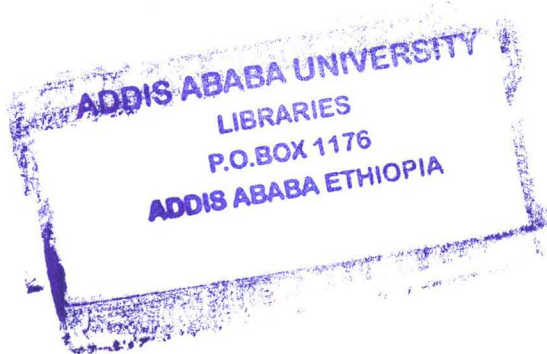


**ADDIS ABABA UNIVERSITY**  
**SCHOOL OF GRADUATE STUDIES**

**CHALLENGES AND OPPORTUNITIES OF STUDENTS  
WITH VISION IMPAIRMENT IN USING ICT: THE CASE OF  
SELECTED PREPARATORY SCHOOLS, DEPARTMENTS AND  
FACULTY OF ADDIS ABABA UNIVERSITY**

**BY**  
**ALEMAYEHU AGONAFIR**



**JUNE 2011**

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**A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE  
STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL  
FULFILLMENT FOR THE REQUIREMENTS FOR THE DEGREE  
OF MASTERS OF ART IN SPECIAL NEEDS EDUCATION**

**ADDIS ABABA UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
DEPARTMENT OF SPECIAL NEEDS EDUCATION**



**JUNE 2011**



## **Acknowledgements**

Above all, I would like to thank my advisor Ato Belay Hagos for his constructive comments and without which this paper would not have been a success.

With no immediate benefits, students, teachers, education experts have helped me a great deal. Thank you very much.

My greatest gratitude should also go to all those who have helped me on commenting the paper, reading texts, searching books, lending books, consulting and giving important advises. It is impossible to list the name of these all people with in a few pages.

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## Acronyms and Abbreviations

AFB	American Foundation for the Blind
AAU	Addis Ababa University
CCTV	Closed Circuit Television
ENAB	Ethiopian National Association of Blind
FGD	Focus Group Discussion
GUI	Graphic User Interface
ICT	Information and Communication Technology
JAWS	Job Access With Sound
MOE	Ministry of Education
PSIR	Political Science and International Relation
TTS	Text-to-speech
WWW	World Wide Web

## **Abstract**

*Information and communication technology influences various sectors including education. Today it becomes meaningless to produce students who are ICT illiterates and most professions require ICT graduates. Due to this, the education sector of almost all countries have made attempts to incorporate ICT courses in their curriculum. In Ethiopia this Information and Communication Technology course is given as an introduction for most college and university students. It is also given for all students in the preparatory schools, printed the course book in ink for grade 11 and 12. There were many students with vision impairment who were attending their classes in these universities and preparatory schools.*

*The central aim of this study is to investigate the challenges and opportunities of students with vision impairment using ICT. The participants of the study, 154, were students with vision impairment who attended and are attending the ICT course in the Minilik II preparatory school, Yekatit 12 preparatory school and six departments (Amharic, English, Afan Oromo, Sociology, PSIR, History) and faculty of law of the Addis Ababa University. The other participants, 18, were ICT teachers, School Administrators/department heads, and Education professionals/experts. The data were collected using questionnaire, interview, and focus group discussions. To analyze this data, qualitative and quantitative methods were used.*

*As the findings, there was little awareness on ICT course in the selected sites. ICT course was not given for department of Amharic, English, Afan Oromo, PSIR and History. The first, second and third year students with vision impairment at department of Sociology and Faculty of Law had not take the course. But there were some students with vision impairment who had take the course from the department of sociology and faculty of Law. In addition, students with vision impairment in the Minilik II and Yekatit 12 preparatory schools did not take the course. Concerning the attitude of the teachers, there were negative attitudes on ICT course related to students with vision impairment. This creates negative feeling on most of students with vision impairment that they are not equal with the sighted students. They explained their discontent for not taking ICT course, because they feel that they are far from the technology. Moreover, it makes them feel behind the time and not to be users of technology and increased their dependency on use personal reader and writer for every educational support. Due to this there were no practice of ICT course for most of the students. Majority of these students with vision impairment also did not have support system of hardware, software, transcribed ICT books of Braille, audio and large print.*

*On the other hand, the Ministry of Education did not adapt and transcribe the ICT ink book into brail, large print and audio for the use of students with vision impairment. This shows that the Ministry of education which announced the inclusive policy, contradict itself excluded the needs of students with vision impairment.*

*ICT course should be given for students with vision impairment fulfilling the necessary hardware, software and other accessibilities for the need of the students so as to make the visually impaired students productive citizens.*

# CHAPTER ONE

## 1. INTRODUCTION

### 1.1. Background of the Study

Over the last few years, the impact of information technology on society has become the concern of many people. It is clear that in the coming decades information and communication technology (ICT) will affect and shape most parts of our society. It will come to radically influence the global economy, and to an unknown degree, our culture and the way we perceive the world, our relationship to it, and our actions (Ericsson 2010). That is, no one knows specifically what role it will play in the future, but we know that it will be significant and that our decisions today will influence the direction in which it will develop tomorrow.

In this regard, ICT influences various sectors including education. And today it becomes meaningless to produce students who are ICT illiterate. This is because most professions require ICT literate graduates. Due to this, the education sector of almost all countries have made attempts to incorporate ICT courses in their syllables. Many of the activities performed after graduation are directly or indirectly ICT touched. The situation urge students with and without vision impairment to be acquainted with ICT (Dengo, 2000).

According to Jahangir and etal (2003), ICT is given as a course for all types of the students including students with vision impairment. In developed countries, students with vision impairment are getting the chance of ICT course in their elementary, junior, secondary and higher level education. The course starts with the basic skill of computer on the elementary level and goes to software development, hardware engineering, computer programming, webpage designing, and other advanced computer programs (David, 2000).

By getting ICT skills, persons with vision impairment have the opportunities to be secretaries, nurses, computer programmers, chemists, doctors, car mechanics, accountants, electrical engineers, etc (Jahangir and etial (2003). This shows that the skill of Information and communication technology makes independent person with vision impairment on their profession.

When we come to the case of Ethiopia, this Information and Communication Technology (ICT) course is given as introduction for most college and university students. It is also given for all students in the preparatory schools, printed the course book in ink with two volumes. The first volume is for grade 11 and the second one is for grade 12 (MOE, 2006). Some preparatory schools were giving this ICT course for both types of learners' i.e. Students with and without vision impairment. However, the nature of the Information and communication technology course needs additional software, hardware and other supporting materials for students with vision impairment.

Some students with vision impairment were getting the Information and Communication Technology (ICT) course properly in the same manner with that of visually able students without having the necessary hardware and software equipments. On the other hand there were some circumstances where students with vision impairment supposed to take ICT course but may be excluded from the class for multiple reasons. In this respect, this research aspires to study the challenges and opportunities of students with vision impairment in using ICT.

## **1.2. Statement of the Problem**

ICT course is given for all preparatory schools in Ethiopia. It is also given as introduction course for many departments of higher education. In these preparatory schools and higher educations, there are different types of learners who should take ICT course. Among these learners, students with vision impairment were some.

It is assumed that students with vision impairment in preparatory schools and in university level take ICT courses with their full sighted classmates without special

considerations. It is also likely to believe that ICT instructors give the course fulfilling the necessary hardware and software devices for students with vision impairment. In addition, the ICT teachers are expected to have positive awareness on the assistive technology, and expected to have positive attitude towards students with vision impairment. Moreover, ICT teachers are expected to have good practice on teaching students with vision impairment.

However, as the researcher has noticed, many of students with vision impairment in the preparatory schools and in the main compass of the Addis Ababa University were not good competent in using the computer for their educational purpose although it was important for their future career.

Owing to these problems, this research attempts to explore the challenges of students with vision impairment related to the provisions of ICT courses. In addition, it explores the opportunities of students with vision impairment on ICT course.

Therefore, the central aim of this study was to investigate the challenges and opportunities of students with vision impairment in using ICT in the selected two preparatory schools, six departments and one faculty of Addis Ababa University. In this regard, the research attempts to answer the following basic questions:

1. Where do students with vision impairment get information about ICT course, classroom and school compound?
2. Do students with vision impairment take ICT courses?
3. How is the attitude of students with vision impairment and their teachers on the ICT course?
4. How are the practices of students, teachers, and schools/departments on ICT courses?
5. Is there any support system on the ICT education for the needs of students with Vision impairment?
6. What challenges face students with vision impairments on the ICT course?

### **1.3 Objectives of the Study**

The major objective of the study was to point out the challenges and show the opportunities of students with vision impairment in taking ICT courses in the selected research sites.

### **1.4. Significance of the Study**

The researcher believes that this study would help for departments and schools that are working with students with vision impairment to understand student's with vision impairment and their problems related to ICT and other courses; and to design solution for the problems. In addition, the findings may be signal for concerned schools, department, faculties and organizations to adjust suitable teaching-learning condition for students with vision impairment on the ICT course equally with visually able students.

Similarly, the research finding may also help curriculum designers to consider the situation of students with vision impairment modifying the curriculum to the needs of students. Moreover, instructors may benefit from the findings in order to adjust their method of teaching and prepare appropriate supporting materials according to the need of students. That is, instructors will use effective methods of teaching for both students with vision impairment and sighted students. Finally other researchers may use the findings as a springboard for further research in the area.

### **1.5. Delimitations of the Study**

The researcher studied the challenges and opportunities of visually impaired students taking ICT courses. This means, ICT course is given as introduction to the preparatory schools and college and university students. The concern of this research was not on graphics, designing and pictorial pages related to the ICT course.

The study was conducted at Minilik and Yekatit 12 preparatory schools and six departments and one faculty of Addis Ababa University main campus. The six

departments were English, Amharic, Afan Oromo, Sociology, Political Science and International Relation, and History. The one faculty was Law. The reason of selecting these places was that there are large numbers of students with vision impairment who are supposed to take ICT course as compared with other similar schools. Moreover, the students of the two preparatory school are expected to join universities so that it was reasonable to scrutinize challenges they would face by taking Addis Ababa University as a springboard.

The research also limited to the challenges of students with vision impairment in ICT course and the opportunity of students with vision impairment using the ICT.

### **1.6 Limitations of the Study**

In order to conduct this research, there were some limitations. It was difficult to get recent and important literature in ICT provision for students with vision impairments in Ethiopia. Even those materials focusing on ICT were not suitable for the researchers with vision impairment so that the researcher was enforced to look for materials relevant for the research from different bodies including genuine websites from internet.

Apart from these, some of the respondents delayed returning the questionnaires distributed. The researcher dropped those who did not return and removed those who did not respond very properly. In addition to these, time and finance were other limitations of the study.

### **1.7 Organization of the Study**

The aim of the study was to investigate the challenges and opportunities of students with vision impairments on taking ICT course. Therefore, the first chapter contains the background, objectives, significant, delimitation and limitations of the research. The second chapter deals with the review of literature. The third chapter focuses on the research methodology. And the fourth chapter is the presentations of the findings. The next chapter stresses on the data analysis. The last chapter present summary and conclusion of the study. And of course, recommendations of the findings are also part of the last chapter.

## **CHAPTER TWO**

### **REVIEW LITERATURE**

This review literature deals with the ICT course given to students with vision impairment in the secondary school and higher education level. In this case the literature covers issues related to ICT course which includes ICT students with vision impairment, ICT teachers, ICT classrooms, and school administration. These issues are discussed in four major categories: awareness, attitude, practice and support system.

#### **2.1 Awareness**

In the provision of an inclusive program for a student with vision impairment, awareness is multi-faceted. It encompasses the entire program being offered and is an ongoing foundation for its success. According to AFB (2010), an awareness and knowledge of the eye condition, its impact on academic and nonacademic learning and daily tasks, is frequently not included in the information sharing. This knowledge is fundamental to the understanding of the student's needs.

It is also important to know at what stage of the student's development the vision loss occurred. Many of these issues can be helped by an understanding and considerate teacher of the visually impaired and through the coordination of that teacher's services and those of a guidance counselor or social worker in the educational system. AFB (2010) also advised to provide the regular teaching staff with ongoing in-services to increase this understanding. This is because, it is necessary to create an atmosphere and climate of support for the student.

##### **2.1.1. Understanding Vision Impairment**

Vision impairment means that a student's eyesight cannot be corrected to a "normal" level. According to Ally and Bacono (1998), vision impairment may be caused by a loss of visual acuity, where the eye does not see objects as clearly as usual. These writers

elaborated that, it may also be caused by a loss of visual field, where the eye cannot see as wide an area as usual without moving the eyes or turning the head.

There are two category of vision impairment: blindness and low vision. As Gearheart and Weishahn (1992) determined low vision means a student who can read printed materials in either enlarged print or standard print with the use of special magnification device. These students with low vision use sight to learn, but their visual impairments interfere with daily functioning. They also can receive information through sound or touch, or modify their computer displays so the screen is more legible. Gearheart and Weishahn (1992) also determined that blindness means the student uses touch and hearing to learn and does not have functional use of sight. These writers explained that these students use Braille, large print and taped materials other than print. Students with blindness cannot use a computer monitor and must receive information from their computers via another sense such as hearing or touch.

There are some other students with vision problem in the classroom not categorized under vision impairment. As Gearheart and Weishahn (1992) elaborated, these students show some indications of vision impairment like rubbing eyes; shutting or covering one eye; unusual sensitivity to bright light; tendency to lose his/her place in a sentence or page while reading; holding reading material too close or too far or frequently changing the distance from near to far or far to near; tendency to reverse letters, syllables, or words; letter confusion like letter of similar shape (o and a, c and e, n and m, h and n, f and t). If students show one or more of the above indications, these students can be categorized under vision impairment.

Therefore, there are two different types of students with vision impairment in the regular classroom. These are the one noticed and categorized under vision impairment and the other is the one not noticed and not categorized under vision impairment. Classroom teachers and other concerned bodies on the teaching-learning activities should give much attention for all types of students with vision impairment to participate them equally with the other students.

### **2.1.2. Awareness on Education and Technology**

Technology has changed the way people learn. Traditional method of education is not longer able to meet the needs of today's learners (O'Hara, 2003). According to O'Hara, over the past 50 years, computer and information science has emerged as a major discipline of study. This technology is driving the demand for new forms of higher education (Maitra, 2007). In the developed countries, technical institutes, colleges, and universities offer degree programs in this discipline. Current occupations and job openings suggest that many jobs now require a substantial amount of formal post secondary education in the computer field (ISTE, 2010).

Vanaja and Rajasekar (2008) state that even though computers have a lot of applications in various fields, one should not forget their applications in the field of education. They further state that, therefore, computer literacy is very much essential for teachers as well as learners. They are very useful and helpful in the teaching-learning process. As Redmond (2008) described, student use of computers is ever increasing, creating a need to cater to those with impairment the same way as other students.

Technological change is now starting in education. That is why today's schools bring amazing technology to the classroom. According to Redmond (2008), day by day schools are including computers in their classrooms and teachers are starting to use them not only to teach how a computer works, but also as a tool to teach any subject. Now, Windows brings digital media to facilitate rich, project based learning, in and out of the classroom for the students across the globe (Elan, 2008).

On the other hand, providing accessible technology in the classroom to students with impairment enables all students to have the same educational opportunities. As Redmond (2008) described, if a student with vision impairment cannot use the classroom computer because he/she can't read the small text on the screen, she/he will not be provided with the same opportunities to learn that their sighted peers have. Therefore, currently

education and technology are going together for the success of today's learners. Providing equal access education supported by technology for students with vision impairment can make them good competent in their classroom.

### **2.1.3. The Importance of Assistive Technology for Students with Vision Impairment**

Assistive technology can only enhance basic skills, it cannot replace them. As Allan (2006) advised that assistive technology should be used as part of the educational process, and can be used to teach basic skills. As this writer description, assistive technology for students with visual impairments is more than an educational tool; it is a fundamental work tool. The writer also explained that, it is equivalent to pencil and paper for non-impaired students. Moreover, students with vision impairment use assistive technology to access and use standard tools, complete educational tasks, and participate on an equal basis with non-impaired peers in the regular electronic educational environment. The importance of Assistive technology does not automatically make educational and commercial software/tools accessible or usable. It is advisable to select and use appropriate technology at the appropriate time for students with vision impairment.

