

## ORIGINAL ARTICLE

# Status of Satellite Television Broadcast Programs Implementation in Mathematics and Science Subjects in Ethiopian Government High Schools from Teachers Perspective

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### *Abstract*

*As the ICT domination in our day to day life is increasing, the Ethiopian Government convinced to utilize its opportunity for improving quality of education by introducing plasma television learning media in high schools of the country. The objective of this study was to determine implementation status of satellite plasma television broadcast in Ethiopia from the perspectives of teachers. Specifically, it investigated the state of Mathematics and Science lessons implementation in 22 secondary schools in four regional states. The study employed descriptive survey method. A total of 444 teachers were participated in the study. The study attempted to gather information from the respondents on variables related to the different phases of implementation of plasma lessons. The majority of the teachers reported that the time assigned for introduction during pre-broadcasting was not sufficient. Some of the issues of plasma lesson planning and organization were rated superior by the majority of the respondents. For instance, the plasma lessons were judged as well-planned by 90.9% of teachers and well-organized by 88.6% of teachers. As reported by teachers, plasma lessons were generally judged positively regarding the attention given to the needs of students. On the other hand, plasma lessons' responsiveness to students with special need was rated negatively. With respect to the scope and depth of the plasma lesson content covered, 70.4 % of teachers agreed that the depth was up to the level of the students. Relevance of the content covered was judged appropriate by 91.5% of teachers. Though class work and homework tasks of lessons were judged appropriate, feedback given to these tasks were judged differently by the respondents. In general, some of the inherent features of the technology were rated positively by significant majority of the respondents.*

*Key words: education, Mathematics, Science, high school, plasma television*

### INTRODUCTION

Science and technology are currently overwhelming the day to day life very rapidly. Governments of the developing countries are giving emphasis to science and technology convinced that they are part of the major means of development. Education is also one of the entities influenced by this rapid change enforcing

governments to change their policies in line with the new trend.

Ethiopia, therefore, started changing its educational policy towards expansion and improving the quality which was criticized for decades. Education in Ethiopia undergoes a paradigm shift since the introduction of Education and Training Policy in 1994. Along with

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political, economic and social changes introduced at societal level, democratization of the education sector was addressed that calls for system and curriculum change. The implementation of the change of educational direction then started by planning five year strategic plans worked out consecutively, named ESDP I, II, III, (MoE 1998, 2002, 2005).

Convinced by its opportunity to bring about fast growth and development to the country, the Ethiopian Government gave emphasis to science and technology progressively changing the system adjoined by the core approach of student centered learning. Good examples for such radical change are the higher diploma program (HDP) training for tertiary level instructors for one year on job training to upgrade their teaching quality capacity certified at the level of higher diploma, targeting to produce qualified human power at higher level (MoE 2003). The implementation of plasma television(PTV) learning media in six subjects(mainly Mathematics and Sciences) in all Government high schools throughout the country is the second example ventured by the Government showing its commitment to take the opportunity of science and technology, though there were several questions surrounding its venture. In light of these developments, the introduction of direct satellite televised education program since 2004/2005 academic year in Government secondary schools was perceived differently by various

### **Statement of the problem**

The use of new technology (Plasma television) in Government secondary schools become one of the sources of contempt among different education stakeholders, since training policies and their implementation becoming contested political issues in Ethiopia (Inter Africa Group 2004).

The sudden introduction of PTV in 2004/05 in high schools throughout the country

stakeholders of education.

A number of rationales were forwarded by policymakers in justifying the importance of ICT in education. Among others, educational technology enables the country's education system align with international development, contributes to the nation demand for trained human power and create communities that utilize modern system of information (MOE/EMA 1998). On the other hand; contrary to policy rhetoric, some studies conducted at school level revealed that school actors have negative perceptions due to various reasons (Brook 2007; Ali 2005).

It is obvious that there can be resistances from teachers, students, parents etc. when such new changes are implemented. Besides the resistance forces mentioned, other challenges like shortage of supportive resources may inevitability occur at least at the beginning. ICT knowledge, skill and change in methodology are some of the challenges that hinder the proper utilization of the technology.

The purpose of this study is therefore to investigate the situation of this newly set up plasma television implementation in line with teachers' perspective. This is mainly to answer the central question, what would be the perception and attitude of the school teachers specifically Mathematics and Science teachers when going out of the conventional teaching and learning system and facing the new plasma television supported delivery system?

within the national education manifested sudden debate and practice, coupled with the nature of its top-down decision (denying teacher autonomy in making decision as to when and how to teach) has rendered anxiety among members of the teaching force. Together with the series of reform initiatives since the beginning of the millennium (performance based evaluation, the new management guideline etc.) within the general

understanding held by Government that schools and teachers as failed to meet national priorities (MOI 2002a, 2002b).

The overall rationale, the processes that led to its introduction etc., were largely absent within government's policy documents. Some of the arguments the Government used to justify the introduction of plasma television include shortage of qualified secondary school teachers where only 40% of teachers at this level were qualified to teach (MOE 2005) and to establish common basis to secondary national curriculum where national school leaving certificate examination will be given by

making uniform instruction across all regional states. Even though the reaction of teachers was well-felt, their voices in this regard were not well represented in a systematic educational enquiry. The purpose of this study is, therefore, to reveal some of the issues surrounding implementation of plasma television program in Government secondary schools, and to investigate the reactions of one of the major school level actors-teachers. In addition, the need to take this topic came in response to centrality of the new technology in contemporary education debate.

#### **Central research question of the study:**

This study then tries to answer the central research question; what would be the situation of teaching and learning when PTV implemented in line with the perception and attitude of the school teachers during their delivery system? This central question follows the following sub-questions:

- How do teachers rate the quality of the program content and presentation?
- What is the role played by teachers during implementing the program?

- To what extent the learning environment (classroom interaction) is conducive for effective implementation of the satellite plasma television program?
- What are the possible advantages and limitations of the plasma instruction?
- What potential changes could there be to patterns of usage of the technology among schools, teachers, and students?

#### **Significance of the study**

This study attempted to assess the general picture of issues related to the implementation of satellite plasma television broadcasting in Mathematics and Science lessons in Ethiopia using the perception of the school teachers. Therefore, it may provide feedback on the strengths and weaknesses of the program to the concerned bodies. This research may be also useful to overcome the limitations and strengthen the advantages of satellite plasma television. Consequently, it plays a crucial role to create conducive environment for the teaching and learning process by satellite

plasma television. The study shows the stand of the majority of teachers involved in this new style of teaching so that the Government could improve for a better system of education. Moreover, the study may be cornerstone for other researchers to conduct similar studies.

