasma TV, I used to be delighted and well prepared. I used to understand my students' problems. I used to clarify vague concepts to students. But at the present televised situation, I am unsupportive to my students since I have no time to do so. 'ለይስመላ ነው የቆምኩት::' As a result, my love and devotion to the teaching profession is being washed away."

You can understand here that the teachers were dissatisfied since they had no time to share their expertise with their students. Before the plasma TV project started, teachers were considered intellectual models. During the use of the traditional teacher-centred methods, the preparation, presentation and selection of the media were left to the classroom teachers alone. Such roles were used as sources of moral satisfaction and respect for the teachers (Amare, 1998). This is not the case at present. Throughout the period of my field observation, classroom teachers commonly asked students, "What did you learn yesterday?" at the beginning and "What do you learn today?" at the end of the lesson. Only one or two students showed responses in such occasions by naming the title of the lessons. Further discussions based on the issues of "why" and "how" were rarely addressed.

The reduced role of classroom teachers will deskill them in the end, i.e. they will be likely to lose speaking skills, presentation skills, media selection and utilization skills since the teaching responsibility was apparently shifting to the machines. Lack of practising the foreign language would also intensify the problem of being deskilled on the part of teachers. All these could catalyze de-professionalisation.

In short, both students and teachers became inactive during the televised lessons. Such reduced role of teachers and students is likely to minimize the commitment needed to bring the desired educational goals into effect.

2.4.6. Happiness versus hopelessness

Since context analysis was not conducted in the research setting, most students were not interested in the televised scenarios. Students' needs, predispositions, desires and experiences were hardly addressed. As a result, they did not show interest in the plasma TV. Instead, the students preferred learning from the classroom teacher on face-to-face basis. Whenever the televised instruction was interrupted due to blackouts or transmission problems, students felt happy. They usually cursed the plasma TV whenever it restarted. When I asked Belachew about his feelings during the interruption of the plasma TV, he said, "Its interruption is a relief for us. We become delighted since our teachers can teach us at a normal pace. Unfortunately, our happiness is short lived after the plasma TV resumed. Our happiness is replaced by hopelessness."

Students have developed hate of the televised instruction since its nature of transmission did not address their learning needs. Teachers also witnessed students' unhappiness in the plasma TV. Mesfin reported,

"Students wish the plasma TV were broken. 'ተሠብሮ በተገላገልን ይላሉ፡፡' Students usually ask me to put the plasma TV off and continue the lesson on face-to-face basis. I cannot do this since the government favours it. Once upon a time, the transmission was interrupted. As I entered the class, they shouted 'እልልልል!' to celebrate their utmost happiness [in Amharic]."

A student also said, "I hate coming to school ever since the plasma TV started. I am not interested in it. If only the plasma TV burnt out! If only it broke down! I always prey to God to fulfill my wish." Surprisingly, following the curse of the student, fire broke out one day near the school compound unexpectedly. Students and teachers together with members of the community in the town controlled the fire cooperatively. Many students used even their clothes to put off the

fire. Had it not been for the efforts of the school community, the school might have been destroyed by the fire that was lit up in the farmlands by an unidentified person.

Whenever there was no transmission, I have observed lively classroom interactions between the classroom teachers and their students. Students did not show frowned faces. They became delighted. They also became engaged in learning tasks relatively in a better way than the televised situations. Students asked more questions. They became involved in solving problems. They attentively listened to the classroom teachers' explanations. They took down notes legibly without missing too many concepts. They could ask their teachers for clarification, meaning or repetition of issues that were not clear to them. Such engaging activities and manageable situations increased students' participation and they became pleased.

During the interruption of the plasma TV, teachers were also engaged in different activities. They asked their students. They explained concepts to the audience. They also gave class works and checked students' works. Though the teachers predominantly use lecture methods, they invited students to ask questions in the middle of their explanations. Such lively conversations that were hardly observed during the televised instruction forced me to consider the teacher-centred methodology more interesting and engaging. My reason for this was that students became more participatory for their own learning as compared to what they did during the plasma TV instruction.

Students' dissatisfaction due to the televised lessons was more likely to create hopelessness towards school activities. Students frequently showed signs of defeat, failure and incompetence to learn from the televised teachers. Consequently, the students were pessimistic to their future academic career. Tarikwa, for example, reported her hopelessness as, "I will not pass this year. If at all I pass, I will not be successful in my future academic studies. The very introduction of the plasma TV is aimed at making us detainees."

I also share students' views of hopelessness whenever I think of the televised classroom atmosphere. The students could not cope up with the pace of the televised lessons. They were simply hypnotizing. Geletaw described the situation as follows:

“Education is becoming tantalizing. ‘እንቁስሰጥሽ ሆኗል’. How do you feel when you are hungry and experience a tantalizing smell of food while you cannot get that food? Similarly, we see televised teachers but they do not see us; they speak to us but we do not listen to them. If at all we listen to them, we do not understand them. ‘ላም አለኝ በሰማይ ወተቷንም አላይ ነው ነገሩ’ ”

Parents have also reported to the school during a conference about their students’ hopelessness ever since the plasma TV was introduced in the school. Hopelessness has spread not only among students but also among teachers due to their passive roles in the teaching-learning process. Bedilu explained,

“I feel incompetent and unsupportive to my students despite my internal urge to help them... I feel depressed and annoyed. At present, we teachers are irritated and dissatisfied. Hence, my love and devotion to the teaching profession is being eroded and I have become hopeless.”

Hopelessness is likely to initiate passivity eroding ones’ devotion for the realization of ones’ mission. Ones’ educational life will be futile if not supported by ones’ hope for success. I believe that if we do not have hope, we will have no power to cope with this tempestuous world (Friere, 2003). We have seen so far that students’ happiness increased whenever their classroom teachers taught them while there was no transmission. Responsible and concerned teachers for their students’ learning also felt the same. However, the students felt dejected as the plasma TV transmission resumed.

2.4.7. Hiding in the jungle

We have seen earlier that most students and teachers were disinterested in the plasma TV instruction. However, there were also some students and teachers who were interested in the televised situations.

Some students showed affection to the plasma TV due to its attractive nature of presentation associated with its colours, pictures, arts, music and motion since the medium is suitable for entertainment (Amare, 1998). As a result, there were situations in which students showed

reactions against classroom teachers' presentation. Such students said that plasma TV instruction was better than the conventional way of lessons presented by their classroom teachers. Whenever lessons were conducted in the conventional way, these students felt bored. They usually longed for the continuation of the televised lessons if interrupted. Belachew described such students as follows:

"Students who love the plasma TV are only those who come to school for pastime, not for learning. These students prefer the plasma TV to the classroom teacher because they consider the TV as a video-film. Hence, they watch the TV for fun and enjoyment. Moreover, the plasma TV is suitable to talk nonsense to one another as they wish since the classroom teachers fail to control them due to the chaos created by the plasma TV itself."

Indeed, the classroom atmosphere was not conducive for teachers to attend what the students did and said during the transmission. Quiet classroom atmosphere could not be maintained whenever the plasma TV was opened. Students could appear attentive while they were really inattentive. Thus classroom teachers failed to manage the behaviour of their students. Such apparently democratic condition is not constructive for the young students. Even worse, there was no time for teachers to check students' class activity, homework or assignment. Teachers checked students activity only once or twice per semester. However, during the conventional face-to-face instruction, teachers used to check students class work more frequently. Marta also reported the following:

"There may be some students who love the plasma TV since classroom teachers never ask them any questions. Teachers also do not check assignments. Hence, students hide themselves in the jungle [plasma TV] 'አንድ ጫካ መደበቂያ ሆኗቸዋል' No one regulates them what they say and do."

I have seen such students who simply laughed and made fun even when there was nothing on the screen that was laughable as such. Of course, the fun was usually associated with the plasma TV itself since TV is known mostly for news broadcast and entertainment in our country. Besides that, teenagers are interested to make fun and laugh both in the class and out of the class (Daniel, 1994). Whenever the transmission was suddenly interrupted, the jungle would be removed and

everything was revealed to the classroom teacher. This exposed students' misbehaviours. Hence, such students preferred the plasma TV to the face-to-face instruction just to hide themselves.

The plasma TV created a hiding place not only for lazy and unprepared students. It was also suitable for teachers who were less concerned and inconsiderate to their students' learning. These teachers considered the plasma TV as the "best medium to facilitate learning." They argued that the plasma TV was employing students-centred methodology. Such teachers actually failed to name any one of the tasks that made the plasma TV participatory except the displays of laboratory experiments during the transmission. I agree with the fact that the plasma TV can present laboratory experiments in a "lively manner". This can reinforce students learning to understand chemical reactions in subjects like chemistry, biology and physics. However, teachers and students were not actively engaged in the experiment. They merely observed it. Chemical or physical reactions, involving changes in colours, shapes, size or sound could be seen or heard on the screen. But the audience failed to touch, smell and taste whenever possible. Teachers who favoured the plasma TV always echoed the experimental values of the transmission. They also perceived the plasma TV as a load-reducing medium. They even believed that the plasma TV was a shortcut to bring development in our nation. Fikirte reported on the issue, "The plasma TV is very good for teaching. It is suitable to cover the textbook on time. It is also a relief to me since it reduces my workload." Another teacher participant also continued, "Information technology is better for students. It is also very crucial to combat our backwardness since we have to cope up with the rest of the world."

Such views revealed that some teachers also worship the technology as most elites did. They considered it as a panacea (Beynon and Mackaey, 1988). They perceived it as a means to solve not only our school problems but also problems of our underdevelopment. Such people expect development to come from without our culture. Reality shows us that advancement should be initiated from within the native culture. Otherwise, it will backfire our endeavors towards development unless handled with care (Amare, 1998; Teklehaimanot, 2000).

I understand that as some students found the plasma TV a hiding place from the painstaking efforts of learning activities, so did some teachers. Belachew still reported, "Lazy and

unprepared teachers love the plasma TV. They do no more than opening and closing the plasma TV ‘ቀን ወጥቶላቸዋል’”.

Such reduced roles of classroom teachers could hardly be the source for their moral satisfaction. These teachers rarely prepared for presenting a lesson in the classroom. Whenever there was interruption of transmission, they felt depressed and waited for the continuation of the transmission eagerly unlike most of the school community. Thus lazy and unprepared teachers and students were hiding themselves in the jungle (plasma TV) and they were enjoying it.

4.2.8. Duplication of effort

In the previous discussion, it is implied that the satellite TV instruction has taken the lion's share of the period while a small portion of the time was allotted to the classroom teacher. Particularly during the first semester, classroom teachers were given five minutes for introducing the lesson and five minutes for concluding the daily lesson while the televised teacher has taken thirty minutes. In the second semester, the classroom teacher was given two minutes for opening the plasma TV (without any introduction) and ten minutes for concluding the daily lesson. This time arrangement might give the classroom teacher relatively longer time. However, the time was still not sufficient to meet the needs of teachers and students who constantly demanded for less televised lessons despite the fact that the school administration turned its deaf ears to them. The change in time allotment was not useable. ‘አልሸሸም ዘወር አለ፡፡’ ”

Too much time allocation for the televised lesson depicted that the role of classroom teachers was subordinate to the teaching-learning process. The plasma TV was more of a “substitutive” than supportive to the classroom teachers. Of course, it is naïve to think of the complete substitution of the conventional instruction by the plasma TV.

