ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

AN ASSESSMENT OF INFORMATION TECHNOLOGY IMPLEMENTATION IN SECONDARY SCHOOL CURRICULUM IN BALE ZONE

ABATE LEGESSE

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ABSTRACT

This study was mainly aimed to assess the implementation of Information Technology in secondary schools in Bale zone. Specifically, the study explores the availability of curricular materials in the schools, teachers' qualification and competency in implementing IT, schools equipment with the necessary IT infrastructure and the major factors that influence the implementation of IT in secondary schools curriculum in Bale zone.

To conduct the study, descriptive survey method was employed. The sample covered six secondary schools in Bale zone. Purposive sampling was employed in the selection of teachers. Stratified randomly selected students (n=1200) were involved in filling questionnaire to obtain first hand information. Interview was also made to four school principals. Relevant statistical tools such as percentage, rank order, ratio and mean values made data analysis.

Results show that inadequate financial support, inadequacy of in-service training, large class-size, inadequacy of time for practice, problems with the Internet access and poor supply of facilities were some of the major problems that hinder the implementation of IT in secondary schools curriculum in Bale zone. The qualifications of teachers at secondary schools level are inappropriately and inadequately trained in the area of implementing Information Technology.

The conclusion drawn from the study is that aspects of the new IT grade 11 and 12 curriculum are being implemented minimally and poorly due to teachers' lack of basic IT competence and other factors mentioned earlier. The implementation process in the past three years failed to maintain some fertile grounds like training teachers with IT basic competency skills and knowledge and supplying necessary materials sufficiently. Hence, it appears to be wise and timely to take appropriate measures to change the much-unchanged operational IT curriculum.

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ABBREVIATION

ICDR-Institute of Curriculum Development and Research

IT-Information Technology

ICT-Information and Communication Technology

K-R 20 –Kuder Richardson 20

MOE-Ministry of Education

TGE-Transitional Government of Ethiopia

CHAPTER ONE

1. INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Nowadays, thinking about the world without Information Technology is not possible for any society (Leon and Leon, 1999). The emergence of globalization and global economy necessitates the use of information technology in our daily lives. The silicon chips technology has revolutionized the way activities are performed and it also narrowed the world into a village. In other words, it brought the world into our homes, offices, schools, recreation centers etc via computer terminals.

Information technology has become something that we can't avoid using. It is now becoming the agent of change. There are rapid and considerable advancements in the area of information and communication technologies. This dynamism has its own strong influence on developing countries. As a matter of necessity, not as a matter of option, we need to use Information Technology to manage our daily activities. Use of Information Technology simplifies the way things are done in offices or organizations, facilitates communications between people and organizations in different and distant areas, and increases our recreation facilities. Hence, everyone needs to have the knowledge of applying information technology in his/her daily activities.

The educational system has a central function to perform in the introduction, development and use of new technologies. It has the responsibility through its schools to prepare the leaders of tomorrow for the challenges they will face in a society.

The need to produce a computer literate work force to meet the demands of the economy and society puts pressure on schools to ready young people who are familiar with the use of information technology (Kent and McNergney, 1998). Children are expected to be aware of the nature and uses of computers in order to be able to cope with the present and future technological society (O'shea and Self in Sarmin et al., 2003). This preparation of children, the future workforce, can be facilitated through education and presuppose the widespread introduction of Information Technology with in the educational field. In which, evidence points to the conclusion that the use of Information Technology in education can be significant to support the teaching of subjects (Mc Kinsey and Co. in Sarmin et al., 2003).

Thus, according to Tissue (1997:5), the common rational to incorporate Information Technology in education are

- Improved learning effectiveness.
- Greater access to information.
- Graduates need computer & information technology skills to be competitive in the job market.
- Increased productivity.
- Sharing of resources and courseware.

- Greater access to education via distance learning -enables new method to deliver education, including continuing education, to open new markets and consolidate educational institutions.
- External forces-competition for students, pressure from parents, students, and public funding sources.

In addition to these, it brings diversity to the teaching and learning process, integrated learning systems, which include mechanisms for tracking a child's progress, have been reported to be beneficial in raising basic numeric (Mc Kinsey & Co., 1997).

Furthermore, research and experience have shown that the educational benefits of technology in schools are wide-ranging and significant. According to SACCS (1997), the effective use of Information Technology in schools can:

- Provide students with immediate access to a richer sources of materials,
- Reduce the risk of failure,
- Present information in new, relevant ways which help students to understand, assimilate and use it more readily, and
- Enhance learning for students.

Information Technology also supports the education process indirectly, as it is used to administer schools; to provide easy access to information through use of the Internet, and to support teacher development (The Independent ICT in School Commission, 1997).

In the view of the situation in Ethiopia, it has been fitting to tough upon introducing Information Technology to the second cycle of secondary school education system. In doing so, students have equipped with an initial, basic understanding of the repercussions of Information Technology developments in addition to their general education. The more young people learn to discuss and Asses the advantages and disadvantages of new technological developments, the sooner they will be able to draw up plans of action for themselves. Eventually, they contribute to the economic development and social empowerment of the country.

This necessitates offering the subject Information Technology at grade 11 and 12 curricula since 2001.This is the first attempt in the history of Ethiopian education. And, the quality and standard of education in a given country is mainly determined by the essence of its curriculum and the process of its implementation (MOE, 1994:3).Hence, a study was not carried out so far in assessing the status of implementation and on the factors that influence the implementation of Information Technology in secondary schools in Bale zone.

1.2 STATEMENT OF THE PROBLEM

Introducing Information Technology in the school curriculum is one of the measures taken to minimize the information gap between developed and developing countries. The integration of Information Technology in the school curriculum of our country is a new perspective. This is the first attempt in the history of Ethiopian education.

Numbers of factors influence the application of Information Technologies in the Ethiopian schools. The major factors include lack of information, securing adequate funding and securing professional development (Yiftusira, 2003).

The purpose of this study is, therefore, to assess the implementation of Information Technology in secondary school curriculum in Bale zone focusing on the following specific objectives:

1. to investigate the availability of curricular materials.
2. to assess teachers' qualification and competency in implementing Information Technology.
3. to observe how secondary schools are equipped with the necessary educational infrastructure in order to implement Information Technology.

4.to assess the major factors that influences the implementation of Information Technology in secondary school curriculum in Bale zone.

5.to recommend appropriate strategies through which the implementation of Information Technology in secondary schools curriculum in Bale zone could be enhanced.

Accordingly, to attain the objectives stated above, the study ought to answer the following basic questions:

1. Are there curricular materials of Information Technology available in sufficient numbers?
2. Do teachers have the necessary qualification and competency to implement Information Technology in secondary schools?
3. Are secondary schools equipped with the necessary IT infrastructure in order to implement Information Technology?
4. What are the major factors inhibiting the implementation of Information Technology in secondary school curriculum in Bale zone?
5. What can be done to enhance the implementation of Information Technology in secondary school curriculum in Bale zone?

1.3 SIGNIFICANCE OF THE STUDY

The appropriate implementation of curriculum has crucial importance. It is true that Information Technology plays a key role in the socio-economic development of a country.

Hence, this study appears to be useful in assessing the major problems of implementing Information Technology in secondary school curriculum in Bale zone.

This study is, therefore, significant for the following reasons:

1. It provides valuable information to Curriculum experts and implementers about the major factors that hinder the implementation of Information Technology in secondary school curriculum in Bale zone.
2. It helps all pertinent bodies to design a viable strategy, which in turn can promote the implementation of Information Technology in secondary schools.
3. To the best knowledge of the writer, a thorough study was not carried so far in those high schools of the zone that could alleviate prevalent problems of implementation of Information Technology and hence will help as a springboard for further studies on similar issues in contributing additional information and document base.

1.4 DELIMITATION OF THE STUDY

The wide spread educational implementation Problems dictate to limit the scope of the study to a manageable size. Accordingly, the scope of the study is delimited to focus in investigating the availability of curricular materials and Information Technology infrastructure, teachers' qualification and competencies to teach Information Technology, and the major factors inhibiting the implementation of Information Technology in secondary school curriculum in Bale zone.

All secondary schools in which Information Technology have been given as a subject were selected for the study in the zone. Thus, the findings of this assessment were only being generalized to secondary schools of Bale zone.

1.5 LIMITATIONS OF THE STUDY

Among the various problems encountered, the following were found to be the major ones.

1. In such survey study, it is not usually possible to get representative data on the teaching learning process. Information on the implementation of Information Technology requires repeated assessment on the process of implementation for many times. But this assessment was more of a one shot process,
2. Shortage of local relevant materials with respect to the topic under study,
3. Lack of seriousness of some respondents in filling the questionnaire, and
4. The other limitation arises from the need to measure actual classroom practice of teachers and students. Teachers and students expected to manifest Information Technology basic competencies.

Despite the constraints, the study was plainly managed and completed.

1.6 DEFINITION OF KEY TERMS

Assessment- is the process of collecting, interpreting, and synthesizing information in order to:

. make decisions about students

. judge instructional effectiveness

. inform educational policy

(Gage & Berliner, 1998:509)

Implementation-refers to the actual use of the planned curriculum into practice.

Information Technology – refers to the course given as a subject Information Technology for grade 11 and 12.

Secondary School – refers to grade levels 11 to 12 (Preparatory classes).

CHAPTER – TWO

2. REVIEW OF RELATED LITERATURE

2.1 IMPLEMENTATION OF SCHOOL CURRICULIM

Curriculum Implementation is one of the main aspects of curriculum development–the process of which continues even after the plans are tried out. The definitions given by various scholars show this process and are also similar.

Fullan (1991) defined implementation as the actual use of an innovation in practice. Similarly, Dalton (1988:14) defined implementation as "the actual use of curriculum or what it consists of in practice." The important features of these definitions- the actual use of curriculum in practice – is shared by many scholars like Marsh (1992), Evans (1993), Pratt (1980) and Berman & Mc Laughlin (1976). All imply that by subjecting the plans to the concrete toward the process of implementation gives curriculum life.

Despite its complex nature, the emphasis given to implementation had been minimal until 1970s (Fullan, 1991; Hall & Loucks 1975). Program developers were concerned more on writing plans which teachers are expected to implement, the assumption was good and interesting plans would produce a similar kind of outcome in the hands of teachers. Nevertheless, as Ornstein and Hunkins (1988) put it, when educators realize that many new programs "do nothing more than just on shelves," educator's concerns started to emerge

with what happens next to the best written educational plans. Paradoxically, what was neglected and underestimated by policy makers in the educational scene as a stage of curriculum development found to be a complex and cumbersome task.

Seemingly, many educators understand the cruciality and complexity of implementation. Dervegt and Knip (1990:191) noted that "implementation is a complex, concrete, and fragmented nuts-and –bolts affair involving a series of discrete activities through out the school. It is close to the bone as the change looks like."

Similarly, Pratt (1980:435) stated "the voyage from first identification of student need to eventual learner achievement is often stormy, but better curriculum sink without trace on the school of implementation." According to these scholars, the "change with out change" or "intention becoming façade syndrome" or "innovation re-innovation" is phased which indicate the centrality of implementation and the evolving nature of plans while being implemented.

From these remarks, we can easily see that implementation as compared to other curriculum aspects is a complex process as it confronts real classroom situations. It is concrete because, as noted by Dervegt and Knip (1990:191), it involves teacher, students, administrator and other concerned bodies in direct contact with the innovative concept. It relates to bolts and nuts because it demands "not only to get the innovation in place but also to get the innovation components in tune".

Because of its complexity, successful implementation involves a great deal of material and manpower cost (Hord, 1995). Its demands are many like the factor which interwoven affect the successful implementation (Verspoor, 1993; Walter, 1981; Hall, 1995). In relation to this, Hall (1995; 104) stated, "Implementation is an equally costly phase of the change process. It requires parallel policies and procedures to those that are addressed routinely for development". Besides, Leslie Bishop in Ornstein and Hunkins (1988) mentioned that implementation requires reorganizing and adjusting personal habits, ways of behaving program emphases, and existing curricula and schedules. As such, it seems that with a change in curriculum, the frameworks necessary to put it into practice need also to be altered. Hence, it would be of great help to have a look at these procedures; structures and adjustment include so as to clearly visualizing the process of implementation.

