5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. SUMMARY OF THE MAJOR FINDINGS

Introduction

The purpose of this research was to study the opportunities and challenges in integrating PTV in teaching secondary school Biology in Government secondary schools in the Eastern part of Ethiopia. For the realization of the study, a total of 672 respondents (570 students, 87 Biology teachers, 5 Principals, 3 PTAs, 5 ICTCCs and 2 REBHs) were the participants of the present study. Descriptive survey research design was employed to study the problem. Data were collected through questionnaires, interviews, FGDs and Observation Checklist. The collected data were analyzed both qualitatively and quantitatively. Accordingly, the major findings of the study were summarized under the following sub-headings.

5.1.1. Interests, perceptions and beliefs of teachers and students towards PTV Integration

It was found out that most of the teachers (95%) showed their keen interest in integrating PTV in their classroom lessons. Similarly, most of the students (78.2%) perceived PTV integration educationally helpful and revealed their interest and constructive views towards it. Results from interviews and FGDs also corroborated this finding. However, teachers’ reflections in this regard showed that students were reluctant to learn Biology through PTV. The major reasons, as suggested by teachers from their observations, were students’ lack of proficiency in English language, shortage of time and speedy broadcast by PTV.

The study also indicated that, a great majority of the teachers (90.5%) were happy to receive commands from PTV teacher and act on them while PTV lesson was going on, whereas most of the students
(87.4%) were not. With reference to group teaching and learning while PTV lesson was going on, an overwhelming majority of the teachers (96.3%) reported that they were interested to work with students in pair or groups works. On contrary, a great majority of the students (93.1%) reflected that they were not interested.

It was investigated that most of the teachers (85%) perceived themselves as one of the most important elements of the teaching/learning activities in a classroom where PTV is teaching. Furthermore, teachers rated their significance as very high (27.6%), high (33.3%), medium (32.2%) and low (6.9%).

In respect to the professional competence of the teachers, as viewed against those of PTV teachers, a relatively large number of teachers (44.8%) believed that they were less competent than PTV teachers, whereas about 33% of them perceived that they were more competent than PTV teachers. 21.8% of them were hesitant. However, a very large number of teachers (70%) revealed their belief that PTV teachers can’t replaced them in the classroom. Likewise, most of the students (51%) were of the opinion that classroom teachers can’t be substituted by PTV teachers, whereas about 39.6% of them revealed their belief that PTV teachers can substitute classroom teachers. Results from the teachers’ interviews also indicated that they didn’t hold a belief that they can be replaced by the surrogate teachers – the PTV teachers.

The study also investigated that majority of the students (50.4%) didn’t prefer learning Biology by PTV teachers although about 39.3% of them preferred leaning Biology by PTV teachers than classroom teachers. Rather, a great majority of the students (77.4%) preferred learning Biology by both PTV and classroom teachers. During the interviews and FGDs as well as in the open-ended part of the questions, the students revealed that learning by both of the teachers benefits them in that one complements the other. Especially, they liked PTV for its practical demonstrations and the classroom teacher for the close interactions.
Lastly, it was found out that an overwhelming majority of teachers (93.1%) reported that they were unable to effectively integrate PTV lessons into their classroom teaching-learning activities. The major reasons forwarded were lack of adequate knowledge and skill on how to effectively integrate ICT into classroom lessons in general and PTV in particular; shortage of power and time, technical problems, lack of schedules and reluctances by students.

**5.1.2. Views of students and teachers on the pace of educational broadcast by PTV**

The study showed that, except few teachers, a vast majority of them (81.6%) revealed that the speed of educational broadcast by PTV was so fast and hence, students were facing difficulty in copying notes from the PTV screen. This finding is in congruence with the reports made by most of the students (58.2%). However, about 38% of the students perceived that the pace of educational broadcast by PTV was not fast.

In connection to this, a relatively high number of teachers (46%) disclosed that the pace of educational broadcast by PTV was not speedy and hence, students had less difficulty of listening to PTV lessons, whereas a comparable proportion of teachers (44%) reported that the speedy transmission had negatively affected students’ listening to PTV lessons. On the other hand, an overwhelming majority of the students (92.3%) believed that the pace of educational broadcast by PTV was fast that they couldn’t effectively listen to it. As reported by most of the teachers (58.6%) the pace of PTV was high and has negatively affected students’ visual learning from the PTV screen. Although the extent of clarity of visual aids displayed on the screen were chiefly rated (by teachers) as excellent (35.6%) and very good (44.8%), effective learning from the visual aids was not fully actualized.

In line with this, the researcher’s classroom observation and interviews with students, on top of speedy transmission, large class size (about 100 students per class, appendix VIII-C) has negatively affected
students’ effective viewing of the visuals displayed on the PTV screen. The glaring (shining) effect of PTV screen was a problem and seriously affected learning of those students sitting in the front left and right sides of the classroom.