Since the amount of money invested for buying plasma television is huge, it is an indicator for the dedication of the Government to improve the teaching-learning process and hence needs the support of all stakeholders of schools including Teacher Education Institutions. The universities in general and College of Education Addis Ababa University in

particular are responsible as one of the stakeholders to play a leading role in this connection. Therefore, this research will enable the universities and colleges to

## **Materials and methods**

### **Study design and sites**

The study design of this research is a mixed design mainly quantitative supported by qualitative both through close-ended and open-ended types of questions using questionnaire where by Mathematics and Science teachers are the study units. In this study, twenty two randomly selected Government secondary schools in four regional states namely Amhara, Oromia, Tigray and Southern Nations Nationality Peoples Regional States (SNNPR) were surveyed based on the sample frame of the 2004/2005 Ministry of Education Statistical year (MOE 2006). This study employed primary sources of data obtained from Science and Mathematics teachers who were teaching from grade 9-12 in those sampled schools at the time of data collection.

### **Sample size**

The research surveyed five schools each from Amhara, SNNPR and Tigray Regional States and seven schools from Oromia Regional State. A total of 444 teachers teaching at the time of sampling were involved in the study. All existing subject teachers (on average 20 teachers per school) of Mathematics and Science (Biology, Chemistry and Physics) were involved.

### **Data collection instrument**

A self administered questionnaire was used to collect data from research participants. Four types of questionnaires, one for each subject, were prepared containing exactly the same items except the title. The questionnaire was organized into four

play their role being the center of academic excellence mainly issues related to the teaching and learning process in secondary schools through the support of ICT media where its products/trainees will work in the future.

sections: general information of respondents, the specific roles teachers play before, during and after broadcasting of plasma television. The questionnaire also contained some items asking for the general comment of the respondents about the satellite television instruction. There are 37 items including open-ended and closed-ended ones. In addition to the questionnaire the researchers observed some classes. Validity and reliability of the instrument were controlled by the review of two related senior professionals followed by pilot study eliminating and refining the items of the questionnaire.

### **Survey Response Rate**

Slightly more number of teacher questionnaires (444) was returned from the expected number (440). Some of the questionnaires were not included in the analysis since they missed some of the key information.

## **METHOD OF DATA ANALYSIS**

Teachers evaluated the success of plasma PTV presentation rating the activities by using the parameters such as strongly agree, agree, disagree, strongly disagree and indifferent. Moreover, teachers also evaluated some of the activities of PTV by using Very poor, poor, fair, good and very good and at time with categories like always, most of the time, sometimes, rarely and not at all. During analysis some of these categories were combined to provide aggregate picture of respondents' views. For example, to the variable of the study, both strongly agree and agree were combined to indicate positive response where as disagree and strongly disagree were combined and reported as negative responses. Close-

ended items of the questionnaire were encoded using version 14 SPSS-PC software package and basic statistical methods were employed for analysis. The open-ended data were analyzed qualitatively by identifying and discussing related themes along with the quantitative data.

**Ethical issues**

The consent of all teacher respondents involved in the study was granted supported by an official letter from the previous College of Education, now

College of Education and Behavioral Sciences, AAU to pass through the proper channel starting from the school principals.

**RESULT**

**Research respondents background information**

Of all 444 teacher respondents, 31.2% were from Amhara, 26.2% from Oromia, 22.4% from Tigray and 20.1% from SNNPR (Figure 1(a)). Concerning their subject specialization; 28.8%, 25.3%,

20.9% and 24.9% were Mathematics, Biology, Physics and Chemistry teachers, respectively (Figure 1(b)). With respect to their experience in teaching, 66.5% of them had served in the profession between 10-37 years where as only 18.7% of them served below 5 years by the time of this study. Though their teaching experience in the current schools ranged from 1-30 years, about 62% of them had served below 5 years where as about 22 % served at least for the last 10 years.

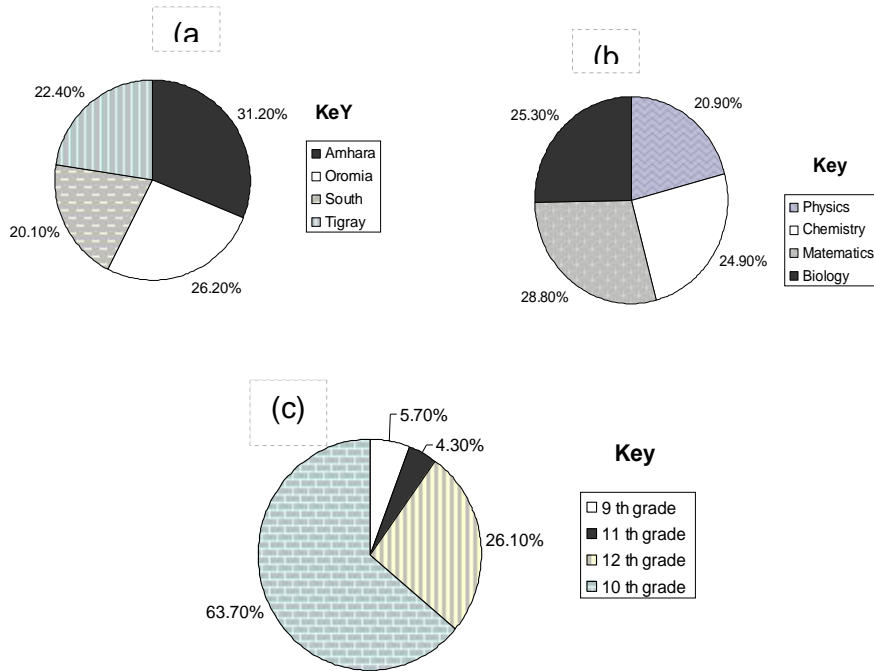


Figure 1. Proportions of teachers’ respondents (a) by regional state; (b) by subject specializations; (c) teaching experiences by grade levels.

With regards to sex, the majority of them (93.9%) were males where as only 6.1% were females. About 96% of respondents' age was evenly distributed between 22-50 years. Regarding their qualification, the majority of them (about 84.6%) had first degree where as about 12.9% and 1.6% of them had diploma and second degrees in their respective subjects of specialization, respectively.