At its present status, the plasma TV was used to doing the traditional roles of classroom teachers. It was mainly used for information transmission. The plasma TV teachers were now considered intellectual models by playing the role of experts in different subject areas. Actually, the plasma TV did whatever the classroom teachers used to do: lecturing, asking, explaining and

demonstrating lessons in a more rigid manner than the conventional way. The difference was that the plasma TV presented lessons at the fastest pace accompanied by pictures, colours, experimental displays and musical background. Whatever the classroom teachers used to do in a humane manner was being done by the plasma TV in the form of automation. This shows no more than duplication of effort.

Moreover, I have found the contents of the plasma TV and textbooks to be much more similar. Whatever was found in the textbooks was transmitted on the plasma TV. A students-participant reported, "The contents of the plasma TV and the textbooks are identical". The difference was that the contents of the textbook were stable so that students could refer to them any time if they wanted to whereas the contents of the plasma TV were transitory (Kozma, 1996). The audience had no chance of viewing for the second time despite the possibility of the new technology to be down loaded. The school, however, failed to do so.

Another difference was that any information on the textbook was beautified through colourful pictures on the plasma TV. Other than these, the lessons on the plasma TV resembled the direct replica of the textbooks. That was why a student said, "We have been looking at pictures the whole day. 'ሰዕል ስናይ ውስጥ መጣን'". The plasma TV played the role of not only the teachers but also the textbooks. Had the plasma TV been supportive, it should have not been designed in the form of the photocopy of the textbooks.

I wondered why the school (the research site) has installed a plasma TV in each classroom while textbooks were distributed on one-to-two basis i.e. a book was shared between two students due to shortage of textbooks. It is implied here that the school gave priority to the expensive technologies by neglecting cheaper technologies (books) which could even be better than the former for engaging students in learning tasks (Amare, 1998).

Everything presented on the plasma TV was a copy of the textbooks page by page (See Appendix 3). Such similarities may indicate the relationship and integration between the televised- and the textbook-contents. However, the identical nature of the contents between the

two media and the role of the plasma TV to do whatever can be done by the classroom teachers imply more of duplication of effort, which in turn can lead to wastage.

4.2.9. Globalization is reflected in the classroom

Of course, I understand that we live in the period of information-age. My research participants also recognized the fact that we live at the time of globalization. Participants revealed that the use of the plasma TV or ICT was the direct consequence of the so-called globalization that is intended to benefit rich nations. Indeed, globalization is taking place in the field of business and information flow through the reduced physical proximity among nations of the world. A teacher reported on the issue,

“ICT is introduced to our classrooms due to the influence of globalization. The world is becoming a small-village because of increased communication channels. However, our schools should not have started the modern ICT for classroom purposes at our present level of development. I believe that developed nations did not start modern communication technologies before they become rich. We should have done the same.”

I agree with the views of the above research participant. The west has developed through gradual steps but with painstaking efforts naturally. However, we have engaged ourselves in the consumption of the western technologies, which may even bring repercussions to the development of our culture unless handled properly (Amare, 1998; Teklehaimanot, 2000). The gap between the haves (the knows) and the have-nots (the know-nots) has increased too much ever since globalization is accentuated (Teklehaimanot, 2000). I believe that we should not be eluded by globalization. The billionaires have started to travel to the space for recreation and luxury while our poor people die of hunger failing to get a morsel of bread.

There were also other research participants who favoured the use of ICT at the classroom level. Fikirte reported, “The use of modern communication technology or ICT in the classroom is suitable to bring development in our nation. Students have also the right to benefit from the modern technologies.” She viewed that development could be realized from without our culture. This is not, however, the case. Development should always be primarily initiated from within our

own culture. Unfortunately, our school systems hardly realize this reality (Amare, 1998; Teklehaimanot, 2000).

Regarding the use of the plasma TV at its present status, it favoured only those students who were fluent in the language of medium of instruction (English). Students from good families also benefited from the plasma TV since it was supportive of their learning as they could learn privately at night in tutorial forms. Those students who could not afford learning privately failed to benefit from the plasma TV. Belachew explained the issue as follows:

“The plasma TV is suitable for those students from rich families who are learning at night privately as well. But we are from rural areas. We learn using packed-food ‘በስጥ’ . We cannot afford to learn privately like the rich ones from urban areas.”

Globalization is reflected in the classrooms since schools are not islands detached from the community. However, as globalization favoured the rich and powerful nations in the world at the expense of poor nations, it did so in schools as well. Ever since the plasma TV has been introduced in the classrooms, only bright students who were fluent in English attended the televised lesson eagerly. These students found the plasma TV supportive to their learning. However, students from poor families and rural areas did not have the chance to learn privately at night. Globalization applies the rule of “the survival of the fittest.” So does the plasma TV. Smart students and those from good families benefit a lot from the plasma TV while the poor fail to benefit from it.

4.2.10. The “bullet” missing its target

The very introduction of the satellite TV instruction has been to “improve” the teaching-learning process. For this purpose, high-fidelity messages (the bullets) were sent to the audience on the plasma TV (Amare, 1998). However, research-site observation and participants’ own reaction revealed that both students and teachers become even more inactive than the conventional way.

The transmission has given focus for six “top-priority” subject areas including English, mathematics, chemistry, biology, physics and civic and ethical education. It was primarily aimed

at making lovely and lively transmission on these subject areas using pictures and laboratory experiments. It was hoped that students would be more interested and devoted in the televised subjects than the non-televised subject areas. However, the students have developed hatred to the televised subject areas and they have started to be interested and engaged in the non-televised subjects such as history, geography, Amharic and physical education. Students were not interested in the televised subjects due to the unsympathetic and inconsiderate nature of the televised teachers and the unmanageable pace of the presentations. The pace of the televised lesson was beyond students' learning ability. The limited English language ability of students has also created inconvenient classroom atmosphere for students' learning. As a result, the students become delighted and attentive to attend the non-televised lessons instead of the televised ones. A students-participant, pseudonym Tsehaynesh, reported:

"Before the introduction of the plasma TV, I used to be very interested in biology, physics, chemistry and mathematics. I also used to be uninterested in subjects like history, geography, and Amahric. However, the introduction of the plasma TV has shifted my area of interest. Consequently, I am very interested to the non-televised subject areas. Not only me, but also the whole class wait for such subject areas eagerly."

Despite the transmission of high-fidelity messages, the audience became disinterested in the televised lessons. Belachew also said, "I do not understand the televised lessons. I prefer the non-televised subject areas." Hence, the "bullet" is missing its target.

Satellite TV instruction was also aimed at the transmission of "standardized and quality" education for all urban and rural schools in the same way all over the nation. However, the transmission focused on quantity education through quick content coverage. The transmission also favoured the rich and smart students. Weaker students and those from rural areas have found the plasma TV more inconsiderate for their learning. Thus, family background differences as well as individual differences among students hardly allowed the flow of the fidelity messages to hit the target as they were preplanned. These were not the only problems. The transmission of lessons also reduced students' study-time. Marta reported on the issue,



"The plasma TV has also taken away our study-times. We used to study on weekends but now we don't. We take tests on every weekend and even at night. This is done not to miss the televised lessons on school days. Teachers are also very busy. They do not have any spare time to give us tutorial lessons."

Females and rural students who are traditionally heavily engaged in household activities were also marginalized from the learning process. Marta further said, "Although we girls are busy at home, supporting our family, there is nothing encouraging to us ever since the plasma TV is introduced." However, the new education policy was primarily meant to favour females and rural students. What is happening in schools is contrary to this. Theory has once again become anomalous to practice 'ፍጥል ወዲያ ቁዝግዝግ ወዲህ'.

4.2.11. Adding insults to injuries

One of the crucial issues that both students and teachers seriously depicted was the problem of understanding English. Students found it difficult to understand the English language that is the medium of instruction in secondary school as stipulated in the new Education Policy (1994). Of course, English is taught as a subject starting from Grade One while Amharic is used as the medium of instruction at primary level in the Amhara Regional State except a few special zones.

When I observed classroom interactions, students commonly spoke to one another in their own mother tongue. They also gave responses to their teachers in Amharic even though their teachers asked them in English. Students felt ashamed of speaking English. Whenever they tried to speak in English, they usually covered their mouths with their hands; bent down their heads; turned away their glance from you or simply smiled and mixed Amharic in their speech or stopped speaking suddenly. If you speak to them in English, they commonly ask you "what do you mean by this?" in Amharic. They still did this in their mother tongue. Whenever the students were asked to participate or discuss, they did it in their vernacular language. If at all they spoke English, it was broken or mixed with Amharic in a code-switching manner. I have also observed classroom teachers translating the tasks given by the televised-teacher into Amharic. Otherwise, students failed to understand what the given activity was all about. A teacher-participant, Tadesse, reported,

“Although English is given starting early from Grade One, students do not have a considerable vocabulary in English. English teachers still focus on teaching grammar. Students do not develop communication skills. Let alone to understand the transmitted lessons, they even fail to spell their own names correctly.”

A student-participant, Tarikwa, also explained, “We have learned English just as one subject, not as a medium of instruction. We do not have skills in listening, speaking, writing and reading. Thus we do not understand what is transmitted through the plasma TV.”

I agree with the views of the participants in general. Whenever I invited students to reflect their needs for the tutorial sessions, they always told me to deal with grammar, which included parts of speech, conditional sentences, prepositions, reported speech, etc. They did not ask me to conduct any tutorial session on how to develop their speaking, reading, listening or writing skills. The students did not have note-taking and note-making skills. Whenever lessons were transmitted on the plasma TV, they usually tried to copy down everything said by the televised teachers and everything written on the screen. Even worse, students usually did not read the whole word at a glance to copy it down. Instead, they glanced at the screen again and again to write down a syllable or even a letter. They missed the major concepts. Hence, students in Grade Nine were at the state of confusion for two reasons: first, they could not cope up with the pace of the plasma TV and second; they did not understand the language of the medium of instruction. As the saying goes, this situation adds insults to injuries for the students. ‘በእንቅርት ላይ ጆሮ ደግፍ ሆኖባቸዋል፡፡’

My colleagues and I evaluated the English language syllabi from Grade One to Eight last year. We identified that the English language designed for the General Primary Education was very shallow (Yalokwu, 2001). Students learned only simple, short, monosyllabic, everyday words like “books”, “pens”, “jump”, “fat”, “drink” etc. However, when the students joined Grade Nine, they faced challenging words like “embezzlement”, “factorization”, “fertilization”, etc. In addition to this, the focus of the syllabi was on grammar.

Of course, the use of students' mother tongue as the medium of instruction in primary schools has got its own pedagogical and political advantages. However, students and teachers demanded the use of English as the medium of instruction to be introduced at lower grade levels, either in Grade Six or Seven. A teacher-participant, Tesfaye, reported,

Our government should change the medium of instruction in Grade Seven and Eight into English. Otherwise, students who join Grade Nine without considerable English language skills fail to understand subjects that are given in English.

I understand the challenging nature of using a foreign language as the medium of instruction for young school children. Thus the use of the vernacular language as the medium of instruction is unquestionably better. However, the question is which grade level is appropriate to introduce the use of English as the medium of instruction? Teachers and students preferred Grade Seven. The New Education and Training Policy (1994) recommends Grade Nine. If easy way of learning does not facilitate learning, I prefer Grade Six. If not, I prefer the vernacular language to continue to be the medium of instruction up to tertiary levels (colleges and universities).