Overall, responses from questionnaires, interviews, FGDs and open-ended parts of teachers’ and students’ questions affirmed that the pace of educational broadcast by PTV was fast and affected students’ note taking, effective listening and visual learning. In particular, although the visual aids displayed on PTV screens were exceedingly important, as the researcher’s classroom observation revealed, the students could neither copy, draw nor view them properly.

As to the suitability of PTV lesson broadcast to all the students in a given classroom, remarkably, nearly every student (93.0%) indicated that PTV educational broadcast didn’t take students’ individual differences into account, while a comparatively high number of teachers (51.7%) agreed that educational broadcast by PTV considers students’ individual differences. However, some of teachers (36.8%) held a view that individual differences of students were not taken into consideration by PTV and thus, it was not suitable for all the students.

Almost all Ethiopian government schools lack special classes designed for students with special needs. According to the study, this was primarily attributed to financial and infrastructural constraints, sticking to the policy that promotes inclusive education; and lack of due attention by the MOE and other concerned bodies such as schools, DEBs and REBs. Furthermore, interviewed and FGD participant teachers reflected that they used the same curriculum, same methods of teaching and PTV mode of instruction for all the students irrespective of their backgrounds (such as fast, slow or medium learner; impaired or non-impaired learner, etc).
5.1.3. Views of Students and Teachers on the Contents, Lesson Objectives and Clarity of PTV Lesson Broadcast

As to the clarity and relevance of the PTV lesson objectives, apart from few teachers, a great majority of them (72.4%) indicated their common feeling that lesson objectives were clearly stated (by PTV) at the beginning of the lesson broadcast. Furthermore, a vast number of teachers (85%) revealed that PTV lessons presented were closely related to the objectives stated earlier.

Attempts were made to group schools on the basis of availability and functionality of Biology labs. Accordingly, based on the school observation checklist, discussions with teachers and interviews with lab technicians, the sampled schools were classified into 4 categories. They were schools with: (i). Functional labs (14.3%); (ii). Partially functional labs (21.4%); (iii). Non-functional labs (7.7%) and (iv). No labs (53.8%).

As indicated by a great majority of the students (93.0%), most of their schools had Biology labs. However, these labs were mere buildings without the required equipments and chemicals. As a result of that, as emphasized by a vast majority of the students (92.3%), Biology lab practicals hadn’t been conducted. In the same way, Biology lab activities (practicals) were conducted by teachers fully (13.9%), partially (20.8%), and not at all (65.2%) in their respective schools. Furthermore, as pointed out by most of the teachers and students, the major reasons that prevented them from conducting Biology lab activities were (i). Lack of chemicals, equipments, technicians, rooms and attention by the schools, and (ii). Demonstration of vital Biology lab activities by PTV. Among the reasons, as indicated by majority of the teachers (45.98%) and students (29.8%), dependence on PTV appears to rank first (Tables 9 and 21). In addition, in all the observed schools (which had lab buildings), the labs were in aggregate, i.e. all science subjects (Biology, Chemistry and Physics) had a single lab room in common. Most of them were small
rooms without lab safety rules and devices; poorly organized and ventilated.

Teachers and students were requested if PTV demonstrates various Biology practical activities or not. Accordingly, almost every teacher (93.1%) and the largest part of the students (82.3%) responded that various types of Biology practical (experimental) activities were demonstrated by PTV. In relation to this, most of the students (58.6%) and teachers (63%) revealed their belief that the experimental activities demonstrated by PTV were understandable.

However, some reservations and concerns pointed out by most of the teachers (87.4%) were language difficulty, power interruptions, high speed, shortage of time, non-repeatability of PTV lesson and its sole being audio and visual medium but not kinesthetic means of teaching-learning tool. Their concerns are also advocated by learning theories which emphasize that learning through audio-visuals accounts only for 50% of our learning (Dale, 1969).

The researcher’s classroom observation data closely fit to what had been indicated by the above respondents. In addition to the above multidimensional parameters that negatively affect the demonstration of practical activities [by PTV] and the smooth flow of the PTV lesson, two vital factors affecting the PTV integration were noticed: (i). Overlap of exam periods (in schools) with broadcast schedule i.e. the researcher observed that students were taking their mid-examinations while PTV lesson was transmitting. Although no one was attending the broadcast, it had been broadcasted for about two weeks (mid-exam weeks). (ii). Students registration (enrollment) lagging behind the academic calendar. The researcher observed that PTV lesson broadcasts were transmitted while students’ registration was going on. In the above two cases, academic wastages were noticed, i.e. many episodes (practical as well as theoretical) were missed and not compensated. The problem was further
exacerbated by the PTV’s non-repeatable nature of broadcast plus lack of CD copies of the episodes broadcasted.