### **2.1.4. Information and Communication Technology (ICT)**

As Ericsson (2010) described, Information and Communication Technology (ICT) is a tool that constitutes a new infrastructure, changing the way our societies function, while its technical applications gives us totally new opportunities to both preserve the best elements of our society, and develop new and better solutions to our existing problems.

According to Bluton (1999), ICT is a shorthand for a computer, software, networks, satellites, links and related systems that permit persons to create, analyse, exchange and use data, information and knowledge that have been almost unimaginable (Tinio, 2002). On the other hand, states that ICT is an acronym that stands for Information and Communication Technology. And he goes to say that It is a divers set of technological tools and resources used to interact, create, disseminate, store and manage information.

Over the last few years, information technology's impact on society has become a hot topic. Ericsson (2010) said that no one knows specifically what role the ICT technology will play in the future, but we know that it will be significant and that our decisions today will influence the direction in which it will develop tomorrow.

The growth of this ICT has also had a profound influence on higher education. According to Garcia and Munoz (2006), today, students can pursue scientific, educational, and research goals using the Internet. The entrance of ICT into this has led to review of educational programs and teaching methods. These programs have reviewed their curricula in light of the needs of society and the market. Continued reviews are needed to meet future needs (O'Hara, 2003).

The use of ICT in special schools can make the difference between a student being able or unable to integrate (Louise, 2004). Special education must be special if this assists the personal development of the student, and should encourage integration wherever possible. This certainly applies to the skill of Information and Communication Technology. In recent years, ICT has done a great deal to integrate pupils into regular education and people with a visual impairment into society. When planning education and the use of ICT in special education, it is crucial to ensure that computers and ancillary equipment are not only used at the special school itself, but also at home, in clubs, at friends' houses, in follow-on education and in the individual's subsequent job (Snetselaor, 2009).

For students with vision impairment, however, ICT skills are even more important, since the digital revolution has made some of these information exchange applications available to them for the first time. For example, it is now much easier for them to study at regular education institutes; to read the latest newspapers and magazines; to read their letters and received from the bank; and to cast their votes and to communicate with the rest of the world without the other person knowing that they are students with vision impairment (Ibid). Likewise, it is only possible for person with vision impairment to gain access to information provided through the "world wide web" (www) because of the

availability of technologies which enlarge text or convert the information to audio or tactile media (Williamson and Amanda, 2001).

According to Snetselaor (2009), currently person with vision impairment need a computer for almost all subjects. A laptop enables to be in a sighted group without the monitor screen obstructing the view of their fellow students or their teachers. Moreover, this avoids the far from ideal situation in which pupils can hide behind their large computer monitors. Because person with vision impairment need a computer far more often and in different places due to its prosthetic function, a laptop is also preferable due to its ease of mobility. In such cases, special equipment, in the form of, say, an electronic note-taker, can also prove invaluable, although there are very few pupils who have access to both a computer and a note-taker. In a school where pupils frequently have to change classrooms, a cordless network is one way of avoiding having to constantly log on and off the network.

### **2.1.5. ICT Teachers and their Relation with Student with Vision Impairment**

If a teacher is going to provide training to students with vision impairment, it is important to have good relation with the students in the classroom and labs. To make the teaching and learning process smooth, the ICT teacher should welcome and introduce him/her, classroom, and devices in the ICT laboratory for students with vision impairment according to their needs. This is because; the training room and the hardware devices may be new experience for the students. The ICT teacher should also allow for students with vision impairment to tell their name. This helps the teacher to address later the trainee calling by their name so the students will know that the teacher is speaking to them. In addition, nod or smile may go unnoticed. Instead of using such body expressions, teachers should use words to express his/her fillings. Moreover, teachers should remember to tell for the students that he/she is going to leave the classroom, so that the students with vision impairment are not left talking to themselves (Pedersen, 2009).

Therefore, beyond the usual management of classroom, teachers should give much attention to have good relation with students with vision impairment. This helps not only for the teaching and learning process, but also for equal computation of students with vision impairment with their other friends.

### **2.1.6. ICT Classroom Setup for Students with Vision Impairment**

Students with vision impairment should be lead towards the sit in the classroom. If there is any change of setup of devices in the computer classroom, there should be information for these students. This will make objects easier to find, for example keyboard, speaker, floppy drive, compact disks drive, universal serial port, tape recorder, printer, scanner, etc. This means, the trainee needs to be informed ahead on any changes in classroom. The other thing is here; the doors of ICT classrooms should be open or close fully. If a door opened half way, the edge of the door may be dangerous for students with vision impairment when they come in and out. Likewise, the path way of the ICT classroom should also be free from tripping; such as bags, chairs, coats, wires etc (Pedersen, 2009).

Therefore, if there are change of setting arrangement of equipment and devices, this could be problem on adjustment of ICT classroom setup for students with vision impairment. This lead them to face to problems as well they may not be good participant in the class.

## **2.2. Attitudes of Teachers and Others towards Students with Vision Impairment**

Attitude is the one of the most influential, psychological factors that plays significant role in education.

According to Redmond (2008), attitudes about disabilities certainly impact students in school, but again, it is during school where equal access to learning opportunities for individuals with disabilities can set the stage for successful employment in the future. As educators, there is a need to find the correct solutions that can help those students excel at academics, and later in life.

Different cultures have different views about ICT and their readiness to help their children acquire the desired skills. In Senegal parents are willing to pay the costs of their children's ICT needs in school, paying in the form of computers, connection and other hardware, which is a very good sign and evidence of willingness of parents and society as a whole to contribute towards ICT proliferation. In Vadodara, India in an experiment where children used computer mathematics games two hours a week performed significantly well than the students who didn't. It would be a good research question as to why they didn't but this is clear evidence of the fact that ICT has the advantage over traditional face to face or guided-learning. The attitudes of teachers towards the work they do with the support of digital technologies continue to be an important indicator of educational value. In 2003, a monitoring scale was developed to assess the attitudes of Costa Rican teachers towards ICT in education, within the National Program of Educational Informatics of the Ministry of Public Education and the Omar Dengo Foundation. The scale evaluates 11 attitudinal dimensions, including the value that teachers place on technology, their motivation to work as educators, their satisfaction with the Program, their self-perception on their capacity to teach, their vision of future, their sense of control over the technology, and their disposition to learn abilities related to technology. The scale was applied to a total of 319 teachers of educational informatics during 2003, as well as to a small group of teachers in a study that compared two schools that do not belong to the program with two similar schools that belong to the Program. Among the important findings were the following:

The geographic zone in which the teachers work is not associated with differences in their attitudes towards technology in the teaching-learning process, which is generally positive. The number of years of experience in their teaching position is a variable that is positively correlated with their vision of future, the positive perception of their own performance and the feeling of control over technology. Teachers in multi-grade schools (one-room schools serving populations of K-6 students), where a single teacher works, are the ones that show greater satisfaction with the Program. Teachers working in the Program tend to value the role of technology they are more satisfying Ed with their capacities to teach, and they feel that they can achieve better results with students. The

Program seems, overall, to be able to create conditions and opportunities for the development of capacities in teachers, which support the achievement of equity. These results suggest that teachers who work with digital technologies have positive self-perceptions that enhance their capabilities in the classroom (Fundación Omar Dengo, 2000).

### **2.3 Practices of Students with Vision Impairment**

As mentioned by Snetselaor (2009), most developed countries Students with vision impairment do have opportunities of practicing the ICT for the following purposes. Students with vision impairment use ICT to read the same newspapers as other people at the same time, to attend the same courses as other people, in the same way and at the same time, to be considered for the same jobs as other people, the ability to make use of the same opportunities for communication as sighted people, such as e-mail, chat-rooms, etc. The following sub topics discuss the practices of ICT of the Netherlands. This model country, Netherlands, on ICT lesson has a good experience on students with vision impairment from other countries.

Knowing the ICT skill as a get for education for students with vision impairment, most developed countries are giving the skill for all types of students with vision impairment starting at the age of 6 to 8. The Netherlands is one of these countries. In this country beyond giving the ICT course at age of 6 to 8, students with blindness will generally use a laptop and partially sighted students will use either a laptop or a desktop depending on their field of vision. In the Netherlands, in secondary and higher education the blind students use laptops and partially-sighted students use desktops. This is because the blind students need a computer for almost all subjects. A laptop enables them to be in a sighted group without the monitor screen obstructing the view of their fellow students or their teachers. Moreover, this avoids the far from ideal situation in which pupils can hide behind their large computer monitors. Because blind students need a computer far more often and in different places due to its prosthetic function, a laptop is also preferable due

to its ease of mobility. There are very few students who have access to both a computer and a note-taker.

These all are being given for students with vision impairment due to the availability of infrastructure in the country. In The Netherlands, the objectives of ICT education and the use of ICT in educational establishments defines the degree to which ICT equipment must be available for students. Students with vision impairment use integrated computer, in which students use digital workbooks instead of traditional textbooks. This requires good ICT skills on the part of students with vision impairment and a high deploy ability of the available infrastructure (Snetselaor, 2009).

As elaborated by Snetselaor (2009), taking one or two ICT lessons in a week is not enough to teach the skills required for students with vision impairment in the Netherlands. This is the reason why the skills are given for many hours each week. Likewise, all textbooks are supplied in digital form. That is to say computers are available for every lesson: carried out in classrooms students with vision impairment are also exchanging information digitally with their teachers via e-mail. Moreover, the infrastructure is also available at other locations like at home or in school-based residential units, so that the students with vision impairment can carry on working in the same way out of the classroom.

ICT education is means for all lessons for students with vision impairment. That is why teachers of students with vision impairment in The Netherlands are trained in this profession and guiding the students in their lessons. This shows that teachers of students with vision impairment are the key factor of the successful implementation of ICT in the education. Beside the mainstream computer skills and the knowledge of the use of computer programs students with vision impairment get the skill on the special assistive technology devices and special assistive software programs. This skill is being given by the ICT teachers. Even more than the ICT teachers, the itinerant teachers guide students with vision impairment and advice them concerning different types of assistive technologies (Snetselaor, 2009).

## **2.4 Support System for Students with Vision Impairment**

Students with vision impairment should get the appropriate assistive hardware and software materials to attend the ICT course equally with the other full sighted friends of them. This means, there should be well organized support system on the ICT education for students with vision impairment to participate them equally in the ICT classroom. According to Snetselaor (2009), the ICT policy in education must coordinate the following four main points; the education strategy (vision), teachers skills (expertise), the available software programs (software and content), and the available equipment (infrastructure). These four elements must be properly balanced if ICT is to be successfully given for students with vision impairment. This means that all four elements must be given equal attention. If this balance is not maintained, the least developed aspect will determine the level attained from ICT education.

### **2.4.1. The Education Strategy (vision)**

As Gearheart and Weishan (1992) described, students with vision impairment have been mainstreamed into regular classroom for more than half a century. Early professionals recognize that students with vision impairments could be educated with their sighted peers with minor modifications and adaptations. The limitations imposed by a visual disability did not require a special curriculum. As Gearheart and Weishan elaborated, educational materials must be provided in different media or in modified or adapted form so that student with vision impairment can learn through sensory channels other than vision. As the example of As Gearheart and Weishan elaborated if students are not able to read material in printed form, the material would be provided through the tactile (touch) or auditory channels. If student can read printed material but with considerable difficulty, the material may be enlarged or the student may use magnification devices or reading

machines. Therefore, the primary nature of special education services for students with vision impairment is related to the modification and adaptation of educational materials.

#### **2.4.2. Using Alternative Teaching Method and Adaptations of Educational Materials**

All teachers of students with vision impairment should be skilled in ICT and guiding the students in using the ICT in their lessons (Snetselaor, 2009). They are the key factor of the successful implementation of ICT in the education. Besides, the mainstream computer skills and the knowledge of the use of mainstream computer programs they need to know the special assistive technology devices and special assistive software programs. Actually the ICT-teachers of the special schools are able to teach this special equipment. Also the itinerant teachers should be able to guide students and advice mainstream schools concerning even more different types of assistive technologies in also all different school grades and situations.

Snetselaor (2009) advised that it is necessary for ICT teachers to use an alternative teaching method in the classroom. This is because of having different students in a class. Among these, students with vision impairment may be some. These students with vision impairment have their own special needs of learning the lesson. To address equally all learners in a class, teachers expected to change their teaching strategies according to the need of the learners. According to Gearheart (1988), it is expected from ICT teachers to adapt and to use for the following concepts and educational materials.

**Concrete materials:** Whenever possible, instruction should be initiated at a concrete level. It should start with concrete materials, moving more to the abstract as the student develops the concept. The use of manipulative, tangible, or auditory materials is preferred to totally verbal instructions or lessons. “Hands-on” learning should be emphasized as much as possible, and the student may need reputed contact with the objects. Although a model of an object may be necessary, the real object or situation is much preferred. For

example, if we think about the ICF lesson on vacuumed tube, it is better to bring and show the actual vacuum tube in the classroom.

**Chalkboard:** When writing on the chalkboard, the teacher should be certain to explain verbally the concept or actual writing being presented. In general, any highly visual instructions or lessons should supplement with verbal explanations. This can become routine with a little effort and practice. Some teachers have found it helpful to give for students with vision impairment a copy of the note written on the board. To be certain that the best possible dark-light contrast is provided, be certain the chalkboard is clean as possible. Allow the low vision student to move as close as to the chalkboard as necessary to see it comfortably.

**Fatigue:** The student who has low vision may become fatigued if tasks involving close visual examination are required for long period of time. It may be helpful to vary activities as much as possible, as by alternating listening activities, close visual activities, and motor activities. Student should be encouraged whenever possible to take short breaks for activities requiring prolonged periods of visual work.

**Media:** If a film strip being used has titles, ask another student to read the title aloud to the entire class. When a film is used, another student may summarize the key visual concepts or very briefly provide a running visual narrative.

**Extra time:** The student with low vision may need extra time to complete assignment and examinations. In this regard, allowing some more time is important. The work may be completed in the resource room or library or at home. If the student understands the concepts being presented, it may be a good idea to shorten the assignments.

**Tactile activities:** For the approximately 20 percent of visually impaired students who are involving in activities that should emphasize the tactile sense. Use activities such as clay modeling, figure painting, weaving, paper sculpture, and collage whenever possible. It is important that the student have the experience of carrying out the process involved in

an art project. The end product should be deemphasized. By completing the process, in whatever medium, the student can achieve the same objectives as peers.

**Assignments:** At the secondary level, note taking and submitting assignments often are course requirements. Students with vision impairment naturally should meet these requirements, but the way they do so may be different. Students with vision impairment may use a slate and stylus; braillewriter, cassette tape player. If they use recorder for the lecture, they may transcribe their note into Braille. Some teachers allow the students to provide a modified recording of their note in handout form.

**Class participation:** If the students are expected to raise their hands to gain recognition or respond, the visually impaired student should be expected to do the same. Since the visually impaired students may not be able to see classmates raising their hands to respond, the teacher may need to provide specific instructions on hand raising procedure.

**Examinations:** Exam taking procedure may have to be modified for the students with vision impairment. Reading Braille or large type takes considerable longer than reading standard print and it may be necessary either to extend the amount of time for completion of the exam or reduce the number of exam items. The student should not be penalized if he can not finish the exam because of the tools he is using. Of course this modification depends on whether the purpose of the exam is speed or power; if the purpose is speed, the visually impaired student may have considerably difficulty. The administration of the exam may also have to be modified; for example, it may be necessary to:

- A. administer the exam orally,
- B. tape the exam in advance and have the student record or type his answers, or
- C. send the exam home with the student and have the parent read the test while the student types or Braille writers his answers.