About 63.7% and 26% of them had experiences in teaching at grade 10<sup>th</sup> and 12<sup>th</sup>, respectively (Figure 1(c)). The majority of respondents (about 95.4 %) had between 15-30 hours workload per week. Teachers also reported that the

average classsize the school they teach range between 35-100 students per class (Table-1).

**Table-1: Average Number of Students Per Class, as Reported by Respondents.**

Average number of students per class	Teachers response	
	No	%
35-50	46	10.4
51-69	191	43
70-100	207	46.6
Total	444	100

**Before broadcast**

**Share of introduction time between the teacher and the technology**

The first attempt made in this study was to check whether research participants had adequate knowledge of the time assigned by the Federal Ministry for classroom teachers' use of lesson introduction. Accordingly, only 65.3% of teachers said that they have only two minutes. Quite unexpectedly, 34.5% of them said that they have ten minutes which was astounding. Similarly, participants were asked to judge the adequacy of the introduction time

assigned to the classroom teacher (Figure 2). Accordingly, it was judged as either poor or very poor by 61.6% of teachers. Surprisingly large proportion of teachers (42.9%) introduced the lesson either sometimes or rarely while 3% introduced the next lesson not at all (Figure 3). Those respondents who judged the introduction time as inadequate were further asked to suggest what time they think would be sufficient for this purpose. Accordingly, 87.1% of teachers suggested between 5-10 minutes, where as the majority (55%) of them believed that five minutes would be enough.

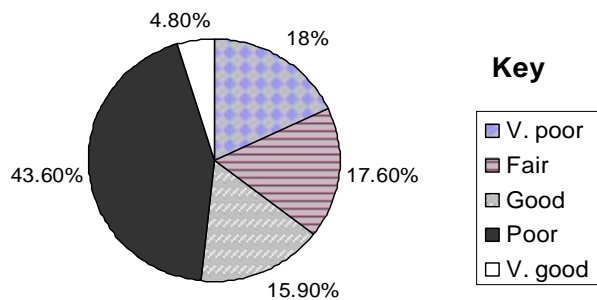


Figure 2. Time assigned for teachers to introduce the lesson, as reported by respondents.

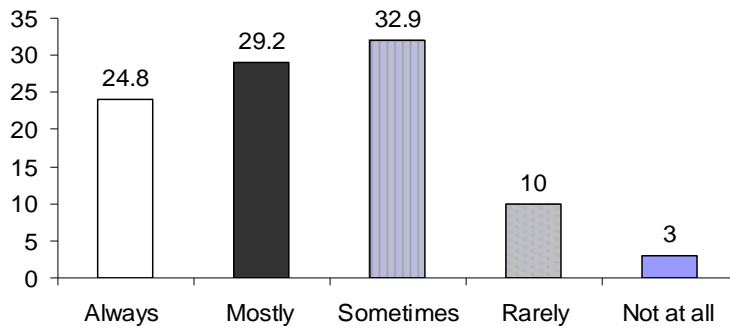


Figure-3: Frequency of teachers introduction, as reported by teachers.

**The Broadcasting phase**

**Plasma lesson organization**

Table 2 below presents aspects of plasma lesson organization and the response made by the research participants. In all aspects of lesson organization, the plasma program was found to be superior as the majority of respondents (>80%) rated it positively. The majority of

respondents agreed with the fact that plasma lessons revise the previous lessons, state clearly the objectives and content of the lesson. In general, the plasma lessons were found to be well-planned and well-organized. In this study, 80.8 % of teachers agreed that plasma lessons have appropriate pace.

**Table-2: Aspects of plasma lessons planning, as reported by respondents.**

No	Aspects of lesson planning	Agree (%)	Disagree (%)	Total number of respondents
1	It revises the previous lesson	89.1	10.9	431
2	It clearly states daily instructional objectives	83.6	16.4	433
3	It clearly states the content of daily lesson	94.5	5.5	434
4	It provides a summary of the daily lesson	89.6	10.4	434
5	The lessons are well paced	80.8	19.2	428
6	The lessons are well organized	90.1	9.9	435
7	The lessons are well planned	88.6	11.4	429

**Sensitivity of plasma lessons to students' need**

As shown in Table 3, the ability of plasma lesson in motivating (74.4%) and giving equal access to quality education (82.5%) to all students were positively rated by significant proportions of respondents. The responsiveness of plasma lessons to students with special

needs, presents different stance. Plasma lesson provide both sound and vision hence marginalizes students with both hearing and sight impairment. Large proportion of teachers believed the fact that visually impaired students were significantly hindered by the technology.

For example, about 79.4% of teachers believed that the technology had no place for the visually impaired students. The respondents believed that the technology had limited place for hearing impaired

students. 73.1 % of teachers disagree with the statement that the plasma television 'considers individual differences'.

**Table-3: Aspects of students needs attended by the plasma lesson, as reported by respondents.**

No	Aspects of students need	Agree (%)	Disagree (%)	Total number of respondents
1	It motivates students to learn	74.4	25.6	429
2	It encourages students to participate	68.3	31.7	433
3	It clearly communicates to the students	60.3	39.7	428
4	It has no place for visually impaired students	79.4	20.6	413
5	It has no place for hearing impaired students	76.3	23.7	413
7	It makes students to have equal access to quality education	82.5	27.5	436
8	It considers individual differences	26.9	73.1	433

#### **Relevance of the content and task of the plasma lesson**

Table 4 outlines issues of curriculum relevance and participants' level of agreement or disagreement. Teachers were asked to rate the scope and depth of the plasma lesson content. Concerning the depth of plasma lesson content, about 70.4% of teachers agreed as appropriate.

Similarly, the content covered by plasma lesson was agreed relevant by significant majority, 91.5 % of teachers. The appropriateness of the class work and homework tasks of the plasma lesson were also agreed by research participants. In general, high percentage of teachers seems to agree with the appropriateness of class work than home work.