Above and beyond, as indicated by most of the teachers (85%) and students (65.6%), shortages and lack of chemicals and equipments in their schools were alleviated through educational broadcast by PTV. In the same way, a reasonably large number of teachers (85%) and most of the students (66.6%) thought that shortage and lack of Biological instructional aids, apart from lab equipments and chemicals, were relieved by PTV. Interview and FGD results obtained from students and teachers go in line with thoughts indicated above. Although there were few qualms from the researcher’s side, his observation data, for most of its parts, closely fits to the views made above.

As to the style of presentation and simplification of Biological concepts, most of the teachers (76%) and students (62.9%) revealed their consent that Biological concepts were presented by PTV in a simple and understandable manner.

As to the role of PTV in demonstrating field lessons in the classrooms, a good number of students (76.6%) and teachers (74%) believed that PTV presented timely and relevant field phenomenon (lessons) into classroom. In connection to this, most of the students (68.1%) and a great majority of the teachers (84%) disclosed their belief that PTV demonstrated ample examples to explain the lessons it presented. In addition, reflections obtained from the respondents through interviews, FGD and open-ended parts of the questions agreed with the decisions made above by the same respondents. On top of that, the researcher’s classroom observations of the PTV lesson broadcast endorsed the same.

Finally, as to the harmony between PTV lesson broadcast and textbooks as well as teachers’ guides, about a comparable number of teachers unveiled their agreement (46%) and disagreement (44%) on the issue. Similarly, most of the students (55.5%) thought that PTV lessons
and their textbooks go hand-in-hand, while 35% of them revealed their belief that there were mismatches between their textbooks and PTV lesson broadcast.

5.1.4. Tradition of Time Sharing Among Students, Classroom Teacher and PTV Teacher

In regard to the sufficiency of the time given to teachers to introduce, present and summarize lessons before and after PTV lesson broadcast, they were of the opinion that the time given to them was sufficient to introduce the lesson (50.6%), present the lesson (58.6%) and summarize it (56.3%), whereas about 42.5%, 39.0% and 37.9% of them, respectively, indicated that the time given was not sufficient to introduce, present and summarize lessons. Yet, a fairly small proportion of teachers, 6.8%, 2.3% and 5.7%, respectively, were appeared to be doubtful. In addition, comparable percentages of teachers (44.8%) and (45.9%), respectively, revealed their agreement and disagreement with the amount of time they were given to assess (evaluate) their students and provide them with feedback. Yet, 9.2% of them were hesitant. Consequently, classroom assessments were conducted ‘always’ (25.3%), ‘sometimes’ (35.6%), ‘rarely’ (27.6%) and ‘not at all’ (11.5%). Once again, teachers rated their teaching preparations as excellent (25.5%), very good (43.7%), good (23.0%), fair (5.7%) and poor (2.3%).

Concerning the sufficiency of time given to teachers to interact with their students while PTV lesson was going on, most of the teachers (54.0%) claimed that the amount of time given to them to interact with their students was thought to be sufficient. yet, 36.7% of teachers were unsatisfied with the amount of time allotted. About 9.2% of teachers couldn’t make their decision. Similarly, most of the students (49.7%) revealed that the time given was not sufficient to interact with their teachers, whereas about 37.7% of them held a different view and responded that they were given sufficient time. Still, 12.6% of the
students were not sure. Although the response provided by 54.0% of teachers and 37.7% of students allege that the amount of time given was sufficient, these responses appears to be in conformity with the researcher’s classroom observations and responses obtained from most of the teachers and students participated in FGDs and interviews. According to the researcher’s observation, teachers and students were in problems to interact with each other as they were given with meager time and hence, their interaction was limited by time. Furthermore, teachers rated student-student and student-teacher interaction as medium and low.

Once again, as indicated by majority of the teachers (68.9%) and students (65.3%), the amount of time given to students to copy notes, draw diagrams, etc from the PTV screen was not sufficient. In connection to this, the researcher’s on-the-spot classroom students’ notebook checkup revealed that their notebooks were: (i). Not well written (ii). Full of incomplete sentences, and (iii). Combination of the two. From the interviews and observations, the researcher came to learn that these problems were mainly attributed to high speed of PTV and shortage of time. On the other hand, as indicated by most of the teachers (55.2%) and students (49.5%), the time given to students to solve problems (questions) displayed on PTV screen was sufficient. However, 36.7% of teachers and 40.5% of students were dissatisfied with the amount of time given. The rest 8.0% of teachers and 10% of students were ignorant about the issue. Furthermore, in regard to this, the researcher’s classroom observations indicated that: (i). The amount of time given was not related to the difficulty level of the question (ii). Time was not considered for the classroom teacher to give feedback to students on the question posed by the PTV teacher as PTV teacher sometimes jumps without giving appropriate feedbacks on the questions. (iii). No sufficient “wait time” was given. Based on the classroom observations, minimum
and maximum time given for a question was 2 and 5 minutes, respectively.