If the examination is to be taped, the reader should state the total number and type of questions, the value assign to each item and time limitations. The examination should be

read slowly and clearly. Sometimes the students can braillewriter his responses and give them to the resource or itinerant teacher, who in turn writes in the student's responses and returns the test to the regular teacher. Some students require few or no modifications and are able to take the test with the other students. Achievement testes administered at the beginning and end of school year, because of their relative importance and the amount of time needed to complete them, may have to be administered by the resource or itinerant teacher or an aide. The regular teacher should be certain to consult with the resource or itinerant teacher in advance to concenter these and other options for testing.

Therefore, knowing the special needs of students with vision impairment, teachers can use different method of teaching and the students also can use the adapted educational materials. In this way, students with vision impairment in their academic skills can compute with the other students equally.

### **2.4.3. The Availability of Software Programs and Hardware Devices for Students with Vision Impairment**

Hardware is equipment which can be touch by hand like computer, keyboard, speaker, and monitor. Software is the programs which run on the computer's hardware. Here is the list of the hardware and software that brings the world of accessible computing to life for students with vision impairment.

#### **2.4.3.1. Hardware Devices for Students with Vision Impairment**

There are hardware devices to support students with vision impairment in the ICT classrooms. According to Redmond (2008), the following are some of these hardware devices for students with vision impairment.

Enlarger or Closed Circuit Television (CCTV) is a magnification device that enlarges and projects printed materials onto a television screen. This device magnifies a printed page

through the use of a special television camera with a zoom lens and displays the image on a monitor. Screen magnifiers work like a magnifying glass. They enlarge a portion of the screen, increasing the legibility for some users. Some screen enlargers allow a person to zoom in and out on a particular area of the screen. Microsoft Magnifier is a basic screen magnifier in Windows (Ibid).

Braille 'n speak is an input/output device that acts as a Brailier. The student can use the Braille 'n speak for things such as note taking, writing papers, or doing assignments. The Braille 'n Speak can be hooked to a computer to be used with various software programs or to print to a Braille Printer. There is other type of keyboard which has Braille display on it. A good example is refreshable Braille displays. This display provides tactile output of information represented on the computer screen. A Braille "cell" is composed of a series of dots. The pattern of the dots and the various combinations of the cells are used in place of letters. Unlike conventional Braille, which is permanently embossed onto paper, refreshable Braille displays mechanically lift small, rounded plastic or metal pins as needed to form Braille characters. The user reads the Braille letters with his or her fingers, and then, after a line is read, can refresh the display to read the next line (Redmond, 2008).

Embosser is type of Braille Printer which prints in Braille. Examples include Versa Point, Juliet and Blazer. Braille embossers transfer computer generated text into embossed Braille output. Braille translation programs convert text scanned in or generated via standard word processing programs into Braille, which can be printed on the embosser. Because of the size of the "cells" that are used in place of letters and the formatting of documents to be read by individuals who are blind, the amount of text normally contained on one 8.5-by-11-inch sheet of paper results in multiple pages when printed in Braille (Redmond, 2008).

Scanner is a device that converts an image from a printed page to a computer file. Optical-Character-recognition (OCR) software makes the resulting computer file capable of being edited (Ibid).

Portable notetaker is small portable units that employ either a Braille or standard keyboard to allow the user to enter information. Text is stored in files that can be read and edited using the built-in speech synthesizer or Braille display. File may be sent to a printer or Braille embosser, or transferred to a computer.

#### **2.4.3.2. Software Programs for Students with Vision Impairment**

Software is a collection of programs and routines that support the operations of performing a task using a computer. Software also includes documentations, rules and operational procedures. Software makes the interface between the user and the electronic components of the computer. There are different types of software manufactured for persons with vision impairment. Common software, assistive technology product, those students with vision impairment use is called a screen reader (Redmond, 2008). Screen readers are software programs that present graphics and text as speech. Computer users who are blind may also use Braille displays and Braille printers. A screen reader presents all information to the user via a computerized voice. For the operating system or an application to be accessible to someone who is blind, it needs to provide information about its interactions with the user in a manner that assistive technology can then present in an alternative format. For example, if a sighted user sees a list of box containing several selections to choose from, the assistive technology product (often a screen reader and/or refreshable Braille display) needs the necessary information so it can inform the blind user that he or she needs to choose from a list of selections. The list of selections might be spoken or presented in a tactile fashion with a Braille display (Ibid).

**Screen reader software:** Screen readers are software programs that present graphics and text as speech. Because a monitor is irrelevant to a computer user who is blind, a screen reader is used to verbalize, or “speak,” everything on the screen including names and descriptions of control buttons, menus, text, and punctuation (Redmond, 2008). As the user moves the cursor from point to point by pressing the Tab key, for example, each new command button is described. The text is read aloud, for example, “OK” or “Enter.” In essence, a screen reader transforms a graphic user interface (GUI) into an audio interface (Ibid). Screen Reading software can be used to translate information shown on the screen

and translate in to spoken words using a speech synthesizer such as JAWS, WINDOWEYES, WINDOWS BRIDGE, Vocal Eyes, etc (Freedom Scientific, 2010). Speech synthesizers receive information going to the screen in the form of letters, numbers, and punctuation marks, and then “speak” it out loud. Often referred to as text-to-speech (TTS), the voice of the computer is synthesized speech—a distinctive, sometimes monotone voice that is the joining together of preprogrammed letters and words. Using speech synthesizers allows students with vision impairment to review their input as they type (Ibid).

Speech synthesizers receive information going to the screen in the form of letters, numbers, and punctuation marks, and then “speak” it out loud. Often referred to as text-to-speech (TTS), the voice of the computer is synthesized speech—a distinctive, sometimes monotone voice that is the joining together of preprogrammed letters and words. Using speech synthesizers allows blind users to review their input as they type (Ibid).

**Screen magnification software**, it is one of a number of screen magnification programs currently available. It is one of the most widely used by people with low vision. It is a magnification program, which works with all other Microsoft Windows programs, such as Word, Excel (Pedersen, 2009).

Braille translation software - translate text and formatting into appropriate Braille characters and formatting. Among the software which translate characters to Braille; MegaDots and Duxbury software are common. These programs can also make printed text accessible through the use of a scanner (Redmond, 2008).

Eye Relief – is software used to increase size to four times of normal print size which can be used with laptop PC, large print word processor (Bishop, 1996).

#### **2.4.4. The Accessibility Options for Students with Vision Impairment**

According to Redmond (2008), accessibility is providing access to products and services to everyone who wants to access the product or service. Accessibility is about removing

barriers. As Redmond, accessible products can be adjusted to meet the needs and preferences of a diverse set of individuals that might use the product. In other way, accessible technology is computer technology which enables individuals to adjust a computer to meet their visual needs. To be accessible, technology must be flexible enough to meet the individual needs and preferences of a diverse set of people with many different types of abilities (Ibid).

According to Redmond (2008), the “typical” classroom has become more accessible to the student with vision impairment due to the advances made in technology. Students with vision impairment are able to utilize one or more of these tools, to help overcome their impairment. These Accessibility features and products are also helpful for people with low vision and blindness. In Windows XP and Windows Vista, these features include: keyboard shortcuts, text to speech with narrator, screen magnifier, and sound notification. Even though earlier versions of Windows also included accessibility features, these newest Windows versions offer the best accessibility (Redmond, 2008).

There are many options for individuals with vision difficulties to modify the computer displays and appearance so it is more legible, or receive information through sound or touch. You can increase clarity and legibility on your monitor by changing screen resolution, increasing the size of fonts and icons, High Contrast options, and using a screen magnifier to enlarge a portion of the computer screen (Ibid).

#### **2.4.4.1. Accessibility Options for Students with Low Vision**

As Redmond (2008) described, people with low vision do not have clear vision even with the use of eyeglasses, contact lenses, or intraocular lens implants. There are many ways to adjust and personalize the appearance of Windows to make it easier to see for an individual with vision impairment. You can increase clarity and legibility on your monitor by changing screen resolution, increasing the size of fonts and icons, High Contrast options, and using Magnifier to enlarge a portion of your screen. There is a wide range of accessibility features to make Windows easier to see (Ibid).

As Pedersen (2009) said, one of the most common accessibility solutions for a computer user with low vision is a screen magnifier. Microsoft Windows XP and Windows Vista, for example, include a basic screen magnifier program called Microsoft Magnifier (Redmond, 2008). Other than this, students with low vision read printed matter in a variety of different ways. Some people use a combination of glasses, low vision aids and large print to help them to read printed material. A CCTV (Close Circuit Television) is a common reading aid for people with low vision. A CCTV consists of a camera, a magnifier and a TV screen. The printed matter is placed under the CCTV camera which enlarges the print onto the TV screen. Portable CCTVs are also available. Some use a small "handheld" camera that is passed over the text to be enlarged (Ibid).

In addition Pedersen (2009) elaborated that many people with low vision are dependent on adequate lighting to move around independently or work at a computer screen effectively. Overall even lighting is important. As Pedersen, if there is only one overhead main light, the trainee can end up working in his own shadow. Task lighting can supplement general illumination. An adjustable task light behind the person can be positioned to shine light directly onto what the person needs to see, for example, book, keyboard, etc. Ensure that the lighting does not shine directly onto the computer screen as this can cause glare making the screen less readable. Consult with the trainee when discussing lighting levels, as it will have to be customized for the individual (Ibid).

The use of color and contrast on the computer screen is important. The individual will often know how the screen must be configured as far as color and contrast are concerned. Some will be able to make their own necessary adjustments; others may need your help. Microsoft Windows allows adjustment of screen settings, for example color contrast, font size, etc. Some people with vision impairments may not be able to read the screen with the default color configuration, but will find text more readable if the background is black and the text white. The correct color contrast for the individual may also improve their ability to read the screen for longer periods of time (Pedersen, 2009). PC users with low

vision can often find that the font and colors used on websites are difficult to see. Colors, font and links can be adjusted using Internet Explorer Properties. Sometimes, it is useful to allow the Browser to employ Windows desktop colors. Likewise, it is very important to choose a suitable font to be used as the default file of the word processor. The person with low vision must use a font type that is clear and easy to read. Arial, Tahoma, and Verdana are good choices of font type. Individuals will probably have their own preferences (Pedersen, 2009). Choice of zoom level in programs like Word, Excel etc: Many programs, for example Microsoft Word and Excel, have an optional text zoom level (Ibid).

As Pedersen (2009) advised, mouse cursors and text cursors can change appearance and size. For users who rely on a mouse, a larger arrow is often preferable. Specialized programs and cursors are available for installation via the Control Panel. An example of one of these is called Handy mouse. A slow cursor is easier to control than a quick cursor. The speed can be adjusted via the Control Panel. For mouse users, personalized tool bars in Microsoft Office programs may be an advantage. Choose the necessary icons and delete unnecessary information to make the screen layout clearer and less detailed. Several programs include an enlarged icons option. Also menus must always be arranged in the same way throughout Microsoft Office. Some programs employ personalized menus which show recently used items first and require the user to click on an arrow to see the full menu. This makes it hard for the vision impaired individual to recognize the screen image.

Training materials must be designed with some knowledge of the way the individual acquires information. Find out about the reading methods and previous use of technical aids used by the trainee. The preliminary assessment interview should be able to determine what adaptations should be made to training materials. Adaptations that can be made include provision of printed materials in a clear, good font size so they can be read, scanned, magnified. The paper should have a matt finish to reduce reflection and glare and information should not be over detailed to allow ease of reading with a low vision aid. Photocopies must be clear and not have streaks. Clear notes will be useful to all trainees. It is recommended that all documents should be produced in at least 14 point

size font. Large print is useful to some vision impaired trainees. Use a good font such as Arial at size 22 (Pedersen, 2009).

#### **2.4.4.2. Accessibility Options for Blind Students**

It is important to remember that just as with people with low vision, people who are blind also have special needs. Even if they may use some of the accessibility options listed under low vision above, they have their own options. At all times, remember to ask the persons opinion about their individual needs and preferences. The large majority of people who are blind have experienced some level of sight before they lost their sight. They may or may not have perception of light where they can distinguish light from darkness.

Most people who are blind will rely on their other senses of hearing, touch and smell in their everyday lives. A person who is blind uses audible information to interpret a great number of situations. Very few people who are blind read Braille. Most people who are blind - who have become blind later in life - depend on taped books and recorded texts. Now, the computer can also be a possible source for reading or acquiring information (Pedersen, 2009). For these purpose, there are software to read a text on a screen. For instance, JAWS or Window-Eyes tell the user what is on the screen and what functions are being carried out on the PC. Menus, dialogue boxes and program titles are read aloud while working with Windows. In this case, a person who is blind uses the same functions on the PC as a person full sight. Headphones can be used with speech output, so that the rest of the class will not be interrupted. The mouse has no meaning for a screen reader user. All operations are carried out from the keyboard. An example of good practice would be to structure the training to: Firstly work from the menu bar of the program using the keys. Then introduce possible shortcuts in the program. Some people who are blind may use Braille for reading and writing. One example of a Braille input and output computer is the "Braille Lite". It is a computer keyboard where the text is shown on a Braille display. The machine can be connected to a standard PC. In this way it is possible to transfer files between the PC and the Braille Lite (Pedersen, 2009).

## **CHAPTER THREE**

### **3. Research Design and Methodology**

This section deals with the research design, research site, population, source of data, research instrument, data collection procedures, data analysis method and procedures.

#### **3.1. Research Design**

The study investigated the challenges and opportunities of students with vision impairment on taking ICT course. To conduct the study, the researcher employed descriptive method. This is because, this method allows the researcher to describe the current status of the issue under study and use different data gathering tools. And also it is suitable to collect various types of data that enable the researcher to scrutinize the issues from different perspectives (Kotheri, 2004). In addition, educational researchers have acknowledged the value of mixing methodologies to provide a complementary set of information that would more effectively (than a single method) inform practice (Samuel, 2004).

#### **3.2. Research Site**

This research was done in Addis Ababa, particularly at Minilik and Yekatit 12 Preparatory Schools, six departments (Amharic, English, Afan Oromo, Sociology, PSIR, History), and faculty of law of the Addis Ababa University main campus.

#### **3.3. Participants of the Study**

The participants of the study were students with vision impairment who attended and attending the ICT course in the selected two preparatory schools and at the 6 departments

and one faculty of the Addis Ababa University. There were also other participants. These were ICT teachers, School Administrators/ department heads, and Education professionals/experts.

### A. Students with Vision Impairment

The first participants of this study were students with vision impairment who have been learning in the Minilik preparatory school, Yekatit 12 preparatory school, six departments and one faculty of the main campus of Addis Ababa University.

Out of the total 213 population, 75% (160) participants selected using systematic random sampling to respond to the questionnaires. However, full data were gathered from 154 participants (M= 102, F= 52). This is because the questionnaires were distributed for 160 volunteer students with vision impairment to fill them in collaborations with their readers. Among these students with vision impairment, 4 students did not return, and also 2 questionnaires were discarded due to not be filled correctly. As a result, 154 students completed and returned the questionnaire. Among these participants, 20.1% (31) were from Minilik II preparatory school; 13.0% (20) were from Yekatit 12 preparatory school. As shown in the following table, the rest 66.9% (103) were from AAU six departments and one faculty.

Table 1: the Composition of Students with Vision Impairment

Grade/department	Number of students	%
Minilik G. 11 & 12	31	20.1
Yekatit G. 11 & 12	20	13.0
Fac. Law	38	24.7
Dep. Amharic	27	17.5
Dep. English	6	3.9
Dep. Afan O.	6	3.9
Dep. History	9	5.8
Dep. PSIR	4	2.6
Dep. Sociology	13	8.4
Total	154	100.0

Among these participants, 51 were in age group of 15-20 years; 51 were in 21 to 25 year; 14 were in 26 to 30 year; 1 was in 31 to 35 year; and 3 were 36 and above age group. The sex composition of the participants was 52 were females, and 102 were males.

#### **B. ICT Teacher**

There were also 3 participant ICT teachers from Minilik II preparatory school and 2 participant ICT teachers from Yekatit 12 preparatory school who were giving ICT course for grade 11 and 12. Likewise, there were 4 participant ICT teachers in the main compass of Addis Ababa University who were giving the ICT course for some of the 6 departments and one faculty of Addis Ababa University main campus.