Change derived by Information Technology is having a significant impact on each life and is increasing critical issue for education.

Economic, social and educational pressures have led to increasing importance being placed on technology education (Medway, 1989). The importance of technology in the school curriculum of every secondary student had been strongly advocated (Vohra, 1987).

In their review of technology education in schools, Allsop and Woolnough (1990) explain that technology has developed along four different lines, each with its own traditions and character. One approach is that dominated by craft teachers, a second is an

approach focusing on hi- tech advances such as computers and electronics, a third approach presents technology as an engineering course at the secondary level, while a fourth views technology as a subset of science.

2.2. CURRICULUM OF TECHNOLOGY EDUCATION FROM DIFFERENT THEORETICAL PERSPECTIVES

Technology has increasing impacts on society and applications in education (Ferre, 1991). Technology education is slowly gaining recognized place in the school curriculum that reflect the importance of these imputes.

Curriculum theory provides one way to guide educational change (Herschback, 1992). Although curriculum development is an inexact process because many of the decisions are largely value judgments, there are, nevertheless, ways to go about it, which produce consistent resorts. According to Herschback (1992), there are five basic curriculum design patterns of technology education. Each is supported by an underlying rationale, and each produces a curriculum design with distinct characteristics. These perspectives include:

a. academic rationalist (separate subjects)
b. Intellectual processes.
c. Personal relevance.
d. Social reconstruction.
e. Technical / utilitarian (competencies)

Each design pattern is supported by a rational that guides the selection and ordering of content.

A. Academic Rationalist

Academic rationalism conceptualizes curriculum as distinct subjects or disciplines. This perspective is the most widely used curriculum design pattern and it originates from the liberal arts of the classical curriculum (Herschback, 1989).

Academic rationalism is described by Hirst and Peters (1974) as follows.

> Academic rationalism, among the several curriculum orientations, is the one with the longest history. This orientation emphasizes the schools responsibility to enable the young to share the intellectual fruits of those who have gone on before, including not only the concepts, generalizations, and methods of the academic disciplines but also those works of art that have with stood the test of time for those who embrace this curriculum orientation, becoming educated means becoming initiated into the modes of thought these disciplines represent or becoming informed about the content of those disciplines (pp. 198-199).

Thus the major purpose under girding academic rationalism is to transmit the knowledge and aesthetics of one generation to the next. This is accomplished through education, which is organized within recognized academic disciplines.

Academic disciplines organize subjects around conceptions of knowledge. Mc Neil (1981) suggests, "The irreducible element of curriculum is knowledge" and that the "nucleus of knowledge and the chief content or subject matter of instruction are found in academic subjects that are primarily intellectual." (p. 53).

Given the theoretical perspective of organizing subjects around conceptions of knowledge, the academic rationalist perspective of technology education will emanate from a characterization of technology as knowledge, which provides the boundaries or framework for a discipline (Erekson, 1992).

Several technology educators have endorsed the academic rationalist perspective of technology as a discipline. Shermis in Devore (1964) presents five points as follows:
An intellectuel discipline:

1. has a recognizable and significant tradition, an identifiable history.
2. has an organized body of knowledge which has structure with unity among the parts. The knowledge has:
    a. been objectively determined by verifiable and agreed upon methods.
    b. stood the test of time there by evidencing durability

c. been found to be cumulative in nature, and

d. deals in concepts and ideas from a theoretical base

3. is related to man's activities and aspirations and becomes essential to man by addressing itself to the solution of problems of paramount significance to man and his society.
4. identifies as a part of its tradition and history a considerable achievements in both eminent men and their ideas, and
5. relates to the future man by providing the stimulation and inspiration for man to further his ideas and to reach his goals.

Thus, the curriculum rational from the academic rationalist perspective is to develop a structured organizing pattern that transmits knowledge and involves students in the creation of new knowledge. This rationale is embraced by technology educators who organize curriculum such that students are immersed in doing technology, or in learning through performing like technologists.

According to Erekson (1992), there are two major issues that need to be resolved in order for technology education to be congruent with the tenets of academic rationalism. First, the academic rationalist conceptualization of technology education requires that the curriculum be organized into distinct, separate subjects. Technology is dynamic, diverse, and inherently interdisciplinary.

The second issue to be resolved concerns the identification of the scholars of technology. Academic rationalism is founded on the premise of recognized disciplines that organize curriculum around the conception of knowledge.

These disciplines and conceptions of knowledge are identified and developed over time by a body of scholars.

According to McNeil (1981), if technology education desires equal status in curriculum with the classical subjects, technology educators will need to embrace academic rationalism and advocate the perceptive of technology as a new intellectual discipline.

B. Intellectual processes

Through well-developed curricula, technology education programs are able to reinforce academic content, enhance higher order thinking skills, and promote active involvement with technology (Johnson, 1991).

Curricula developed through each curriculum perspective vary in their contribution toward a well – rounded education. There is little doubt that the development of intellectual processes is critical in this age of advancing technology. Tremendous changes have occurred and will continue to occur in the workplace. Increased levels of skills are required to maintain the complex equipment.

There has been a switch from concrete (hands-on) tasks to abstract (minds-on) tasks, which require mental skills such as symbolic and abstract thinking (Grubb, 1984).

Because contemporary curriculum needs to emphasize understanding rather than rote memorization and heighten higher-level cognitive skills in addition to physical and basic skills, curriculum development is more complex than it has been in the past (Johnson, 1992). Part of the difficulty in developing curriculum that emphasizes intellectual processes is the fact that these processes occur only in the mind and are there for not directly observable to the curriculum developer. In addition, good thinkers and problem solvers do not know how they think and solve problems because intellectual processes are not directly observable; teachers often neglect these processes in their instruction.

Intellectual processes are those mental operations, which enable one to acquire new knowledge, apply that knowledge in both familiar and unique situations, and control the mental processing that is required for knowledge acquisition and use (Johnson, 1991).

A curriculum, which focuses on the development of intellectual processes, cannot be developed in isolation. Attempting to teach thinking skills without something to think about is like teaching computer- aided design principles without access to a computer; the theories and procedure can be tasked about, but the necessary skills can never be fully developed (Johnson, 1992).

Early attempts to create instructional programs to develop intellectual processes were unsuccessful because they focused solely on the thinking skills essential for problem solving and neglected the importance of domain knowledge (Newell & Simon, 1972). Recent cognitive research clearly establishes the link between content knowledge and intellectual processes.

A variety of existing instructional models are appropriate for an intellectual processes curriculum. Possibly, the most promising model of instruction for enhancing student intellectual process is called cognitive apprenticeship (Collins, Brown & Newman, 1989).

According to Thomas, et al. (1989), there are five general principles that emanate from the cognitive research, which emphasizes the development of intellectual processes. These are;

1. Help students organize their knowledge.
2. Build on what students already know.
3. Facilitate information processing.
4. Facilitate "Deep Thinking".
5. Make thinking processes explicit.

For an intellectual processes curriculum to be effective, the instructor must view teaching as a cooperative learning venture between student and instructor. The instructor's role is not to transmit information to the student; rather the instructor should serve as a facilitator for learning.

Evaluating student attainment of the desired intellectual processes is the weakest compensate of this curricular approach. Evaluation for this type of curriculum must focus on the acquisition of complex intellectual skills (Johnson, 1992).

C. Personal Relevance

The experience – based nature of technology education suggests a certain affinity with personal relevance. Practice and theory within the profession has influenced and had been influenced by personal relevance designs and their inherent humanistic theories (Petrina, 1992).

Advocates of personal relevance curriculum designs maintain that education should and does play an integral role in a student's life and has a major influence on student's self-concept, psyche, outlook on life, and worldview. Education, within this context, mean holistic growth toward personal and human goals and an integration of the cognitive, creative, aesthetic, moral, and vocational dimensions of being human. The development of people who can transcend contemporary constraints is central to this design (Eisner, 1979; Klein, 1986; Kolesnik, 1975; Maslow, 1968; McNeil, 1981).

Students are free or are active in helping define their own curricula based on their personal problems, developmental levels, goals, interests, curiosities, capabilities, and needs. The following concepts are considered essential to the composition of a personal relevance curriculum design (McNeil, 1981):

1. Participation. There is consent, power sharing, negotiation, and joint responsibility by co participants. It is essentially non authoritarian and not unilateral.
2. Integration. There is interaction, interpenetration, and integration of thinking, feeling, and action.
3. Relevance. The subject matter is related to the basic needs and lives of the participants and is significant to them both emotionally and intellectually.
4. Self. The self is a legitimate object of learning.
5. Goal. The social goal or purpose is to develop the whole person within a human society. (p.9).

These curricular concepts guide the development of learning experiences and their character is dependent on teacher-student-community interaction, deliberation, and discourse.

In personal relevance, curriculum designs, according to Petrina (1972), as a body of established truths is not a source for the initiation of learning experiences. Humanists generally subscribe to a Deweyan instrumental view of disciplinary content.

Disciplinary content has an instrumental function as a means of illuminating a student's life world.

Because of their holistic and integrating nature and potential for unifying students with the learning environment, units are often used to provide organizational structure. Units within personal relevant designs are more attuned to the progressive interpretation than their more popular subject – centered readings.

D. Social Reconstruction

Citing that many members of society were far too concerned with individual needs, the fervent nationalism of the times inhibited international cooperation, and that the economic depression was signaling problems with the existing society and economic structure (Dewey and Childs, 1933). Mainstream progressives believed that the school could be structured in a new way, and encourage students as future citizens to reconstruct society.

Interestingly, the progressives based their interpretation of social reconstruction in experimentalism, and faith in science and technology are fundamental to the philosophy of pragmatism. Bode in Zuga (1992:19) explains social reconstruction as a "continuous reconstruction of experience" in daily school practice.

Technology educators have relied upon technical processes as a means of generating curriculum content. Teaching about technical processes is essential in a "hands on" program. A social reconstruction curriculum orientation would be "hands on" (Zuga, 1992:6). It is the way in which the technical processes are organized that distinguishes the curriculum orientation.

In order to implement a social reconstruction curriculum orientation in technology education, social problems, which have particular relevance to technology, are chosen and become the means for organizing technical processes (Zuga, 1972:7). Technical processes are taught only as the need to know them in order to solve the social problems arises.

2.3 FACTORS AFFECTING CURRICULUM IMPLEMENTATION

The idea of implementation and of the factors affecting actual use seems simple enough, but the concept has proven to be exceeding elusive.

According to Fullan (1991:66-67) effective approaches to managing change call for.

> Combing and balancing factors that do not apparently teachers-simultaneous simplicity-complexity,looseness-tightness, strong leadership-participation (or simultaneous bottom up–top downess), of identity-adaptively, and evaluation. More than anything else, effective strategies way of thinking that cannot be captured in any list of steps or phases to be followed.

Curriculum creators, administrators, teachers, and supervisors must be clear about the purpose or intent, the nature, and the real & potential benefits of the innovation (Ornstein & Hunkins, 1998:292).

Fullan and Pomfret in Ornstein & Hunkins (1998:293) provide us with some sobering comments:

> Effective implementation of innovations require time, personal interaction & contacts, in-service training. And other forms of people- based support. Research has shown time and again that there is no substitute for the primacy of personal contact among implementers, and planners / consultants,

if the difficult process of unlearning old roles and learning new ones is to occur.

Implementation takes time for at this stage in curricular activity we are attempting to win over people to influence their attitudes sufficiently so that people will alter their ways.

Certainly, we do need to pay teachers and other professionals for their extra effort. However, Kouzesa and Posner as cited by Ornstein & Hunkins (1998:293) note that educational leaders have cause for concern if their staff justifies its involvement in a new program. Involvement in curriculum change and implementation solely for financial reasons only contributes minimum effort to the venture. To be institutionalized, an innovation must elicit internal innovation. Too much reliance on external incentives actually constrains people. Individuals contribute their best talents when they accept the new program. When they drive a good feeling from being involved, and when they view their contributions as adding to the quality of students' education.