Lastly, teachers were requested to reflect their views on whether the total time share between them and PTV teachers (20 minutes for each) was fair or not. Accordingly, a great majority of the teachers (64.4%) reported that they were not comfortable with the current time share, whereas about 35.6% of them were comfortable. In connection to this, teachers were also asked to suggest (if they were not comfortable with the time share already in function) a suitable time that fits them best. Accordingly, they suggested 10 minutes (14.9 %), 10-15 minutes (54.0 %), 15-20 minutes (17.2%) and 20 minutes (13.8%) broadcasting time. This finding is in conformity with that of the students’ responses.

5.1.5. PTV and Classroom interactions

The study investigated that student-student classroom interaction was encouraged by PTV and this was reported by 52.8% of the teachers and 45.6% of students. However, 41.1% of students were reported to have a different view that student-student interactions were not encouraged by PTV during Biology classes. Likewise, most of the teachers (63.2%) and students (44.1%) revealed that student-teacher interaction was encouraged by PTV, whereas a comparable number of students (43.2%) were found to hold an opinion that student-teacher interactions were not encouraged by the PTV. As reported by some of the respondents, the major reasons for the lack of student-student and student-teacher interactions were attributed to classroom teachers’ lack of skills in effectively utilizing the given limited time; language barrier between students and PTV teacher and shortage of time. It is suggested that increasing more non-PTV periods, improving teachers’ skill on effectively utilizing the given time, and improving students’ English language skills helps in improving classroom interactions.
In regard to the extent of student-student and student-teacher interaction, the study indicated that student-student interaction was rated (by students) as low (38.2%), Medium (33.3%), very high (10.5%) and high (17.9%). Similarly, student-student interaction was rated by teachers as very high (3.4%), high (17.2%), medium (43.7%) and low (35.6%). It can be inferred from the analysis that the student-student interaction in a PTV classroom was mainly medium and low. Furthermore, it was shown that student-teacher interaction was rated (by teachers) as very high (5.7%), high (27.6%), medium (54.0%), and low (12.6%). Likewise, students rated their interaction with teachers as very high (18.4%), high (24.7%), medium (28.8%), and low (28.1%). Thus, student-teacher interaction had been mainly rated as medium.

In sum, as can be seen from the above analysis, the student-student and student-teacher interactions were mainly at the levels of medium and below. Data from the classroom observation checklist indicated that, the tradition and extent of student-student and student-teacher interactions were not adequate but not nil.

5.1.6. Contribution of PTV Broadcast to Teachers’ Professional Improvements.

In regard to the contribution of PTV lesson broadcast to teachers’ professional (content knowledge and pedagogic) improvements, majority of the teachers (78.1%) reported that their instructional/communicative skills (such as oral communications) were improved through PTV. Especially, 66.6% of teachers emphasized that PTV helped them improve their body languages. Likewise, most of the teachers (73.5%) revealed their agreement that PTV lesson broadcast helped them improve their content knowledge. In addition, the study found out that educational broadcast through PTV significantly helped teachers in improving their classroom assessment/evaluation skills and this was indicated by 72.4% of teachers. Positive feedbacks were also obtained from the teachers.
during the interviews and FGDs, and from responses provided in the open ended parts of the questionnaire on the contributions of PTV in helping teachers improve their professional knowledge and skills.

5.1.7. Teachers’ Professional Development Programs: Trainings and Awareness Creating Programmes

It is generally believed that continuous professional development (CPD) helps teachers update their professional skills and knowledge and thus, boosts up their competence. In this regard, teachers were requested if any training was given to them in an attempt to help them effectively integrate PTV into classroom teaching-learning practices. Accordingly, a great majority of teachers (69.0%) revealed that they were not given any training (by neither schools, DEB, REB nor MOE) on how to effectively integrate PTV into their classroom lessons, while 11.5% of them answered affirmatively and the remaining 19.5% were not sure about the issue. As a result of that, teachers rated their pedagogical skills required for the successful integration PTV as excellent (0%), very good (4.6%), good (11.5%), poor (34.5%) and very poor (49.4%).

In particular, most of the teachers indicated that trainings were not given on how to harmonize various active learning methods with the PTV lesson broadcast (59.8%) and interact with their students (63.2%) while PTV lesson broadcast was going on. Consequently, as reported by the teachers, various active learning methods were implemented ‘sometimes’ (43.7%), ‘always’ (26.4%) and ‘rarely’ (25.3%). And the remaining 4.6% of them were not certain about the item.

Furthermore, the study investigated that neither schools, DEB nor MOE arranged consultative meetings on PTV lesson broadcast mainly focusing on opportunities created, challenges encountered and areas to be improved. Experience sharing among schools (between model and other schools), which is one of the most important aspects of schools performance improvement programmes, was overlooked by the schools,
DEB and MOE. Responses from FGDs and interviews as well as from open-ended parts of the questionnaire endorsed views made above.