#### **C. School Administrators/ department heads**

In addition, the two selected preparatory schools administrators were participants of the study as well the 5 department heads were participants of the study.

#### **D. Education professionals/experts**

Two education experts and curriculum designers from the Ministry of Education and curriculum design of higher level were also participants of the study.

### **3.4. Sampling Technique**

The researcher used systematic random sampling method to select participants. Among the total 213 students with vision impairment, 75% (160) were selected randomly to complete the questionnaires. As a result, the questionnaires were distributed for 160 students and 154 students completed and returned the questionnaires properly.

The researcher also used purposive sampling for the data obtained from interview and FGD. According to Zickmund (2010), purposive sampling involves the use of the researcher's knowledge of the population in terms of research goals. Purposive sampling can also be used to select participants based on their willingness to be studied or on their

knowledge of a particular topic. There were various numbers of students with vision impairment in the selected grades and departments. Thus, by employing purposive sampling technique, two preparatory schools and 6 departments and one faculty of Addis Ababa University were selected.

The researcher employed this purposive sampling technique to select those key respondents for interviews. Two educational experts, two directors from the two preparatory schools, five department heads from Addis Ababa University, five ICT teachers from the two schools and four ICT instructors from Addis Ababa University, were selected and interviewed. Using this method also was used to select those participants of the FGD. Thus, three different sessions were conducted in the three selected research sites. This method helped the researcher to triangulate the data gathered from different informants in different ways.

### **3.5. Sources of Data**

The researcher used both primary and secondary sources of data. The primary sources of data were collected by employing questionnaires and interviews with students with vision impairment, their ICT teacher, department coordinators/department heads, school directors, and educational experts. As part of primary sources, focus group discussions were also conducted with three different groups of students with vision impairment. To supplement the primary data, secondary sources of information were collected from published and unpublished documents such as national policies, development strategies and academic journals related to the study objectives that were also reviewed and incorporated to enrich the findings of the study

### **3.6. Data Collection Instrument**

Both quantitative and qualitative methods were employed to collect the data. For quantitative data gathering, the researcher used structured questionnaire. And also semi-structured interview, guided focus group discussion and document analysis were used for qualitative data collections (Biklen and Bogdan, 1992). Thus, there were four types of

data collection instruments to gather the relevant data. The questionnaires were prepared for students with vision impairment. The interview was prepared differently for the students, their ICT teachers, coordinators and educational experts. The focus group discussion guide questions prepared for the students with vision impairment who were learning in the preparatory school and Addis Ababa University. There were also interview guide questions for the curriculum and other professionals on the ICT course being given. Various documents were also analysed. See the details below.

### **3.6.1. Interview**

Based on the research questions and the objective of the research, there were five types of guide interview questions. The first one was for students with vision impairment who were learning at the Minilik and Yekatit 12 preparatory schools; as well students with vision impairment at six departments and one faculty of Addis Ababa University. The interview included points related with the ICT course such as awareness, attitude, practice and supporting system; that relate to students with vision impairment and their teacher-student relations, and teaching method.

The second type of interview guide questions was for ICT teachers of the students with vision impairment. The interview questions focused on the teaching methods, course devices, awareness of vision impairment, using supporting materials. The third type of interview guide questions was for ICT Department coordinators. The interview questions focused on the teaching methods, course devices, awareness of vision impairment, using supporting materials and other facilities.

The fourth type of interview was for directors/ department heads. The interview guide questions focused on the awareness of vision impairment, available and use of supporting materials, teacher-students relations, school compound, especial service for students with vision impairment, and professionals on the ICT and special needs.

Moreover, there were different interview guide questions for concerned experts related to the ICT course. The interview questions concern about the continuity of the ICT course

given for students with vision impairment in the preparatory schools and in the Addis Ababa University.

### **3.6.2. Questionnaires**

The questionnaires were also prepared by the researcher in English language based on the problems raised on the statement of the problem and objective of the research. There were two parts of questionnaires for the students with vision impairment.

The first part focused on general information; personal background that may have influenced their computer skills, their experience on the use of computers for academic purposes, and their views on the ICT course. The second part concerned on the computer-related skills, which covers basic computer skills, applications, Internet, hardware and software devices, method of teaching, teacher-student relations, supporting materials, and related skills. These both parts of the questionnaire generally focused on the awareness, attitude, and practice and supporting system of ICT education.

### **3.6.3. Focus Group Discussion (FGD)**

Focus group discussions were another instrument to collect data for this research. The researcher gave different points related to factors affecting ICT course for students with vision impairment and unclear ideas on ICT course that students with vision impairment raised on the interview. The FGD were done in the compound of the Ethiopian National Association for the Blind (ENAB), Yekatit 12 preparatory school and the main campus of Addis Ababa University. These three FGDs were managed by the researcher; and the note was taken by a university student. The first group participants were 11 students with vision impairment from Minilik II preparatory school. These informant students were discussed in the computer training room of the Ethiopian National Association for 1:15 hour.

The second group participants were 9 students with vision impairment from Yekatit 12 preparatory school. The discussions were held in their school Braille library room for 1:00 hour. The third group was 12 students with vision impairment who were attending their class in the selected six departments and one faculty of the Addis Ababa University. These students also were discussed in the conference room of the Kennedy library for 1:25 hour.

#### **3.6.4 Document Analysis**

Documents like Ethiopian Training Policy, Students texts for grade 11 and 12 on Information Technology, General Education Quality Improvement Package (GEQUIP) and ICT policy of the Ethiopia were analysed.

#### **3.7. Data Collection Procedure**

The procedures of the collection of the data, interview guide questions were prepared and proof read by the researchers colleagues. The final copies were made ready and held the interviews. In all the interview session prior contact were performed.

According to the interviews feedback, the researcher set the questionnaires and pilot tested by dispatching among 15 potential respondents from Faculty of Law and Department of Sociology on the questions relevant and objective to the research undertaken. These respondent students with vision impairment, who participated on the pilot study, did not participated on the final research. Once minor adjustments were made on the interview and questionnaire, the tool was finalized. The final copies were distributed by providing orientation to the respondent to maximize the returns.

Apart from the two data collection procedures, the researcher also applied an other procedure for FGD. First, questionnaires and interviews responses of the key informants were thoroughly examined and identified some of the major arguments raised. Issues for discussions were prepared. And finally, the FGDs were held in the respected research sites. All these procedures enabled the researcher to gather the necessary data for the research.

### **3.8. Data Analysis**

The data were collected using questionnaire, interview, focused group discussions and different documents. Depending on the nature of the data, various data analysis techniques were used. First, the data collected through questionnaires were tabulated, coded and categorized. And statistical tools such as frequency and percentage were employed to analyse and point out the similarities and differences among the views of the respondents. For this purpose, SPSS version 17 was used. The data of students, their teachers, and educational experts gathered through interviews and FGD and documents were discussed in relation with the findings of the questionnaires.

## CHAPTER FOUR

### FINDING OF THE STUDY

#### 4.1. Background Information

This section deals with the analysis and presentation of data obtained from primary and secondary sources of information gathered through data collecting instruments. The data analysis method was mixed approach, both quantitative and qualitative.

**Notice:** The “Zero” results on the tables in this chapter did not mean that “the students with vision impairment were blank for the subject”. The results just show the unavailability. This can be clearly shown on the results on the tables of those students who did not have ICT course in their departments.

##### 4.1.1. Background Information of Students with Vision Impairment

There were 154 participant students with vision impairment. Among these participants, 20.1% (31) were from Minilik II preparatory school; 13.0% (20) were from Yekatit 12 preparatory school. The rest 66.9% (103) were from AAU six departments and one faculty.

Table 2: Respondents by Sex, Onset of Vision Impairment and Degree of Sight in the preparatory schools

Sex				On Set of vision impairment				Degree of Sight					
Female		Male		From birth		After grown up		No sight at all		Light perception only		Partial sight	
Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
<b>Minilik</b>													
12	23.52%	19	37.25%	15	29.41%	16	31.37%	16	31.37%	1	1.96%	14	27.45%
<b>Yekatit</b>													
13	25.49%	7	13.72%	8	15.68%	12	23.52%	13	25.49%	2	3.92%	5	9.8%
25	49%	26	50.98%	23	45.09%	28	54.89%	29	56.86%	3	5.88%	19	37.25%

As shown on the table above, 31 students from Minilik II, and 20 Yekatit 12, were the participants of the study. The sex composition of the participants was 29 females and 22 males. An attempt was also made to categorize respondents by level of education. In the Minilik II and Yekatit 12 preparatory schools participants were 33.1% (51) grade 11 and 12. Concerning to the onset of vision impairment, there were 45.09% (23) encountered from birth and 54.89% (28) faced the impairment after grown up. Regarding to the degree of sight of the participants, there were 56.86% (29) had no sight at all, 5.88% (3) had only light perception and 37.25% (19) had partial sight.

Table 3: Respondents by Sex, Onset of Vision Impairment and Degree of Sight in the Addis Ababa University

	Sex				On Set of vision impairment				Degree of Sight					
	Female		Male		From birth		After grown up		No sight at all		Light perception only		Partial sight	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
<b>Law</b>														
Year 1-5	5	3.81%	33	32.03%	4	10.5%	34	89.4%	13	34.2%	7	18.4%	18	47.4%
<b>Amharic</b>														
Year 1-4	8	6.1%	19	18.44%	15	55.6%	12	44.4%	11	40.7%	8	29.6%	8	29.6%
<b>English</b>														
Year 1-4	2	0.76%	4	3.88%	1	16.7%	5	83.3%	3	50.0%	1	16.7%	2	33.3%
<b>Afan Oromo</b>														
Year 1-4	2	0.76%	4	3.88%	1	16.7%	5	83.3%	3	50.0%	1	16.7%	2	33.3%
<b>History</b>														
Year 1-4	5	3.81%	4	3.88%	4	44.4%	5	55.6%	2	22.2%	3	33.3%	4	44.4%
<b>PSIR</b>														
Year 1-4	1	0.76%	3	2.91%	0	.0%	4	100.0%	2	50.0%	2	50.0%	0	.0%
<b>Sociology</b>														
Year 1-4	6	46.2%	7	6.79%	7	53.9%	6	46.2%	3	23.1%	4	30.8%	6	46.2%
Total	29	28.15%	74	48.05	32	20.77	71	46.1	37	24.1	26	16.9	40	26

The sex composition of the participants was 29 females and 74 males. An attempt was also made to categorize respondents by level of education. Respondents of AAU were 66.88% (103). As the table shown above, 38 from Faculty of Law, 27 from Department of Amharic, 6 from English, 6 from Afan Oromo, 9 from History, 4 from PSIR and 13 from sociology students were the participants of the study. Concerning to the onset of vision impairment, there were 20.77% (32) encountered from birth and 46.1% (71) faced the impairment after grown up. Regarding to the degree of sight of the participants, there were 24.1% (37) had no sight at all; 16.9% (26) had only light perception and 26% (40) had partial sight.

#### **4.1.2. Background Information of Teachers**

There were three participant ICT teachers from Minilik II preparatory school and two participant ICT teachers from Yekatit 12 preparatory school who were giving the ICT course for grade 11 and 12. These five ICT teachers of the preparatory schools hold Bsc on the field area. Likewise, there were four participant ICT teachers in the main compass of Addis Ababa University who were giving the ICT course for some of the six departments and one faculty. These four ICT teachers in the Addis Ababa University have Msc on the field of ICT.

The mean service years of Minilik II preparatory school ICT teacher was 6 and Yekatit 12 preparatory school was 7. The mean service year of the Addis Ababa University ICT teachers was 3. The teaching services of the ICT teachers were high. This helps the researcher to get reliable and valid information about ICT course and teaching students with vision impairment. These nine ICT teacher's interview also incorporated here as supporting for the quantitative data.

In addition, the two selected preparatory schools vice directors and five department heads were participants on the interview. There were other two participants who were education

experts and curriculum designers from the Ministry of Education and curriculum design of higher level.

The main findings of the study were presented in the following manner based on the responses of the participants.

## 4.2. Awareness

### 4.2.1. Awareness on school compound and classrooms

Table 4: Awareness on school compound and classroom for student's with vision impairment

	From friend		From teachers		From school /department		From friends and teachers		From friend and school / department		From friend .teachers and school/ department		From teachers and school/ department	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Minilik prep.	16	10.4	4	2.6	0	.0	2	1.3	1	.6	4	2.6	4	2.6
Yekatit 12 prep.	10	6.5	3	1.9	2	1.3	0	.0	2	1.3	1	.6	2	1.3
Fac. Law	28	18.2	0	.0	0	.0	0	.0	7	4.5	2	1.3	1	.6
Dep. Amharic	11	7.1	0	.0	2	1.3	0	.0	14	9.1	0	.0	0	.0
Dep. English	5	3.2	0	.0	0	.0	0	.0	1	.6	0	.0	0	.0
Dep. Afan Oromo	6	3.9	0	.0	0	.0	0	.0	0	.0	0	.0	0	.0
Dep. History	6	3.9	0	.0	0	.0	0	.0	3	1.9	0	.0	0	.0
Dep. PSIR	4	2.6	0	.0	0	.0	0	.0	0	.0	0	.0	0	.0
Dep. Sociology	9	5.8	0	.0	0	.0	0	.0	4	2.6	0	.0	0	.0
Total	95	61.68	7	4.5	4	2.6	2	1.3	32	20.8	7	4.5	7	4.5

As table 4 shows, students with vision impairment aware on school compound and classrooms from their friends for the two preparatory schools and six departments and one faculty of Addis Ababa University. Among the total participants of 154, friends were source of information for 95 students with vision impairments. Exceptionally, the Amharic department of the AAU students' source was friends and their department.

In addition as information obtained from interviews and FGD from the students with vision impairments, it was very difficult to know the whole compound of the school and their classrooms for students with vision impairment for first time. Majority of these students in the Minilik II, Yekatit 12 and Addis Ababa University aware of their school compound and the classrooms from their friends.

#### **4.2.2. Awareness on hardware, software and assistive technologies on Provision of ICT Course**

The ICT course was given for both Minilik II and Yekatit 12 preparatory schools for full sighted students only twice in a week. There were seven labs in the Minilik II, and three labs in the Yekatit 12 preparatory schools. All the labs in these preparatory schools were on the up-stair. However, as the research data shows that, there was no ICT course for students with vision impairment in these preparatory schools. In addition, the students confirmed on their interview and focus group discussion on the ICT class that the ICT teacher send out them to stay out side of the ICT lab and the regular classrooms. Most of the students did not know the reason why the miss the course. According to interview results of the ICT teachers, seven of them did not know the importance of the ICT course for students with vision impairment. Even if the two coordinators and teachers knew the importance of the course, it was the schools mandate to give the course for the students with vision impairment. That is why, students with vision impairment in these preparatory schools were sent out from ICT classrooms to stay out side. The reason of this as the vice directors of both schools confirms on their interview, they had not skilled manpower on the field to give for students with vision impairment, and they did not have

the necessary assistive hardware and software for students with vision impairment to give the course. This shows that there was little awareness in the selected preparatory schools on ICT education giving for students with vision impairment.

Among the six departments and one faculty of Addis Ababa University in which students with vision impairment enrolled, there were five departments that did not have the ICT course. These were the department of Amharic, English, Afan Oromo, Political Science and international relation, and History. As the dean of Faculty of Language Study confirms on the interview, there was no ICT course in the faculty. That is why students with vision impairment could not get the ICT course in the department of Amharic, English and Afan Oromo. In addition, there was no ICT course for students with vision impairment in the departments of History and PSIR. According to the department head of the political science and international relation, the ICT course never given in their department before and could not be given for future for all their students including students with vision impairment. This is because, the ICT course never included in their curriculum.