4.2.12. No robot here to do everything within ten minutes

Following the use of satellite TV instruction, the school has started a new system of evaluating students' school performance, which is called continuous assessment. I understand that continuous assessment is a continuous, cumulative, comprehensive and complete way of evaluation that demands more time, energy, material and coordination than ever before (Ogunniyi, 1984). However, the school was running short of time ever since the plasma TV has been introduced. The televised-teachers covered thirty minutes for transmission while classroom teachers were allowed to use ten minutes only. Within this short time, the classroom teachers were expected to revise the previous lesson, introduce the daily lesson and revise the lesson presented through the transmission. There was no time allotted for classroom teachers even to walk from class to class or from one block to another block. It was not uncommon to see classroom teachers running to enter the class in order not to miss any time. Otherwise, they would miss some part of the transmission up until they open the plasma TV. In such a situation, the school administration claimed that students should be evaluated on the basis of continuous

assessment. At an average, there were seventy-five students in each classroom. Each classroom teacher was expected to teach five or six sections. In other words, a teacher was expected to conduct continuous assessment for nearly four hundred students. However, the classroom teacher was not allowed to use more than ten minutes in each section. There was hardly any time for teachers to evaluate students accordingly. As a result, instead of using observation, project work, class work, homework, interviews and other relevant techniques, teachers commonly gave classroom tests every weekend. The most utilized types of tests in the school were objective-types including true-false, multiple-choice and matching items. I was invited to invigilate four test-sessions and that was what I witnessed. Even worse, the testing rooms were so crowded that three students shared a desk during the tests. This was liable to cheating. Since the school has been working full-day, both in the morning and afternoon shifts, teachers had no free time even to give paper-and-pencil tests on school days. A teacher reported,

“Ever since the plasma TV has been started, the concept of continuous assessment is introduced. Within the available ten minutes, we introduce and revise lessons. The time is not enough even to do so; we cannot do continuous assessment in its true sense. There is no robot here to do everything within ten minutes. Thus, we are tempted to give written tests on every Saturday and Sunday though we are not paid for working in weekends.”

Students' evaluation based on this manner was likely to focus on assessing memorization of facts. It did not as such address the evaluation of higher-order thinking skills such as critical thinking, creativity and evaluative skills (Thomas and Albee, 1998), i.e. questions related to “what”, “who”, “where” and “what” were over emphasized while questions related to “why” and “how” were not addressed (See Appendix 4).

The very concept of continuous assessment is to evaluate each student to meet individual needs through setting the pace of the teaching-learning process accordingly. This was difficult to be achieved by the school since the transmission lesson was externally controlled and run at an unmanageable pace. Another teacher, pseudonym Kedir, also reported,

“The use of the plasma TV for classroom instruction and the use of continuous assessment in such a situation are contrary issues. Hence, the government should

arrange the time of the transmission in such a way that it gives a room for us to conduct continuous assessment.”

Since the school gave written tests on the blackboard on weekends, students did not have free time to study their textbooks during weekends. Teacher also worked double shifts. They were also not free. This implies that the teachers had hardly any time for preparation since their role was reduced in the classroom very much. In a classroom situation where teachers did not have time to deal with students' expressiveness skill, presentation skill, organization skill, reasoning skill and others, it is difficult to say that continuous assessment is employed properly. A teacher described his dissatisfaction on the issue as follows:

“In order to conceal the weakness of the plasma TV, school officials have come up with the concept of continuous assessment so that students' failure is said to be reduced. Then the officials will say, ‘the plasma TV is the most successful’. In reality the plasma TV is the least successful.”

Here it is implied that there is miscommunication between the implementers (teachers and students) and the other party.

Once upon a time, fifteen students were given a “project” as a group work. The project was about preparing a pit with one metre depth and two metres width for collecting filthy matters in. Some concerned students, most of which were from rural areas, came and dug the earth and prepared the pit. Their civic and ethical education teacher came and visited the well and promised the students to score ten out of ten. As a new school, it was appropriate to prepare a ditch to pile and burn the rubbish in. The students should have done it as a free service for their school. Attributing everything done with marks has hardly any importance to develop students' learning. The teacher used this mechanism because he could not get his students regularly.

During that day, I heard a group of students nagging with their teacher. The students were begging their teacher for more marks. The teacher felt annoyed and shouted at his students to go away from him. However, one of the students boldly told him that “Let alone we students, even our country is dependent on foreign aids”. Marks were obtained through cheating, guesswork, or even begging from lenient teachers, if any. This could not develop learners' intellectual

competence. Following the incident, the teacher told me that many students did the same because they knew that they would not pass, otherwise.

As we know what happened in a school at the end of the semester, I observed that teachers were busy correcting papers, counting, adding and dividing numbers. Teachers acted as if they were accountants in a business enterprise. Marks seemed to be the end results of the teaching- learning process. This is, however, not the case (Briemer and Paul, 1971). I also believe that the very introduction of continuous assessment in education is to develop students' critical thinking by addressing issues beyond rote memory and single correct answers. It was very difficult to implement continuous-assessment evaluative techniques in crowded, large classes where teachers had no time to deal with the needs of individual students. To say that the school employed continuous assessment is more of fiction than fact at present.

All in all, before the transmission began, teachers as well as students did not have specified roles that engaged them in the teaching-learning process (There was no warm-up or get-ready activity). There was no enough time either to revise the previous lesson or introduce the daily lesson. Similarly, during the transmission students and classroom teachers passively listened to the televised lesson. They were rarely engaged in tasks. The only active agent was the televised teacher. After the transmission, the classroom teacher usually seemed to takeover the role of the televised teacher. However, due to shortage of time, the classroom teacher failed to conduct the summary effectively.

Teachers hardly prepared to conduct lessons. They became dependent on the plasma TV. Whenever the transmission was interrupted, instead of proceeding the daily lesson on face-to-face basis, many classroom teachers played the role of technicians and became busy resetting the channel. In the mean time, the period elapsed and the teachers were forced to leave the class.

The transmission should have been designed in such a way that both classroom teachers and students played prominent roles that were engaging during the three phases of the transmission that were barely addressed: pre-transmission, during (while) transmission and post-transmission.

5. CONCLUSIONS

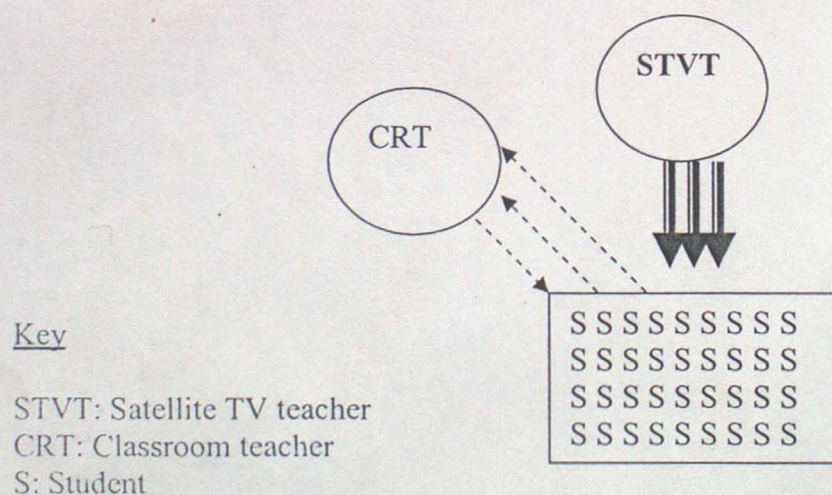
I have presented the conclusions of my research in this section. The first portion deals about the overall patterns of classroom interactions in the televised and non-televised lessons in the research site. I have also developed four major themes: teaching as transmission; disaggregating learning; de-professionalising teaching; and commercialising learning.

5.1 Patterns of Classroom Interactions

I have observed that the televised teachers differed in their presentation skills and ways of praising and encouraging their students. They also differed in allowing time for students to answer a given question and in their manner of communication to the classroom teachers.

I have already discussed how students and classroom teacher remain passive in most cases. However, there were instances where they play a considerable role though this varied from subject to subject. I have presented the nature of the classroom interaction below in diagrams.

Figure 1: No communication between the televised and the classroom teacher



The three unidirectional thick lines represented high fidelity messages flowing from the source in a 'fast forward' fashion to the receivers/students as if they were vessels to be filled (Friere, 1972; Amare, 1998).

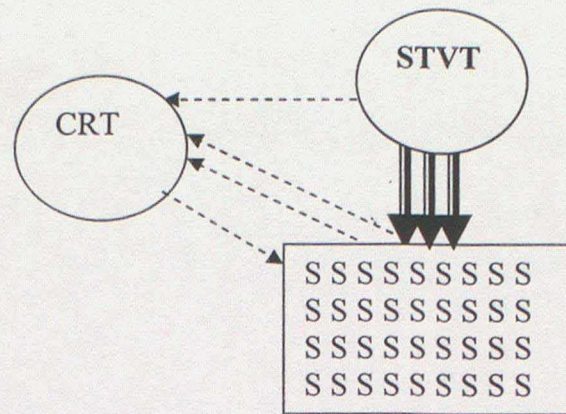
The thick lines also showed one-way communication or transmission and hence the needs beliefs, feelings, values, dispositions and interests of the audience were neglected (Amare, 1998). The classroom atmosphere was not favorable to democratic practices. Instead, the chalk was replaced by the remote controller; the classroom teacher was replaced by the televised teacher and the blackboard was replaced by the TV screen most of the time during the transmission.

The thin, broken line represented that the CRT communicated to the students but in a limited way. The classroom teacher did not have ample time to share his/her expertise with the students. Of course, the CRT had five minutes for introducing the lesson (as well as for revising the previous lesson) through saying, "Today you will learn about.... Listen attentively." During the last five minutes, the CRT revised the lesson by saying "Do you have any question? Or, simply ordered students to copy down key points if the CRT had written something on the board. This was true during the first semester. During the beginning of second semester, only two minutes was given for opening the TV and ten minutes was given for concluding the daily lesson by the CTR while the STVT still took the lion's share_ thirty minutes. The time arrangement seemed to be good but it could not bring a considerable difference.

As there was no line between STVT and the CRT, this showed that there was no communication between the two teachers except when the STVT said, "Good morning everyone" at the beginning and "Goodbye teacher" at the end of the lesson (e.g. in physics, biology, mathematics, and chemistry lessons). Such negligence of the role of the CRT to enhance students' learning could develop feeling of insecurity and dissatisfaction on the part of the teachers.

As indicated by the two broken lines, two or three students out of seventy-five usually gave suggestions to the classroom teacher. However, since it was a large class, it did not allow active learning. Even the very lay out of the classroom was in such a way that the students sat lineally in rows facing the blackboard/satellite TV looking at the back of the other students. This did not enhance human interaction. There was no student-student interaction (Pearce, 1975 in Amare, 1998). Such conditions together with the very nature of televised instruction make students passive (Mander, 1978).