Overall, from the foregoing analysis, it can be inferred that most of teachers were not given with trainings that targeted at enabling them on how to integrate PTV and active learning methods and interact with their students effectively while PTV lesson was going on. The implication is that poor or lack of trainings and consultative meetings in schools lead to poor integration of PTV and in turn this poor integration leads to poor achievements of the educational goal of PTV installation – improving quality, access, relevance and equity.

5.1.8. Extent of Execution of Roles and Responsibilities (Duties) by the Schools’ Key Stakeholders in the Teaching/Learning Processes

Attempts were made to assess the extent of accomplishment of specific duties assigned to each group of key school stakeholders (such as students, teachers, principals, PTA, DEBHs, MOE, etc) as depicted in the MOE’s guideline (Appendix VIII). Accordingly, it was investigated that teachers rated their extent of execution of roles and responsibilities as very high (12.6%), high (34.4%), medium (40.2%) and low (12.6%). Similarly, students rated their degree of execution of roles and responsibilities as very high (37%), high (13.9%), medium (17.4%), low (11.9%) and very low (19.8%). However, a great majority of teachers (73.6%) rated students’ roles and responsibilities as medium and low. Responses from interviews and FGDs indicated that students had been voicing all their concerns related to problems in PTV lesson broadcast.

In regard to the extent of execution of roles and responsibilities of ICTCCs in terms of showing co-operations and giving professional assistances to teachers and students during PTV lesson broadcast, students rated it as very high (42.3%), high (13.7%), medium (13.2%), low (11.6%) and very low (19.30%). However, the same was rated by teachers mainly as medium (48.3%) and low (33.3%). As can be noted
from the analysis, two extreme views were reflected by students and teachers as to the duties of ICTCCs. In this regard, the researcher’s school observation confirmed that ICTCCS were doing all the best to help teachers and students during educational broadcast through PTV.

It was also found out that the roles and responsibilities executed by PTAs were rated by teachers as very high (6.9%), high (10.3%), medium (39.1%) and low (43.7%). From this, it is evident that PTAs discharged their roles and responsibilities to the extent of only medium and low.

Similarly, students rated the roles and responsibilities of their school principals as very high (34.0%), high (17.9%), medium (15.4%), low (12.3%) and very low (20.4%). From this, it can be inferred that students had mixed opinions about the extent of execution of roles and responsibilities by the principals. However, the researcher’s school observations as well as interviews and FGD responses of teachers and students reveal that school principals’ endeavors were appreciable though they were not fully successful in managing problems that arose in the areas of educational broadcast through PTV.

As to the consultative meetings and inquiries conducted by DEB and MOE on challenges encountered, areas to be improved and conditions to be facilitated with regard to the educational broadcast through PTV in secondary schools, it was reported by most of the students that these important activities were not carried out by DEB (89.8%) and MOE (67.2%). Similar reports were made by majority of the teachers, 74.7% and 70.1% for DEB and MOE respectively.

Overall, the study indicated that the roles played and responsibilities discharged by the DEB in assisting schools to successfully run the educational broadcast via PTV was rated by most of the teachers mainly as medium (47.1%) and low (40.2%). The same roles and responsibilities were rated for the MOE (by students) as very low (62.1%), low (11.2%), medium (7.2%), high (6.7%) and very high (12.8%).
From the above analyses, it is obvious that the extent of duties accomplished by DEB and MOE, when viewed vs. the expected roles and responsibilities as depicted in the MOE’s document, was medium and below it calling for more attention and effort.

5.1.9. Technical Quality of and Power supply to PTV

As reported by most of the students (50.9%) and teachers (57.5%), shortage of power was a problem in their schools to run educational broadcast through PTV, while about 43.5% of students and 20.7% of teachers claimed that this was not the case in their schools. A reasonably small proportion of students (5.6%) and teachers (21.8%) were not sure about it. It was also found out that power interruption during the PTV lesson broadcast was the serious problem as pointed out by majority of students (52.5%) and by almost every teacher (96.6%). However, some of students claimed that power interruption was not a problem (38.8%) and were not sure about the problem (8.8%) in their schools.

Furthermore, the study revealed that most of the schools didn’t have alternative sources of energy (such as Generators) to keep on PTV lesson broadcast when power interruption occurs. This was indicated by a great majority of students (71.4%) and teachers (80.5%), while some of the students revealed that their schools had Generators (13.3%) and some were unaware (15.3%) about the issue. Likewise, teachers disclosed that their schools had Generators (16.1%) and uncertain (3.4%).