**Table-4: Relevance of plasma lesson content and tasks, as reported by respondents.**

No	Issues of content and tasks	Agree	Disagree	Total number of teachers
1	The depth of the content is up to the level of students	70.4	29.6	432
2	The content contains the most important points to be covered	91.5	8.5	434
3	It gives appropriate class work	78.4	21.6	430
4	It gives feed back to class work	78.6	21.4	430
5	It gives appropriate homework	52.9	47.1	433
6	It gives feedback to homework	35.1	64.9	427

#### **Participatory approaches rendered by plasma lesson**

As indicated in Table 5, some of the participatory possibilities rendered inherent in the nature of the technology

to which research participants were asked to rate these items based on their level of agreement and/or disagreement. As shown in Table 5, one can not replay back the broadcasted program of the



previous lesson for next time as reported by 76.6% of teachers. The ability of the technology in providing a variety of teaching aid was agreed by 93% of

teachers. Though classroom tasks and content of the plasma lessons were considered relevant, the adequacy of the time given for class work and taking notes were disagreed by most participants. About 74.2% of teachers felt that the time set for class work was not appropriate. Further more, time assigned

to copy notes from the plasma display was rated as not enough by 88.7% of respondents. About 51.3 % of teachers agreed that plasma lesson does not give

sufficient time for students to discuss in groups. About 78.6 % of teachers agreed that feedback was given to class tasks. Similarly the respondents claimed that the plasma television lesson has limitation in providing enough time: to do classwork, to copy notes, and for the teacher to be able to assist students while doing classwork which has been rated in all cases below 30%.

**Table-5: Participation of students in plasma lesson as reported respondents.**

No	Aspects of plasma lesson	Agree	Disagree	Total number of respondents
1	It cannot replay back	76.6	23.4	415
2	It gives enough time to do the given class work	25.8	74.2	430
3	It gives enough time to copy notes	11.3	88.7	436
4	It gives enough time for classroom teachers to help students to do class works	24.2	75.8	435
5	It gives enough time to do the given class works	25.9	74.1	430
6	It gives chance for students to discuss in groups	48.7	51.3	431
7	It utilizes a variety of teaching aids	93	7	430

**Benefits of the technology to classroom teachers**

As shown in Table 6, some of the rhetoric of the technology was supported in this research. The majority of the teachers, 82.6%, agreed that the plasma lesson gave them opportunity to learn various teaching methods. While assigning task, the plasma television teacher also instructs classroom teacher to check, correct or guide but the time given for classroom teachers to help

students to do classwork was judged inadequate by 24.2% of respondents. In line with this, 68% of the teachers agreed that the plasma lesson reduces teachers' workload. On the other hand, only 66.3% of respondents agreed with the statement that plasma lessons will solve the problem of qualified teachers. However, about 47% of the respondents did not believe that the technology would decrease teachers' creativity.

**Table-6: Considerations of the Technology to needs of the Teachers, as reported by respondents.**

No	Aspects of teachers	Agree	Disagree	Total No. of teachers
1	Teachers have good opportunity to learn teaching techniques from plasma lessons	82.6	17.4	436
2	It gives enough time to classroom teachers to help students to do class work	24.2	75.8	435
3	It solves the problem of qualified teachers	66.3	33.7	422
4	It decreases teachers creativity	53	47	428
5	It reduces teachers workload	68.1	31.9	435

**Nature of audiovisual provisions of the plasma television**

Table 7 below identifies qualities of visual experiences provided by the plasma lesson. The respondents were asked to indicate their agreement to the quality of visual provisions rendered by the plasma television. The research participants were asked to rate whether or not the font type and size used, image of font color and contrast between images or font with background color used by the plasma lessons did facilitate reading and attention of viewers. The different techniques that were identified for

bringing effect on students learning were agreed by research participants. The plasma lesson uses relative size and bold fonts for giving emphasis to important ideas; facilitate easy and fast reading of texts by using upper case and lower case letters. Similarly, the appropriateness of colour used by the plasma lessons was judged by research participants. Thus the majority of respondents agreed that to maximize attention, visibility and legibility of information, the plasma lesson uses bright of different color, contrast color between text/ image background.

**Table-7: Quality of visual experiences rendered by the plasma television as reported by respondents.**

No	Aspects of teachers	Agree	Disagree	Total number of respondents
1	Uses relative sizes of font to give emphasis to important ideas	98.2	1.8	437
2	Uses upper and lower case letters to make reading easy and fast	92.8	7.2	434
3	Uses bold text to emphasize information	94.2	5.8	420
4	Text and images stand apart from the background and be easily seen	95.9	4.1	435
5	Uses bright or different for emphasis which catch up the attention of the viewers	96.5	3.5	435
6	Text and colored backgrounds (or background images) contrast to ensure legibility	83.3	16.7	431
7	It does not use complicated background that make the text difficult to read	86.1	13.9	438

As shown in Table 8, the general nature of sound produced by the plasma television (its audibility and quality) were to some extent agreed by the participants, where as the language aspect was not. The majority of participants (96.1%) agreed that lessons were audible even to students who sit at

the back. Quite similarly, 91.4% of teachers agreed with the good quality of sound. On the other hand, the pronunciations of plasma presenters and students understanding were accepted by majority of the respondents. For instance, 66% and 58.8% of teachers agreed that students easily understand the pronunciation and meaning of lesson presenters, respectively.

**Table-8: Quality of auditor experience rendered by the plasma television lessons, as reported by respondents.**

No	Aspects of teachers	Agree	Disagree	Total No. of teachers
1	It is audible for students sitting at the back	96.1	3.9	436
2	It is easy for students to understand the pronunciation	66	34	432
3	It is easy for students to understand the meaning	58.8	41.3	440
4	It has good quality sound that can pay the attention of students	91.4	8.6	441

As indicated in Table 9, all the motion experiences identified were agreed by research participants. The ability of plasma lesson in providing visual access to experiments that would be difficult for the students to get in their schools was

agreed by 92.2% of teachers. In general, plasma lessons did provide students access to visual information that was difficult to convey in words, relate visual information to the life of the learners, present them in appropriate sequences.

**Table-9: Quality of video experience rendered by the plasma television lessons, as reported by respondents.**

No	Aspects of teachers	Agree	Disagree	Total No. of teachers
1	Provide visual access to experiments that would be difficult for the students to get in their schools	92.2	7.8	427
2	Present visual information that is difficult to convey in words	89	11	437
3	Present visual information which are related to the lives of the learners	87.4	12.6	437
4	Present visual information in appropriate sequence	91.3	8.7	436
5	The visual information are presented only when they are needed	84.7	15.3	437

## DISCUSSION

### Background information of the respondents

In the study all subject teachers were involved. The majority of the teachers, 93.9% of the teachers involved were males indicating the number of female teachers at Ethiopian secondary schools is still very low as compared to males. On the other hand more than 84% of the sampled teachers were degree holders at the time of the study. This indicated that the majority of the sampled teachers participated in this study had appropriate qualification and experience. This contradicts with one of the justification of the introduction of satellite plasma television which is to solve the shortage qualified secondary school teachers in the country.