Figure 2: STVT communicating to the CRT to some extent



Every meaning given to figure 1 was also meant for figure 2. The exception here was that the STVT invited the CRT to supervise the class and provide help for those students who were struggling with a given task. Actually, the time was too short to do so. What teachers usually did was to explain in code-switching manner. This was better than the former situation in that the STVT at least recognized the supportive role of the CRT.

Figure 3: The satellite TV teacher all alone

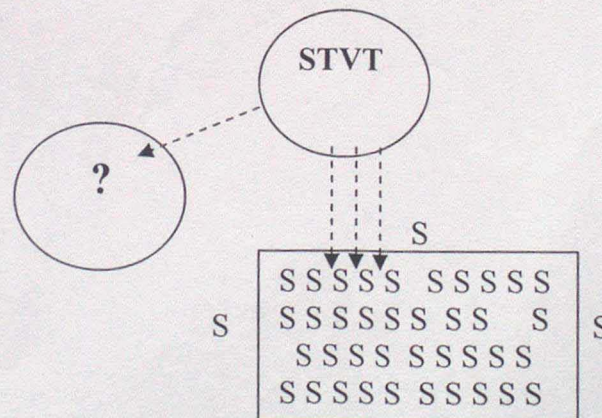


Figure 3 represented a scenario where the CRT left students alone with the STVT whenever he/she conducted two different sections within a single period. The broken lines represented that the high fidelity message was "interrupted" by the chaos created in the class as the students were freed from the control of the CRT. Some students also moved away from their seats. It was hardly possible to attend the lesson in such a situation.

The question mark depicted that although the CRT has left to the next room, he/she was thinking of the students and would come back soon usually after seven or ten minutes. This situation was observed due to shortage of teachers in the school particularly for subjects like English, physics and biology.

As indicated by the arrow, the STVT invited the CRT saying, "Please teacher, supervise your students" but the CRT was not present in one of the section. I understand this situation for the students to be "ከደጡ ወደ ማጡ" as the saying goes, i.e. adding insults to injuries. Let alone the students, even I myself failed to attend the lesson in such situations. Even watching video film for entertainment demands silence for attention and this is maintained by the presence of the owner.

By the time the CRT came back and knocked at the door, students appeared to settle down. It looked for me as if the students and the teacher played hide-and-seek as I saw some of the students crawling under the desk not to be seen by the CRT.

Figure 4: Discussion initiated by the STVT

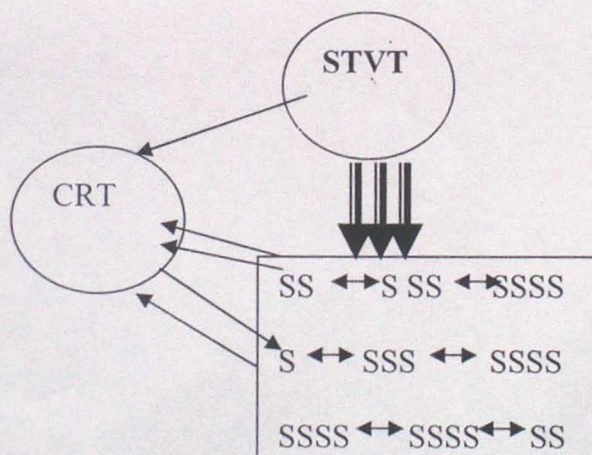


Fig. 4 indicated that STVT sometimes initiated discussion among the audience. The STVT invited students to be in pairs or threes. The CRT was invited not only to supervise the task but also to share his/her views, experiences, ideas, feelings or beliefs about a certain issue with the students. Relatively considerable time (5 to 7 minutes) was given to do so for one question in such situations unlike other televised-situations in which twenty seconds was allotted for solving

a question mostly. As you can see in the figure, the double arrows showed that some students used this opportunity to share their ideas with their peers but they usually communicated in their mother tongue and in code switching manner since they were not fluent in English. Many students, however, remained silent. Such apparently interactive classroom situation was better than the previous scenarios described in figures 1, 2, and 3 above. Nevertheless, this situation was usually observed during civic and ethical education period only. In other subject areas students were frequently busy trying to copy down the questions that were forwarded for discussion by STVT. The time was not enough to copy and understand the question let alone to discuss over the problem.

Figure 5: Classroom teacher all alone

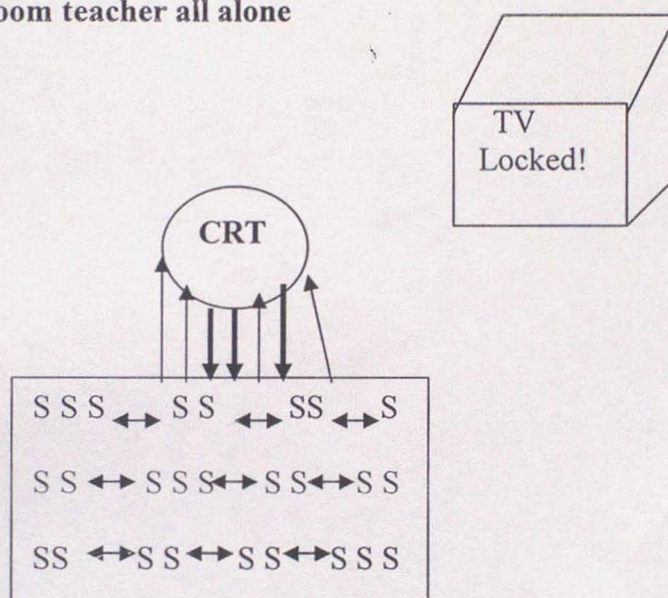


Figure 5 represented the situation when the CRT was leading the lesson for the whole period. This was possible in two conditions: whenever there was no light/transmission and whenever students were given tutorial lessons. In such situations both students and the CRT felt happy and confident. Lively classroom interaction was observed in such situations relatively. The teacher asked the students, checked students' class work and revised problem areas. Here the CRT was very active as opposed to the televised situation. As represented by the double-headed arrows, the students also shared their views with one another and with their teacher. They also took down notes with confidence, not with confusion, since the notes on the blackboard were stable until all

students complete the notes. This was not possible during the transient text on the TV screen (Kozma, 1996).

Of course, the approach used was teacher-centred. However, more time was given for students to discuss on an issue for about ten to fifteen minutes in pairs or threes in the form of using interactive lecture. This was what I did whenever I conduct tutorial sessions every weekend. Although the CRT was still dominating, students did not lose their attention by the noise, motion, picture, art, sound and pace of the machine. Students had also the right to stop the CRT any time and ask for clarification, revision or ask the teacher to slow down the pace of presentation, unlike the transmission. Such flexibility was impossible during the satellite TV instruction. There was no time to stop and think during the televised lessons. If you do not have time, you do not think critically; if you do not think, you do not learn (Thomas and Albee, 1998). Students also felt happy to learn from a teacher whom they know in person. Learning and working with someone who is not strange may increase emotional attachments and thereby learning can be enhanced. Hence, teacher-centred method of teaching, I argue, was more democratic than the satellite TV instruction. Televised lessons were suitable for domination or oppression (Friere, 1972). That was why most students needed to learn from CRT instead of STVT.

Actually, as it is implied in the new education policy (1994), we should have attempted to shift from teacher-centred methods of teaching to student-centred methodologies. However, nowadays, I fear that we are in a state of regression by moving far away from the student-centredness to machine centredness. If the situation is not managed, devastating effects will occur in our schools. The schools have been over flooded by TV due to its attractive and fleeting nature without addressing the needs and interests of the actual change-agents_ teachers and students. Such top-down approaches that did not consider the bottom-up issues were more likely to fail than to succeed (Fullan, 1999).

5.2 Teaching as Transmission

The introduction of information and communication technologies has created electronic classrooms. The physical environment in which teaching and learning occurred was being replaced with an electronic classroom (satellite TV instruction). However, "the process of teaching was very much the same" with the conventional teacher-led classrooms (Downes, 2004:1). The Satellite TV instruction was predominantly used for information transmission purposes. It increased information accessibility in large quantity. In such a scenario, teaching was considered the transmission of information while learning was regarded as to receive it. Although plasma TV was good for transmission purposes, it was not good for teaching for understanding. The transmission gave little time on the part of learners for processing the information in order to understand and interpret it in their own ways. In our case, the plasma TV was not conducive even for transmission of information since students failed to cope up with its pace of presentation. If the pace of the new technology does not consider the learning ability of the audience, there will hardly be any learning (Jaworski, 1994).

Moreover, learning is not a matter of getting information sent from authoritative bodies. "It is two-way communication or dialogue" among involved parties (Friere, 1972; Amare 1998:42). The transmission was characterized by the active role played by televised teachers while students and classrooms teachers were kept in passive roles. Especially, students were kept in "roles of passive receptions, vessels to be filled in with the teaching packages" transmitted through the plasma TV (Friere, 1972, Amare, 1998:42). The transmission did not address the students and teachers' needs and interests. As a result, both students and classroom teachers were disengaged from the teaching-learning activities and both parties were resisting the transmission.

Although communication studies conclusively assert that the audience has the power or will in determining communication effectiveness, this was hardly considered during the transmission. The satellite TV instruction was, therefore, "message-centred or source-centred" which has been identified as less effective than the audience-centred communications (Amare, 1998:42). During the transmission, information was flowing in one-way in "fast-forward" fashion. The pace of the televised lesson was accelerated beyond students' learning ability just to complete the bulky

school curricula. Content without intent seemed to be the focus of the transmission. Hence, students were taken as information recipients. Their critical and creative thinking skills were hampered. These findings were coherent with studies in traditional classrooms. For example, Temechegn (2001:102) posits, "Thinking is usually not allowed, let alone being encouraged since it slows down the lesson and puts the [televised] teacher behind schedule in covering the curriculum".

Amare (1998:45) also concludes, "most secondary school students are not children or clay that can be moulded into shapes the school wants to". That is to say, students have their own affective-filter to process any message they encounter in order to learn it or not.

Teaching as transmission of information on satellite TV was uncondusive to create an accepting, encouraging and humane classroom atmosphere. It was rather contrary to two-way communication. The information was simply flowing unmanageably like the water across the River Abay basin. Although the River Abay is the largest of all rivers in our country, it is still the least utilized one for national purposes. The same happened to the satellite TV instruction. Large amount of information was transmitted through the televised lessons but students hardly utilized it. They failed to handle and process the information for better understanding. The River Abay gives "life" to the lucky people in the desert areas abroad by eroding our fertile soils. The satellite TV also appeared to benefit the owners of science and technology since they found our classrooms suitable for marketing. As a result, the students benefited little and remained inactive during the televised lessons. This is not consistent with the aims of the New Education and Training Policy (1994:6) that envisages "bringing up citizens endowed with humane outlook [...] democratic values having the necessary productive, creative and appreciative capacity in order to participate fruitfully in development". Since the classroom situation was more conducive to permissiveness and undemocratic practices as opposed to active and creative learning environment, the realization of the above education objective seemed to be very difficult. "ፍጥረት ወዲያ ቁጥጥረው ወዲህ።"

As rivers can create waterfalls along their courses, satellite communications have also created "information-falls" in the classrooms. Unless these "falls" are managed properly, infertile minds

may crop up in our education system more than ever. Hence, students should be encouraged to “learn how to learn” in our period of “knowledge explosion” and teachers should learn how to teach in participatory ways in order to enable learners cope up with the changing and challenging world. (Amare, 2000:81; Temechehn, 2001).