On the other hand, the sociology department was giving the ICT course for all students including students with vision impairment in the regular classroom and ICT labs. But, this trend stopped now. According to the department coordinator, the curriculum revised on 2,000 E.C. summer and the department agreed to stop giving reputation course like the ICT course which was given on the preparatory level. Taking this ICT course as reputation for the students the department leave from the list of courses they have. Now, there was no ICT course in the department of sociology. Then, from first to third year students of this department did not get the ICT skill. Similarly, the ICT course was given for all students of Faculty of Law in their first year second semester course. Fourth and fifth year students with vision impairment of this faculty took the ICT course with two credit hours in the Kennedy library computer room. As these students with vision impairment confirms on their interview and focus group discussion, they did not get enough ICT skill as their full sighted friend. The reason they gave for this that the teacher was not familiar with the software and his focus was on the theoretical part only. The rest

third, second and first year students with vision impairment register for the course, but did not take it. As the department coordinator confirms on the interview, the department has plan to give the course separately for future, but still the department could not get ICT teachers to teach separately for students with vision impairment.

Table 5: Awareness on ICT skill for Students with Vision Impairment

Schools/departments	Awareness on ICT Course		No Awareness on ICT course	
	Number	%	Number	%
Minilik II	0	0%	31	100%
Yekatit 12	0	0%	20	100%
Faculty of Law	14	22.6	24	77.4%
Department of Amharic	0	%	27	100%
Department of English	0	.0%	6	100%
Department of Afan Oromo	0	.0%	6	100%
Department of History	4	44.4	5	55.6%
Department of PSIR	0	.0%	4	100%
Department of Sociology	5	38.5%	8	61.5%
Total	23	14.94%	131	85.06%

As the table 5 shows above, there were students with vision impairment who were not aware of ICT course and 85.06% of them responded, “I have never been aware of ICT course before”. From the total number of 154, there were 131 students with vision impairment who did not get the skill of ICT course.

Concerning to the awareness of hardware and software, majority of students with vision impairment confirmed on their interview and FGD that they were not aware of the hardware and software listed for them. Similarly, the interview of ICT teachers confirmed that, there were little awareness on the hardware and software which assist for students with vision impairment. Among the nine ICT teachers, three respondents knew the JAWS (screen reading) software; the rest six teachers did not know even the program. Moreover, there were two ICT teachers who knew about OPENBOOK (scanner reading software), KURZWEIL (scanner reading software), and WINDOWEYES (screen reading) software; the rest seven ICT teachers did not even know the program before.

Concerning to the awareness of software of using Microsoft Word, Microsoft excel, Microsoft access, Microsoft PowerPoint, and Internet, except the three coordinators, the rest six ICT teachers respond on their interview that they did not know what purpose the above mentioned program have for students with vision impairment.

### 4.3. The Attitude of Students with Vision Impairment and their ICT Teachers on ICT Course Especially the Basic Skill of Computer

Table 6: The attitude of students with vision impairment on the ICT course

	Useful		Less useful		Not useful at all	
	Number	%	Number	%	Number	%
Minilik prep.	26	16.9%	3	1.9%	2	1.3%
Yekatit 12 prep.	19	12.3%	1	.6%	0	.0%
Fac. Law	38	24.7%	0	.0%	0	.0%
Dep. Amharic	13	8.4%	3	1.9%	11	7.1%
Dep. English	2	1.3%	1	.6%	3	1.9%
Dep. Afan Oromo	5	3.2%	1	.6%	0	.0%
Dep. History	9	5.8%	0	.0%	0	.0%
Dep. PSIR	2	1.3%	2	1.3%	0	.0%
Dep. Sociology	13	8.4%	0	.0%	0	.0%
Total	127	82.46	11	7.14	16	10.38

As the table six above shows, among the total 154 students with vision impairment 127 responses were, the ICT course is useful; 11 students response were less useful; and 16 students response were not useful at all. This shows that those whose respond useful have positive attitude for the ICT course. On other hand those whose response were not useful at all, they did not have positive attitude on the ICT education.

Related to this, many students with vision impairment in the Minilik II and Yekatit 12 confirms on their interview and focus group discussion that, the main reason of not taking

the ICT course was the negative attitude of the school principals and the ICT teachers have. Two students from Minilik and 1 student from Yekatit 12 preparatory schools assure that they consulted the ICT teachers to take the course, but the teachers did not permit even to enter in to the ICT labs. In addition to this, sending out from the ICT classrooms during the ICT periods makes negative feelings on most of students with vision impairment in these preparatory schools. Most of students with vision impairment as confirmed on the interview, they would like to take the course knowing the importance of the course to minimize their educational barriers. As table six shows, majority of students with vision impairment have positive attitude for the ICT course, and responded that it is very useful.

Concerning to the ICT teachers attitude, as mentioned above most of ICT teachers did not have the awareness of hardware, software and other assistive technologies for students with vision impairment. Beside this, they were excluding students with vision impairment from ICT classes. Due to this, these ICT teachers did not have positive attitude towards students with vision impairment.

#### 4.4. Practice

##### 4.4.1 Practicing the ICT Course

Table 7: Number of respondents on practicing ICT courses

	No		Yes	
	Number	%	Number	%
Minilik prep.	31	100%	0	0%
Yekatit 12 prep.	20	100%	0	0%
Law school	23	62.16%	14	37.84%
Dep. Amharic	27	100%	0	0%
Dep. English	6	100%	0	0%
Dep. Afan Oromo	6	100%	0	0%
Dep. History	9	100%	0	0%
Dep. PSIR	4	100.%	0	0%
Dep. Sociology	7	53.8%	6	46.2

As shown above, students with vision impairment in the two preparatory schools did not have practice of ICT course. Similarly, students with vision impairment in the department of Amharic, English, Afan Oromo, PSIR and history did not have also practice of ICT course. As shown on the table 7, 100% of these department respondents forwarded that they did not take the course totally before. In addition, most students from the departments of Law and sociology did not take the course of ICT. However, there were some students from both departments (law 14, Sociology 6) who have practiced ICT course. If we see the practice of MS-Word and Internet, there were more than 93 students with vision impairment who did not have practice. As the questionnaire, interview and FGD results of the preparatory schools shows, there was no assistive hardware and software devices for students with vision impairment in their ICT labs. In addition, as the students confirm on the interview the ICT teachers as well school principals did not give much attention to give the course. Further more, some students also responded that the course it self needs eye sight and additional devices. This hinders students with vision impairment not to practice the ICT course.

On other hand, the questionnaire, interview and the FGD results of students with vision impairment of Faculty of Law assured that they practiced ICT course in the Kennedy Library computer room. Similarly, Department of Sociology practiced their ICT course in the regular classroom and ICT labs with the other full sighted students.

#### 4.4.2 The Practice of ICT Instruments

Table 8: The practice of students on ICT instruments

	Internet		Audio		Internet & Audio	
	Number	%	Number	%	Number	%
Minilik prep.	0	.0%	31	100%	0	.0%
Yekatit 12 prep.	0	.0%	20	100%	0	.0%
Fac. Law	3	7.9%	9	23.7%	26	68.4%
Dep. Amharic	0	.0%	27	100%	0	.0%
Dep. English	0	.0%	6	100%	0	.0%
Dep. Afan Oromo	0	.0%	6	100%	0	.0%
Dep. History	0	.0%	3	33.3%	6	66.7%
Dep. PSIR	0	.0%	3	75%	1	25%
Dep. Sociology	0	.0%	8	61.5%	5	38.5%
Total	3	1.9%	113	73.4%	38	24.7%

When we see the practices of using the ICT instruments, 3 students with vision impairment of the department of law school had the practice of internet. Out of 154 participant students, 113(73.4%) from the two preparatory school as well selected department of AAU had practice of using audio. In addition, there were 38 students from department of law, History, PSIR and sociology who had practice of both internet and audio. On the other hand if we see the purpose of ICT practice, it was for educational support; to get new information; for examination and study. As information obtained from the interview, the major purpose of practicing ICT instruments was for educational support. Practicing ICT instruments also had educational support, use for examinations and study for students with vision impairment.

#### 4.4.3 The practice of MS Word and Internet

Table 9: The responses of students with vision impairment on practicing of MS Word

Schools/Departments	Practice on Microsoft Word		No practice on Microsoft Word	
	Number	%	Number	%
Minilik II prep.	0	.0%	31	100%
Yekatit 12 prep.	0	.0%	20	100%
Faculty Law	15	39.5%	23	60.5%
Department of Amharic	0	.0%	27	100%
Department of English	0	.0%	6	100%
Department of Afan Oromo	0	.0%	6	100%
Department of History	0	.0%	9	100.%
Department of PSIR	1	25%	3	75%
Department of Sociology	9	69.2%	4	30.8%
Total	25	16.2%	129	83.8%

As table 9 shows, among the total 154 participants, there were 25 (16.2%) who had practice on Word. However, there were 129 (83.8%) students who have not practice of the MS-Word for any purpose. This data shows that most of students with vision impairment did not have the practice of MS-Word.

Table 10: The responses of students with vision impairment on practicing the internet

Schools/Departments	Did have practice of Internet		Did not have practice of Internet	
	Number	%	Number	%
Minilik II preparatory	0	.0%	31	100%
Yekatit 12 preparatory	0	.0%	20	100%
Faculty of Law	13	34.2	25	65.8%
Department of Amharic	0	.0%	27	100%
Department of English	0	.0%	6	100%
Department of Afan Oromo	0	.0%	6	100%
Department of History	0	.0%	9	100%
Department of PSIR	1	25%	3	75%
Department of Sociology	9	69.2	4	30.8%
Total	23	14.9%	131	85.1%

As table 10 shows, among the total 154 participants, there were 23(14.9%) who have practice of Internet. However, 131(85.1%) students did not have practice of Internet for any purpose. This data shows that most of students with vision impairment did not have practice of Internet.

#### 4.4.4 Practice of reading ink printed text

Table 11: Students response on practicing reading ink printed text

School/Department	Using personal reader		Using Scanner		Using my eye sight		Using personal reader & scanner		Using personal reader & my eye sight		Using my eye sight & scanner	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Minilik II prep.	30	19.5%	0	.0%	1	.6%	0	.0%	0	.0%	0	.0%
Yekatit 12 prep.	20	13.0%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Fac. Law	31	20.1%	2	1.3%	1	.6%	1	.6%	2	1.3%	1	.6%
Dep. Amharic	27	17.5%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Dep. English	6	3.9%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Dep. Afan Oromo	6	3.9%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Dep. History	9	5.8%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Dep. PSIR	4	2.6%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Dep. Sociology	9	5.8%	0	.0%	0	.0%	0	.0%	4	2.6%	0	.0%
Total	142	92.2	2	1.29	2	1.29	1	0.64	6	3.86	1	0.6

There was practice of reading ink text for students with vision impairment. Among the given selection of reading text, there were 142 (92.2%) respondents who used personal reader. There were 2(1.29%) respondents who used Scanner to read ink text. There were 2(1.29%) respondents who used their eye sight. There was 1 (0.64%) respondent who used personal reader & scanner. There were

6(3.86%) respondents who used personal reader and their eye sight. There was 1 (0.64%) respondent who used his eye sight and scanner.

#### 4.4.5 Practice of Reading of Computer Screen

Table 12: student's response on the practice of reading screen

Schools/Departments	Have practice of computer screen reader		Did not have practice of computer screen reader	
	Number	%	Number	%
Minilik II preparatory	0	.0%	31	100%
Yekatit 12 preparatory	0	.0%	20	100%
Faculty of Law	38	100%	0	.0%
Department of Amharic	0	.0%	27	100%
Department of English	0	.0%	6	100%
Department of Afan Oromo	0	.0%	6	100%
Department of History	9	100%	0	.0%
Department of PSIR	2	50%	2	50%
Department of Sociology	9	69.2%	4	38.8%
Total	58	37.7	96	62.3%

Concerning the reading the screen of computer, there were 96(62.3%) respondents who did not have any practice of reading of computer screen. There were 58 (37.7%) respondents who had practice of reading computer screen.

## 4.5 Support System

### 4.5.1 Support System on Hardware, Software, and other Assistive Technologies for students with vision impairment

Table 13: Support System on Hardware and Software

Schools/Departments	Have support hardware & software		Did not have support hardware & software	
	Number	%	Number	%
Minilik II preparatory	0	.0%	31	100%
Yekatit 12 preparatory	0	.0%	20	100%
Faculty of Law	20	52.6%	18	47.4%
Department of Amharic	0	.0%	27	100%
Department of English	0	.0%	6	100%
Department of Afan Oromo	0	.0%	6	100%
Department of History	0	.0%	9	100%
Department of PSIR	2	50%	2	50%
Department of Sociology	7	53.8%	6	46.2%
Total	29	18.8%	125	81.2%

According to the data shown above, there were 29 (18.8%) respondents who had support system for their ICT course. On the other hand there were 125 (81.2%) respondents who did not have the supporting system of ICT course. Therefore, most students did not have support system on their ICT course, especially on hardware and software.

#### 4.5.2 The Setting of ICT Class Room and Preferable Sitting

Table 14: Responses of students on classroom settings

	So silent		Classroom with disturbing noise		Little noise, not disturb the learning		I have never attended the ICT course	
	Number	N %	Number	N %	Number	N %	Number	N %
Minilik prep.	0	.0%	0	.0%	0	.0%	31	20.1%
Yekatit 12 prep.	0	.0%	0	.0%	0	.0%	20	13.0%
Fac. Law	2	1.3%	6	3.9%	7	4.5%	23	14.9%
Dep. Amharic	0	.0%	0	.0%	0	.0%	27	17.5%
Dep. English	0	.0%	0	.0%	0	.0%	6	3.9%
Dep. Afan Oromo	0	.0%	0	.0%	0	.0%	6	3.9%
Dep. History	0	.0%	0	.0%	4	2.6%	5	3.2%
Dep. PSIR	0	.0%	0	.0%	0	.0%	4	2.6%
Dep. Sociology	0	.0%	0	.0%	5	3.2%	8	5.2%
Total	2	1.3	6	3.9	16	10.3	130	84.4

Among students with vision impairment who attended the ICT course, they responded about the noise level of the ICT classrooms. There were 2 (1.3%) respondents who said it was silent. There were 6 (3.9%) respondents who said it was classroom with disturbing noise. There were 16 (10.39%) respondents who said it was little noise not disturbing the learning. However, there were 130 (84.4%) respondents who said I never attended the ICT course before. In general, as most students responded that the noise level of ICT class rooms was very low. Due to this reason the class room was supportive environment for students ICT learning.

Concerning to sitting position of students with vision impairment in the classroom as the interview confirms, most of students preferred to sit to the front sit. The main reason of the student's choice was that to catch the teacher voice easily, to get support from the teacher, to record the teachers' voice clearly and to minimize distorting voice. Due to the existence of this class room environment, most students preferred to sit in the front desk. There were two exceptional individuals who did not mind to sit any where in the classrooms.

### 4.5.3 Support System for Reading Text and Screen

Table 15: Student's response on their support of reading a text

School/ Department	Using personal reader		Using Scanner		Using my eye sight		Using personal reader & scanner		Using personal reader & my eye sight		Using my eye sight & scanner	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Minilik II prep.	30	19.5%	0	.0%	1	.6%	0	.0%	0	.0%	0	.0%
Yekatit 12 prep.	20	13.0%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Fac. Law	31	20.1%	2	1.3%	1	.6%	1	.6%	2	1.3%	1	.6%
Dep. Amharic	27	17.5%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Dep. English	6	3.9%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Dep. Afan Oromo	6	3.9%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Dep. History	9	5.8%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Dep. PSIR	4	2.6%	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Dep. Sociology	9	5.8%	0	.0%	0	.0%	0	.0%	4	2.6%	0	.0%
Total	142	92.2	2	1.29	2	1.29	1	0.64	6	3.89	1	0.64

There was a support system to read ink text for students with vision impairment. Among the given selection of reading text, there were 142 (92.2%) respondents who used personal reader. There were 2(1.29%) respondents who used Scanner to read ink text. There were 2(1.29%) respondents who used their eye sight. There was 1 (0.64%) respondent who used personal reader & scanner. There were 6(3.89%) respondents who used personal reader & their eye sight. There was 1 (0.64%) respondent who used his eye sight & scanner.