What ever one's orientation to the curriculum, there is no denying that implementation requires planning, and planning focuses on three factors: People, programs, and processes (Ornstein& Hunkins, 1998:293). These three factors are inseparable.

Educators often require in-service training or staff development and time to feel comfortable with new programs. In-service programs that work have resulted from collaborative effort and have addressed the needs of those who are to be affected by the new curricula. Effective in-service training had the necessary flexibility to respond to the changing needs of the staff. Open discussions allow implementers to voice their objectives or concerns and consequently reduce opposition.

Any attempt at change requires people playing key roles. These players may be students, teachers, administrators, consulates, university professors, parents, lay citizens, and political officials interested in education. Often, such people can play different roles at different times in the change process depending on their skills. Other persons are formally educated to assume particular roles as consultants, researchers, or systems experts.

Involving students in the change effort is not suggesting that teachers and students working on change should take time off from the curriculum of the school. The act of being engaged in considering the "what" of their education and "how" they will experience it can be very much a part of the student's actual curriculum. Regardless of which philosophical view one has of education, there is no doubting that teachers influence student's learning. And better teachers foster better learners. Many educators realize that, of all the people with in the educational organization, teachers often are the most knowledgeable about the

practice of teaching; teachers often represent the best clinical expertise available (Ornstein & Hunkins, 1998:313).

Of course, not all teachers are going to become actively involved in reform or change. The key to getting teachers committed to an innovation is involvement. Good curriculum development is a cooperative venture.

Wilson's Research pointed to a number of conditions that contributed to the school's success in implementing educational technologies including a supportive principal, a full time technology coordinator, abundant technology, and extensive teacher training (Wilson, 1994). Also, Ely (1999) formulated the following conditions that facilitate the implementation of educational innovations.

- Expertise- access to the knowledge and skills required by user.
- Resources- things needed to make it work- funding, hardware, software, tech support, infrastructure, etc.
- Time- allocation of time to make-work.
- Commitment- firm and visible evidence of continuing endorsement and support.
- Leadership- competent and supportive leads of project and larger organization.

A number of factors hinder the application of information technologies in the Ethiopian schools. The major factors include lack of information, securing adequate funding and securing professional development (Yiftusira, 2003)

2.4 EMERGING INFLUENCES OF INFORMATION TECHNOLOGY ON SCHOOL CURRICULUM

Driven by advances in information technology, economic evolution is the largest lead from yesterday's workplace to tomorrows in the last two centuries since the down of the industrial revolution (Thurow, 1999). In response, all forms of societal institutions are altering slowly, but radically even schools. Since one of education's goals is prepare students for work and citizenship, schools are attempting to change policies, practices, and curriculum to meet.

Information technologies as sophisticated computers and telecommunications have unique capabilities for enhancing learning. These include:

- Centering the curriculum on "authentic" problems parallel to those adults face in real world settings (CTGV, 1997).
- Involving students in virtual communities if practice using advanced tools similar to those in today's high – tech work places (Linn, 1997).
- Facilitating guided, reflective inquiry through extended prospects that inculcate sophisticated concepts and skills (Schank and et al., 1994)
- Utilizing modeling and visualization as powerful means of bridging between experience and abstraction (Gordin & Pea, 1995).
- Enhancing student's collaborative construction of meaning via different perspectives on shared experiences (Chan, Burtis and Bereiter, 1997).

- Including pupils as partners in developing learning experiences and generating knowledge (Scardamalia and Bereiter, 1991).
- Fostering success for all students through special measures to aid the disabled and the disenfranchised (Behrmann, 1998).

However, realizing these capabilities requires a complex implementation process that includes sustained, large-scale, simultaneous innovations in curriculum; pedagogy; assessment; professional development; administration; organizational structures; strategies for equity; and partnerships for learning among schools, businesses, homes, and community settings (Dede, 1998).

The ERO (2000) report concludes that the use of Information Technology in schools had to improve the delivery of education and improve student achievement across the curriculum. And, this would only occur if the following conditionsexisted:

- careful and systematic planning
- direct access by students to Information Technology equipment, and
- the provision of teacher training that is coordinated with the purchase of equipment.

2.5 OBJECTIVES OF INTRODUCING INFORMATION TECHNOLOGY INTO THE ETHIOPIAN SECONDARY SCHOOLS

Information Technology is revolutionizing the way in which we live, and work. It is changing all aspects of our life style (Leon and Leon, 1999).

Information technology in the school curriculum is one of the measures taken to minimize the information gap between developed and developing countries.

According to Tissue (1997:5), the common rational to incorporate Information Technology in education:

- Improved learning effectiveness.
- Greater access to information.
- Graduates need computer & information technology skills to be competitive in the job market.
- Increased productivity.
- Sharing of resources and courseware.
- Greater access to education via distance learning eg. , Enables new method to deliver education, including continuing education, to open new markets and consolidate educational institutions.
- External forces-competition for students, pressure from parents, students, and public funding sources

The integration of Information Technology in the school curriculum in Ethiopia is a new perspective.

The new education and training policy document has objectives or expectations expressed in broad terms the realization of technological developments in education, which implies the making of education as a supportive tool for developing traditional technology, and for utilizing modern technology. In this context, promising initiatives are underway by national implementing bodies in the capacity towards practical applications of new technologies in the educational environments.

This necessitates offering the subjects information technology at the second cycle of secondary school curriculum. The initial objectives of introducing information technology in to the Ethiopian secondary education include (Yiftrusira, 2003):

- To help students to develop basic awareness of computers.
- To cultivate a sense of co- operative and life long learning.
- To gain insight in the systematic implementation of Information Technology developments in the Ethiopian school system at a national level.
- To create a forum where those with common concepts is using Information Technology in schools on a national scale can collaborate in developing & implementing new plans of action.

Also as stated by MOE on ICDR (2001) the objective of introducing Information Technology in the Ethiopian high school curriculum is;

- to acquaint students with the new technologies
- to make students capable of applying information technology in their day-to- day lives.
- To give highlights for those who want to continue their studies in the fields of computer and information science.

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1 RESEARCH METHODOLOGY

Descriptive survey was employed to explore the problems. This approach enabled the researcher to identify the prevailing implementation constraints that need to be alleviated so as to enhance implementation of Information Technology in Bale zone. Thus, in describing the existing deterring implementing factors of Information Technology in secondary school curriculum in Bale zone, the descriptive survey research method was found to be relevant and convenient.

3.2 DATA SOURCES

Primary sources of data were gathered from teachers and students through questionnaire. These sources helped the investigator to acquire first hand information and draw valid inferences. Moreover, data from school principals were collected through interview.

Secondary sources of data were gathered through documentary analysis. For these resources were the synthesized information from primary sources of data, they were found to be appropriate for the study.

3.3 SAMPLE POPULATION AND SAMPLING TECHNIQUES

3.3.1 SAMPLE POPULATION

Since the findings of this assessment was generalized to secondary schools of Bale zone, the source of data needed to be representative of the zonal high schools. The basis for the analysis was students and teachers, and hence, the sampling technique was emphasized on data that are collected at school level. Therefore, all the six secondary schools in which Information Technology is given as a subject was covered by this study.

Regarding student respondents, 1200 were taken from 2724, which accounted for 44.1 per cent of the total students. As to teachers' respondents, all available teachers who have taught Information Technology in grade 11 and 12 were taken for this study. Moreover, four school principals were interviewed. On the basis of this, therefore, it could be said that the sample size apparently represents the total population in secondary schools of Bale zone.

3.3.2 SAMPLING TECHNIQUES

All available high schools that have second cycle secondary schools were included in the study. These were Batu Terara, Robe, Agarfa, Dodola, Gindhir, and Jara.

Concerning the respondents, for the teachers and schools principal purposive sampling was employed. Regarding the students, 29.2% from grade 11 and 70.8% from grade 12, stratified random sampling was employed with the assumption that it could help to avoid bias.

3.4 PROCEDURES OF DATA COLLECTION AND INSTRUMENTS

3.4.1 PROCEDURES OF DATA COLLECTION

In collecting data for the study, three steps were adopted. First, relevant literature was collected so as to get adequate information. Second, basic questions were formulated and this helped to indicate the direction of the study. Third, data gathering tools were developed. Before fully using the tools, a pilot test was conducted.

3.4.2 INSTRUMENTS

Two main instruments of data collection, namely: questionnaire and interview were employed. Besides, documentary analysis was made.

The questionnaire was used for students and teachers. In both students and teachers questionnaire the Information Technology Basic Competencies Practice Survey was adapted from North Carolina Technology Competencies for Educators and from Bendigo senior secondary college's ICT & school improvement in accordance with the objectives of grade 11 and 12 Information Technology syllabuses (Johnson and Barker, 2002:123; Ekinsmyth & Nicolson, 2000).

Before fully using the questionnaire, a pilot test was conducted. The reliability of the piloted Teachers' questionnaire, for the Lickert-type, according to Cronbach alpha is 0.81 and for the remaining Yes/No items, according to K-R 20, is 0.94. And, the reliability of the student's questionnaire, for the Lickert-type, according to Cronbach alpha, is 0.79 as well as for the remaining Yes/No items, according to K-R 20, is 0.96.Thus, the results of analysis shows that the questionnaires are reliable and valid.

Interview was made to school principals. On top of these, curricular documents and sources pertinent to the topic under review were consulted.

3.5 METHODS OF DATA ANALYSIS

To analyze the data gathered and tabulated on the study, the following statistical techniques were employed. One was percentage and it was used to explain the personal characteristics of the respondents. The other was average mean and this had to do with identifying factors affecting implementation of Information Technology. The grand mean was employed to see where the aggregate mean of all the groups lies. Rank order and ratio were also employed to analyze the data used in the study

CHAPTER FOUR

4. PRESENTATION, ANALYSIS OF DATA AND DISCUSSION OF RESULTS

4.1 PRESENTATION & ANALYSIS OF DATA

4 .1.1 CHARACTERISTICS OF THE RESPONDENTS

In this study, different categories of respondents-teachers, students and administrative personnel were involved. The respondents are direct stakeholders and, as a result, they were considered to be relevant and main source of dependable information for the study.

One thousand two hundred and twenty seven copies of questionnaire were distributed to the respondents. Of these, one thousand and two hundreds of the copies of the questionnaire were administered to students and twenty-seven were distributed among teachers at zonal secondary schools.

Out of these, 1116 (90.95%) copies of the questionnaire were returned. Of the retuned copies 1089(90.75%) were from students and 27 copies were from teachers. As a result, the responses were found to be sufficient to draw inferences for the study.

The results from the Teacher's Questionnaire & document analysis to the teachers' characteristics in secondary schools of Bale Zone are presented below.

Table 1: Teachers By Sex, Age and service year

		No.	%	Remarks
Sex	Male	26	96.3	
	Female	1	3.7	
Age in years	20-30	11	40.7	
	31-40	15	55.6	
	41-50	1	3.7	
	51and above	-	-	
Service years	1-5	11	40.7	
	6-10	6	22.2	
	11-15	8	29.6	
	16-20	1	3.7	
	21and above	1	3.7	

As cited in the introductory part of this chapter, a total of 27 teachers were involved in the study. Out of these, 6 (22.2%) of the teachers were from Batu Terara while 10 (37%) of them were from Robe and Dodola. As well as 8 (29.6%) were from Agarfa and Gindhir and 3(11.1%) were form Jara secondary school.

As to their sex, 26(96.3%) of teachers were male while the remaining 1(3.7%) of them was female. This reveals that the participation of female teachers in education sector in the high schools of the zone under study were less.

With respect to service years, 11(40.7%) and 6(22.2%) of teachers were between 1-5 and 6-10 respectively. Those who had 11-15 and 16-20 years of service account for 8(29.6%) and 1(3.7%) respectively. The remaining 1(3.7%) was 24 years service. Low years of services show that teachers lack adequate practice about the teaching methodology in the area under study.

The results from the Student's Questionnaire analysis to the characteristics of students' taken as sample of the study are presented below.