At its present status, the satellite TV was even more rigid, dominant and inconsiderate for students’ learning than the traditional teacher-centred method. It is high time we started applying student-centred methods of teaching in classrooms. However, we are awfully moving far away even from the teacher-centred to machine-oriented classroom situations in a manner of regression. Learning can be most effective when the audience and the actual change-agent are given the autonomy and status to make any school decisions based on their own needs and contextual realities. Thus there is a need to shift from teaching as transmission to teaching for understanding. Perkins (1991) in Temechehn (2001:114) argues, “people learn fundamentally by doing more than receiving_ by acting on information and making up their own information”. Hence, classrooms should be organized in a way that students are actively engaged in understanding more often and simply listening much less of the time.

5.3 Disaggregating Learning

Another concept, which characterized the satellite TV instruction, was the disaggregation of learning. This is related to the concept of teaching as transmission. Many educators criticized the trend toward the use of ICT in learning as it constituted the segregation of the traditional learning tasks. Downes (2004) posited that the development of learning content was done in one place, by one person and the use of that content to support learning was done in another place, by another person. This disaggregation of the teaching process may reduce it to a series of parts which, when considered separately are less than the whole. Moreover, the overall emphasis of the transmission was the submission of learners to an external body of knowledge so as to make the learners memorize the “right” answer given as dry facts (Brooks and Brooks, 1997, Richardson, 1997, and Moon, 1999). Open-ended questions were rarely utilized during the televised lessons. If at all there were such questions, the time was too short to deal with them. There was hardly any peer interaction. Cooperative and collaborative learning experiences were not reflected in the

research site. Bits and pieces of information were simply presented from the source to the audience (students).

As a result, important and long-range educational objectives like learning for understanding, critical and creative thinking skills seemed to be difficult to be achieved. Knowledge duplication without knowledge creation, meaning making or interpretation of a particular context was accentuated during the transmission. Such findings were consonant with studies done in the traditional learning atmospheres (McLean, 1995, Brooks and Brooks, 1997, Richardson, 1997).

The Education and Training Policy (1994:4) asserts, "Education, as a very important factor to human development is of a high priority in the overall development endeavor of the government." One of the learning theories that could help for human development is the constructivist view of learning, which enables "the learners [to] construct their own knowledge and the knowledge is conceived to be organized more as a network." (Moon, 1999:106). However, instead of striving toward the human development aspects, schools seemed to emphasis on transmitting the knowledge that "comes cut, dried and packed in crates consisting of discrete, irrefutable pieces of information...." (McLean, 1995 in ESDP and AREB, 1999:7). Valuable learning aspects like constructing meaning, synthesizing, reflection and other thinking skills were barely addressed. In other words, the emphasis of the transmission was "on a quantitative change in the amount of knowledge" instead of "a qualitative change" in the learners (Moon, 1999:107).

The satellite TV instruction was conducted nearly in all secondary schools to transmit the same content at the same time, in the same way by the same televised teacher of a particular subject in a particular grade. Contextual school differences as well as differences among students in needs, interests, age, gender, ability and so on were hardly addressed. Negligence of individual differences could also imply negligence of learning styles. An artful classroom teacher could react to the individual needs of students with regard to ability, attitudes, sex, cognitive skills, motivation and mood while the plasma TV was barely able to account for any of these. It was a de-contextualized approach to learning and teaching since the influence of the classroom culture and the broader social context were barely considered. Schools need to accentuate "uncovering

meaning” on the part of learners instead of focusing on “covering prescribed materials” (Temechegn, 2001:75). Hence, instead of creating the straitjacket of teaching and learning process based on the scientific approach, there should also be a need toward the intuitive or tacit knowledge for the overall development of students.

5.4 De-professionalising Teaching

One of the most attractive aspects of professional work is the manner professionals are treated in the work place. Professionals are presumed to know what they are doing and are paid to exercise their judgment (Pratte and Rury, 1988). Successful school operates on the principle that the essential resource is already inside the school. Especially, determined, intelligent and capable teachers are the foremost components for school effectiveness.

In school-based management, the school strategies encourage participation and development and the role of the teacher is partner, decision maker, developer and implementer, as well. They work together with shared commitment and participate in decision making to promote effective teaching and develop their schools with enthusiasm (Cheng, 1996). Under external control management, the role of teachers is employees, followers and order receivers and implementers. They are passive and cannot participate in decision-making. They only listen to orders and perform duties assigned by the school and central authority (Cheng, 1996). Such external school management system was reflected in the research site. The problem was intensified following the introduction of stateliest TV instruction.

The selection, preparation and presentation of lessons were done by the televised teachers while classroom teachers permissively watched what was being transmitted as if they were students. Exercising one’s “expertise is taken to be the key to autonomy and a sense of professionalism” (Pratte and Rury, 1988:72). However, teachers whose subject areas were televised exercise little control over day-to-day work lives. Whatever teachers did was under the technical control of the television. The teachers did not determine the schedule, location or general content of their work. Formerly, they were the sole executors of someone else’s curricular materials. At present, the classroom teachers lost their conventional roles since both the planning and execution were done by the technology. All these reinforce the process of deskilling in teaching.

In light of standardized, predetermined curricula, teachers were prevented from questioning the underlying values, knowledge and attitudes. Teachers did not have the autonomy to do their job based on their own will and understanding. Pratte and Rury(1988:77) posit , "To achieve a high degree of autonomy, a professional group must maintain that the power to control its own affairs is essential to performing its job". Otherwise, job dissatisfaction will crop up among teachers.

We know that teaching-learning activities are characterized by unpredictability or uncertainty i.e. students can respond to a given learning task in highly complex and unforeseen ways. Artful teachers pay attention to the nature of their students by noticing and responding to highly individualistic responses, modifying aims and methods in the course of their teaching. Teachers respond to the unforeseen teaching-learning process itself. Their teaching is not comparable to auto mechanics following fixed plans. To cope with such situations teachers must be adaptive and creative. However, the presence of high technicality following the plasma TV erodes the occupation's professional status. Teachers were being deskilled since their major role was to put the plasma TV on and off. So long as teachers did not have considerable roles in planning lessons, selecting media and presenting lessons, their professional skills might be washed away. Particularly, since the medium of instruction is a foreign language in high school, teachers may soon lose communication skills as far as they fail to use the target language frequently.

Education does not end up with certification or graduation. Teachers need to adapt the role of facilitating learning instead of being knowledge dispensers. However, what was observed was that teachers were neither knowledge givers, implementers, nor facilitators. The televised-teachers played the role of designers, implementers, controllers, and knowledge broadcasters. This finding was found to be consonant with Pratte and Rury, (1988) and Cheng, (1996). Instead of deskilling classroom teachers, there should be a need towards their empowerment and professional development in order to facilitate the teaching-learning process more effectively.

5.5 The Commercialisation of Learning

Numerous educators have criticized the gradual trend away from teacher-led system of learning following the use of new communication technologies to be a move toward a system of learning in which vested interests may flourish (Schramm, 1977; Downes, 2004). The paramount instantiation of this may be described as the commercialisation of learning through including the corporate or commercial interests to the objectives of public education system. Downes (2004) contends that there seems little doubt that the public education system is already pressed around the edges by commercial interests. As a result, there seemed to be a danger that learning, like most consumer goods, would be offered at varying levels of quality, with the best education being provided to those who can afford it. The dictates of business pay little attention to the public good. While society may prefer that every student be provided quality education, this may not be the best interest of corporate providers. This may be a major threat for the future in our country especially when on-line learning is launched. The General Manager of EMA reported, "The future task will focus on the sustainability and integration of ICT. This would be made phase by phase, first by expanding the instructional TV from priority subjects to all subjects, then to computer based teaching and internet online including Multi-modal teaching to primary level of education" (Demissew in Ethiopia Today, 2004:6).

The major rationale for the introduction and expansion of IT is economic efficiency. IT is now welcomed with little or no debate into classrooms in order to reshape education by industrial lobby. It tends to be accepted without noticing its cultural specificity and its failure to suit unpaid work or work in settings outside the production domain e.g. education (Beynon and Mackay, 1988).

Modern communication technologies has emanated from engineers or technicians. Thus educationalists are in danger of being marginalized. Students, teachers and even curriculum developers do not participate in the design and production of hard and software programmes.

If IT continues to fill our classrooms (with TV, computers etc.), technological objectives will override educational objectives. This can create technological immanence which refers to the

straitjacket of social economic, and policy related arrangements for consumption of the technology since we are far from producing the new technology (Beynon and Mackay 1988).

The product emphasis of computers is inappropriate in the education context, which accentuates process as much as product. Schools do not produce a product in the same way as an industry or business center. IT in education is an intrusion, insensitive to its aims, values and practices. Hardware and software pays little attention to current classroom practices and can be disruptive of existing structures and practices.

IT can affect most walks of life (business, health, agriculture, education etc.). However, such modern technologies are primarily produced for controlling workers in order to increase production in industry. IT can be used as a supportive device in schools particularly to increase information accessibility and develop computer skills. However, education is more of a process that demands internal willingness and commitment mostly on the part of both learners and teachers. External control, which is rigid and insensitive to a particular school context, could result de-motivation among the actual change-agents. It can also create desperation among critical people to see the artificial intelligence being considered superior to the human intelligence. Education demands freedom and democratic atmosphere to utilize its constituencies' internal energy fully which otherwise may remain latent.

To sum up, as new technologies are implemented, it is important to be acutely aware of the social impact of learning as well as the impact of the vested interests in order to ensure the issue of quality in terms of content and its accessibility and methodology. Although the influence of IT on education is inevitable, it is necessary to ensure that the needs and interests of learners, curricula and the society at large are met through careful context analysis instead of running to homogenize what is actually heterogeneous.

It is important to note that satellite TV instruction has myriads of problems as indicated in this research. Hence, it is up to the Ethiopian community in general and our elites and policy makers in particular to consider the issues to alleviate the deficiency areas, if they find any.