Table 16: Student's response on their support of screen reader

Schools/Departments	Have support of computer screen reader		Did not have support of computer screen reader	
	Number	%	Number	%
Minilik II preparatory	0	.0%	31	100%
Yekatit 12 preparatory	0	.0%	20	100%
Faculty of Law	38	100%	0	.0%
Department of Amharic	0	.0%	27	100%
Department of English	0	.0%	6	100%
Department of Afan Oromo	0	.0%	6	100%
Department of History	9	100	0	.0%
Department of PSIR	2	50%	2	50%
Department of Sociology	9	69.2%	4	30%
Total	58	37.7%	96	62.3%

Concerning reading the screen of computer, there were 96(62.3%) respondents who did not have support system for their reading screen, while 58(37.7%) respondents had supporting system for reading screen of computer.

## **4.6 Challenges**

There were many challenges of students with vision impairment in attending and using ICT course. According to the response of students with vision impairment interview and FGD of the two preparatory schools, the first challenge for them was not getting the ICT course equally with the other friend of them. In addition, the text book of ICT course printed in ink. Due to this, students with vision impairment could not use this book. Moreover, the terms and language of the ICT book written for the user of mouse. This means, the book not adapted for the use of keyboard user. Similarly the interview and FGD response of students with vision impairment in the AAU also confirms this. The other point of most of students with vision impairment in the AAU was, they did not attend the ICT course, and this lags them not to be user of the technology for their educational purpose. These the AAU students were expected to take ICT course that they missed on their preparatory level. But, no one give attention to give the course in their departments now. As most of students confirms, departments and concerned bodies on the ICT field did not have positive attitude on giving the course for students with vision impairment. In addition, there was no supporting system on the hardware, software, Braille, large print, audio books and so on. This creates negative feeling on most of students with vision impairment that they were not equal with the sighted students. Moreover, most of students regretted not taking the ICT course that it makes them far from the technology. This increased their dependency to use personal reader and writer for every educational support instead of using technology.

## **4.7 Opportunities**

There were the opportunities of giving the ICT course in the Minilik II and Yekatit 12 preparatory schools. However, this course was given for only full sighted students in these selected preparatory schools. There were ten labs for the practice of this course in these schools. As informants, the computers came with their speakers; and it is enough to start giving ICT course for students with vision impairment. However, no one gives the

opportunities in these selected preparatory schools to provide the ICT course for students with vision impairment. On the other hand, there was the opportunity of giving the ICT course for both students including students with vision impairment in the department of sociology. But, this experience stopped as if taking ICT course reputation for the college level. Among students of this department, fourth year students only got the opportunity of ICT course. In addition to this, there was the opportunity of getting ICT course in the Faculty of Law. This course was given for fourth and fifth both students including students with vision impairment. First to third year full sighted students attended the course. But, first to third year students with vision impairment did not get the opportunity of taking the course. These shows, the opportunities of giving the ICT course for students with vision impairment in the research sites blocked by ICT teachers, schools administrators and departments heads.

To give the opportunities of ICT course for students with vision impairment in schools and departments, the Ministry of Education did not give much attention. In fact, the Ministry of Education announced the inclusive policy to give equal opportunity and accessibility for person with impairment. This is not practical. There is inclusive policy with out inclusive practice in these selected research sites. This contradicts the strategy of the Ministry of Education on the inclusive and its practice for special needs education.

### Discussion of the Results

In this chapter, the results of major findings in relation to the research questions and objective of the study were discussed and interpreted. Therefore, the sources of information about ICT course; classroom and school compound; the provision of ICT course ; attitude of students on ICT; practices in ICT course; support system on ICT course and course materials and challenges were discussed.

#### 5.1 Degree of Sight of the Participants

There were three types of students with vision impairment regards to their degree of sight in the selected research sites. There were 66 students who have no sight at all and there were 29 who have only light perception. According to Gearheart and Weishahn (1992), these two types of students with vision impairment categorized under blindness. This means that the student uses touch and hearing to learn and does not have functional use of sight. These students use Braille and taped materials other than ink print. In addition, students with blindness cannot read a computer screen. They can read the screen of computers by hearing or by touching. Therefore, these students are user of Braille, audio cassette and screen reader software for their ICT classrooms. On other hand, there were 59 students who have partial sight. According to Gearheart and Weishahn (1992), these third group of students categorized under low vision. Low vision means a student who can read printed materials in either enlarged print or standard print with the use of special magnification device. These students with low vision use sight to learn, but their visual impairments interfere with daily functioning. They also can receive information through sound or touch, or modify their computer displays so the screen was more legible for them. Therefore, these students with low vision were user of large print and magnifier for their ICT classrooms.

To give ICT course equally with the other full sight students, ICT teachers, school principals, directors/department heads should give much attention not only for students

with vision impairment (blindness and low vision), but also for students who show behavioral indication of vision impairment in the classroom.

## **5.2. Awareness on Hardware, Software and Assistive Technologies on Provision of ICT Course**

As the finding of these results shows that, among 154 participants there were 131 students with vision impairment who did not take the ICT course in the selected research sites.

ICT course was given twice in a week in both Minilik II and Yekatit 12 preparatory schools. There were seven labs in the Minilik II, and three labs in the Yekatit 12 preparatory schools. All the labs in these preparatory schools were on the up-stair. However, as the research data shows that, there was no ICT lesson for students with vision impairment in these preparatory schools. In addition, the students confirmed on their interview and focus group discussion on the ICT class that the ICT teacher send out them to stay out side of the ICT lab and the regular classrooms. Most of the students did not know the reason why they miss the course. On the other hand, interview results of the ICT teachers, three of them did not know the importance of the ICT course for students with vision impairment. Even if the two coordinators and teachers of the preparatory schools knew the importance of the course, they thought that it was the schools mandate to give the course for the students with vision impairment. That is why, students with vision impairment in these preparatory schools were sent out from ICT classrooms to stay out side. The vice directors of both schools confirmed on their interview, they did not have skilled manpower on the field of ICT teaching students with vision impairment, and they did not have the necessary accessibility hardware and software for students with vision impairment to give ICT course. This means, the ICT course was given for full sighted students only. This shows that there was little awareness on providing the ICT course in the Minilik II and Yekatit 12 preparatory schools for students with vision impairment.

Information Science was giving the introduction of ICT course for most departments in the Addis Ababa University main campus. The name of the course is introduction to information and communication technology. Its code differs from department to department like Course code: BUED 231, ICT 201, ICTE 201, COMP 201, and ICT 301. Among the six departments and one faculty of the Addis Ababa University in which students with vision impairment enrolled, there were five departments that did not have the ICT course. These were the department of Amharic, English, Afan Oromo, Political Science and international relation, and History. As the dean of Faculty of Language Study confirms on the interview, there was no ICT course in the faculty. That is why students with vision impairment could not get the ICT course in the department of Amharic, English and Afan Oromo. In addition, there was no ICT course for students with vision impairment in the departments of History and PSIR. According to the department head of the political science and international relation, the ICT course never given in their department before and could not be given for future for all their students including students with vision impairment. This is because, the ICT course never included in their curriculum.

On the other hand, the sociology department was giving the ICT course for all students including students with vision impairment in the regular classroom and ICT labs up to 2000 E.C.. But, this trend stopped now. According to the department coordinator, the curriculum revised on 2,000 E.C. summer and the department agreed to stop giving reputation course like the ICT course which was given on the preparatory level. Taking this ICT course as reputation for the students the department leave from the list of courses they have. Now, there was no ICT course in the department of sociology. Therefore, from first to third year students of this department did not get the ICT course. In contrast, the ICT course was given for all students including students with vision impairment in the Faculty of Law on the first year second semester. Fourth and fifth year students with vision impairment in this Faculty took this course with two credit hours in the Kennedy library computer room separately from the other sighted friend of them. The rest third, second and first year students with vision impairment register for the course,

but did not take the course up to the end of data collection of this research. But, their class-met were attended the ICT course. As the department coordinator confirms on the interview, the department has planned to give the course for students with vision impairment separately for the future.

However, instead of decreasing barriers, schools and departments of the research sites were increasing dependency on students with vision impairment not giving ICT course. For instance, instead of teaching students with vision impairment in the preparatory schools inclusive classroom, they excluded these students from the regular ICT classroom. It was the same experience of exclusion of students with vision impairment in the Faculty of Law of AAU happened.

Knowing the ICT skill as a get for education for students with vision impairment, most developed countries are giving the skill for all types of students with vision impairment starting at the age of 6 to 8 (Snetselaor (2009).

This shows that ICT course is a get for education for students with vision impairment; and should be started from elementary grades. But, this was not practiced in our country.

It is obvious that, students with vision impairment joined these six departments and one faculty coming from different parts of the country having different background of technology. These students face many problems on their learning. One of the courses which minimize learning problems for students with vision impairment was ICT course. This course minimizes this educational problem substituting personal reader and writer with assistive technology. Using the assistive technology, students with vision impairment can read text, refer books, write notes, work on assignments and examinations.

Concerning to the awareness of hardware and software, students with vision impairment confirmed on their interview and FGD that they were not aware of the hardware and software listed for them. Similarly, the interview of ICT teachers confirmed that, there

were little awareness on the hardware and software which assist for students with vision impairment. Among nine ICT teachers, three respondents knew the JAWS (screen reading) software; the rest six teachers did not know even the program. Moreover, there were two ICT teachers who knew about OPENBOOK (scanner reading software), KURZWEIL (scanner reading software), and WINDOWEYES (screen reading) software; the rest seven ICT teachers did not even know the program before. Concerning to the awareness on using Microsoft Word, Microsoft excel, Microsoft access, Microsoft PowerPoint, and Internet, except the three coordinators, the rest six ICT teachers respond on their interview that they did not know what purpose the program have for students with vision impairment.

As Redmond (2008) described, if a student with vision impairment cannot use the classroom computer because of his/her sight, and can not read the small text on the screen, she/he will not be provided with the same opportunities to learn that their sighted peers have. It is great to hear the achievement of technology to minimize barriers of students with vision impairment. Currently education and technology are going together for the success of today's learners. Providing equal access education supported by technology for students with vision impairment can make them good competent in their classroom.

Generally, if students with vision impairment provided with the ICT course, with the necessary hardware and software, and adapted assistive technologies, they will be successful in their education equally with other full sighted friend of them.

It was expected from the Ministry of Education that there was awareness on the ICT course which is given for all preparatory schools in Ethiopia for all types of students including students with vision impairment. The Ministry of education also printed ink ICT text book for full sighted students to grade 11 and 12. As researcher noticed and gathered information from preparatory schools, the Ministry did not adapt and transcribe the ink book into brail, large print and audio for the use of students with vision impairment. Moreover this, the Ministry started to give ICT course for grade 9 and 10 students. The text book was publishing in ink. According to the response of interview of

high official and experts of the Ministry of Education, this grade 9 and 10 ICT text books were given for publisher to be prepared in ink out side of the country. Again here the Ministry of Education continued its experience not adapting, transcribe in Braille, large print and audio for the needs of students with vision impairment. This shows that the Ministry of education which announced the inclusive practice, itself excluded the needs of students with vision impairment. To implement the theory to practice of inclusion, the Ministry of education itself should give much attention on transcription of texts in to Braille, large print and audio cassette for the needs of students with vision impairment. In addition, the Ministry of Education should give much attention on providing the ICT course for students with vision impairment. Also the Ministry should prepare the assistive technology hardware and software for students with vision impairment for their ICT classes. On the new publication of the ICT text for grade 9 and 10, there should be provision of ICT course for students with vision impairment and transcription of texts in to Braille, large print and audio books adapting the terms and language of ICT books for the ICT course.

### **5.3. Attitude of Students with Vision Impairment and their ICT teachers on the ICT Course**

Different cultures have different views about ICT and their readiness to help their children acquire the desired skills( Redmond ,2008).

As information obtained, two students from Minilik and 1 student from Yekatit 12 preparatory schools assure that they consulted the ICT teachers to take the course, but the teachers did not permit even to enter in to the ICT labs. In addition to this, sending out from the ICT classrooms during the ICT periods makes negative feelings on most of students with vision impairment in these preparatory schools. Many of students with vision impairment would like to take the course knowing the importance of the course to minimize their educational barriers. Majority of students with vision impairment have positive attitude for the ICT course, and responded that it is very useful. Among the total

154 students with vision impairment 127 responded that the ICT course is useful; 11 students responded that ICT course is less useful; and 16 students responded that ICT course is not useful at all. This shows that those, whose selection was not useful at all, did not have good attitude on the ICT education. These negative responses of the students might rise due to lack of information about ICT course.

Concerning to the ICT teachers attitude, as mentioned above most of ICT teachers did not have the awareness of hardware, software and other assistive technologies for students with vision impairment. Beside this, they were excluding students with vision impairment from ICT classes. Due to this, these ICT teachers did not have positive attitude towards students with vision impairment.

## **5.4. Practices**

### **5.4.1. Practice on ICT Course**

In the selected site of the study, the ICT course given for most sighted students. The course includes keyboard, Windows, MS-word, MS-excel, MS-access, MS-PowerPoint, internet and so on. However, Students with vision impairment who were attending in the two preparatory schools did not have these practices on ICT course. As well students with vision impairment in the department of Amharic, English, Afan Oromo, PSIR and History did not have practice on ICT course. In addition, most students from the departments of Law and sociology did not have practice on ICT course. As the questionnaire, interview and FGD results of the preparatory schools shows that the reason of not practicing the ICT course was there was no assistive hardware and software devices for students with vision impairment in their ICT labs. In addition, as the students confirm on the interview the ICT teachers as well school principals/departments did not give much attention to give the course. Further more, some students also responded that the course it self needs eye sight and additional devices.

However, some students from both departments (law 14, Sociology 6) have practice on ICT course. The questionnaire, interview and the FGD results of law school assured that

fourth and fifth year students with vision impairment of the department of Law practiced their ICT course in the Kennedy Library computer room separately and Department of Sociology practiced their ICT course in the regular classroom and ICT labs together with the other full sighted students. There fore, as the result shows most students with vision impairments in the selected sites did not practice the ICT course equally with the other sighted friends of them. Due to this they were not good competent in practicing ICT course.

As mentioned by Snetselaor (2009), most developed countries students with vision impairment do have opportunities of practicing the ICT for the following purposes. Students with vision impairment use ICT to read the same newspapers as other people at the same time, to attend the same courses as other people, in the same way and at the same time, to be considered for the same jobs as other people, the ability to make use of the same opportunities for communication as sighted people, such as e-mail, chat-rooms.

In general, the main purpose of practicing ICT course was for educational support; to get new information; examination and study. However, there was very little or no practice of ICT course with students with vision impairment. This shows that students with vision impairment were far from ICT course, as well from the current technology. If they were far from the technology, they were far from expected ICT skill.

#### **5.4.2. The Practice of ICT Instruments**

It was difficult to see details of the practices of using the ICT instruments. Because, most participant students with vision impairment did not have practice on ICT instruments. This might be, majority of students did not take ICT course.

#### **5.4.3. Practicing MS-Word and Internet**

If we see the results of this research from the total 154 participants, there were 15 students who had practice on MS-Word. On other hand, there were 137 students who did not have practice of the MS-Word for any purpose. This data shows that most of students

with vision impairment did not have the practice of MS-Word. Similarly, among the total 154 participants, there were 13 students who did have practice of Internet. On the contrary, there were 141 students who did not have practice of Internet for any purpose. This data shows that most of students with vision impairment did not have practice of Internet.

But, the ICT course text book which prepared for grade 11 and 12 recommend to practice on the MS-Word, MS-Excel, MS-Access, internet and so on. However this was not true for students with vision impairments in the selected research site. They were far from practicing the above mentioned technologies.

#### **5.4.4. Practice of Reading Text**

There was practice option of reading ink text of students with vision impairment in the selected research sites. Among the given selection options of reading, there were 142 respondents were dependent on personal reader. There were 2 students who use scanner for their reading. There was 1 respondent who uses personal reader & scanner. There was 1 respondent who uses eye sight & scanner. This result shows that most students with vision impairment were dependent on using personal readers. Surprisingly there were four students only who were using the technology of scanner for their reading.