Table 2: Students by their Sex, Age, Grade and School

		Batu Terara		Robe		Agarfa		Dodola		Gindhir		Jara		Total		Rem.
		No	%	No	%	No	%	No	%	No	%	No	%	No	%	
Sex	Male	120	10	132	11	70	5.8	110	9.2	130	10.8	38	3.2	600	50	
	Female	120	10	132	11	70	5.8	110	9.2	130	10.8	38	3.2	600	50	
	Total	240	20	274	22	140	11.6	220	18.4	260	21.6	76	6.4	1200	100	
Age	15-18	40	3.3	82	6.8	53	4.4	68	5.7	49	4.1	16	1.3	308	25.7	
	19-21	162	13.5	137	11.4	79	6.6	116	9.7	151	12.6	39	3.3	684	57	
	22& above	17	1.4	26	2.2	2	0.2	17	1.4	31	2.6	4	0.3	97	8.1	
	NR*	21	1.8	19	1.6	6	0.5	19	1.6	29	2.4	17	1.4	111	9.3	
	Total	240	20	264	22	140	11.7	220	18.4	260	21.7	76	6.3	1200	100	
Grade	11	60	5	64	5.3	30	2.5	60	5	60	5	76	6.3	350	29.2	
	12	180	15	200	16.7	110	9.2	160	13.3	200	16.7	-	-	850	70.8	
	Total	240	20	264	22	140	11.7	220	18.3	260	21.7	76	6.3	1200	100	

Note: NR* - students not returned the questionnaire

As indicated in table 2, a total of 1200 students were involved in the study. Out of these numbers, 600 (50%) were males and 600 (50%) were females; the data reveal the existence of no discrepancy between male and female students in numbers from the sample population.

As far as the students' age was concerned, 684 (57%) were found in the age category of 19-21. It was followed by the age category of 15-18 with 308 (25.7%) of students. The remaining 97 (8.1%) of them were categorized in the age group of 22 and above. The data showed that almost all of the respondents were found in the appropriate school age.

The results from the teachers' questionnaire analysis about Teachers' in-service training and participation in syllabus development of Information Technology are presented in table 3 below.

Table 3: Teachers' in-service training, participation in syllabus development of Information Technology for grade 11and 12

No.	Items	No.	%	Rem.
1	Have you participated in workshops, seminars or in any form of training related to the implementation of information technology			
	Yes	6	22.2	
	No	21	77.8	
2	How long was it?			
	Below 7 days			
	8-15 days			
	16-21 days			
	22-30 days			
	31-60 days			
	61-90 days	6	22.2	
	More than 90 days			
3	Have you taken part while Information Technology syllabus was developed			
	Yes			
	No	27	100	
4	How useful is the teacher's guide and textbook to you?			
	Very useful	9	33.3	
	Useful	18	66.7	
	Some what useful			
	Not useful			

Table 3 indicated that, 6 (22.2%) of the teacher received in-service training related to the implementation of Information Technology. The rest, 21(77.8%), teachers did not get in-service training. The duration of the training, which the teachers received, is three months. None of the teachers took part in the development of the syllabus and even in commenting on the final draft.

As to the usefulness of teacher's guide and students' textbook in promoting the teaching learning process, the majority of teachers 18 (66.7%) regard them as useful and 9 (33.3%) teachers regard them as very useful.

It appears that 21 (77.8%) of the teachers did not get in-service training, which is an important precondition to be fulfilled before teachers are expected to put a new curriculum into practice. Teachers seem convinced about the usefulness of teacher's guide and textbook in promoting the teaching learning process.

This much suffices as background information for the further analysis to be made. Following the main findings of the study are presented.

4.1.2 AVAILABILITY OF INFORMATION TECHNOLOGY CURRICULAR MATERIALS

The results from the document analysis to the availability of Information Technology curricular materials in secondary schools of Bale zone are presented below.

Table 4: Availability of Information Technology Curricular materials in Secondary Schools of Bale zone.

No	School Name	No. of syllabus	Ratio of syllabus /teachers	No. of teacher's guide	Ratio of Teachers guide/teachers	No. of G_{11} students text books	Ratio of G_{11} students text book/ G_{11}studnets	No. of G_{12} students text books	Ratio of G_{12} students text books / G_{12} students	Total No. of students text books	Total ratio of students textbooks /students
1	Batu Terara	4	1:1.5	3	1:2.0	92	1:2.3	62	1:4.6	154	1:3.2
2	Robe	2	1:2.5	2	1:2.5	132	1:2.7	66	1:4.2	198	1:3.2
3	Agarfa	2	1:2.0	2	1:2.0	42	1:1.2	30	1:4.5	72	1:2.6
4	Gindhir	1	1:4.0	4	1:1.0	93	1:2.0	72	1:3.5	165	1:2.7
5	Dodola	4	1:1.3	2	1:2.5	162	1:3.0	136	1:5.3	298	1:3.0
6	Jara	1	1:3.0	1	1:3.0	87	1:1.4	-	-	87	1:1.4
	Total	14	1:1.9	13	1:2.1	608	1:2.3	366	1:3.6	974	1:2.8

Note : G_{11} – grade 11 in 1996 E.C.
G_{12} - grade 12 in 1996 E.C.

The data displayed in table 4 showed that the numbers of students' textbook vary from grade 11 to grade 12. Thus, the general trend shows, there is unequal distribution of Information Technology students' text books among the schools. Moreover, the data in table 4 make valid the existence of teacher's guide and syllabuses in limited numbers.

4.1.3 TEACHERS' QUALIFICATION AND COMPETENCIES TO TEACH INFORMATION TECHNOLOGY

The results from Teachers Questionnaire and the document analysis of teachers qualification and competencies are presented below.

Table 5: Teachers by Qualification, work load per week in periods and major fields of studies

		No.	%	Remarks
Qualification	12+certificate	1	3.7	
	12+1	1	3.7	
	Diploma	6	22.2	
	Bachelor Degree	19	70.4	
Workload per Week in periods	1-5	-	-	
	6-10	-	-	
	11-15	1	3.7	
	16-20	21	77. 8	
	21-25	4	14.8	
	26-30	1	3.7	
	31 and above	-	-	
Major field of Studies	Computer maintenance and Automation	1	3.7	
	Introductory computer science	1	3.7	
	Library science	2	7.4	
	Mathematics	13	48.2	
	Statistics	1	3.7	
	Physics	4	14.8	
	Chemistry	4	14.8	
	Electricity	1	3.7	

As table 5 showed, the qualification of teachers, 19 (70.4%) and 6 (22.2 %), were Bachelors and Diploma holders respectively. Those who had 12+1 and 12+ certificate were two.

Regarding the major field of studies, only 2 teachers are graduated with computer maintenance and automation and introductory computer science. From these, one is diploma holder and the other is certificate. The remaining teachers are graduated by majoring mathematics [13(48.2%)], physics [4(14.8%)], library science [2(7.4%)], statistics and electricity. Thus, the qualifications of teachers at secondary schools level are inappropriately and inadequately trained in the area of implementing Information Technology.

The results from the Teacher's Questionnaire analysis to the teacher's Information Technology basic competencies are presented below.

Table 6: Teacher's Information Technology Basic Competencies

	Activities	V. Compt. (5)		Compt. (4)		S.W.Compt. (3)		Not a.Compt. (2)		Unsure (1)	
		No.	%	No.	%	No.	%	No.	%	No.	%
A	Basic Computer operating skills	27	100								
B	Set up computer systems	9	33.3	15	55.6	3	11.1				
C	Word processing	26	96.3	1	3.7						
D	Spread sheet	3	11.1	8	29.6	12	44.4	4	14.8		
E	Database			1	3.7	26	96.3				
F	Networking			9	33.3	12	44.4	6	22.2		
G	Telecommunications							27	100		
H	Media communications					4	14.8	22	81.5		
I	Multi-Media Integration					2	7.4	25	92.6		

Note:

V.Compt. =Very Competent

Compt. =Competent

S.W.Compt. =Somewhat Competent

Not a. Compt. =Not at all Competent

The assessment of teachers' technology skills seems at first glance to be straight forward, at least in comparison to assessing other abilities teachers must have in classroom management, content, and in structural design. However, when we try to assess a particular teacher in a particular situation, the issues suddenly become more complicated.

The major issue is the actual technique for "getting at" the skills we want to assess. The most common type of instrument used in U.S Department of Education technology programs is the self-report survey (Johnson and Barker, 2002:128).

Thus, the key findings from the survey of the basic competencies of Information Technology, as table 6 shows, is that all teachers were competent in basic computers operating skills and word processing. And, they have the least competency on basic skills of telecommunications, media communications, multimedia integration, networking and developing database.

The results from the survey of Student's Questionnaire analysis to the student's basic Information Technology competencies are presented below.

Table 7: Students' Information Technology Basic Competencies

	Activities	V.Compt. (5)		Compt. (4)		S.W.Compt. (3)		Not a. Compt. (2)		Unsure (1)		Omitted
		No.	%	No.	%	No.	%	No.	%	No	%	
A	Basic computer operating skills			528	48.5	349	32.1	212	19.5			
B	Set up computer systems					8	0.7	1062	97.5	19	1.8	
C	Word processing	44	4	396	36.4	464	42.6	162	14.9			23
D	Spreadsheet							1072	98.4	17	1.6	
E	Database							1089	100			
F	Net working					3	0.3	1042	95.7	36	3.3	8

Note:

V.Compt. =Very Competent

Compt. =Competent

S.W.Compt. =Somewhat Competent

Not a. Compt. =Not at all Competent

Similarly, table 7 shows the response of students on Information Technology basic competencies practice survey. As can be seen from the table, basic operating skills and word processing were rated high with 80.5% and 83% respectively with competent and somewhat competent of these skills. Where as, almost all students were not competent at all on basic skills of database, spreadsheet, set up computer systems, and networking competencies.

4.1.4 AVAILABILITY OF INFORMATION TECHNOLOGY INFRASTRUCTURE

Key findings from the survey of relevance to the availability of Information Technology infrastructure are highlighted below

Table 8: Availability of Information Technology infrastructure

No	School Name	No. of computers	Ratio of computers per students	Electricity utility		Telephone facilities		Internet access		No. of printer	VSAT Satellite
				Yes	No	Yes	No	Yes	No		
1	Batu Terara	8	1:62	✓		✓			✓	2	-
2	Robe	16	1:39	✓		✓			✓	1	UC*
3	Agarfa	9	1:21	✓			✓		✓	1	UC*
4	Gindhir	12	1:37		✓	✓			✓	1	UC*
5	Dodola	12	1:72	✓		✓			✓	2	UC*
6	Jara	10	1:12		✓		✓		✓	-	-
	Total	67	1:41							7	

Note:

UC*- Under Construction

As indicated in table 8, all available computers were found in the computer center of each school. Dodola and Batu Terara have the highest scarcity of computers in which their ratio of computer per students was 1:72 and 1:62 respectively. Also, the response of teachers showed the severe problem of poor supply of facilities such as computers.

Out of the six high schools under study, Jara high school has no electric utility service for Information Technology equipment while Gindhir has a generator serving from 3:00 PM to 10:00 PM only. Except the above two high schools, the remaining four high schools have electricity utility service for their Information Technology equipment.

With regard to telephone facilities, except Agarfa and Jara high schools, the remaining four high schools have telephone service in their schools. But, all schools had no access to the Internet service at the time the investigator collects the data. All the remaining Information Technology equipment like: telex, telegraph, videotext, and fax machine and server computer were not available in all school under the study.

As to the available applications software, except Jara high school, all the remaining high schools reported the existence of Microsoft word 2000, 98, 95, Microsoft excel 2000, 98, Microsoft access 2000, Microsoft power point 2000, Microsoft publisher 2000 in their schools in limited numbers.

Thus, the appropriate Information Technology tools were in limited supply. Access by all students and teachers were limited. Therefore, most of the schools seem to be ill-equipped with the necessary infrastructure.