Notwithstanding, researcher’s school observations and responses from interviews and FGDs (with students and teachers), showed that schools with Generators were not using them mainly because of lack of fuel. Financial constraints and lack of fixed budget for fuel and maintenance were suggested as major problems. Thus, from the above discussions, it can be inferred that schools didn’t have alternative sources of power to run PTV lesson broadcast when power interruption
happened. Consequently, as disclosed by respondents, many episodes of Biology including instructional aids and lab demonstrations were missed. The probability of compensation of the lost lessons was reported to be rare.

With reference to the technical quality (suitability, proper functioning, physical strength, etc) of the PTV, most of the students (49.3%) and about half of the teachers (46.0%) reported that the technical aspects of the PTV was not good. Frequent failure, heating up, buzzing sounds, diffused and unclear images (sometimes), sudden rise up and fall of sound, and its delicacy were the major down sides of the PTV. However, about 37.9% of students and 33.3% of teachers were contented with the technical qualities of PTV. About 12.8% of students and 20.7% of teachers were not aware about the issue.

Lastly, since large class size (about 100 students per class) is a common phenomenon in Ethiopian schools, students were asked if large class size affected or not their learning from the PTV screen. Accordingly, majority of the students (60.7%) replied that they were comfortable and could watch PTV lesson broadcast from any corner in the classroom, while about 32.6% of students responded negatively implying that they couldn’t attend PTV lesson broadcast from any corner in the classroom. Yet, a fairly diminutive percentage of students, about 6.7%, were not sure regarding the issue. Researcher’s classroom observations and responses from interviews and FGDs (from students and teachers) revealed that shining/glaring effect was the major problem for students sitting in the left and right front sides of the classroom in large class sized classrooms (Appendix VIII-C).
5.2. CONCLUSION

Based on the analysis of data and summary made above, the following conclusive remarks were made about the study.

As to the views held by respondents with respect to their beliefs, perceptions and interests towards PTV integration in teaching secondary school Biology, the study found out that the most of them were of the opinion that integration of PTV in teaching secondary school Biology was useful. Furthermore, it was investigated that schools were highly dependent on PTV for their experimental (lab) demonstrations for science subjects. The study also indicated that the respondents have shown keen interest and held a constructive view towards the integration of PTV. Once again, teachers had a positive self-perception as viewed vs. PTV teachers. Thus, from this, it can be inferred that majority of respondents had positive attitudes towards the integration of PTV in teaching secondary school Biology.

In regard to the opportunities created to students as well as to Biology teachers, as a result of integration of PTV in teaching secondary school Biology, the study investigated out that PTV played a crucial role in presenting both theoretical and practical Biology lessons. In particular, presentations of outstanding instructional aids and demonstrations of Biology lab experiments were of high importance. Furthermore, it was reported that PTV was helpful in bringing the “real world” into the classroom lessons. Teachers also disclosed that PTV helped them improve their professional skills and knowledge in the areas of Biology teaching. Uniform lesson transmission and on-time content coverage were the other merits of PTV lesson broadcast mentioned. From this, it can be inferred that good opportunities were created (by PTV) to students as well as Biology teachers.

High speed of PTV Biology lesson broadcast; students’ low level of English proficiency and advanced accent of PTV teachers (all...
foreigners); shortage of time for both students and teachers; teachers’ low level of pedagogical skills on how to successfully integrate PTV into classroom lessons; lack of student-student and student-teacher interaction; inability of teachers to implement various active learning methods during PTV lesson broadcast; lack of awareness creating trainings to teachers as well as students; shortage of textbooks, PTV guides, schedules and technicians; some technical problems of PTV (including audio and visual technical hitch); non-stopping and non-repeatable nature of PTV broadcast; power shortage and interruptions; symptom of negative attitudes held by some teachers and students towards PTV integration; inability of PTV to take into account students individual differences (such as visually and aurally impaired students; fast and slow learners) and failure of concerned bodies (stakeholders) to execute their roles and responsibilities as depicted in the MOE’s guideline were the major challenges that negatively affected the effective integration of PTV in teaching secondary school Biology in the sample schools.

Lastly, review of related literatures (“Global” experiences, section 2.6 and Table 2) of some selected countries in relation to the Television integration into the classroom teaching-learning activities showed that the present mode of PTV integration in Ethiopia differed from the those countries with respect to the manner of integration (it is compulsory); length of telecasting time (2hrs per day); contents of broadcast (purely academic); interactivity of the broadcasting (non-interactive); language of broadcast (monolingual – English language only); availability of alternative educational channels (No alternative educational channels); and Ownership of the educational broadcasting center (entirely government owned). From this, it can be inferred that Ethiopia is the only country to entirely depend on PTV lesson broadcast for its theoretical and practical lesson presentations.
Implications of the Study

It is generally believed that Television plays an important role in enhancing students motivation, engagement and interest to learn (Wiken, 2005; CPB, 2004). Motivation, full engagement and interest in turn play a significant role in understanding concepts and retaining them for a relatively loner time. Furthermore, TV has a great potential of increasing students’ learning through creative and critical thinking. Many researches reveal that multiple tracks of audio and visual information convey powerful learning benefits, as each source complements the other.