As revealed by the majority of the respondents, they teach in overcrowded settings. About 89.6 % of teachers were actually teaching well beyond the class size set by the education policy for these levels of education.

### Pre-Broadcasting of Plasma lessons

Implementation of the new plasma technology introduced not only differentiation of roles and role relationships between the real human and the televised teachers but also the way these two teachers are related with the students. Specific terms of reference had been issued by the Ministry concerning the roles of each party by dividing the instructional time into pre, during and after broadcasting phases. Under this section, participants were asked about their opinion and the extent of implementation of some of the salient features of the pre-broadcasting phase.

### Share of introduction time between the teacher and the technology

One of the serious critics made to the plasma technology, based on existing literature, was related to the share of roles and responsibilities and the division of instructional time between the

classroom and televised teachers. When the technology appeared for the first time in 2004/05 academic year, 30 out of 40 minutes (75%) of instructional time were assigned for the televised teachers by leaving only 10 minutes (25%) for classroom teachers. Thus, actual lesson presentation was left for the televised teacher all the way from the first lesson up to the end of the year. On the other hand, classroom teachers make use of five minutes each for introducing and summarizing the lesson before and after the broadcasting.

The instructional innovation was not wholeheartedly welcomed by the school communities. According to Temtim (2007) due to teachers' early resistance to the innovation, since the second semester of 2004/05 academic year some nominal adjustment was made to the share of instructional time assigned for classroom teachers by adding two minutes and by reshuffling the relative share of instructional time between introduction and summary of lesson. Thus overall instructional time was pushed by adding two more minutes (to become 42 minutes) and classroom teachers were expected to use only two minutes for introducing the coming lesson and to use the remaining ten minutes for making summary of televised lesson.

This result seems interesting in the sense that after three years of implementing the innovation, 34.5 % of teachers did not indicate the time set for pre-broadcasting session to which their roles seems pivotal in the face of the challenge students' face as a result of the innovation. The two minutes fixed by the Ministry for classroom teacher to introduce the days lesson does not consider the time required for teachers to move from one section to another and such outright omission was attributed due to the top-down nature of policy making that did not consider views of grassroots actors. More than 61% of the teachers involved in this study also indicated that the time assigned to the classroom teachers to

introduce the day's lesson was poor or very poor. As a result, a large proportion of teachers introduce the lesson either some times or rarely. A number of findings also revealed that with such time share teachers can do nothing more meaningful than acting like operator-opening and closing the television (Getnet 2008; Brook 2006; Jeylan 2006).

One would question the wisdom of policymakers in authoritatively assigning two minutes only for teachers to introduce about the focus of the televised lesson without taking into account its pedagogical requirements. In this respect, Gigne and Briggs (in Borich 1988) argued that to bring about tight relationship between teaching and learning, teachers need to follow the sequence of seven instructional events. Out of these, the first three instructional events namely getting attention, informing the learner about the objective and stimulating recall of prerequisite learning were identified as preliminary instructional events that need to be attended before the actual presentation of the lesson.

According to the authors, without the students' attention nothing in the lesson will be learned, let alone actively engage them in the learning process. Once the internal processes of learning were activated in ways that corresponds to the content to be presented, the channel on which the lesson will be transmitted should be given and the most effective way of focusing learners' receptivity was to inform them the complexity of the behavioral outcomes they are expected to attain by the end of the lesson. Finally, since learning cannot occur in a vacuum, the necessary task-relevant prior information must be retrieved and made it ready for use (Borich 1988). One may simply question the adequacy of two minutes for the execution of these introductory events, especially as teachers change sections. Nevertheless, the very 34.5% of teachers having 10 minutes for the introduction is a controversial issue in contradiction to the fixed 2 minutes in which case further investigation need to be done whether the respondents confused the introduction and the consolidation times in the questionnaire or if there were some high school flexible enough to adjust the time in their own capacity which is not plausible.

### **The Broadcasting Phase**

This phase of instruction would represent the actual lesson being delivered. It was planned to be transmitted centrally from the EMA studio from the 3<sup>rd</sup> to 33<sup>rd</sup> minutes of each period of instruction.

### **The Nature of Plasma TV Lesson**

Careful planning is absolutely essential for effective teaching. It helps to produce well-organized classes, purposeful class atmosphere and reduce the likelihood of disciplinary problems (Callahan & Clark 1982). In all issues of lesson organization stated in this study, plasma lesson was rated positively by the majority of the respondents. Quite surprisingly, the pace of the plasma lesson was also rated positively by the majority of the respondents in contrast to other similar studies carried out so far. Presently, plasma lessons are no more sources of inspiration to students as too often stated in official rhetoric. A single phrase that all earlier studies on the subject unanimously agreed was the fast pace of plasma instruction (Gary 2005; Ali 2005; Brook 2006; 2007; 2008; Tessema 2006 Getnet 2006; Temtim 2007; Akalewold *et al.*, 2011). For example; according to Gary "... every thing about the program is too fast. Students cannot take in what presenters are saying; there is not enough time to complete the exercise or to copy the notes given on the screen" (2005). In this study, 80.8 % of teachers agreed that plasma lessons have appropriate pace. In spite of accumulated research findings that state otherwise, such high positive response rate was probably attributed to the way the item was stated in the questionnaire for it does not clearly specify in terms of students capability.

The researchers believed that teachers responded to the item from their own perspective, for the new innovation also determined teachers fate as attendants to "expert lessons."

According to some studies (for example Temtim 2007) the innovation was generally technocratic in its approach and the process was attended without the

participation of students and teachers. For example; the learning pace, language ability etc., of students were not taken into account and many of the difficulties visible since its implementation were evidence for the marginalization of the actual actors. Thus another way of uncovering the responsiveness of the plasma lesson was by asking participants to some of the issues of planning and to what extent attention was paid to them. Thus aspects of lesson organization, needs of students and teachers, relevance of the content and tasks of the lessons etc. were considered for examination. In general, the plasma lessons were found to be well-planned and well-organized.

### **Sensitivity of Plasma Lessons to Students' Need**

Success of the teaching learning process depends largely on how it fitted to the students' abilities, needs, aptitude, interest and goals (Callahan & Clark 1982). Students who are well motivated to learn usually do learn if lessons are reasonably well designed. On the other hand, if students' attitude towards school and school learning were antagonistic, teachers' effort alone did not likely to be fruitful (Ibid: 128).