BIBLIOGRAPHY

- Abate Legesse, (2004). An Assessment of Information Technology Implementation in Secondary School Curriculum in Bale Zone. Masters Thesis AAU (Unpublished).
- Abre Mekuria,(2004). The Utilization of Social Studies Educational Radio Programme in the Second Cycle Primary Schools in Amhara Region. Masters thesis AAU (unpublished).
- Abraham Asaro, (2001). Preparation and Utilization of Instructional Materials in Primary Schools of Wolayta Zone. Masters Thesis AAU. (Unpublished).
- Abyotawi Democracy (Hidar 15, 1997 Eth.C) Secondary School Education as Discussed by Different Political Parties. (Translated).
- Agalianos, A. and Cope. P.(1994). "*Information technology and knowledge: the non-neutrality of content-specific educational software*". **Journal of Education Policy** 9 (1): 35-45. Taylor and Francis Publishers.
- Allan, C. and Francis, H. (1988). *Curriculum Foundations and Issues*. New Jersey: Prentice Hall. Engle Woodcliff.
- Amare Asgedom (1998). *Television Method of Learning: A Habit of Learning with the Least Effort*. **Bulletin of Bahir Dar Teachers College** 9 (1): 1-14.
- _____(1998). *Culture and Development*, **IER Flambeau** 5:1-6 AAU Addis Ababa.
- _____(1998). *Communication Theories and Instructional practice: A Limited Effect Perspective*, **IER Flambeau** 5:39-49. AAU Addis Ababa.
- _____(2000). An Andragogic Approach to Teaching and Learning, **IER Flambeau** 8 (1): 73-88.
- _____(2003). Higher Education in Ethiopia. Unpublished
- _____(2004). *Debates in Research Paradigms: Reflections in Qualitative Research in Higher Education*. **The Ethiopian Journal of Higher Education**: AAU 1 (1): 41-61.
- Barker, B.O. and Patrick, K.R (1989). "*Instruction Via Satellite Television: An Exploratory Analysis of Teacher Effectiveness*". **Research in Rural Education** 5 (3): 31-36 Orono: University of Maine.
- Best, J. and Kahn, J. (1999). *Research in Education*, 7th Ed. New Delhi Prentice Hall of India Private Limited.
- Betsate Terefe (2000). Application of Instructional Materials in the Primary School of the

- SNNPR. Masters Thesis AAU (Unpublished).
- Beynon, J. and Mackay, H. (1988). "Information Technology into Education: towards a critical perspective" **Journal of Education Policy** 4(3): 245-257.
- Bridges, D. (1998). Quality in Teacher Education and Training: Key note lecture to National Conference on the Quality of Primary and Secondary Education in Ethiopia: Visions for the 21st Century. Awasa, July 12-18 (Unpublished).
- Brimer, A. and Paul, L. (1971). *Wastage in Education* Paris: UNESCO.
- Brooks, J. and Brooks, M. (1997). *The Case for Constructivist Classrooms*. London: Flamers press.
- Clark, K.(1983). *Education and Educational Media*. London:Sage Publication.
- Chalmers, A.F. (1999). *What is Thing Called Science?* (3rd Ed) Indianapolis Cambridge: University of Queens/and press.
- Cheng, Y.C. (1996). *School Effectiveness and School-based Management*. London: The Flamer Press.
- Cox, M., et al (2004). *A Review of the Research literature Relating to ICT and Attainment*. Coventry BECTA: <http://www.becta.org.uk>.
- Cresswell, J.W. (1998). *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*. London: SAGE Publications.
- Cuban, L. (1985). *Teachers and Machines*. New York: Teachers College Press.
- Daniel Desta (1994). "How to Relate the Teaching-Learning Activities with students' Behaviour?" (translated). **IER FLAMBEAU**. 3 (1): 19-23.
- Dale, E. (1969). *Audio-Visual Methods in Teaching* 3rd ed. New York: The Dryden Press.
- Derese Ayenachew (1992). Debre Berhan Town: Its Ancient History (Translated) Unpublished.
- Desalegn Sherkabu (2004). The Experience of Addis Ababa and Awassa non-Government Second Cycle Primary Schools in Using Computers for Supplementing Instructions. Masters Thesis AAU (Unpublished).
- Denzin, N.K. and Lincoln, Y.S. (1994). *Handbook of Qualitative Research* (eds). London: SAGE Publications
- _____(2000). *Handbook of Qualitative Research* (2nd ed). London: SAGE Publications.

- _____. (2003). *The Landscape of Qualitative research: Theories and Issues* (eds). Thousand Oaks: SAGE Publications.
- Downes, Stephen. (2004). "From Classrooms to Learning Environments; A Midrange projection of E-Learning Technologies," **The College Quarterly**.7 (30):n.p.
- ESDP and Amhara REB, (May, 1999). Review of First Cycle Primary School Teacher Education and Training in Amhara Region. (Unpublished Final Document).Bahir Dar.
- Ethiopia Today (November, 2004). "ICT for Quality Education in ETHIOPIA. Year 8, Number 4. Bi-monthly magazine Addis Ababa. PP: 3-7.
- Friere, P. (1972). *Pedagogy of the Oppressed*. New York: Herder and Herder.
- _____. (2003). *Pedagogy of Hope*. London: Flamers Press.
- Fullan, M. (1999). *Change Forces*, Philadelphia: Flamers Press.
- Gall, M., Borg W., Gall, J. (1996). *Educational research (ed.) An Introduction*. London: Longman Publishers.
- Guba, E.G and Lincoln, Y.S. (1994). *Competing Paradigms in Qualitative Research*. In W.K. Denzin and Y.S. Lincoln (eds), **Handbook of Qualitative Research**. London: Sage Publications.
- Howe, K. and Eisenhardt, M. (1990). *Stnadards for Qualitative and Quantitative Research: A Prole gomenon*. **Educational Research** 19 (4):2-9.
- Jaworski, J. (1994). "Production of Audio Media" **The International Encyclopedia of Education** (2nd ed). Kidlington. 1:396-404 Pergamon.
- Kahsay Gebre, (1998). Evaluation of Social Studies Radio Instruction at Lower Grades of Primary Schools in Addis Ababa. Masters Thesis AAU, (Unpublished).
- Kozma, R.B. (1996). "Learning with Media". **Review of Educational Research**. Washington, D.C. 179-211 AERA
- LeCompte, M.D. and Preissle, J. (1993). *Ethnography and Qualitative Design in Educational Research* (2nd ed.) London: Academic Press.
- McLean, M. (1995). *Educational Traditions Compared: Content teaching and Learning in Industrialized Countries*, London: David Fulton Publishers.
- Mander, J. (1977/78). "Four Arguments for the Elimination of Television," **The Co-Evolution Quarterly**, 38-52.
- McLuhan, M. (1967). *The Medium is the Message*. New York: Santam Books.

- Merriam, S. (1998). *Case Study Research in Education: A Qualitative Approach*. San Francisco: Jossey-Bass.
- Miles, M.B. and Huberman, A.M. (1994). *An Extended Source Book: Qualitative Data Analysis* (2nd ed) London: Sage Publications.
- Moon J.(1999).*Reflection in Learning & Professional Development: Theory and Practice*. London: Kogan Page.
- Obanya, P. (1999). *The Dilemmas of Education in Africa. Regional Office for Education in Africa (BERDA)*. Dakar:UNESCO.
- Ogunniyi, B. (1984). *Measurement and Evaluation in Education*. London: McGraw-Hill.
- *Passey, D.et.al (2004). *Emerging Findings: The Motivational Effect of ICT on Pupils*. London: DFES <http://www.dfes.gov.uk>.
- Perkins, D. (1991). *The Thinking Classroom: learning and teaching in a culture of thinking*. Boston:
- Pratte, R. and Rury, J. (1988). "Professionalism, Autonomy and Teachers," *An Interdisciplinary Journal of Educational Policy* 2 (1):71-89 Butterworths Publishers.
- Reeves, T.C. (1998). *The Impact of Media and Technology in Schools: A Research Report* Prepared for the Bertelsmann Foundation: The University of Georgia.
- Richardson, L. D. (1997). *Principles and Practice of Informal Education: Learning through Life*. London: Routledge.
- Salomon, G. and Leigh, T. (1984). "Predispositions about Learning from Print and Television", **Journal of Communication** 34:119-135. Thousand Oaks. Sage Publications.
- Savicevice, D.M. (1998). *Adult Education from Practice to Theory Building*. Peterlang Frankfurt.
- Schramm, W. (1977). *Big Media, Little Media: Tools and Technologies for Instruction*. Bevelly Hills Sage.
- Seels, S. et al (1996). *Educational Technologies*. : <http://www.se.com>.
- Spratt, C. et al. (2000). *Using Technologies in Teaching: an initiative in academics staff development Educational Teachnology and Scociety* 3(3) 2000.
- Stake, R.E. (1995). *The Art of Case Study Research*. Thousands Oaks: SAGE Publications.

- Stark, R. et al (2000). The Impact of Information and Communication Technology Initiatives. Interchange series. Edinburgh: The Scottish Executive Education Department: <http://www.Scotland.gov.uk>.
- Tefera Tadesse (2001). Evaluation of the Implementation, of Science Radio Broadcast in the Primary Schools of A.A. Masters Thesis AAU (Unpublished).
- Teklehaimanot Haileselassie (2000). "The Role of Education in the Challenge of Underdevelopment Syndrome of Africa: A Lesson from the Orient," **IER FLAMBEAU**. AAU 8(1):1-11
- Temechehn Engida (2001). Issues, Methods and Materials in Teaching Primary School Subjects. Unpublished M.Ed. Course Material, Department of Curriculum and Instruction, Faculty Education, AAU, Addis Ababa.
- The New Education and Training Policy (1994). Addis Ababa: EMPDA Press.
- Thomas, M. and Albee, J. (1998). Higher-Order Thinking Strategies for the Classroom. Kansas: Midwest Regional ACS convention.
- UNESCO, (1997). UNESCO Guide to Teaching and Learning in Higher Education: (Unpublished Trial version).
- _____ (2000). ICT and Education: [http:// www Unesco doc. unesco org](http://www.Unesco.doc.unesco.org).
- _____ (2002) Information and Communication Technologies in Teacher Education: A Planning Guide [http:// www/google.com](http://www/google.com)
- Wilson, Roger, (2001). "School Books May Beat Computers" Financial Times, 22 may 2001.
- Yalokwu, P.O. (2001) *Quality Primary Education in Ethiopia in the 21st Century: Issues, Problems, and Strategies for Implement,* In Amare et al. (2002): Quality Primary Education in Ethiopia IER AAU, Addis Ababa.
- Yin, R.K.(2003). *Case Study Research: Design and Methods* (3rded) London: Sage Publications.

APPENDIX 1: RESEARCHER'S ETHICAL PRINCIPLES (TO BE DISCUSSED ORALLY WITH RESEARCH PARTICIPANTS)

Thank you for accepting to participate in this research, Teaching with and Learning from Satellite Television. My purpose is to undertake research as a requirement for MA qualification at the Addis Ababa University, with your cooperation for a better understanding of how the teaching-learning process goes on with satellite TV instruction. At present the idea of learning from satellite Television is highly contested. Through this research, I want to understand how the teaching-learning process is going on: teaching, learning, classroom interaction, teachers and students' roles. I will also try to understand problem areas to the development of secondary education in a particular school. Data will be collected through interviews with you, in addition to observation and related documents.

The information you share with me will be secured with the utmost confidentiality and your personal identity kept anonymous. Fictitious names will be used in case names are needed in the report. There are no known risks and discomfort associated with this study. The expected benefits associated with this study are the discussion results that may be helpful to improve our educational system. I would be happy to share the findings with you after the research is completed or even while in process. I assure you once again, your name will not be associated with the research findings in any way, and your identity as a participant will be known to me only.

Principles and Procedures for the Research

The following framework consists of my ethical principles and procedures. I am willing to discuss these principles with you in pursuit of an agreed upon and amended framework. Do not hesitate to ask any questions about the study either before participating or during the time you are participating.

1. Participation in the research is voluntary. You have the right to withdraw from the research at any time;

2. Information given to me (by your will) will be treated as belonging to you; and it can be used only with your permission;
3. Observations and interpretations made by me will be treated as belonging to me. Whenever implicated in such observations and interpretations, you will be invited to comment upon their fairness, accuracy and relevance;
4. I will seek your permission to create or use audio records. You have the rights to refuse, change your mind after being recorded, or withdraw your recordings. You can edit or change them, as you are invited to listen to the taped information. Copies of transcripts will also be shown to you for checking for correct transcription;
5. I will securely store data;
6. In case views may be revealing, the presentation of these views will be negotiated with you;
7. Full anonymity of your identity and confidentiality of the information you share with me will be maintained;
8. Except for the purposes of professional collaboration in the project, no data arising from interviews will be disclosed in any form to third parties without your explicit and prior consent. Where data is shared for the purposes of professional collaboration these protocols and procedures apply to all those involved in that collaboration;
9. I am willing to discuss these principles and procedures with you in pursuit of an agreed framework for the research and to amend them as necessary, and
10. You have the right to get any benefits during your participation.