TV plays the abovementioned vital educational roles provided that it is properly utilized. Conversely, if ‘why’, ‘how’ and ‘when’ of TV integration isn’t thoroughly thought of, its disadvantage may overweigh its advantage and can adversely affect students’ learning. In view of these facts, the findings and implications of the present study are briefly indicated as follows.

It was found out that most of the respondents revealed their applauds about the educational significances of PTV in teaching secondary school Biology. They revealed that Biological concepts, Models, simulations, experimental activities, etc demonstrated by PTV were striking and extremely useful.

However, a number of problems (challenges) were investigated in the integration of PTV as summarized in section 5.2 above. These problems and weaknesses call for thorough thinking of the way PTV is integrated in teaching secondary school Biology. If these critical problems and downsides are not alleviated right away, the implication will be poor integration of the PTV. This means that all the endeavors and costs incurred in the process of installation of PTV will be futile.
5.3. RECOMMENDATIONS

Based on the findings, conclusions and implications made about the study, the following recommendations were made to properly address and help mitigate the problems observed in the present mode of PTV integration in Ethiopia. Furthermore, the following suggestions are meant (strategies) to help draw on maximum potential of PTV integration in improving secondary school Biology teaching in Ethiopia in general and in the Eastern part of Ethiopia in particular.

i. Recommendation to MOE

Since the educational broadcast through PTV is centrally controlled by MOE; it is strongly recommended that the MOE should take the following remedial suggestions into account for the effective integration of PTV, and thereby successful achievement of the educational goals of the PTV integration.

- The current pace of educational broadcast (by PTV) didn’t allow students to listen to PTV Biology lesson broadcast and take short notes from the PTV screen. Furthermore, it didn’t take students’ individual differences into account. It is one size-fit-all mode of broadcast. Thus, it is advised that the present pace of educational broadcast should be minimized.

- The tradition of time sharing between classroom teacher and PTV teacher was reported to be unreasonable. Mainly because of the shortage of time, student-student and student-teacher interactions were poor. Furthermore, teachers couldn’t implement various active learning methods, assessment techniques and give feedback to students. All these vital pedagogical activities demand adequate time. Thus, the study suggested that the present PTV lesson broadcasting time should be reduced from 20 minutes to 15-20 minutes, so that the classroom teachers can utilize the remaining
20-25 minutes for his/her various classroom activities. Furthermore, it is suggested that the broadcast should be very selective, so that more non-plasma periods will allow more time for the student-student and student-teacher interactions.

- Students’ English language proficiency was found to be very low. This brought problems in effective understanding of the PTV lesson broadcast. Thus, it is strongly recommended that emphasis should be given to the students’ English language skills, especially listening skills, beginning from the lower grade levels. In addition, advanced English language pronunciation assumed by PTV teachers (all foreigners) brought problems to students’ understanding of the Biological concepts. Thus, it is strongly suggested that PTV Biology teachers should be Ethiopians.

- Teachers’ pedagogical skills required for the effective integration of PTV was investigated to be poor. Furthermore, as indicated in Table 3, most of the teachers were young and novice with low teaching experiences. Thus, this calls for the organization and implementation of continuous teachers’ professional development (induction and in-service) programmes or training focusing on the areas of ICT integration, in particular in effective integration of PTV.

- Some symptoms of negative attitudes towards the PTV integration were exhibited by some students and teachers. This resistance may be attributed to the lack of awareness on the educational significance of educational broadcast through PTV or any other reasons such as problems related to PTV lesson broadcast. Thus, MOE, in collaboration with schools, DEB and REB should arrange consultative meetings on opportunities created, challenges encountered and areas to be improved in/by the integration of
educational broadcast through PTV, so that doubts and reservations can be cleared.

- It was investigated that the extent of execution of the expected roles and responsibilities by the MOE was rated as medium and low. Some lacunae were noticed. Thus, MOE, as a centrally controlling body, should act and play its roles and responsibilities as per the guidelines depicted in its document (guideline).

- Shortages and complete lack (in some schools) of textbooks, PTV guides and Schedules were other factors that immensely affected the effective integration of PTV Biology lesson broadcast. Thus, MOE is strongly advised to make sure that adequate textbooks (PTV-based), PTV guide and schedules are distributed to all schools fairly before the broadcast begins.

- Lack and shortage of trained PTV technicians, too, were other challenges to the effective integration of PTV. Thus, MOE, in collaboration with the REB and DEB, should employ well trained PTV technicians and promote (through training) skills of technicians already in duty. Thereby, simple technical problems of PTV, but with high potential of affecting PTV lesson broadcast, will be easily managed.