4.1.5 FACTORS AFFECTING THE IMPLEMENTATION OF INFORMATION TECHNOLOGY

A number of factors hinder to the implementation of Information Technology in Ethiopian schools. The major factors include lack of information, securing adequate funding and securing professional development (Yiftusira, 2003). Other, among the major implementation factors that affect the implementation of Information Technology include shortage of textbooks and reference books, problems with internet access, poor supply of facilities, inadequacy of periods to cover the contents, large class-size, deficient knowledge base for Information Technology, inadequate technical support by the teachers, inadequacy of time for practice, difficult of roles and activities incorporated in textbook, inadequate financial support for Information Technology, inadequacy of in-service training and lack of support from school personnel.

As a result, to arrive at the major factors that affect the implementation of Information Technology for the study under review, opinions and responses were gathered from different groups of respondents.

Table 9: Factors Affecting the Implementation of Information Technology (the result from the analysis of Students' Questionnaire)

No	Variables	Very severely (5)	Severe (4)	Moderate (3)	Slightly (2)	Not at all (1)	Average Mean	Rank
1	Shortage of textbooks and reference books	72	148	379	337	153	2.68	10
2	Problems with internet access	821	142	125	-	-	4.64	2
3	Poor supply of facilities such as computers	724	306	28	31	-	4.58	3
4	Inadequacy of periods to cover the contents	523	443	47	67	9	4.3	6
5	Large numbers of students in a class	675	216	193	5	-	4.43	4
6	Deficient knowledge base for Information Technology	714	169	157	49	-	4.42	5
7	Inadequate technical support by a teachers	326	547	15	183	18	3.90	7
8	Inadequacy of time for practice	794	259	36	-	-	4.70	1
9	Difficulty of roles and activities in corporate in text book	54	101	812	83	39	3.04	9
10	Inadequate financial support for Information Technology	352	282	231	198	26	3.68	8
		Grand mean = 4.04						

Table 9 shows the responses of students on the factors that affecting the implementation of Information Technology as the determinants of implementation process in secondary schools in Bale Zone. As can be seen from the table, inadequacy of time for practice was rated high with the average mean score 4.70. On top of this, during the interview conducted with school directors, they raised that the shortage of time for practice hampers the implementation of Information Technology to a great extent for the students.

Moreover, problems with the Internet access and poor supply of facilities such as computers and its equipment were rated high with average mean of 4.64 and 4.58 respectively. In line with this, during observation, in all of the schools, there were no Internet access and in many of schools, there were no sufficient numbers of facilities such as computers and its equipment. Also, the respondents rated variables such as large class-size, deficient knowledge base for Information Technology and inadequacy of periods to cover the contents as severe problems.

Table 10: Factors affecting the implementation of Information Technology (the result from the analysis of Teachers' Questionnaire)

No	Variables	Very severely (5)	Severe (4)	Moderate (3)	Slightly (2)	Not at all (1)	Average Mean	Rank
1	Poor supply of materials such as textbooks teachers guide and syllabus	-	-	10	16	1	2.33	14
2	Unclear syllabus objective and teaching activities	-	2	14	5	6	2.44	13
3	Students poor background knowledge	-	27	-	-	-	4.00	9
4	Inadequacy of periods to cover syllabus objectives and contents	18	3	4	2	-	4.37	7
5	Absence or inadequacy of in-service training	24	2	1	-	-	4.85	2
6	Difficulty of roles and activities incorporated in text book	20	2	1	4	-	4.41	6
7	Large numbers of students in a class	23	3	1	-	-	4.81	3
8	Poor supply of facilities such as computers	13	8	6	-	-	4.26	8
9	Inadequate Technical support by school directors on how to implement the subject matter	4	15	8	-	-	3.85	10
10	Inadequate Technical support by school supervisors on how to implement the subject matter	2	10	10	5	-	3.33	12
11	Inadequacy of time for practice	21	4	2	-	-	4.70	4
12	Inadequate financial support for Information Technology	25	2	-	-	-	4.93	1
13	Inadequate methodological training of Information Technology	22	3	1	1	-	4.70	4
14	Deficient knowledge base for Information Technology	5	13	6	3	-	3.74	11
		Grand mean = 3.99						

As indicated in table 10, the majority of the respondents asserted in their responses that inadequate financial support for Information Technology, inadequacy of in-service training and large class-size are major barriers to implementation of Information Technology. Accordingly, from the stated fourteen variables, the average mean of these stated items are 4.93, 4.85, 4.81 respectively. It can be inferred that inadequate financial support, inadequacy of in-service training, large number of students in a class, inadequacy of time for practice and inadequate methodological training of Information Technology influenced severely the implementation of Information Technology in secondary school curriculum in Bale Zone.

With regard to variables number 1 and 2,the majority of the respondents with the average mean of 2.33 and 2.44 respectively agreed that poor supply of materials such as textbooks, teacher's guide, syllabus and unclear syllabus objectives and teaching activities were variables affecting implementation of Information Technology slightly in the zone. Moreover, during the data gathering time, it was observed that the ratio of textbooks given to students was 1 to 3. And all schools have student's textbooks, syllabuses, and teachers' guide in limited numbers in the schools under study.

Difficulty of roles and activities incorporated in textbook, inadequacy of periods to cover syllabus objectives and contents, poor supply of facilities such as computers, and students' poor

background knowledge were reported by most teachers as having severe influence on the implementation of Information Technology. Also, the respondents regarded lack of support from school personnel's as well as supervisors and deficient knowledge base for Information Technology as severe hindering factors.

Generally, it appears that though the degree varies all of the factors tend to affect the implementation of Information Technology in secondary school curriculum in Bale zone.

4.1.6. THE MAJOR PROBLEMS FACED IN IMPLEMENTING INFORMATION TECHNOLOGY

Some of the major problems faced in implementing Information Technology as observed by teachers were indicated as follows.

- Computers were insufficient in numbers.
- Scarce (or almost null) budget was allocated to implement Information Technology
- Lack of technical support by school personnel.
- Lack of in-service training of teachers.
- Insufficient training.
- Insufficient time for practice.
- Large class- size.
- Insufficient infrastructure.
- Students' poor background knowledge about Information Technology.

School principals have also indicated the following major problems faced in implementing IT.

- Scarce (or almost null) budget was allocated to implement Information Technology
- Credentialed teachers were not available to teach Information Technology in all secondary schools in the zone.
- Computers were insufficient in numbers.
- Insufficient infrastructure.

4.1.7. RECOMMENDED SOLUTIONS

For the above problems faced in implementing Information Technology, the teachers and school principals recommended the following solutions.

- The government should allocate sufficient amount of budget for the implementation of Information Technology as well as it would be supplied enough infrastructure of Information Technology.
- In-service Training should be given for Information Technology teachers.
- Information Technology technician should be hired by the government.
- Teachers should take training on maintenance of IT infrastructure.
- Information Technology would be included as a subject or integrated to the curriculum of lower grades.

4.2. DISCUSISION OF THE RESULTS

The focus of this study was to assess the availability of Information Technology curricular materials, teachers' qualification and competence in implementing IT, how secondary schools are equipped with the necessary educational infrastructure and the major factors that hamper the implementation of Information Technology in secondary school curriculum in Bale zone.

Research and experience have shown that the educational benefits to technology in schools are wide-ranging and significant (SACCS, 1997:2). The effective use of Information Technology in schools can:

- reduce the risk of failure
- provides students with immediate access to a richer source of materials.
- encourage teachers to take a fresh look at how they teach and ways in which students can learn.

With this in mind, the findings present in table 4 to 8 indicated the existence or absence of favourabl teaching-learning environment in the schools for the implementation of Information Technology, ranging from the facilities of the schools to the service provided by the schools' administration. The student's textbook, teacher's guide and syllabus of Information Technology exist in all secondary Schools in Bale zone. But, it is not fully provided to all students .

It is important that the implementation requires teachers to have knowledge and skills needed to put the roles and activities into practice. This means the important factor related to teachers is the knowledge they have. In relation to this, McCormick et al. (1995) mentioned that teachers would teach best in areas, which they are knowledgeable, have effective materials and techniques. Walter (1981), Posner (1992), Bennett and Carre (1995) also claimed that teachers' knowledge and understanding of the subject matter is a major factor that affect implementation. As indicated by this study, most of the teachers needed an in-service support, feeling not competent with their existing knowledge and skills. The data also appears to support this teachers' need. Because most teachers 92.6% were not qualified in majoring to teach Information Technology and 77.8% of the teachers have not taken training related to the implementation of Information Technology. Moreover, except basic computer operating skills and word processing, most teachers were not competent on basic skills of telecommunications, media communications, multimedia integration, networking and developing database as reported by them. Similarly, on the side of students', most of them were not competent in basic skills of database, spreadsheet, set up computer systems and networking.

This is very unfortunate given the wide agreement and strong place prior training of teachers with new skills and knowledge before large-scale implementation (Fullan, 1991; Johnson, 1994).Because, schools cannot move with the changes without improving the skills and abilities of the individual professional educators within them (SACCS, 1997:13).

Successful professional development programs are those that approach changes in a gradual and incremental fashion. That is, the primary goal of professional development has always been to improve the performance of the organization, the staff and, ultimately, the students. On top of this, professional development is recognized now more than ever before as the primary vehicle for dealing with the on-going changes in education as a result of technological advances and information revolution in the world.

The success of curriculum implementation is often restricted by lack of facilities, equipment and teaching resources in the school. Verspoor (1982:1) generalized that the unfavorable economic environment and the resulting scarcity of resources jeopardized the ability of developing countries to provide quality education.

The lack of readily available, timely, pertinent training is not the only barrier to be overcome by teachers. The main challenge for a school is to create an infrastructure from which an Information Technology learning environment can be launched and developed, only once this is achieved can many benefits be realized (Ward, 1999). Technology infrastructure includes all the elements that support the integrated use of technology: the computers themselves, the wires that connect them, the demonstrative rules and regulation that apply to the acquiring and use of computers, the fiscal resources, and the professional development that is needed to use computers (Weikart & Marrapodi, 1999).

Thus, from the Information Technology resources computers are one of the equipments in which, Computes become part of the infrastructure in this aspect and seen as an integral tool just like a pencil.

Research suggests a ratio of one computer to every five students is required for effective use. And, ideally, they should also be linked to a school wide network to allow resource sharing, easy access by students and teachers (SACCS, 1997: 7). But, the result of this study shows that the numbers of computers in all secondary schools in the zone were found to be scarce in that their average ratio is one computer to every forty one students. And, all computers found in the schools were not networked in both local area network and wide area network. The appropriate Information Technology tools were in limited supply in secondary schools in Bale zone. Thus, most of the schools seem to be ill equipped with the necessary infrastructure. The schools, which have put the infrastructure and personnel in place for Information Technology, are in the best position to in-service their own staff (SACCS, 1997:13).

Numbers of factors contribute to the application of Information Technology in secondary school curriculum in Bale zone. Variables like inadequacy of time for practice, problems with the internet access, poor supply of facilities were the high rated hampering factors of Information Technology implementation in secondary schools in the zone. Also, large class- size, deficient knowledge base, and inadequacy of periods to cover the contents hampered

the implementation of the curriculum as reported by students. On the other side, teachers reported that inadequate financial support, large class size, inadequacy of time for practice and inadequate methodological training of Information Technology hampered very severely the implementation of Information Technology in secondary school curriculum in Bale zone.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

The purpose of this study was to assess the implementation of Information Technology in secondary school curriculum in Bale zone.

To this end, the following questions were formulated.

1. Are there curricular materials of Information Technology available in sufficient numbers?
2. Do teachers have the necessary qualification and competency to implement Information Technology curriculum?
3. Are the secondary schools equipped with the necessary IT infrastructure in order to implement Information Technology?
4. What are the major factors inhibiting the implementation of Information Technology in secondary schools curriculum in Bale zone?
5. What can be done to enhance the implementation of Information Technology in secondary schools curriculum in Bale zone?

Questionnaire, interview and document analysis were used to collect data from one thousand and two hundreds students, twenty-seven teachers and four school principals. The collected data was analyzed through percentage, rank order, ratio and mean values.