THANK YOU

ALI YASSIN ALI, RESEARCHER

Appendix 2: Students' Handwriting from the TV.

The vector

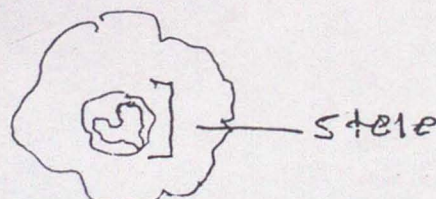
Transpiration results in the osmotic
movement of water across each
water removed from the xylem
cells of the

when water leaves the xylem to
enter the cells by

water is then pulled up from
the roots

Trace the path of water through
a plant from the time it is

Soil → roots
S



How are the epidermal cells
of the root

it is clear that the root hairs
increase

Endoderm
pericycle

(Student 1)

~~Write down the causes that stop breathing~~
~~and require artificial respiration to~~
~~revive the person?~~

~~• Drowning~~ a. Electric shock

~~• Gas poisoning~~ • Accidents

~~• Airway that must be open to allow air to reach~~
~~the lung.~~ • Choking

• Breathing so that there is no

• Circulation that allows blood flow
obstruction of the airway.

• Lack of oxygen in the air

• Interruption of the heart and lung action

A. Apnea is unconsciousness due to

lack of oxygen.

If the brain is deprived of oxygen for more
than 4-6 minutes it leads to brain

damage. Artificial respiration consists of the following
basic steps,

* Response assessment

* Breathing

* Airway opening

* Lung ventilation

* Pulse assessment

Response

assessment

• Determine if the person is

• Gently shake the person

Name

Take

(Student 2)

APPENDIX 3: A SAMPLE OF TELEVISED CHEMISTRY LESSON (TAPED AND TRANSCRIBED) AND A PORTION OF THE LESSON FROM STUDENTS' TEXTBOOK (PHOTOCOPIED) IN GRADE NINE

Date: January 16th 1997 Eth.C.

[With out giving any introduction, the classroom teacher opened the TV.]

Educational Media Agency Presents Satellite Television Programme.

Hello teacher and students! Welcome to the fifth lesson in this unit. Keep your notebook, pen and pencil informant of you. We will cover the portion form pages 102 to 103 of your textbook.

In this lesson, we will revise what you have learnt about atomic numbers and mass numbers in the previous lesson [students actually did not learn the previous day due to technical problems]. Then we will discuss the isotopes of elements and finally relate this to atomic mass and relative atomic mass, so let us begin with some revision.

Do you remember our discussion regarding atomic number and mass number? What is the definition of atomic number? The atomic number of an element is the number of protons in the nucleus of each atom and it is represented by the symbol Z. What is the definition of mass? The mass number of an element is the number of protons and neutrons in the nucleus. It is represented by the symbol A. It determines the mass of the nucleus. They are both on page 102 of your textbook if you like to review them. Now let us try an example. An atom has 17 protons and 18 neutrons. Using the periodic table on page 120 of your textbook, identify the element and then write the symbol of the element including A and Z values. Obviously, because the atom has 17 protons, it must be the chlorine atom. So we write, it as follows: $^{35}\text{Cl}_{17}$

The mass number of the atom is the total number of protons plus neutrons which is $17+18=35$. Then we write the atomic number 17 at the bottom. The symbol for chlorine is Cl. Also note that the approximate atomic mass for chlorine would be similar to the mass number, which is 35.

Now, do you recall that we previously said that all the atoms of a given element has nuclei that contain the same number of protons. For example, all Cl atoms have 17 protons in their nuclei. The nuclei of all the atoms of a given element do not necessarily contain the same number of neutrons, however. For example, all oxygen atoms have on atomic number (Z) equal to 8 and therefore have 8 protons in the nucleus and 8 electrons surrounding the nucleus. This features the property of oxygen atom from atoms of all other elements. But, three different kinds of oxygen atoms are found on the screen [O16, O17 and O18]. Now, you need to write this down in your notebook and then say how many protons and neutrons in the nuclei of the atoms represented by these symbols. (Time allowed 1 min.). Right! Let us check your answers. The atom of this type (O16), we find 8 protons and 8 neutrons in the nucleus. The atom of this type (O17) contains 8 protons with 9 neutrons in its nucleus and finally the third type (O18) of atoms has also 8 protons together with 10 neutrons. So all oxygen atoms have the same atomic number (Z), which equals 8, and their nuclei have the same nuclear charge of positive 8. They all have different masses, however, depending on the number of nucleons in their nuclei. Now what do we call atoms of an element that have different masses? Yes, they are called isotopes. We have discussed this concept briefly before. Let us take a look at some more examples. Many of the atoms have two or more naturally occurring isotopes. Even the simplest element, hydrogen, has two stable isotopes. Take a look at the two isotopes on the screen now. Write them down and then determine how many protons, neutrons and electrons each has. (Time allowed 1 min.). [The classroom teacher explained the given task in Amharic]. The nucleus of the right isotope written here (1H) has only one proton. There is no neutron in the nucleus. Obviously, there is one electron in this hydrogen atom. The nucleus of the other hydrogen isotopes contains a proton and a neutron. Because there is one proton; there is also one electron to make the atom electrically neutral.

Isotopes are usually distinguished by the mass number in the symbol of the isotopes and they are not usually given specific names. However, the hydrogen isotopes are an exception. The hydrogen-1 isotope is simply named protium, The hydrogen-2 isotope is given a special name deuterium or heavy hydrogen. I would also just mention at this



point that there is also a third unstable radioactive isotope of hydrogen called tritium. But in the case of the other elements, the isotopes have no special names since the atomic number is implied by the symbol of the element. It is often omitted. So, for example, the three isotopes of oxygen could just be written with just the same number and referred to as **O16**, **O17** and **O18**, respectively. We automatically know and assume that the atomic number for each of the isotopes is the same. Some elements have just one isotope that occurs naturally; for example, the element chlorine and phosphorus. But many of the elements have two or more isotopes. E.g. Helium-3 and Helium-4, where one isotope has one neutron and other has two neutrons. In addition to naturally occurring isotopes, others can be made artificially. For example, **P30** and **Na 24** by bombarding atoms with nuclear particles. This is done in nuclear laboratories under careful monitoring. The nuclei may be bombarded with protons or neutrons on the nucleus of a given atom. We will not go into much detail of these reactions except to say that in these nuclear reactions, atoms form into different nuclei. So atoms are transformed into different atoms nuclear reactions form different chemical reactions. The important thing to know is that the isotopes of an element is found not only in the elements itself but also in all the compounds of the element. Naturally occurring water, for instance, would consist of a number of combinations of the isotopes of hydrogen and oxygen. Mostly, it would be the combination of two hydrogen-1 isotope atoms with one oxygen atom because there are high percentages of this form naturally. However, there would also be some water molecules made up of the other isotopes of hydrogen and oxygen. Water that consists entirely of molecules composed of the hydrogen-2 isotopes with oxygen is called deuterium oxide or commonly known as heavy water. It is manufactured synthetically and used in some nuclear reactions to slow down electrons. Note that the atomic mass of an element can be found by using the average of the masses of its naturally occurring isotopes. How do you describe the mass of an atom? It is so tiny to be conveniently expressed in kilograms or grams. Because the mass of proton is equal to 1.672×10^{-24} grams, which is equal to 1.672×10^{-27} Kgs. In fact, a unit of 10^{-27} would be a convenient size. However, this unit is not used. Instead, today we use the atomic mass unit. It is given the symbol a.m.u or you may just find the symbol u. The unit of the atomic mass has been defined by international agreement as one fourth of the mass of one carbon

atom. In other words, the mass of one C4 atom would be found exactly in four atomic mass units. The reason that carbon is chosen for the basis for comparison is because of its abundance in living and non-living things. We have to try to stop the issue of relative atomic mass for a moment to understand the unit we use for it. Let us get back to it now. The numerical value of the atomic mass is equivalent to atomic mass. The only difference is that relative atomic mass has no units. If a sample of a particular element was taken in nature, we would find that there is a mixture of the elements isotopes, in the sample in certain ratio. For example, in a naturally occurring sample of 100 chlorine atoms, approximately 76 of the atoms would be of the isotope Cl 35 whereas approximately 24 of the atoms would be of the isotopes Cl 37. This is known as the abundance of each isotope. Note that the isotopic abundance can be defined as the amount of isotopes multiplied by 100 and divided by the total number of all types of isotopes of the element. So, if we know the relative abundance, that is the percentage and mass of each of the isotopes of an element, we can then calculate the average mass of an atom of the element. The mass of an abundance of isotopes can be measured in the laboratory with the mass spectrometer. We will not discuss how this instrument works right now. All you need to know is that accurate measurements of atomic masses can be made using a mass spectrometer. The measurements are then used in calculations. We have discussed the hydrogen isotopes several times in this lesson. So let us also use this familiar example in calculations. The question says that in a naturally occurring sample of hydrogen 99.985% of the atoms are hydrogen-1 atoms and 0.015% are a hydrogen-2 atom. The mass of the hydrogen atoms is 1.00783 amu and the mass of the hydrogen-2 atom is 2.01410 units. Find the atomic mass of an atom of hydrogen?

So the mass contributed of the hydrogen atom is the percentage abundance of hydrogen 1 divided by 100 and multiplied by the mass of hydrogen-1. Whereas the mass contributed by the hydrogen-2 is the percentage abundance of hydrogen 2 divided by 100 and multiplied by the mass of hydrogen-2. This is a very small number. Now we need to add the contribution made by each isotope. Thus the average mass of hydrogen is 1.00798 amu. This is the average atomic mass of hydrogen. The relative atomic mass is the same number but without a unit. Now, this is said to be a tiny fractional amount that differs

from the mass of the H atom but in other elements the contribution of mass may be the second or third isotope makes a significant difference.

Let us try this question. Chlorine has two isotopes. Cl 35 has the mass of 35 units and Cl 37 has a mass of 37 units. Their respective abundances are 75.76% and 24.24%. Find the atomic mass of chlorine. Why don't you try this question? You need not write it down as it is also given in your textbook on page 103. But do not refer to them now for the answer. Try the answer on your own. (Time allowed 1 minute). [The classroom teacher explained the task in code switching manner].

Ok! Time is up. I am sure that you have finished. First you have to find the mass contribution of each atom. Do this by taking the percentage and dividing it by 100 and then multiplying by the mass of the isotopes. Do the same for the mass contribution of the Cl 37 atom. This equals 8.967 u. Then, finally, we add the two mass contributions together. The relative atomic mass is 35.5. Well done if you got the correct answer. If you need to check your method, you should use your textbook later.