To evaluate plasma lesson in this study, aspects of students' need- its ability to motivate students, access to quality education, and its consideration for the special needs of visually and hearing impairment students and the pace of instruction were identified. Table 3 identified some of the students' variables to which research participants were asked to indicate their degree of agreement and/or disagreement. Even if the plasma lesson does not consider individual differences, the way it presents the lessons are well organized and well planned. As a result of this, large proportions of teachers positively rated that plasma lesson has the ability to motivate students and give equal access to quality education to all students. This result correlates with the widely voiced claim of policymakers in justifying the

value of the innovation (MOE/EMA 1998). It was acknowledged that the variety of information, visual and audio experiences; often beyond the capacity of the classroom teacher to assemble, would sustain students' attention and motivation. The responsiveness of plasma lessons to students with special need, presents different stance. Plasma lesson provide both sound and vision hence marginalizes students with both hearing and sight impairment. Large proportion of teachers believed the fact that visually impaired students were significantly hindered by the technology. For example, about 79.4% of teachers believed that the technology had no place for the visually impaired students that makes students with sight impairment at relatively advantageous position than students with hearing impairment who could not access the spoken medium for it was not supported with sign language. This fact was agreed by most of the participants. The respondents believed that the technology had limited place for hearing impaired students.

Even though significant number of respondents (82.5%) agreed with the official rhetoric that the innovation 'makes students to have equal access to quality education' (sensitive strategy from equity perspective to which policy makers are preoccupied), this outcome stood at variance with the various needs of students. According to Temtim (2007) plasma lesson gives attention to visual and auditory oriented students at the expense of kinesthetic ones. Due to the acknowledging dire shortage finance, policymakers took the innovation as panacea with the determinant of laboratory work and other practical activities, thus denying meaningful learning for all; especially the kinesthetic ones. This contradiction was apparent for 73.1 % of teachers disagree with the statement that the plasma television 'considers individual difference.'

### **Relevance of the content and task of the plasma lesson**

Subject contents are the substance of teaching. Teachers are expected to select those contents that seemed most likely be important to students. Such principle, according to Callahan & Clark (1982:5) was referred as the doctrine of contingent value. Such principle implies that thorough coverage of the most important, useful content was more desirable than covering everything superficial. They advised the need to regard content not as an end but rather as a means to knowledge and learning that was not available for use was not of much value.

One of the Ministry's arguments in favor of the innovation resides in the ability of the technology to cover curriculum portions within the specified academic time table by all the schools in the country. Beside this, the content of the lessons is argued by the Ministry as relevant to secondary students for it is designed based on the national curriculum (MOE/ EMA 1998 E.C.).

Though the relevance of school curriculum had long being the focus of considerable debate, it was now used to give credibility to the plasma lesson. The Ministry further argued that it followed exactly what was identified in the national curriculum, though it was labeled as 'vastly overcrowded' (Tewodros 2006; 68), specific instances were mentioned by several researchers to indicate the problem of relevance (Gary 2005; Ali 2005; Brook 2006; Tewodros 2006; 2007) according to Gary (2005) in physics lesson, students see more of Johannesburg upper class suburbs and supermarkets than they do scenes from Ethiopian life. The plasma presents 'rich content but it is not selective' (Tewodros 2006: 69). The appropriateness of the class work and homework tasks of the plasma lesson were also agreed by research participants. In general, high percentages of teachers seem to agree with the appropriateness of class work than home work.

Based on available findings, there is a different interpretation to such mainstream perspective, one seemingly concerns for policymakers was related to content coverage. Before the introduction of plasma lessons, it was argued that most teachers did not manage to finish the content of their subjects, for most part due to the scope of secondary curriculum. Thus, when content coverage was singled out without referring to other important competing outcomes to which professional educators' weight, then it is indeed a success, but what if understanding was valued equally or above that of mere content coverage?

One may also needs to ask a similar question to understand fully how plasma lessons manage to finish a nationally prescribed curriculum to which it was impossible to some classroom teachers. Was there any thing meaningful done to reduce the scope of existing national curriculum and taught only what seemed to be relevant? Based on existing findings, this concern of policymakers was addressed through the elevation of content coverage at the expense of students understanding and their meaningful participation. The various instructional strategies employed by the plasma mode of instruction to attain such purpose were done at the expense of students direct needs. These include shortage of the time for students' to do problems, the little time given to students' to do class work and copy notes , and no feedback from the plasma teacher.

For example, one sound pedagogical implication was to adjust instruction to the need of students. In the case of plasma lesson, what were done was to the opposite. Hence, instead of adjusting instruction to the various needs of students, students were demanded to adjust themselves to the demands of the plasma lesson. To illustrate this fact, reference could be made how one study identified how content coverage was

addressed and the manner in which it was done.

Classroom teachers, though not speak Standard English, could understand the contextual situations of their students, gave due concerns to their understanding, revises portions and more importantly address to students questions. Instead of attempting to reduce the scope of the bulky national curriculum (which is done at the national level for secondary curriculum is centralized), the professional practice of teaching and teachers was judged based on criteria unacceptable to most teachers.

Classroom teachers are, thus, successful in letting students learn and understand those limited portions and their failure in finishing the nationally prescribed curriculum was attributed to the pace of students learning. From these two competing demands, and based on existing data and interpretations, classroom teachers held themselves responsible to their students learning need rather than policymakers' intention of coverage.

#### **Participatory Approaches Rendered by Plasma Lesson**

The success of any course depends upon the excellence of the plan and the skill with which the plan was carried out (Clark & Star 1986). A number of arguments were forwarded by policymakers for justifying the importance of satellite education television program. For example; the new technology was believed to change the teaching culture, in Ethiopian context teaching was criticized for being depended largely on teacher verbalism.

In this regards the introduction of plasma lesson was not considered as innovative since direct instructional mode prevailed, a transition from teacher centeredness to plasma centeredness ( see Gary 2005; Ali 2005; Getnet 2008; Temtim 2007; Brook 2008).



As shown in Table 5, using the broadcasted program one cannot replay back the PTV lessons depending on the need of schools which was perceived not appropriate by 76.6% of the teachers. This specific instance illustrates the issue of power, and how through plasma lessons teachers and students were made powerless. Since transmission was managed from the center, the lessons were beyond the control of the school actors. Power interruptions and technical problems were frequent as a result instruction was disrupted. The serious implication of these phenomena was succinctly argued by Brook (2006: 75) during his observation of one of the school he observed that had experienced power interruptions for two consecutive days.