The findings showed that,

1. The three curricular materials: students' textbook, teacher's guide and syllabi existed in all schools in limited numbers.
2. The qualifications of teachers at secondary schools level are inappropriately and inadequately trained in the area of implementing Information Technology. Because, all teachers were not qualified in majoring Information Technology to teach IT in secondary schools.
3. All teachers were competent on basic computer operating skills and word processing
4. Most teachers were not competent on basic skills of telecommunications, media communication, and multimedia integration, networking and data base development.
5. Two high schools, Gindhir and Jara, have no electric power supply for their Information Technology equipment devices.
6. All high schools have no access to the Internet service but all of them, except Agarfa and Jara, have digital telephone service for their administrative service.
7. Most schools have application software's such as Microsoft word, Microsoft excel, Microsoft access, and Microsoft power point publisher in limited numbers.

8. Inadequate financial support, inadequacy of in-service training, large class-size, inadequacy of time for practice, problems with the internet access and poor supply of facilities were some of the major factors that hinder the implementation of Information Technology in secondary school curriculum in Bale zone.
9. Allocating sufficient budget for implementation of Information Technology, facilitating in-service training for teachers, introducing Information Technology in lower grades have been suggested as solutions by Information Technology teachers and school principals.

5.2. CONCLUSIONS

On the basis of these findings, the following conclusions are made.

1. There exists curricular material of Information Technology in all secondary schools of Bale zone. But the numbers seem insufficient.
2. Non-professional teachers were used to teach Information Technology subjects because trained teachers of Information Technology were not available in secondary schools in Bale zone
3. Most of the secondary schools seem to be ill- equipped with the necessary infrastructure of Information Technology in Bale zone
4. Many factors impede the implementation of Information Technology. The major ones are inadequate financial support, inadequacy of in-services training, large class size, inadequacy of time for practice, problems with the Internet access and poor supply of facilities. Some of these factors are interrelated; hence it is their combined effect, which would seriously deter the implementation of Information Technology.
5. Generally, Information Technology syllabi of grade 11 and 12 are being implemented minimally and poorly in secondary schools in Bale zone due to lack of some fertile grounds like training of teachers & supplying the necessary infrastructure sufficiently.

5.3. RECOMMENDATIONS

Based on the findings of the study and the conclusions drawn, the following recommendations were forwarded so as to promote the implementation of Information Technology in secondary schools curriculum in the schools under study.

1. Oromia Education Bureau in collaboration with Ministry of Education should strive to supply curricular materials of Information Technology in sufficient quantities to the schools.
2. A lack of training is commonly cited as major obstacles hindering teachers for successful implementation of Information Technology. Because the qualifications of teachers at secondary schools level are inappropriately and inadequately trained in the area of implementing IT. This benchmark should be captured by giving in-service training for teachers to acquaint with the knowledge and skills of teaching IT. Thus, teachers' professional developments are seen as the area for development and concentration. Therefore, teachers are particularly anxious to receive training as to how computers can be implemented in to the teaching process (Collins, Hammond and Wellington, 1997). It is possible, by considering different training models, to overcome this issue. For instance, teachers may be trained through distance learning, or in special training centers, or in the schools where they teach. While the first method may be more cost efficient, the latter method may be more effective, as teachers have the opportunity to learn and improve the delivery of their teaching in the schools where they teach.

3. The country's institutions of higher education have to be strengthened to fill the gap between the current supply and demand for skilled teachers by providing graduates with the required skill in the area of IT.
4. Those schools that have not electric power should buy generators for their Information Technology equipments service.
5. An important factor for the success of equipping schools with computers and other infrastructure are attracting community support. Parents should be incorporated into the decision making process. This will encourage them to feel responsible for the infrastructure need. In addition, the government should initiate Non-government institutions to enrich Information Technology infrastructure to secondary schools. On top of this, the government should allocate resources and facilities in line with the schools' goals and priorities.
6. Finally, the researcher would like to recommend that other studies be made on the implementation of IT using qualitative methods to observe what actually is going in classroom, through process perspective. Besides, problems that are detected and identified in implementing Information Technology in secondary schools in Bale zone need to be researched to have clear image of implementation in our country.

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Appendix – A

Addis Ababa University

Department of Curriculum and Instruction

Graduate Studies Program

Teacher's Questionnaire

The aim of this study is to assess the implementation of Information Technology in grades 11 and 12. Be confident that the information gathered will be used only for the **research** purpose. Hence, you are kindly requested to provide the necessary information, which is very helpful to the quality of the research as well as to bring practical solutions to the problems.

You are not expected to write your name on the questionnaire

Thank You Very Much!

Part –I

DIRECTION: PLEASE MARK WITH A TICK (✓) YOUR RESPONSES ON THE SPACE PROVIDED. AND FILL THE APPROPRIATE RESPONSE IF THE QUESTION REQUIRES WRITTEN RESPONSE.

Background Information

1. Sex ----------
2. Age ----------
3. Qualification ----------
4. Field of Study: Major---------- Minor----------
5. Years of service ----------
6. The subject /s you taught ----------
7. The grade/s you taught ----------
8. Work load per week in periods ----------

9. Currently I use computer approximately --------- hours per week in the classroom.

10. At the beginning of this school year, I used the computer approximately ------- hours per week in the classroom.

11. If you do use computers, what type of training have you received? (rank order all that apply)

---------- No training.

----------Basic computer literacy (on/off operations, how to run programs)

-------- Computer applications (word processing, MS DOS, etc)

---------computer integration (how to use in the classroom curriculum)

12. Where did you receive your training? (Rank all that apply)

--------- Self taught.

-------- College/University.

-------- Other. Please specify_____

13. Have you participate in workshops, seminars or in any form of training related to the Information Technology implementation?

Yes _____

No. _____

14. If your answer for number 13 is yes, how long was it?

Below 7 days _____

8-15 days_____

16-21 days_____

22-30 days _____

31-60 days _____

61-90 days _____

More than 90 days _____

15. If your answer for number 13 yes, how many times have you participated?

one _____

two _____

three _____

16. Have you taken part while the Information Technology syllabus was developed?

Yes _____

No _____

17. If your answer for number 16 is yes, in what way do you take part?

In setting objectives and contents while it was being drafted _____

In commenting on the syllabus, before it was put in to practice _____

In commenting on the syllabus, after it was put in to practice _____

If any other, _____ _____ _____

18. To what extent are your comments and suggestions, if any, incorporated in the designed syllabus ?

    a. completely _____
    b. mostly _____
    c. to a certain extent _____
    d. not at all _____

19. Do you have the teacher's guide and textbook of grade 11 and 12? (In which you are teaching now.)

Yes _____

No _____

20 How useful are the teacher's guide and textbook to you in promoting the teaching learning process as intended?

    a. very useful _____
    b. useful _____
    c. some what useful _____
    d. not useful _____

21. To what extent are you committed to implement the roles and activities identified in the teacher's guide and text book?

    a. very committed _____
    b. Committed _____
    c. some what committed _____
    d. not committed _____

Part II. Availability of IT Infrastructure

DIRECTION: PLEASE MARK A TICK (√) YOUR RESPONSES ON THE SPACE PROVIDED. AND FILL THE APPROPRIATE RESPONSE IF THE QUESTION REQUIRED WRITTEN RESPONSE.

1. Do you have electric utility service for your Information Technology equipment?
   ---------- Yes
   ---------- No
2. Which of the following Information Technology equipment (service) does your school have?

No.	IT Equipment	Yes	No	Quantity (If answer is yes)
A	Telephone			
B	Telex			
C	Telegraph			
D	Video Text			
E	Tele Text			
F	Fax machine			
G	Desktop computers			
H	Printer			
I	Server computer			
J	Network			
K	Internet/e-mail			
L	Internet/World Wide Web			
M	VSAT Satellite terminal			
Others Specify				

3. Have many Defective computers does your school have?----------

4. Have many Defective printers does your school have? ----------

5Which of the following application Soft wares does your school have?

No.	Software Name	Type of Soft ware	How many users
A	MS-DOS		
B	MS-EXCEL		
C	MS-ACCESS		
D	MS-POWER POINT		
E	MS-PUBLISHER		
	Others (Specify if any)		

Part III

Direction: The following are lists of possible factors that influence the extent of the implementation of Information Technology. Indicate the extent they hamper the teaching learning process of Information Technology with a tick (√)

Equivalence of explanations or the rating scale

5. Very severely
4. Severe
3. Moderate
2. Slightly
1. Not at all

No	Factor	5	4	3	2	1
1.	Shortage of curriculum materials such as text book, teacher's guide, syllabus, and reference books					
2.	Unclear syllabus objectives and teaching activities					
3.	Students poor background knowledge					
4	Inadequacy of periods to cover syllabus objectives and contents					
5.	Absence or inadequacy of in-service training					
6.	Difficulty of role and activities incorporated in text book					
7.	Large number of students in a class					
8.	Poor supply of facilities such as computers					
9.	Lack of support from school directors on how to implement the subject matter					
10.	Lack of support from supervisors on how to implement the subject matter					
11.	Inadequacy of time for practice					
12.	Inadequate financial support for Information Technology					
13.	Inadequate methodological training of Information Technology					
14.	Deficient knowledge base for Information Technology					

Part IV. **Information Technology Basic Competencies Practice Survey**

Direction: Please mark a tick (√) your responses on the space provided. And fill the appropriate response if the question required written response .

1. How competent are you in using a computer to do each of the following?

Activities	Very Competent	Competent	Some what competent	Not at all competent	Unsure
A. **Basic Computers Operating Skills** . start up and shut down computer system & peripherals . Install/reinstall & update system software and printer drivers.					
B. **Set Up Computer Systems** .set up Computer System and connect peripheral devices					
C. **Word Processing** .Write a paper .enter & edit text .copy & move a block of text					
D. **Spreadsheet** .enter data in existing MS-EXEL .insert MS-EXEL into word processing document					
E. **Data Base** .sort a database by specific fields .insert MS-ACCESS into word processing document					

F.**Net Working** .use a file server (connect/logon, retrieve a program or document ,save a document to a specific location .select/de-select a network zone . Search for information on the World Wide Webs .Send and receive e-mail .join in an on-line forum or chat room					
G.**Telecommunications** .connect to the internet or on-line service .use effectively distance learning, desktop video conferencing and tele teaching technologies.					
H. **Media Communications** .produce print-based products (eg. news letters, brochures, posters, etc.) .produce a video					
I. **Multi Media Integration** .use a linear multimedia presentation .input and digitize sound from microphone and audiocassette player/recorder.					

2. How important is each of the following computers –related skills for your teaching?

Computer – related skills	Very important	Important	Some what important	Not at all important	Unsure
Basic computer operation skills					
Set up computer system					
Word Processing (MS-Word) .eg. Write a paper					
Spreadsheet (MS-Excel) Eg. Draw picture or diagram.					
Use a Database (MS-Access)					
Develop a Database					
Search for information on the World Wide Webs					
Send and receive e-mail					
Present information (eg- Use power point)					

3. During the past school year, how often did your students on average do the following for the work you assigned ?

Activities	Daily	Several times each week	Several times each month	A few times	Never
Open or shut down computer					
Install/re-install & system software and printer					
Set up computer system					
Use the internet					
Enter and edit text					
Send or receive e-mail					
Use a word processing program					
Copy and move a block of text					
Use a graphics program					
Join in an on-line forum or chat room					
Use a presentation program (eg. power point)					
Develop a database					
Other computer uses (specify)					

4. How many of the following activities have you ever done?

Activities	Yes	No
Set up computer system		
Made changes to a computer's hardware		
Updated an application program (eg word processor)		
Recovered a damaged file		
Write papers		
Draw pictures		
Created a web site		
Developed a database		

5. Indicate the areas where you feel you need assistance when teaching Information Technology. Indicate by ticking the appropriate column. Tick one column only on each line.

Areas of assistance	Very high need	High Need	Low needed	Not needed	Unsure
Gaining relevant Information Technology Knowledge					
Increased competence, software application					
Increased competence when working with network administration					
Planning suitable learning experiences					
Other (Specify if any)					

Direction:

Please mark with a tick (√) your responses Yes /No on the space provided for the following questions .