#### **5.4.5. Practice of Reading Screen**

Concerning practice of reading the screen of computer, there were 96 respondents who did not have practice of reading computer screen before. On the other hand there were 58 students who had practice of reading the screen of computer. Therefore, most students with vision impairment were far from the technology using reading the computer screen. In addition, this shows that most students with vision impairment did not have practice of using assistive software.

Knowing the ICT skill as a get for education for students with vision impairment, most developed countries are giving the skill for all types of students with vision impairment

with the necessary practice starting at the age of 6 to 8. The Netherlands is one of these countries. In this country beyond giving the ICT course at age of 6 to 8, students with blindness will generally use a laptop and partially sighted students will use either a laptop or a desktop depending on their field of vision (Snetselaor, 2009).

Generally it was expected from students with vision impairment of secondary and higher level that they would have practice of ICT course and instruments of assistive technologies. It was also expected that, MS-Word and Internet are part of daily practice of these students. Moreover these, students with vision impairment should not be dependant on reading text and screen of computer. To read a text they can use scanner with scan reading software like OPENBOOK. To read the screen of computer, these students can use screen reading software like JAWS.

## **5.5 Support System on ICT Course**

### **5.5.1. Support System on Hardware, Software, and other Assistive Technologies for Students with Vision Impairment**

The nature of ICT course was not the same as other theoretical courses. This course has theoretical and practical part. For the practical part, it needs computers with their accessories. Fulfilling the computer with its accessory and supporting materials for full sighted students, all research sites were giving the ICT course. However, these devices and supporting materials were not enough for students with vision impairment. There was no support system for ICT course on the hardware and software, as well on Braille, audio cassette, and other devices for students with vision impairment. Due to this, there were 102 respondents who did not have the idea of supporting system of ICT course.

Accessibility was one of the supporting systems for students with vision impairment. According to Redmond (2008), accessibility is providing access to products and services to everyone who wants to access the product or service. Accessibility is about removing

preferences of a diverse set of individuals that might use the product. In other way, accessible technology is computer technology which enables individuals to adjust a computer to meet their visual needs. To be accessible, technology must be flexible enough to meet the individual needs and preferences of a diverse set of people with many different types of abilities.

In addition Snetselaor (2009) described, the ICT policy in education must coordinate the following four main points; the education strategy (vision), teachers skills (expertise), the available software programs (software and content), and the available equipment (infrastructure).

The four items mention above was very important for support system of ICT course. However, these supporting system were different for students with vision impairment who attend and attending the ICT course. This means there should be awareness and well oriented ICT teacher on the accessible technologies to give the course for students with vision impairment. There should be also additional hardware and software to assist ICT course for the need of students with vision impairment. Moreover, there should be Braille, large print, audio books with other necessary devices.

### **5.5.2. Setup of ICT Class Room**

It was very difficult to get support information to know the whole compound of the school and the classrooms for most students with vision impairment for first time as information obtained from interviews and FGD. These students in the Minilik II, Yekatit 12 and Addis Ababa University were getting support of information about their school compound and classrooms from their friends. Among the total participants of 154, full sighted friends of students with vision impairment were source of information for 95 students. On the other hand, the ICT classrooms as well the labs were not supportive for students with vision impairment in both the two preparatory schools as well in the AAU.

As the researcher noticed, the desks were very narrow and computers arranged very near to each other. There was no extra place to put student's text books and bags. The spacing between desks also very narrow to move easily.

If there were ICT course for students with vision impairment, Pedersen (2009) advised to give the following information on the changes of classroom setup for students with vision impairment. If there is any change of setup of devices in the computer classroom, there should be information for students with vision impairment. This will make objects easier to find. If a door opened half way, the edge of the door may be dangerous for students with vision impairment when they come in and out. Likewise, the path way of the ICT classroom should also be free from tripping; such as bags, chairs, coats, wires etc.

In general, there should be support system for students with vision impairment to know their school compound, classes and specifically ICT labs.

### **5.5.3. Support System on Reading Text and Screen**

Most of students with vision impairment were dependent on other on reading text. There were 142 respondents who use personal reader. Exceptionally there were 4 students who use scanner. It was good start to use scanner for reading ink text. But these four students were using the scanner in the Library of America Embassy . According to the interview and FGD, students with vision impairment in the selected research sites did not have options of getting Braille, large print, audio cassette, audio CD, magnifier and other support system for their reading. Similarly, there were 94 respondents who never use computer. These students were not familiar to the screen reading software which was one of the support system.

As Pedersen (2009) described, most people who are blind will rely on their other senses of hearing, touch and smell in their everyday lives. A person who is blind uses audible information to interpret a great number of situations. Very few people who were blind read Braille. Most people who were blind - who have become blind later in life - depend

on taped books and recorded texts. Now, the computer can also be a possible source for reading or acquiring information (Ibid). For these purpose, there were software to read a text on a screen. For instance, JAWS or Window-Eyes tell the user what is on the screen and what functions are being carried out on the PC (Freedom Scientific, 2010). Menus, dialogue boxes and program titles are read aloud while working with Windows. In this case, a person who is blind uses the same functions on the PC as a person full sight. Headphones can be used with speech output, so that the rest of the class will not be interrupted. The mouse has no meaning for a screen reader user. All operations are carried out from the keyboard. An example of good practice would be to structure the training to: Firstly work from the menu bar of the program using the keys. Then introduce possible shortcuts in the program. Some people who are blind may use Braille for reading and writing. One example of a Braille input and output computer is the "Braille Lite". It is a computer keyboard where the text is shown on a Braille display. The machine can be connected to a standard PC. In this way it is possible to transfer files between the PC and the Braille Lite (Ibid).

Pedersen (2009) also said that, one of the most common accessibility solutions for a computer user with low vision is a screen magnifier. Microsoft Windows XP and Windows Vista, for example, include a basic screen magnifier program called Microsoft Magnifier (Redmond, 2008). Other than this, students with low vision read printed matter in a variety of different ways. Some people use a combination of glasses, low vision aids and large print to help them to read printed material. A CCTV (Close Circuit Television) is a common reading aid for people with low vision. A CCTV consists of a camera, a magnifier and a TV screen. The printed matter is placed under the CCTV camera which enlarges the print onto the TV screen. Portable CCTVs are also available. Some use a small "handheld" camera that is passed over the text to be enlarged (Ibid).

The lack of supporting system on reading text and reading screen of computer makes students with vision impairment dependent on personal support. This increases their

dependency on others. To minimize this problem classroom teachers and other concerned person should contribute their effort to full fill the necessary supporting systems.

#### **5.5.4. Support System on Using word and Internet**

There were more than 93 students with vision impairment who did not have support system of MS-Word and internet in their schools. People with a visual impairment have always been at a disadvantage in terms of information and communication, because information has not been available in an accessible form and because students with vision impairment in particular have their own written alphabet. Digitization has made great strides forward in both these areas, which means that the services provided will now have a duty to remove this disadvantage. The services must also dovetail with other facilities that were set up for the target group. For example, pupils can download the textbooks they need for their studies from the Internet. This gives Internet use a higher priority in education. Examples of information include digital books, the Internet, encyclopedias, dictionaries, newspapers and magazines. Examples of communication include e-mail, the exchange of same-format texts and chat-boxes.

According to Redmond (2008), the “typical” classroom has become more accessible to the student with vision impairment due to the advances made in technology. Students with vision impairment were able to utilize one or more of these tools, to help overcome their impairment. These Accessibility features and products are also helpful for people with low vision and blindness. In Windows XP and Windows Vista, these features include: keyboard shortcuts, text to speech with narrator, screen magnifier, and sound notification. Even though earlier versions of Windows also included accessibility features, these newest Windows versions offer the best accessibility (Ibid).

Moreover, ICT course should be given in the inclusive classrooms. Inclusive education required a shift of emphasize on the task of persons providing educational services to make sure that the educational settings were adjusted to accommodate the special educational needs rather than trying to make the student with disabilities fit in to the given educational settings (Tirussew, 2005).

## 5.6. Challenges

There were many challenges of students with vision impairment in attending and using ICT course. According to the response of students with vision impairment interview and FGD of the two preparatory schools, the first challenge for them was not getting the ICT course equally with the other friend of them. In addition, the course text ICT book printed in ink. Students with vision impairment could not use this book, because, every terminology and the language written for the user of mouse. This means, the book not adapted for the use of keyboard user. Similarly the interview and FGD response of students with vision impairment in the AAU also confirms this. Most of students with vision impairment in the AAU did not attend the ICT course, and this lags them not to be user of technology for their educational purpose. These the AAU students expected to take ICT course that they missed in their preparatory level. But, no one give attention to give the course in their departments. As most of students confirms, departments and concerned bodies on the ICT field did not have positive attitude on giving the course for students with vision impairment. In addition, there was no supporting system on the hardware, software, Braille, large print, audio books and so on. This creates negative feeling on most of students with vision impairment that they were not equal with the sighted students. Moreover, most of students regretted not taking the ICT course that they were far from the technology. This increased their dependency to use personal reader and writer for every educational support instead of using technology.

According to Burgstahler (2011), many students with vision impairment face challenges in schools gaining knowledge. Burgstahler listed the following some examples of challenges and their accommodations.

- For the student who has difficulty reading standard text or graphics due to a visual impairment, materials can be provided in large print or Braille, on tape, or via computer and tactile drawings. Access to adaptive technology that provides enlarged, voice, and/or Braille output can be useful.
- If seeing material on a blackboard or overhead projector due to a visual impairment is a challenge, a student may use binoculars and the instructor can be sure to verbalize the content of all visually displayed materials.

- For the student who cannot read output from standard science equipment because of a visual impairment, try interfacing lab equipment with computer and providing large print and/or speech output. Also, mark scientific equipment with Braille and large print labels can be helpful as well.
- If a student has difficulty reading because of specific learning disability, providing extra time and access to materials via a computer equipped with speech and large print output can sometimes be helpful. Internet access with a system like this can also be an important resource.
- For a student who has difficulty taking notes in class because of a mobility or visual impairment, use of a portable computer system with word processing and adaptive technology can allow independent note-taking.
- A student who cannot operate lab equipment and conduct lab experiments due to mobility impairment can benefit from an accessible lab facility and adjustable-height tables. A lab partner or scribe can facilitate participation. In addition, computer-controlled lab equipment with alternative input devices (e.g., speech, Morse code, alternative keyboard) and modified scientific equipment can provide access.
- For the student who has difficulty completing research because of a disability, access to research materials on the Internet can be helpful.
- For the student who has difficulty completing and submitting worksheets and tests because of a visual impairment and/or a specific learning disability, instructors can provide worksheets and tests in large print or Braille, on tape, or via computer. Access to adaptive technology that provides enlarged, voice and /or Braille as well as standard print output can maximize student independence.

To Solve this challenges of students with vision impairment who faced in taking and using ICT course, the Ministry of Education should play much role in giving awareness, attitude, practice and support system for the students, their ICT teachers and for their schools.

## **5.7 Opportunities**

The opportunities of giving the ICT course in the Minilik II and Yekatit 12 preparatory schools should continue incorporating students with vision impairments.

Among the ten labs in the schools, the ICT teachers and school principals should arrange special classroom for students with vision impairment.

It is possible to start ICT course with those computer and their speaker for students with vision impairment.

Knowing the importance of ICT course especially for students with vision impairment, the Faculty of Law, department of sociology and other department should give the course for these students.

The Ministry of Education also should give much attention to give the opportunities of ICT course in schools and departments where students with vision impairment enrolled.

## Chapter Six

### Summary, Conclusions and Recommendations

#### 6.1 Summary

The central aim of this study was to investigate the challenges and opportunities of students with vision impairment on ICT course in the Minilik II preparatory school, Yekatit 12 preparatory school, six departments and one faculty of Addis Ababa University. To achieve this objective, the researcher formulated the following questions:

1. Where do students with vision impairment get information about ICT course, Classroom and school compound?
2. Do students with vision impairment take ICT courses?
3. How is the attitude of students with vision impairment and their teachers on the ICT course?
4. How are the practices of students, teachers, and schools/departments on ICT courses?
5. Is there any support system on the ICT education for the needs of students with vision impairment?
6. What challenges face students with vision impairments on the ICT course?

The participants of the study were 154 students with vision impairment who attended and were attending the ICT course in the selected preparatory schools and at the six departments and one faculty of the Addis Ababa University. There were also other 18 participants. These were 9 ICT teachers, 2 School Administrators, 5 department heads, and 2 Education professionals/experts. This research was done in the Addis Ababa, particularly in the Minilik II preparatory school, Yekatit 12 Preparatory School, six departments (Amharic, English, Afan Oromo, Sociology, PSIR, and History) and faculty of law of the Addis Ababa University main campus.

There were three types of instruments to gather the relevant data. These were questionnaire, semi-structured interview and guided focus group discussion. There were separate interview prepared for the students, their ICT teachers, coordinators and educational experts. That is the data were collected using questionnaire, interview, and

focused group discussions. After the data was collected, it was reduced, coded and categorized. To analyze the data, qualitative and quantitative methods of analysis was used.

The finding of this result shows that, there was little awareness on vision impairment in the selected research sites for both two types of students with vision impairment categorized under blindness and low vision. There was also no awareness on ICT course giving for students with vision impairment in the selected research sites. There was no ICT course for students with vision impairment in the two preparatory schools. Among the six departments and one faculty of the Addis Ababa University in which students with vision impairment enrolled, there were five departments that did not have the ICT course. These were the department of Amharic, English, Afan Oromo, Political Science and International Relation, and History. In addition, the Sociology department was giving ICT course for all students including students with vision impairment in the regular classroom and ICT labs up to 2000 E.C.. After revising the curriculum for the department on end of 2000 E.C., the department agreed to stop giving reputation course like ICT course which was given on the preparatory level. Now, there was no ICT course in the department of sociology. Then, from first to third year students of this department did not get the ICT course. In contrast, the ICT course was given for all students in the Faculty of Law on the first year of second semester for all students they have. Fourth and fifth year students with vision impairment in this Faculty took this course with two credit hours in the Kennedy library computer room separately from the other sighted friend of them. The rest third, second and first year students with vision impairment register for the course, but did not take the course. The department has planned to give the course for these students separately for the future.

Regarding to the awareness of the hardware and software for ICT course, students with vision impairment were not aware of the hardware and software for the course. Similarly, the ICT teachers were little aware of hardware and software which assist students with vision impairment. Most of students with vision impairment and ICT teachers did not

know the JAWS (screen reading software), OPENBOOK (scanner reading software), KURZWEIL (scanner reading software), and WINDOWEYES (screen reading software). It was expected ICT skills from the teacher to teach the students on Microsoft Word, Microsoft excel, Microsoft access, Microsoft PowerPoint, and Internet. But, most of ICT teachers did not know what purpose these program have for students with vision impairment.

In general the awareness of students with vision impairment and ICT teachers in the research sites were not good on the ICT course.

About the attitude of students, ICT teachers and school principals/department heads; majority of students with vision impairment know that ICT course is useful for their academic study. This is why, these students have positive attitude on ICT course. But, most of these students with vision impairment did not know the reason why they miss the course. Students with vision impairment in the two preparatory schools were staying outside of ICT classroom. This created negative feeling on most of students with vision impairment. This exclusion of students with vision impairment from ICT class shows that the ICT teachers and the school principals have negative attitude for students with vision impairment. In addition those departments which did not give the ICT course also created negative feeling on their students.

Concerning to the practice of ICT course, majority of students with vision impairment from the two preparatory schools as well as six departments and one faculty of the AAU did not have any practice. This practice includes reading text using magnifier, scanner, and other means. The practice also includes reading the screen of computer using screen reading software. In addition, the practice includes writing and printing texts with computers and Braille printers. But, Most of the students as well ICT teachers did not have the practice of the mentioned programs. This lack of practicing technology makes students with vision impairment dependant on personal reader and writer. However, some students from both departments (law 14, Sociology 6) have practice on ICT course.

There was lack of supporting system on assistive technologies for writing on computer, reading text and reading screen of computer for students with vision impairment in the selected research sites. In addition to this, there were no Braille books, large print books, and audio books and other supporting system for these students.