The implication of this was that once lessons were not attended (be it technical problem, power failure or being absent due to personal reason) the lessons were passed for good. Despite the fact that students learn in a stressful situation (fast pace, unable to take note, difficulty with language etc.) such skipping of lessons would further widen the gap in students learning and making teachers work uncertain with what topic to prepare for the class. The non-repeatable and non-rewind able nature of the lesson means lack of control over the transmission that attributes a general feeling of helplessness (see Brook 2006; Ali 2005; Getnet 2008).

The ability of the technology in providing a variety of teaching aid was agreed by 93% of teachers. Though classroom tasks and content of the plasma lessons were considered relevant, the adequacy of the time given for class work and taking notes were disagreed by most participants. About 74.2% of teachers felt that the time set for class work was not appropriate. Usually the set time for doing exercises were not sufficient, to which students had to risk understanding of the question for writing it.

Further more, time assigned to copy notes from the plasma display was rated as not enough by 88.7% of respondents. In this line, both Gary (as native speaker) and Tewodros (2006) (as physics teacher) attempted to copy text from plasma display but failed to do so. According to Tewodros, "the pace of instruction did not provide students time to think: this probably implies that there was less meaning construction." (Ibid: 59). In the face of uncontrolled instruction, absence of plasma guide for students, the time assigned for taking note did not consider students level of note taking. This results students frustration due to lack of doing any thing meaningful out of the speedy broadcast (Brook 2006).

About 78.6 % of teachers agreed that feedback was given to class tasks. Students were occasionally asked to carry out tasks framed between 20 to 40 seconds, the immediate feedback given to them after the time set discouraged them from attempting the task. According to Brook (2008:33) 'Most students do not cope with this situation and are not able to finish the tasks on time. After all, it does not matter if students attempt to carry out the tasks or not; the answers will appear on the screen at the end of the allotted time.

Even then, most participants assumed that the time given for students activities were low. About 51.3% of teachers agreed that plasma lesson does not give sufficient time for students to discuss in groups.

In general, the extent of students' participation in planning varies greatly, the range being from almost no participation in conservative traditional classroom to (rarely) students' making almost all decisions in progressive alternative schools (Clark & Starr 1986). In almost any lesson, students do some planning though teachers' did the major planning activities.

This finding seems reasonable; in light of recent findings that generally rated plasma lesson instruction as teacher-centered where more concern was laid to content coverage (Brook 2006; Tewodros 2006; 2007).

#### **Benefits of the Technology to Classroom Teachers**

The Ministry rhetoric also includes the benefits of the technology to classroom teachers. One of the salient arguments set forward was related to shortage of adequate number of competent teaching force. Thus, the technology could present competent teachers to all students of the nation, irrespectively of the location of the schools. Plasma lessons provide best teachers that helped school teachers to learn not only the language, but also the method of teaching.

Some of the rhetoric of the technology was supported in this research. The plasma television teachers were elevated as qualified and experienced in the Ministry rhetoric, though observation by a number of researchers revealed the opposite. For example, Tekeste (2006) labeled them as 'readers' and not teachers. More probably, they were recruited for their language proficiency, hence, instead of teaching they read out the lesson to the detriment of the students. But on the other hand, this study proves the opposite whereby 82.6% of teacher agreed that the plasma lesson gave them opportunity to learn various teaching methods which needs deeper investigation in this direction.

Though the actual teaching was made by the plasma television teacher, classroom teachers were expected to play the role of facilitation. The Ministry guideline also identified a number of specific roles for teachers to play while plasma lessons were in progress. While assigning task, the PTV teacher also instruct classroom teacher to check, correct or guide and the time left for this was judged inadequate by 24.2% of respondents.

On the other hand, only 66.3% of respondents agreed with the statement that plasma lessons will solve the problem of qualified teachers. Since the lion share of instructional time was given to the technology, about 68% of teachers agreed that it decreased teacher work load. The technology deprived teachers from making instructional decisions to which they used to have (Ali 2005; Brook 2007; Tessema 2006; Getnet 2008). The cumulative effect of this was gradual distancing from their profession and with the resultant atrophy of their intellectual capability. This fact was further reinforced; for about 48.1% of respondents believed that the technology would decrease teachers' creativity.

#### **Nature of Audiovisual Provisions of the Plasma television**

Audiovisual instructional materials are appropriate since they facilitate teaching-learning process, though they could not substitute classroom teacher (Clerk & Star 1986). They do make learning more interesting and vivid by appealing students' attention and promoting motivation and retention (ibid). Audiovisual materials are well recognized in the teaching learning processes for they maximize learning due to the multiple avenues of sensations they rendered for the learners. Though they are generally taken important, their selection should be made based on their some criteria.

What seemed worrying as attested in various studies was the problem of understanding as a result of the combined effort of pace and high language demand of the lesson. Participants were asked whether understanding the meaning was easy to which about 41.3% of respondents disagreed. Citing specific example from plasma science lessons, Gary (2005) referred to the overly academic language; taken mostly from American and British textbooks that present challenge to the majority of students. He further argued that: It is not simply technical science terminology that

is the problem. It is the connecting words, the length and complexity of sentences and the overly academic, third person style of writing that makes both the oral and written presentations in plasma, and also in textbooks, so difficult to follow. The English is not simplified into either children's language or, most importantly, for second and third English language speakers.

**After the Broadcast**

When the actual lesson through broadcast was over, teachers were generally expected to give overall summary of the program. Teachers need to identify and discuss issues of the lesson that may challenge to students and any other queries from the students. Finally the

teacher was expected to introduce the title and content of the next televised program. The relatively extended time given for teachers' summary was judged as low probably due to the emphasis plasma lessons on the principles of content coverage. The relatively larger portion covered by each plasma lessons during those thirty minutes might contribute to difficulty for a teacher making summary of the lessons within ten minutes. (see also account of Ali).

Concerning the time given for teachers to make summary of the plasma lesson, about

87 % of teachers responded that; as part of summary, they did not introduce the next lesson either always or most of the time.

## CONCLUSION AND RECOMMENDATION

Most of the class interactions during the plasma television lessons in all the subjects investigated under this study found to be the very success of the Plasma television implementation. To this end, plasma television lesson organization, plasma television lesson planning, use of variety of methods for presentation supported by visual aids, content coverage and selected exercises with in the given schedule, providing equal access to students through out the nation, proper utilization of the technology (size and style of fonts, color utility for relevant topics), are all the strength of PTV lessons during these subjects lessons. In general the plasma lessons were found to be well-planned and well-organized.