No	Question	Response	
		Yes	No
6.	Does the syllabus clearly explain how formative and summative assessment should be undertaken?		
7	Do you have enough physical resources in your school to implement Information Technology?		
8	Have you ever made an effort to collect information different from other teachers on how to improve the way you teach the subject matter?		
9	Have you planned to gather resources and information while being prepared to teach Information Technology?		
10	Have you planned to organize and mange resources, activities and events required in the daily teaching and learning process of Information Technolgy?		
11	Have you analyzed the implementation of Information Technology, its characteristics and consequences on students?		

12 Do you believe teachers at your school are well prepared to teach this subject?

Yes ----------

No----------

Unsure ----------

What is the reason for your response? ----------

---

13. Have you taken any action to gain information about Information Technology implementation other than the teacher's guide and text book?

Yes ----------

No----------

If yes, what do you do?

---

14. Have you improved the way you teach Information Technology from time to time?

Yes ----------

No----------

If yes, in what ways have you improved?

---

15. Have you analyzed detailed requirements and available resources needed to use the text book of Information Technology ?

Yes ----------

No----------

If yes, what are the available resources of implementing Information Technology, which is not present in your school?

---

16. Have you examined the problems you face in terms of time, resource and from students while implementing the subject matter ?

Yes ----------

No----------

If yes, mention some of them

17.Is the balance between the practical and theoretical tasks what you expected?

----------Yes.

---------- No.

Give reasons for your answer.----------

18.List the major problems have you observe in implementing Information Technology. ----------

---

---

19. What should be done to alleviate the major problems you face while implementing the subject matter ?

Appendix- B

Addis Ababa University

Department of Curriculum and Instruction

Graduate Studies Program

Student's Questionnaire

The aim of this study is to assess the implementation of Information Technology in grades 11 and 12. Be confident that the information gathered will be used only for the **research** purpose. Hence, you are kindly requested to provide the necessary information, which is very helpful to the quality of the research as well as to bring practical solutions to the problems.

You are not expected to write your name on the questionnaire

Thank You Very Much!

Part –I

Background Information

1.Sex ----------

2.Age ----------

3.Grade ----------

4.School----------

Part II

Direction: Following list of possible factors that influence the extent of the implementation of Information Technology are presented . Indicate the extent they hamper the teaching learning process of Information Technology with a tick (√)

Equivalence of explanations or the rating scale

5. Very severely = (V.Sev.)
4. Severe = (Sev.)
3. Moderate = (mod.)
2. Slightly = (Sli.)
1. Not at all = (Not.)

No	Factor	V.Sev. (5)	Sev. (4)	Mod. (3)	Sli. (2)	Not . (1)
1.	Shortage of text books and Reference books					
2	Problems with the Internet access					
3.	Poor supply of facilities such as computers					
4	Inadequacy of periods to cover the contents					
5	Large number of students in a class					
6	Deficient knowledge base for Information Technology					
7	Inadequate technical support by the teachers					
8	Inadequacy of time for practice					
9	Difficulty of roles and activities incorporated in text book					
10.	Inadequate financial support for Information Technology					

Part III. Information Technology Basic Competencies Practice Survey

Direction: Please mark a tick (√) your responses on the space provided. And fill the appropriate response, if the question required written response .

1. How competent are you in using a computer to do each of the following?

Activities	Very Competent	Competent	Some what competent	Not at all competent	Unsure
A. **Basic Computers Operating Skills** .start up and shut down computer system & peripherals .install/reinstall & update system software and printer drivers.					
B. **Set Up Computer Systems** .set up Computer Systems and connect peripheral devices					
C. **Word Processing** .Write a paper .enter & edit text .copy & move a block of text					
D. **Spreadsheet** .enter data in existing MS-EXEL .insert MS-EXEL into word processing document					
E. **Data Base** .sort a database by specific fields .insert MS-ACCESS into word processing document					
F.**Net Working** .use a file server (connect/logon, retrieve a program or document ,save a document to a specific location .select/de-select a network zone . Search for information on the World Wide Webs . Send and receive e-mail . join in an on-line forum or chat room					

2. How often did you on average do the following for the work your teacher's assigned?

Activities	Daily	Several times each week	Several times each month	A few times	Never
Open or shut down computer					
Install/re-install & system software and printer					
Set up computer system					
Use the internet					
Enter and edit text					
Send or receive e-mail					
Use a word processing program					
Copy and move a block of text					
Use a graphics program					
Join in an on-line forum or chat room					
Use a presentation program (eg. power point)					
Develop a database					
Other computer uses (specify)					

3. How would you rate your ability to use a computer?

---------- Good.

---------- Fair.

----------Poor.

4.Currently I use the computer approximately -------- hours per week in the classroom.

5.At the beginning of this school year, I used approximately -------- hours per week in the classroom.

6.Would you consider a school-based apprenticeship while you are at school?

--------- Yes.

---------- No.

---------- Unsure.

7.Do you believe teachers at your school are well prepared to teach Information Technology?

--------- Yes.

----------No.

Give reasons for your response.

---

8. Is the balance between the practical and theoretical tasks what you expected?

----------Yes.

----------No.

Give reasons for your answer.

Appendix – C

Addis Ababa University

Department of Curriculum and Instruction

Graduate studies Program

Interview

(Guide for school principals)

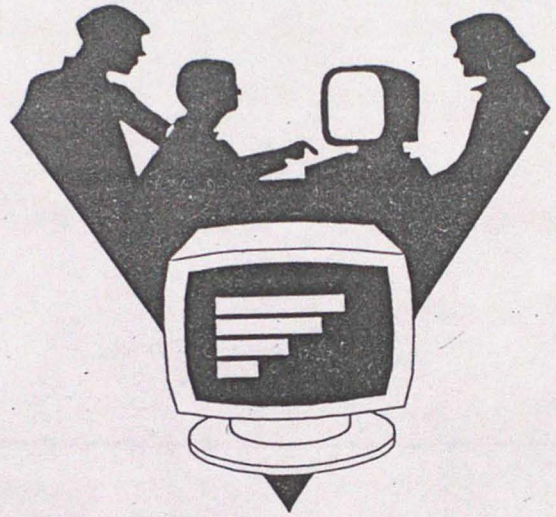
Name of the schools _____

Wereda _____

1. Are Information Technology infrastructures being developed in the schools?
   1.1 Do all classrooms have one or more computers for student use?
   1.2 Are these all networked together across the whole schools?
   1.3 Does the school have access to the Internet?
   1.4 Do all students have effective access to the Internet?
2. Is the school providing for appropriate Information Technology professional development?
   2.1 How much time has been spent per teacher in the last year for Information Technology professional development?
   2.2 Has the school committed any of its own resources to Information Technology professional development?
   2.3 Do teachers have access to computer and Internet in the classroom?
3. Is effective use made of Information Technology in learning?
   3.1 What improvements in teaching and learning has the school made through the use of Information Technology?
   3.2 What Information Technology based teaching learning resources are used?
4. What is the school doing well in implementing Information Technology?
5. What is the school doing poorly in implementing Information Technology?
6. What major problems do you observe in the implementation process of Information Technology?
7. What should be done to alleviate these problems?

INFORMATION TECHNOLOGY

SYLLABUSES FOR GRADES 11 & 12



INFORMATION TECHNOLOGY

INFORMATION TECHNOLOGY

SYLLABUS FOR GRADE 11

INTRODUCTION

The present age is characterized by the information and communication explosion.Information and communication technologies are nowadays important and expanding areas of business. They are goods and services in themselves. Information and communications technologies are regarded as messengers of change. There is a considerable growth in information and communication fields. This growth has its own impact in developing countries like Ethiopia. Making clear the extraordinary value of these technologies through various meanses is associated with the social, political, economic preconditions of a given country. The biggest challenge, however, is to create the financial, instructional and human conditions. Information and communication technologies have a value in contributing for an increased productivity ,more efficient operations and better resource sharing and management.

Introducing Information Technology (IT) in the school curriculum is one of the measures taken to minimize the information gap between developed and developing countries. The integration of information technology in the school curriculum of our country is a new perspective. This is the first attempt in the history of Ethiopian education. The objective of introducing IT in the Ethiopian highschool curriculum is to aquaint students with the new technologies and to make them capable of applying these technologies in their day-to-day lives. It is also to give highlights for those who want to continue their studies in the fields of computer and information science.

Specific Objectives	Contents	Pds	Methodology	Teachhing Aids	Evaluation
At the end of the lesson students should be able to: • define information • list the different sources of information • Identify types of documentary sources of information • Distinguish between formal and non formal non-documentary sources • Explain how information helps the society. • What is meant by Technology • Define IT. • Identify the components of IT • Trace the development of IT • Explain why IT is needed.	**Unit 1. Introduction to Information Technology** 1.1. What is information? 1.1.1. Sources of Information 1.1.1.1 Documentary sources • Primary Documentary Sources • Secondary documentary sources • Tertiary documentary Source 1.1.2 Non-Documentary Sources • Formal non-dec. source • Information non- doc. sources 1.2. Information and the society 1.3. What is technology? 1.4. What is information technology (IT)? • constituents of IT. • history and development of IT • the need for IT	15	• introduce the lesson by giving notes and explain concepts • give examples of all type of sources information • select definitions which are appropriate for the subject • discuss the distiction between formal and informal non documentary sources - clarify concepts of IT - discuss the need for information and how it is used in society		Ask student to: • define information • list the different sources of information • identify documentary sources • distinguish between formal and non-formal non-documentary sources. -Explain how information helps the society. -What is meant by technology? -Define IT. -Identify the components of IT. -Trace the development of IT -explain why IT is needed.

Specific Objectives	Contents	Pds	Methodology	Teachhing Aids	Evaluation
After the lessons students should be able to:- • define data processing • explain the difference b/2 information & data. • explain how to collect data process and convert it in to information. • explain what is meant by: – data organization – data transfer • Identify data processing operations - recording - duplicating - verifying etc. • Describe the manual data procsystem in to action.	**Unit 2. Information And Data Processing** 2.1. Information and Data Processing • Information versus data 2.2. Data Processing and organization • Data processing defined • Data processing cycle • Data processing operations • Data transfer 2.3. An analogy: Data processing • components of manual data processing • placing manual data processing systems into action.		- Introduce the lesson by giving notes and explain concepts - Describe each sub topic by giving more emphasis to the theme of data processing operations		Ask students to: • define data processing • explain the difference between information & data. • explain how to collect data process and convert it in to information. • explain what is meant by: – data organization – data transfer • Identify data processing operations - recording - duplicating - verifying etc. Describe the manual data procsystem in to action.
After studing the topics in this section students should be able to: ▪ define the term computer ▪ Discuss the start of early computing ▪ Discuss the earliest tools used in computing	**Unit 3. Computers; Evolution , Types and Application** 3.1 Computers : definition 3.2 Evolution of computers 3.2.1 The origins • Historical events and important personalities in the development of computers 3.2.1.1. Dark Ages (5000 B.C - 1890 A.D.) • Abacus (5000 B.C.) • Napier's Bones (1670) • oughtred's slide Rule (1632)		- introduce the lesson by giving notes and explain concepts - show portraits of personalities that contributed for the development of computer technology		Ask students to: ▪ define the term computer ▪ Discuss the start of early computing ▪ Discuss the earliest tools used in computing ▪ Name important personalities that contributed to the development of computer

Specific Objectives	Contents	Pds	Methodology	Teachhing Aids	Evaluation
• Name important personalities that contributed to the development of computer technology in the - Dark Ages - Middle Ages - Modern Ages -Discuss the developments in each computer generation	• charles Babbage • Joseph M.Jacquard 3.2.1.2. The Middle Ages (1890-1944) • Herman Hollerith and the punched card system. 3.2.1.3. The Modern Ages (since 1944) • Howard G. Aiken • Boolean Algebra • Mark I. 3.2.2. Generation of computers • The First Generation (1946-1958) • Electrical Numerical Integrator and calculator (NIAC) • Universal automatic calculator (UNIVAC), etc. • the second Generation (1959-1965) • The appearance of small sized computers such as IBM 1401 • The third Generation (1966-1971) • The appearance of high speed printers • The Fourth Generation (1972 -) • Improvement of mass storage and input /output devices • The Fith Generation.		- show pictures of these instuments - discuss the developments seen in all these Ages - discuss the topic , get the pictures of the machines and show to your students		technology in the - Dark Ages - Middle Ages - Modern Ages
- identify and discuss the various types of computers	3.3 Type of computers. • micro computers • works stations • mini computers • main frames		Introduce the lesson and and discuss the types of computers . - Explain what differences are		- identify and discuss the various types of computers