- Lack of reliable source of power supply to PTV lesson broadcast was another serious problem. Power shortages and interruptions were investigated negatively affecting the smooth flow of PTV lesson broadcast. Thus, MOE, along with the REB and DEB should deal with the ELPA (Electric power supply Authority) to handle the problem to some extent. In addition, in lieu of entirely depending on hydroelectric power; MOE, in collaboration with the Ministry of mine and energy, should look for alternative sources of power (such as solar energy, Biofuel energy, etc). In addition, schools should be provided with Generators and adequate budget for its
fuel and maintenance cost. Therefore, by using the above various options, the possibilities of missing of the PTV lesson broadcast can be minimized.

- Speedy broadcast and shortage of time compounded with non-repeatable and non-stopping nature of PTV posed students with great problems of listening, notes taking and understanding of the Biological concepts being broadcasted. Thus, it is strongly recommended that the MOE should provide schools with the CD/DVD copies of the PTV Biology lesson broadcast, so that students and teachers can use/refer to them whenever they want.

- Visually and aurally impaired students were made to sit together with other non-impaired students in common classes. The study disclosed that these impaired students were helpless. Not all PTVs have sign language PTV teachers (Figure 4a) for aurally impaired students, but some, whereas no system has been designed for visually impaired students in the PTV class. They were in problem. Thus, MOE, in collaboration with REB and DEB should: (i) equip all the PTVs with PTV’s sign language teachers for aurally impaired students. (ii) provide visually impaired students with Brailles and JAWS software with CD copies of the Biology episodes along with computers, or (iii) organize special classes (centers) at local, regional or national level for students with special needs (aurally and/or visually impaired students).

- It was investigated that schools were almost entirely dependent on PTV for the presentations of instructional aids and demonstrations of practical (lab) activities for science subjects. Since watching to presentations and lab demonstrations on the PTV screen are still theoretical, and can’t be compensations for the actual practical activities, schools should have their own science laboratories. As theories of learning suggest, learning-by-doing is superior to mere
listening to lectures or watching videos. The same was emphasized by Dale (1969). (Fig. 2).

- ‘Global’ experiences (Table 2, section 2.6) show that TV lessons are used only as enrichment/supplementary material, unlike Ethiopia where PTV lesson broadcast is used as a compulsory (major source) material. Furthermore, TV lessons transmitted are multi-disciplinary, multi-lingual and are aired only for few minutes, unlike Ethiopia where half of a period is occupied by PTV. Multiple channels, owned by both government and private, were also features of reviewed countries. Thus, the MOE is advised to adopt and adopt good experiences of the countries mentioned above (Table 2.6) for the betterment of the current PTV lesson broadcast.

**ii. Recommendations to Schools, DEB and REB**

- Schools, as final implementers of the curriculum, have great roles to play and responsibilities to accomplish in an attempt to ensure educational quality. To achieve the educational goals of educational broadcast through PTV, schools should make sure that there are adequate textbooks (PTV-based), PTV guides, schedules and technicians before broadcast starts. In addition, schools, in collaboration with the DEB/REB, is advised to arrange consultative meetings on PTV lesson broadcast mainly focusing on opportunities created, challenges encountered and areas to be improved.

- REB and DEB, as a bridge between MOE and schools, have significant roles to play and duties to accomplish as depicted in the MOE’s (2002c) guideline. However, the study indicated that the roles and responsibilities demonstrated by REBs and DEBs were rated as medium and low. This shows that there are gaps between what were expected and are done. Thus, for the successful
integration of PTV in secondary schools, DEB and REB, as immediate commanding bodies to schools, should strengthen the links between schools and MOE; facilitate the teaching-learning processes in the schools through: (i) providing up-to-date textbooks, (ii) employing and training PTV technicians, (iii) providing awareness creating (and orientations) trainings to teachers and students with specific reference to the educational broadcast through PTV, and (iv) arranging consultative meetings (with school community) on continuous basis on challenges encountered by schools during PTV integration, identify them (problems) and look for remedies along with MOE and other concerned bodies.

**Recommendations for Further Study**

While conducting the present study, a number of issues related to integration of PTV into classroom teaching-learning processes were raised by the respondents, and noticed by the researcher that require intensive studies to bring the issues into consideration. Accordingly, the researcher recommends further in-depth and broader studies to be undertaken: (i). On all grade levels (9-12) on all subjects (discipline-wise) in the country that investigates the views of all schools’ stakeholders, (ii). Holistically, i.e., the study that takes into account the various elements (such as curricula, ICT, policy, input/output, quality, PDP, actors [stakeholders], etc) that interplay and positively or negatively affect the effective integration of PTV in teaching secondary school subjects, and (iii). On the Effectiveness of PTV in teaching junior and elementary school subjects in Ethiopia.