Let us try one more question in this lesson. The question uses the example of the metal gallium. It is the silvery white metal at room temperature and commercially prepared compounds of gallium are used as semi-conductors. Naturally occurring gallium consists of two isotopes_ Gallium 69 and Gallium 71. The mass for each isotope is given. The percentage abundance of each isotope is 60.3% for Ga-69 and 31.7% for Ga-71. Try this example on your own. (Time allowed: 1 minute) [The classroom teacher explained the given task in student's mother tongue and in English in mixed ways]. If you got the final answer of 69.72, then well done! Let us check our answer. First we will find the contribution of Ga 69 isotope. Then we do the same for Ga 71 isotope and finally we add the two mass contributions to get the atomic mass of Gallium, which is 69.72. Good! Now you should revise the work we have done in answering questions 3 and 4 on page 103 for homework.

Just a quick revision of what we covered in this lesson. Firstly, we revise atomic number and mass number. We discover more of the isotopes of elements in detail and then related isotopes to average atomic mass and the relative atomic mass. Well that is all for me for now. Goodbye students! Goodbye teacher!

[The classroom teacher continued his summery. What are isotopes? Among the few students who raised their hands, a student responded 'atoms with different mass number'. The classroom teacher said, "Yea! Atoms of the same elements having different mass are said to be what? Isotopes. When we see the three isotopes of oxygen, they have the same atomic number, but they have different atomic masses. If compounds contain the same atomic number, do they exhibit the same characteristics? [No response from the students]. The teacher continued, የአክሲድን አይስቶፖች ተመሳሳይ የኬሚካል ባህርያት አላቸው ወይ? The student who responded first was given a second chance and said "አላቸው:: ምክንያቱም አንድ አይነት electrons ስላላቸው The teacher said "Yea! Mostly we know that the atomic number of an element is equal to the number of electrons. Among the three subatomic particles, electrons determine the chemical properties of substances. Isn't it? የአንድ ነገር ኬሚካል ባህሪ የሚወስኑት ምንድን ናቸው? ኤሌክትሮን ናቸው:: ስለዚህ ሦስቱም የአክሲድን አይስቶፖች አንድ አይነት ባህሪ ያሳያሉ ማለት ነው:: ሌላው ዛሬ የተማራችሁት አቶሚክ ማስ ነው:: Atomic mass is calculated by multiplying the isotopic masses of each isotope by its percentage abundance and by adding all these values, Isn't it? ሌላው ዛሬ የተማራችሁት ሪሌቲቭ አቶሚክ ማስ ነው::

Isn't it? ሌላ ጥያቄ አላችሁ?

Students showed no responses). The teacher left the room.]

B). A portion of the lesson from the textbook

established by James Chadwick in 1932. The neutron is electrically neutral, has about the same mass as the proton, and is in the nucleus. Since all the heavy subatomic particles — protons and neutrons — are in the nucleus, most of the mass of the atom is concentrated in its nucleus. Because protons and neutrons make up the nuclei of atoms, they are collectively referred to as *nucleons*. Table 4.1 summarizes the properties of the three subatomic particles.

Table 4.1 Properties of subatomic particles

Name	Location	Electric charge	Mass (g)	Approximate relative mass (amu)
proton	nucleus	positive (1+)	1.672×10^{-24}	1
neutron	nucleus	neutral (0)	1.675×10^{-24}	1
electron	outside the nucleus	negative (1-)	9.11×10^{-28}	0

The atomic number of an element, represented by the symbol Z , is the number of protons in the nucleus of its atom. Since an atom is electrically neutral, it consists of equal number of protons and electrons. Therefore, atomic number is also the number of electrons in a neutral atom.

$$\text{Atomic number} = \text{Number of protons}$$

For example, the atomic number of oxygen (O) is 8 and thus it has 8 protons in its nucleus. The number of its electrons is 8, because an uncharged atom has the same number of protons and electrons.

The mass of one proton or one neutron is about 1837 times the mass of one electron, so almost the entire mass of an atom is in its nucleus. The mass number of an atom, represented by the symbol A , is the sum of the number of protons and neutrons in its nucleus.

$$\text{Mass number} = \text{Number of protons} + \text{Number of neutrons}$$

The difference between mass number and atomic number is the number of neutrons.

It is sometimes useful to include the atomic number and the mass number in the symbol of an element as in form ${}_Z^AX$, where X is the symbol of the element, and Z and A are atomic number and mass number respectively. For example, the symbol ${}_{9}^{19}\text{F}$ stands for fluorine atom whose atomic number is 9 and mass number is 19.

Atoms of the same element with the same number of protons but different number of neutrons are called isotopes. Isotopes can also be defined as atoms of the same element with the same atomic number but different mass number. For example, the element hydrogen has three isotopes, namely, hydrogen-1 (protium), hydrogen-2 (deuterium) and hydrogen-3 (tritium). These isotopes are represented by the symbols ${}^1_1\text{H}$, ${}^2_1\text{H}$ or ${}^3_1\text{H}$, respectively.

The atomic mass (also known as relative atomic mass) of an element is the average of the masses of its naturally occurring isotopes. Its unit is amu (atomic mass unit). (Note that this unit is used because in weighing atoms, units such as grams would be impractical. To get around this problem of size, scientists have established this special unit). Atomic mass is calculated by multiplying the isotopic masses of each isotope by its fractional or percent abundance and adding all these values together.

For example, the element chlorine has two isotopes ${}^{35}_{17}\text{Cl}$ and ${}^{37}_{17}\text{Cl}$ with their isotopic masses 35 and 37, respectively. The natural percent abundance of ${}^{37}_{17}\text{Cl}$ is 25% and the natural percent abundance of ${}^{35}_{17}\text{Cl}$ is 75%. The atomic mass of the element chlorine is determined as:

$$\left(35 \times \frac{75}{100}\right) + \left(37 \times \frac{25}{100}\right) = 35.5$$

Questions

1. Why do we say that the mass of an atom is concentrated in its nucleus?
2. How many protons, neutrons and electrons are there in ${}^{39}_{19}\text{K}$?
3. An atom contains eleven protons and twelve neutrons. Write its symbol, including A and Z . What is its approximate atomic mass?
4. The element bromine has two isotopes, ${}^{79}_{35}\text{Br}$ and ${}^{81}_{35}\text{Br}$. They exist in nature in a 1:1 ratio. What is the atomic mass of the element bromine?

4.8 THE ATOMIC MODELS

A. Introduction

Scientists often use models when they are trying to describe and explain something so small (such as an atom or a molecule) or so large (as the solar system or the universe) that can't be observed directly or completely. Many famous scientists, both physicists and chemists, have contributed to our understanding of the atom. Still many scientists are working hard to reveal more about the mysteries of the atom.

APPENDIX 4: BIOLOGY AND ENGLISH CLASSROOM TESTS AS COPIED
FROM THE BLACK BOARD

Grade Nine Biology Test

I. Say true or false accordingly.

- 1. The smallest unit of life is a tissue.
- 2. Cell-wall is found in both plants and animals.
- 3. Ribosomes produce carbohydrates.
- 4. All green plants prepare their own food.
- 5. The powerhouse of the cell is called mitochondria.
- 6. Animals that feed on flesh only are called omnivorous.

II. Choose the best answer

- 7. Which of the following animals is different?
a.) cow b) ox c). fox d). sheep
- 8. ATP stands for ____
a). Anti triposphere c). Adenosine two phosphate
b). Adenosine tri-phosphate d). Anti three phosphate
- 9. All animals have ____ chambers of heart.
a). one b). two c). three d). four e). none
- 10. Mostly green plants prepare their food in their ____.
A. roots b) xylem c) leaves d) phloem

English Test for Grade Nine

Choose the best answer

- 1. Abebe is sitting ____ Kebede and Mamo.
A) of b) at c) in front d) between
- 2. He ____ yesterday.
a) die b) dies c) died d) dying
- 3. Almaz and Martha ____ football.
a) are played b). are play c) are playing d) playing
- 4. They bought a big house. The underlined word is
a) noun b) verb c) adjective d) pronoun
- 5. He killed the lion. This sentence is in ____ voice.
a) active b) passive c) active and passive d) none
- 6. The house ____ last week.
a) is building b) builds c) building d) was built
- 7. Do you mind ____ the door?
a) open b) to open c) opening d) opened
- 8. She lives ____ Addis Ababa.
A) on b) in c) under d) over
- 9. Please! Stop ____
a. talk b) talking c) talked d) to talk
- 10. Have you finished ____ your homework?
a) do b) to do c) doing d) does

Appendix 5: English Test Results Based on Televised & non-televised Lesson

No (<i>Non</i> televised lesson)	Test 1 10% (televised lesson)	Test 2 10% (televised lesson)
1	8	6
2	9	5
3	7	6
4	5	5
5	10	6
6	8	5
7	9	5
8	6	-
9	4	2
10	10	7
11	8	5
12	9	5
13	9	4
14	9	5
15	8	6
16	7	5
17	7	4
18	8	6
19	10	5
20	10	6

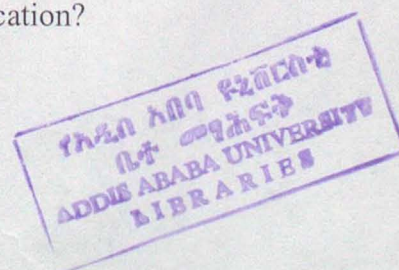
No	Test 1 <i>Non</i> - (televised lesson)	Test 2 (televised lesson)
41	10	6
42	9	6
43	9	5
44	8	7
45	9	5
46	8	6
47	9	6
48	5	3
49	9	6
50	6	3
51	6	4
52	7	5
53	7	5
54	10	6
55	10	5
56	8	4
57	9	5
58	9	6
59	8	6
60	8	7

21	9	5
22	9	4
23	8	-
24	8	6
25	6	3
26	6	4
27	5	3
28	7	5
30	8	4
31	8	5
32	9	5
33	9	8
34	10	7
35	6	8
36	6	3
37	7	6
38	8	8
39	8	4
40	8	5

61	7	-
62	9	4
63	10	5
64	8	5
65	10	7
66	10	7
67	9	7
68	5	2
69	7	5
70	7	6
71	7	4
72	5	5
73	8	6
74	10	5
75	7	6

Appendix 6: Typical Questions Raised During the Interview with a Research Participant (Student)

- How do you get learning from the satellite TV?
- Why learning from the plasma TV?
- How do you compare and contrast the plasma TV with the conventional (face-to-face) instruction?
- How do you behave during the transmission?
- How do you describe the role of your classroom teachers during the transmission?
- How do you get the relationship between the contents of the plasma TV with the textbooks?
- Why do some students and teachers prefer the plasma TV and why do many others hate it?
- Some people say that the plasma TV improves educational quality. How do you see this?
- Which medium is more interesting to you? Why?
- How do you feel whenever there was no transmission? Why?
- How do you get along with your school work?
- How do teachers and students perceive the plasma TV?
- How do teachers evaluate your school performance? And how is your school result?
- What are the strong and weak sides (if any) of the plasma TV? Why?
- How do you see your past, present and future education?



Appendix 7: Continuous Assessment /Evaluation Form

Grade_____

Section_____

No	Student's Name	Test 1 10%	Test 2 10%	Test 3 10%	Class Participation 10%	Project work 20%	Final Exam 40%	Total 100%
1								
2								
3								
4								
5								
6								
7								
8								
9								
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