On the subject of the accessibility options under accessory of the Microsoft Company program, most of ICT teachers did not know that there was support of the computer program for students with vision impairment on every computer. Similarly ICT teachers, school principals and other concerned persons did not give much attention to transcribe ICT course text book which prepared for grade 11 and 12 for the support of students.

On the other hand, the Ministry of Education did not adapt and transcribe the ink book into Braille, large print and audio for the use of students with vision impairment. Moreover this, the Ministry started to give this ICT education for grade 9 and 10 students. This grade 9 and 10 ICT text books were given for publisher to be prepared in ink out side of the country. Again here the Ministry of Education continued its experience not adapting, transcribe in Braille, large print and audio for the use of students with vision impairment. This shows that the Ministry of education (2006) which announced the inclusive theory, itself excluded the needs of students with vision impairment.

## **6.2. Conclusions**

1. Majority of students with vision impairment were getting information about school compound, classroom and ICT course from their friends.
2. There was no ICT course for students with vision impairment in the two preparatory schools. Among the six departments and one faculty of the Addis Ababa University in which students with vision impairment enrolled, there were five departments that did not have the ICT course. These were the department of Amharic, English, Afan Oromo, Political Science and international relation, and History. In addition, the sociology department gave ICT course for fourth year only. Students with vision impairment who were first to third year of this department did not get the ICT course.

In contrast, the ICT course was given for all students in the Faculty of Law. Fourth and fifth year students with vision impairment in this Faculty took this course with two credit hours. The rest third, second and first year students with vision impairment did not take the course.

3. Students with vision impairment have positive attitude on the ICT course and would like to take it. On the contrary, those schools as well departments which did not give the ICT course created negative feeling on their students with vision impairment. Specially, those ICT teachers from preparatory schools who sent out students with vision impairment from ICT classes have negative attitude.
4. Many of students with vision impairment from the two preparatory schools as well as six departments and one faculty of the AAU did not have any practice on ICT course. However, some students from both departments (law and Sociology ) have practice on ICT course.
5. There was no any support system given for ICT course for students with vision impairment according to their needs in the selected research sites.
6. There were no supporting teaching materials transcribed in to Braille, large print, audio and other means.
7. Students with vision impairment face challenges of not getting the ICT course transcribed ICT books, supporting system on the hardware, and software. In addition, students with vision impairment in AAU expected to take ICT course that they missed in their preparatory schools. But, no one give attention to give the course for them. Departments and concerned bodies on the ICT field did not have positive attitude on giving the course for these students. This creates negative feeling on most of students with vision impairment that they were not equal with the sighted students. They regretted not taking ICT course, because they feel that they were far from the

technology. Moreover, this lags them not to be user of technology and increased their dependency to use personal reader and writer for every educational support.

### **6.3. Recommendations**

Based on the above conclusions, the following recommendations were forwarded.

1. Students with vision impairment should get information about their school compound and classroom from their school principals and other special needs educators. Especially students with vision impairment should get information about their ICT classroom setting from ICT teachers.
2. ICT course should be given for students with vision impairment in preparatory schools fulfilling the necessary hardware, software and other accessibilities for the need of the students. On this point, the Ministry of Education must play great role in changing the curriculum and adapting educational materials for the need of students with vision impairment. Those departments of students with vision impairment should give much attention to give the ICT course for the students. Especially the faculty of Law should continue giving ICT course for the students with vision impairment.
3. The Ministry of Education should give much effort on changing the negative attitude of ICT teachers on their training to give emphasize on the accessibility programs which comes with Microsoft programs. The Ministry should give much emphasis on changing the attitude of ICT teachers, school principals, and other concerned professions on the ICT field.
4. In the school level, ICT teachers and school principals should facilitate the ICT classrooms for practice of students with vision impairment. ICT teacher also should prepare them selves for the practice of the course for students with vision impairment.

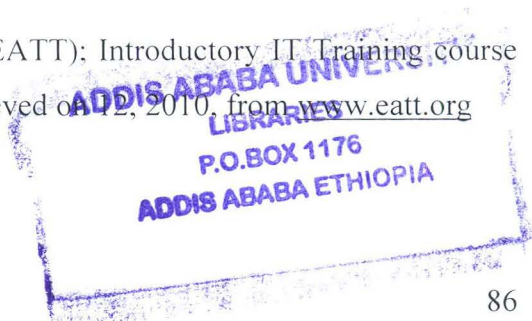
5. The Ministry of Education should allocate enough budgets for the support system of ICT course especially on hardware, software, and other accessibility devices of ICT course for the needs of students with vision impairment.
6. There should be equal access of the ink printed texts in schools adapted and transcribed in Braille, large print and audio. The terms and language of ICT books should also be adapted to the user of keyboard.
7. Schools and departments at the national level should sit for experience sharing on the challenges, problems and solutions on supporting students with vision impairment

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APPENDIXES  
APPENDIX A  
ADDIS ABABA UNIVERSITY  
COLLEGE OF EDUCATION  
DEPARTMENT OF SPECIAL NEEDS EDUCATION

Questionnaire for students with vision impairment

Dear Student:

I am a post graduate student at Addis Ababa University, department of special needs education. The purpose of the questionnaire is to gather data for the research in titled “challenges and opportunities of students with vision impairment using ICT”. Your cooperation in providing relevant information is highly important for the success of the study. Please be Franck and respond each item as accurate as you can.

Thank you in advance for your kind cooperation.

Notice: No need of writing your name. The data will be kept confidential.

PART ONE

General information

1. Name of the department/ preparatory school \_\_\_\_\_

2. Age

- 15 to 20
- 21 to 25
- 26 to 30
- 31 to 35
- 36 and above

3. Sex

F  M

4. Grade/ year \_\_\_\_\_

5. Onset of vision impairment

From birth

After grown up

6. Degree of your sight

No sight at all

Light perception only

Partial sight

If any other, please specify \_\_\_\_\_

7. When did you start learning in this department/ preparatory school? \_\_\_\_\_

## PART 2

Alternative answers are given. Put ✓ mark in the box to indicate your answer. It is possible to have more than one choice.

1. Where do you get information about school compound and classroom

From friend

From teachers

From school directors and principals

If any other, please specify \_\_\_\_\_

2. Are you attending the ICT course equally with the other full sighted students

Yes

No

3. If your answer for question number 2 is “no” what do you think the reason is/are?

- The ICT course should not be given for students with vision impairment
- The course needs additional software
- The course itself need eye sight
- The course needs additional devices
- If any other reason, please specify \_\_\_\_\_

4. Where do you attend the ICT course

- In the regular classroom
- In the laboratory of ICT classroom
- In other classroom
- There is no ICT class for students with vision impairment
- If any other, please specify \_\_\_\_\_

5. You get information about ICT lesson from

- Friend
- Teacher and lab assistant
- Yourself tactile
- If any other, please specify \_\_\_\_\_

6. Which of the following ICT instrument are you using

- Internet
- Scanner
- Audio
- If any other, please specify \_\_\_\_\_

7. Based on your answer from question number 6, what purpose do you use the above mentioned technologies

- For educational support
- For examination and study
- To get new information
- For other purpose

8. Which one do you think is an important devices to give the ICT course for the students with vision impairment

- Large print books
- Speaker
- Brailled books
- Computer
- Audio software which assist students with vision impairment
- Others

9. When ICT teacher or lab assistant gives explanation

- It is enough to catch their sound
- Sometimes it is not clear
- I cannot listen at all

10. While you are learning and using digital recorder/cassette recorder, the ICT teacher

- Gives encouragement to record
- Do not mind using the devices
- Not willing, but I am using the devices.
- Never gives encouragement to record.

11. If you want additional support on ICT lesson

- My classmates give support to me
- The ICT teacher/lab assistant assists me by giving their leisure time

- I never get additional support outside the classroom
- I never need support before
- If any other reason, please specify \_\_\_\_\_

12. Do you take examination in your ICT classrooms

- Yes
- No

13. If your answer for question number 12 is yes, how are you taking the examination

- Braille
- Large print
- Audio cassette
- Personal reader
- If any other, please specify

14. How are the ICT classrooms

- So silent
- Classroom with disturbing noise
- Little noise, not disturb the learning

15. How do you read ink printed text

- Using personal reader
- Using Scanner
- Using my eye sight
- If any other, please specify \_\_\_\_\_

16. If you use computer, how do you read the screen

- With personal reader
- Using screen reader software
- Using your eye sight \_\_\_\_\_
- Using other means

17. Where do you prefer to sit in the classroom

- The front sit

- The back sit
  - The middle sit
  - I do not mind to sit anywhere
18. For what purpose do you use the Microsoft word
- To write text
  - To edit text
  - To study lesson
  - To read text
  - If any other, please specify
19. For what purpose do you use the internet?
- To get educational material
  - To send and receive message
  - To get books and other materials
  - To read a text
  - If any other, please specify
20. How useful is the ICT education especially the basic skill of computer important for student with vision impairment?
- Useful
  - Less useful
  - Not useful at all

## APPENDIX B

ADDIS ABABA UNIVERSITY  
COLLEGE OF EDUCATION  
DEPARTMENT OF SPECIAL NEEDS EDUCATION

### Interview for students with vision impairment

Dear student:

I am a post graduate student at Addis Ababa University, the Department of Special Needs Education. The purpose of this questionnaire is to collect data for a research entitled “Challenges and Opportunities of Students with Vision Impairment in Using ICT”. Your cooperation in providing relevant and candid information is highly important for the success of the study.

Please be frank and respond to each item as accurate as you can.

Thank you in advance for your cooperation.

Notice: No need of mentioning your name during the interview. The data will be kept confidential.

1. Have you ever taken the ICT course before?
2. What benefit did you get from the course?
3. If you did not take the ICT course, what is the reason?
4. What benefit do you lose not attending the ICT course?
5. Is the ICT classroom well prepared in your preparatory school for the needs of students with vision impairment?

6. What type of teaching method do you get from your ICT teacher? Please mention if there is any kind of assistance for students with vision impairment.
7. What problems do you face when you are learning the ICT course?
8. How did you solve the problem?
  
9. If you are attending the ICT lesson, are you learning with the full sighted students together or in different special classroom?
10. What problems do you face learning the ICT course together with full sighted students?
11. What support do you get on learning the ICT course together with the full sighted students?
12. What problems do you face not learning the ICT course equally with full sighted students?
13. What support do you get not learning the ICT course equally with the full sighted students?
14. How did you take the ICT theoretical examination?
15. How did you take the ICT practical examination?
16. If you compare yourself with the full sighted students are you equally benefited on the ICT lesson? Please explain it briefly.
17. What is your suggestion for the continuity of ICT course for students with vision impairment for future?

## APPENDIX C

ADDIS ABABA UNIVERSITY

COLLEGE OF EDUCATION

DEPARTMENT OF SPECIAL NEEDS EDUCATION

### Interview question for teacher of ICT course

Dear teacher:

I am a post graduate student at Addis Ababa University, the department of special needs education. The purpose of this questionnaire is to collect data for a research entitled “Challenges and Opportunities of Students with Vision Impairment in using ICT”. Your cooperation in providing relevant and candid information is highly important for the success of the study.

Please be frank and respond to each item as accurate as you can.

Thank you in advance for your cooperation.

Notice: No need of mentioning your name during the interview. The data will be kept confidential.

1. What ICT instructional method do you use in teaching students with vision impairment?
2. What effort do you make to call the attention of students with vision impairment while you are teaching ICT course?
3. How do you explain new technology for students with vision impairment while you are using it in the classroom?
4. How do you explain abstract ICT terms for the students with vision impairment in the classroom?
5. How do you give notice while you are entering and living the classroom?

6. How do you communicate students with vision impairment in the classroom?
7. Do you guide students with vision impairment to get their preferable sit?
8. Do you allow using any recording devices for students with vision impairment to attend the lesson in the classroom?
9. Do you prepare examination for students with vision impairment according to their needs?
10. Can you please tell me if there is any problem never forgets you faced on the teaching and learning process while you are teaching students with vision impairment?
11. Attending the ICT course with the full sighted students, do the students with vision impairment benefit equally? Why?
12. Is the ICT course given in the same classroom for both students with vision impairment and full sighted students?
13. If students with vision impairment are not taking the ICT course, what effort personally are you taking to give the lesson for future?
14. What do you suggest to give ICT course for students with vision impairment for future?

APPENDIX D  
ADDIS ABABA UNIVERSITY  
COLLEGE OF EDUCATION  
DEPARTMENT OF SPECIAL NEEDS EDUCATION

Interview question for coordinator of ICT course

Dear coordinator:

I am a post graduate student at Addis Ababa University, the department of special needs education. The purpose of this questionnaire is to collect data for a research entitled “Challenges and Opportunities of Students with Vision Impairment in using ICT”. Your cooperation in providing relevant and candid information is highly important for the success of the study.

Please be frank and respond to each item as accurate as you can.

Thank you in advance for your cooperation.

Notice: No need of mentioning your name during the interview. The data will be kept confidential.

1. Do you have the ICT course in your preparatory school for students with impairment?
2. What challenges do you face on the teaching the ICT course for students with vision impairment?
3. What opportunities students with vision impairment get learning the ICT course?
4. Do you have any model students with vision impairment who uses the ICT technologies successfully?
5. How do you coordinate the ICT course for students with vision impairment?
6. What plan do you have to give the ICT course for future for students with vision impairment?

APPENDIX E

ADDIS ABABA UNIVERSITY  
COLLEGE OF EDUCATION  
DEPARTMENT OF SPECIAL NEEDS EDUCATION

Interview for school director

Dear director:

I am a post graduate student at Addis Ababa University, the department of special needs education. The purpose of this questionnaire is to collect data for a research entitled “Challenges and Opportunities of Students with Vision Impairment in using ICT”. Your cooperation in providing relevant and candid information is highly important for the success of the study.

Please be frank and respond to each item as accurate as you can.

Thank you in advance for your cooperation.

Notice: No need of mentioning your name during the interview. The data will be kept confidential.

1. Name of school \_\_\_\_\_
2. duty/ responsibility \_\_\_\_\_
3. How many ICT teachers do you have?
4. How many ICT classroom/ lab do you have?
5. How many students with vision impairment do you have?

Female \_\_\_\_\_

Males \_\_\_\_\_

6. Are these students with vision impairment getting the basic educational materials for their lesson?
7. What other services do you have for these students with vision impairment?
8. Is there ICT course in the school for the students with vision impairment?
9. Do you have ICT teachers with special training for students with vision impairment?
  10. Do you have ICT training for the teachers to update their skill on new technologies?
  11. While the full sighted students are attending the ICT course, what do students with vision impairment are doing at this moment?
  12. What effort do you think you should take to give the ICT course for students with vision impairment for future?
  13. What majors should be taken to give the ICT lesson for students with vision impairments?
  14. Have you ever discussed ICT and issues of students with vision impairment with the teachers, special needs educators and government officials?
  15. Do you have enough budgets to allocate for the facilities and training for students with vision impairment?
  16. How do you follow up and monitoring the budgetary system that to facilitate the ICT devices and special training for ICT teachers of students with vision impairment for the planned purpose?

## FOCUS GROUP DISCUSSION GUIDE

1. What is the ICT course?
2. What is the importance of the ICT course for students with visually impairment?
3. What benefit do you get learning the ICT course?
4. What benefit do you loose not attending the ICT course?
5. What do you think on the course of ICT which you are not taking equally with your class mate?
6. What effort did you take to learn the course?
  7. While the full sighted students are attending the ICT course, what are you doing at this moment?
8. Do you have any comment or suggestion for the continuity of ICT course for the students with vision impairment?

## Declaration

I, the undersigned declare that this thesis is my original work, as not been presented for a degree or any kind of study in any other university and that all sources of materials used for the thesis have been duly acknowledge.

Name: Alemayehu Agonafir

Signature: 

Date: \_\_\_\_\_

This thesis has been submitted for examination with my approval as a university advisor.

Name: Belay Hagos

Signature: 

Date: 14 June 2011