On the other hand, very few elements of teaching learning activities such as insufficient time for the school teacher involvement and students to take their own notes and do class exercises followed by discussion, no opportunity for visually impaired students, were weaknesses of the new technology implementation.

Thus, as the PTV implementation found helpful in many aspects of the class activities going on supporting the teacher, the program must be encouraged and supported with a continuous and flexible modification of planning and

appropriate time distribution to alleviate its weaknesses progressively.

Thus,

1. For the success of the teaching learning, enough time should be given for teachers to make introduction and students to do their jobs properly. The time given for the plasma teacher and the class room teacher should be revised.
2. Class size should be reduced so that teachers will get enough time to help students during class work.
3. Schools should have the whole programs so that they can use it whenever a need arises.
4. The plasma has to give time for teachers to give tests, quizzes and assignments.
5. Teachers should have to get modules so that they will prepare before classes and this helps students to get enough time to attend the plasma lessons.
6. The schools should prepare additional classes to help students.
7. Teachers should have their own role to play during the three phases; introduction and consolidation having enough time to complete; and during presentation, supporting the PTV presenter in writing important terms and formulas on the black board beyond supervising and guiding students' during the class activities.

## BIBLIOGRAPHY

- Akalewold E.(2005) Civics and Ethics Education Curriculum Policy- Recent Government's Interest and Subsequent Development. IER Flambeau Vol. 13. No.1.
- Akalewold E., Kassahun M., Zelalem T., Addis S. (2011). Status of Satellite Television Broadcast Programs Implementation in Mathematics and Science Subjects in Ethiopian Government High Schools from Students Perspective(Unpublished article)
- Ali Y (2005) Teaching with and Learning from electronic Media: a case study on satellite TV instruction in Debre Berhan General secondary school. Thesis submitted to the school of Graduate Studies, AAU. (Unpublished document).

- Amare A. (1998) Television Method of Learning: A habit of Learning with the Least Effect. Bulletin of Bahir Dar Teachers' College 9(1): 1-14.
- Borich G (1988) Effective Teaching Methods, New York: Macmillan Publishing Company.
- Brook L. (2006) Plasma television Teachers: where a different reality takes over African Education in Critical educational visions and practices in Neo-liberal times; L dahlstrom and Mannberg Umea (eds.) Global south network publishers, University, Umea, Sweden pp. 71-88.
- Callahan J and Clark L (1982) Teaching in the Middle and secondary Schools: planning for Competence (3<sup>rd</sup> Edn), New York: Macmillan Publishing Company
- Gagne, R.M. etal(1992) Principles of instructional Design: 4<sup>th</sup> Edition. New York Sandiago, Harcourt Brace Jovanovich College.
- Gary . K (2005) Ethiopian Educational Satelite television programs: helping Students Get the most out of plasma, Annual research conference, Kotebe college of teachers Education 7-8 april 2005.
- Getnet D. (2008) using "plasma TV" broadcast in Ethiopisn secondary schools: a brief survey. Australian Journal of Educational technology vol 24(2), 150-167.
- Inter Africa Group (IAG, 2004) Background Paper Prepared for the Experts Debate on the Ethiopian Education and Training Policy: November 18, 2004 at UNCC
- Kassahun M. and Zelalem T. Assessment on the impact of plasma television implementation on the teaching learning process of Mathematics class: The case on selected practicum sites( High Schools) for Education faculty of Jimma University, Ethiopian journal of Education and Sciences Vol. 2 No. 1,2006.
- Kedir A. (2006) Contradictions, Challenges and Chaos in Ethiopian Teacher Education , Journal for Critical Education Policy Studies Volume 4, Number 1.
- Mathewos S. (2006) teaching and learning through educational technology: a case study on satelite TV instruction in Wachemo Secondary School. Thesis submitted to the school of Graduate Studies, AAU. (Unpublished ocument)
- Ministry of Education (2002) Education & Training Policy and its Implementation. Addis Ababa: Mega publishing.
- Ministry of Education (2002a) Education & Training Policy and its Implementation. Addis Ababa: Mega publishing.
- \_\_\_\_\_ (2005) Educational Statistics annual abstract 1998 E.C ( 2005-2006) Addis Ababa , Ministry of Education
- \_\_\_\_\_ (2002b) Education Management, Organization, Public Participation and Finance Guideline. Addis Ababa: EMPDA (Amharic document)
- Ministry of Education [MoE], (1998). Education Sector Development Program I (ESDP I).The Federal Democratic Republic of Ethiopia, Addis Ababa, Ethiopia.
- Ministry of Education [MoE], (2002a). Education Sector Development Program II (ESDP II).The Federal Democratic Republic of Ethiopia, Addis Ababa, Ethiopia.
- Ministry of Education (2002b) Education & Training Policy and its Implementation. Addis Ababa: Mega publishing.

- Ministry of Education (2002c) Educational management, Organization, Community Participation and financial guidelines, Addis Ababa, Ethiopia
- Ministry of Education (MoE), (2003). Teachers Education System Overhaul (TESO), Handbook, final. Ministry of Education, Addis Ababa, Ethiopia.
- Ministry of Education (MoE), (2005). Education Sector Development Program III (ESDP III). The Federal Democratic Republic of Ethiopia, Addis Ababa, Ethiopia. Addis Ababa.
- Ministry of Information (2002a) Federal Democratic republic of Ethiopian Government capacity Building Strategy and program. Addis Ababa. Mega Publishing.
- Ministry of Information (2002b) Ethiopian Democratic Republic Government
- capacity Building Strategy & program. Addis Ababa: mega printing press.
- Tekeste N (1996) Rethinking Education in Ethiopia (Uppsala, Nordiske Afrikainstitutet).
- \_\_\_\_\_ (2006) Education in Ethiopia- From Crises to the brinks of Collapse. Discussion Paper 33. Stockholm: Nordiska Afrikainstitutet
- Temtim (2007) Integration of ICT in the high schools: the case of Addis Ababa administration (unpublished document).
- Tewodros G. (2006) the role of ICT in Teaching –Learning Process: A case Study on Plasma Instruction in Addis Ketema Secondary School. AAU School of Graduate Studies: Unpublished MA Thesis.
- Transitional Government of Ethiopia (1994) *Education Sector Strategy*. Addis Ababa: EMPDA.