Specific Objectives	Contents	Pds	Methodology	Teachhing Aids	Evaluation
	• super computers		there between each computer type		
- discuss the characteristics of computers	3.4 Characteristics of computers • increased speed • reduced cost • improved quality		- Discuss briefly the characteristics of computers		- discuss the characteristics of computers
- discuss the capabilities of computers	3.5. Capabilities of computers • accept input data process • present output information		-explain shortly what computers can do		- discuss the capabilities of computers
- discuss for what purposes computers are used for	3.6. The uses of computers • personal productivity • information management • communications • education (CIA) • record keeping • customer services • guidance & control		- Discuss in which areas we can use or apply computers today		- discuss for what purposes computers are used for
-discuss and compare human mind with computers - discuss the limitations of computer	3.7. Comparing man with computers • limitations of computers		- Compare and contrast computers and human mind - Explain what limitations computers have		-discuss and compare human mind with computers - discuss the limitations of computer Ask syudents to: - define hardware and identify its components

Specific Objectives	Contents	Pds	Methodology	Teachhing Aids	Evaluation
At the end of this topic students should be able to : - define hardware and identify its components - discuss output devices - define CPU - mention the functions of CPU - discuss the characteristics of the CPU - Discuss the storage devices	. **Unit 4. The Computer System** 4.1. The Hardware 4.1.1 Input Devices • The key board • the disk drive • The mouse • The scanner, etc. 4.1.2 Output Devices . • The disk drive • Monitor/screen/Display • printers, etc 4.1.3 The central processing Unit (CPU) • What is CPU • The functions of CPU - The Arithmetic & Logic unit (ALU) - The control unit. • Characteristics of CPU. 4.1.4 The storage Devices. • Definition of key Terms - Storage - Devices • Primary & secondary storage • The need for storage devices - Magnetic tape storage - Magnetic disk storage - Floppy disk (diskette) - Optical disk (CD,ROM….)	10	- Introduce the lesson by explaining some basic concepts - Discuss the various components of the computer system - explain subcomponents of the computer system - demonstrate each device or hardware		- discuss output devices - define CPU - mention the functions of CPU - discuss the characteristics of the CPU - Discuss the storage devices discuss the components of the memory unit

Specific Objectives	Contents	Pds	Methodology	Teachhing Aids	Evaluation
-discuss the components of the memory unit - discuss the software and its types	4.1.5 The components of the memory unit • Read Only Memory (ROM) • Random Access Memory (RAM) 4.2 The Software 4.2.1 What is a soft ware? 4.2.1.1Types of software. 4.2.1.1.1 System softwares 4.2.1.1.2 Application softwares • Word processors • Spread sheets • Database management systems (DBMS) • Computer graphics 4.2 Programming languages • Definition • Characteristics of PL. • Levels of Languages. • Machine languages • Assembly languages • Compilers & interpreters • Major high-level languages • FORTRAN • COBOL • BASIC • Pascal		- discuss ROM and RAM briefly - explain concepts and software types - discuss application softwares very briefly - discuss briefly what is meant by programming languages , their characteristics and levels - dexplain which programming languages are included in each level		- discuss the software and its types - discuss data representation and coding systems - discuss the computer number system

Specific Objectives	Contents	Pds	Methodology	Teachhing Aids	Evaluation
- discuss data representation and coding systems	4.4 Data representation • Coding systems - ASC II - EBCDIC • Bits, Bytes and words		- discuss basic concepts of data representation		After studing this unit students should be able to: - define operating systems - discuss the functions of OS
- discuss the computer number system	4.4.1 The computer number system • The Decimal number system • The Binary number system • Hexadecimal		- discuss the number system		
After studing this unit students should be able to: - define operating systems - discuss the functions of OS	**UNIT 5 OPERATING SYSTEMS (OS)** • Definition 5.1 Function of operating systems • providing services. • Acting as an interface	2	-introduce the lesson and explain concepts - choose appropriate definitions OS		- name the types of OS
- name the types of OS - list some common types of OS	5.2 Types of operating systems • Single-user, single-tasking • Single-user , multitasking • Multi-user, multitasking 5.3 Some common operating systems		- discuss the functions and types of operating systems		- list some common types of OS
-discuss the history of MS-DOS - operate some basic DOS commands - discuss MS-Windows	5.3.1. DOS • History of MS-DOS • Basic DOS Commands 5.3.2 MS Windows • What is windows ? • Types of windows • Versions of MS windows	10 23	- discuss the history of MS-DOS - show practically how the dos commands operate - allow students to practice the basic		-discuss the history of MS-DOS - operate some basic DOS commands - discuss MS-Windows

Specific Objectives	Contents	Pds	Methodology	Teachhing Aids	Evaluation
- develop some basic skills of windows	• windows 3.x • windows 95/98/2000 5.3.2.1. Working in Windows environments • Understanding the win desktop • Opening & shutting down • Using windows help • Working with multiple windows • Drive, folder, file management and, etc. • Running an application . • Accessories.		DOS commands - discuss basic concepts of windows and its history of development - show practically how to operate in the windows environment - allow students to work practically on windows environment		- basic skills of windows

INFORMATION TECHNOLOGY

SYLLABUS FOR GRADE 12

INTRODUCTION

The present age is characterized by the information and communication explosion.Information and communication technologies are nowadays important and expanding areas of business. They are goods and services in themselves. Information and communications technologies are regarded as messengers of change. There is a considerable growth in information and communication fields. This growth has its own impact in developing countries like Ethiopia. Making clear the extraordinary value of these technologies through various meanses is associated with the social, political, economic preconditions of a given country. The biggest challenge, however, is to create the financial, instructional and human conditions. Information and communication technologies have a value in contributing for an increased productivity ,more efficient operations and better resource sharing and management.

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Specific Objectives	Contents	pds	Methodology	Teaching Aids	Evaluation
At the end of this unit students should be able to: - define what an application package is - name the types of application package	**UNIT 6 APPLICATION PACKAGES.** ▪ definition of an application package 6.1 Types of application packages		- Introduce the lesson and explain concepts - choose appropriate definition and explain the types of application packages		- define what an application package is - name the types of application package
- discuss word processing - list popular word processing programs	6.1.1. Word processing • definition • popular word processing programs	17	- discuss briefly what is meant by word processing		- discuss word processing - list popular word processing programs

Specific Objectives	Contents	pds	Methodology	Teaching Aids	Evaluation
- develop basic skills in MS-WORD	MS - WORD		- conduct practical sessions in the computer laboratory - allow students to practice		
-develop basic skills in MS-EXCEL	6.1.2. Spread Sheets • Types (lotus, Quatro pro.) • MS - EXCEL	17	- conduct practical sessions in the computer laboratory - allow students to practice		
- define DBMS - discuss DBM objectives - list the types of DBMS - develop basic	6.1.3. Data base management systems • Definition • DBM Objectives • Types • MS-Access	17	-conduct practical sessions in the computer laboratory - allow students		- define DBMS - discuss DBM objectives - list the types of DBMS

Specific Objectives	Contents	pds	Methodology	Teaching Aids	Evaluation
skills in MS-ACCESS			to practice		
- define information systems - list the basic components of information systems - discuss the system development cycle	**Unit 7 INFORMATION SYSTEMS** 7.1. What is an information system • Basic components of information systems. • Approaches in developing an information system (the system development cycle)	3	- Introduce the lesson and explain basic concepts - Choose appropriate definitions - Discuss the system development cycle by drawing the cycle on the blackboard		- define information - systems - list the basic components of information systems - discuss the system development cycle

Specific Objectives	Contents	pds	Methodology	Teaching Aids	Evaluation
At the end of this topic students should be able to: - define data communication - trace the developments of data communication	**UNIT 8 DATA OMMUNICATIONS AND THEIR DEVELOP - MENTS IN ETHIOPIA** 8.1. Data communication • Definition • Historical developments	2	- introduce the lesson and choose appropriate definitions of concepts		- define data communication - trace the developments of data communication
-discuss the development of data com. In Ethiopia - discuss the advent	8.2. Data communication in Ethiopia 8.2.1. The development of Telecommunications		- discuss how data communication developed in Ethiopia - explain the		-discuss the development of data com. In Ethiopia - discuss the advent of

Specific Objectives	Contents	pds	Methodology	Teaching Aids	Evaluation
of telecomm. to Ethiopia - discuss application of data communications in general and: - information services - telephone,etc.in particular	in Ethiopia 8.2.2. Application of data communications • Information services • Telephone • Telex • Telegraph • Fax • Video Text • Teletext		introduction of telecommunications in Ethiopia - arrange excurssions to the near by tele-communication center		telecomm. to Ethiopia - discuss application of data communications in general and: - information services telephone,etc.in particular
- define networking - list the types of	8.3. NETWORKING 8.3.1. Definition 8.3.2. Importance of Networking 8.3.3. Types of Networks	3	-choose appropriate definition of		- define networking - list the types of networks

Specific Objectives	Contents	pds	Methodology	Teaching Aids	Evaluation
networks - discuss LAN	8.3.3.1. Local Area Network (LAN) • Components of LAN • Advantages of LAN • Topologies of LAN		networking -discuss LAN and WAN - arrange visits to		- discuss LAN
-discuss WAN	8.3.3.2. Wide Area Network (WAN)		organizations which have networks		- discuss WAN
-discuss Network configurations	8.3.4. Network configurations				- discuss Network configurations

Specific Objectives	Contents	pds	Methodology	Teaching Aids	Evaluation
-discuss the issues concerning the internet such as -Applications -retrieval tools,etc. - discuss communications hardware - discuss communications softwares used such ast he Internet explorer, Netscape	8.3.5 INTERNET • Definition • Historical background • Applications • Retrieval Tools • Doing Business using Internet 8.3.6. Communications hard ware • Terminals • modems • Interface units • Hubs 8.3.7. Communications Softwares		- Choose appropriate definition of concepts - at the end of the lessons arrange programmes to introduce your students with the INTERNET. - Allow them to see how it works and to appriciate - Let your students to		- discuss the issues concerning the internet such as -Applications -retrieval tools,etc. - discuss communications hardware - discuss communications softwares used such ast he Internet explorer, Netscape Navigator

Specific Objectives	Contents	pds	Methodology	Teaching Aids	Evaluation
Navigator - discuss communications channel -define protocols - describe the rules and procedures governing data communication in the Net.	8.3.8. Communications Channels • physical structure • Transmission speed • Transmission direction • Transmission made • Line configuration • Leased verses switched lines 8.3.9. Protocols ▪ definition • The Internet protocol (IP) • Transmission Control Protocol (TCP) • Simple Main Transfer Protocol (SMTP) • File Transfer Protocol (FTP) • Hyper Text Transfer Protocol • User Data gram protocol (UDP)		prepare notes on the internet using their own sources other than the textbook - discuss protocols by choosing appropriate definition		Ask students to: - discuss communications channel -define protocols - describe the rules and procedures governing data communication in the Net.

Specific Objectives	Contents	pds	Methodology	Teaching Aids	Evaluation
-define computer security	**UNIT 9 COMPUTER SECURITY** • Definition	1	- explain briefly what is meant by computer security		- define computer security
- discuss what is to be secured.	9.1. What to secure • Physical Security • Hardware & Software Security • Data Security		- explain physical,hardware &software and data security		- discuss what is to be secured.
-define computer viruses	9.2. Computer Viruses • Definition		- choose appropriate definition of computer viruses		-define computer viruses
- discuss the classification of computer viruses	9.2.1. Classification of Computer Viruses • Boot Sector (indirect action • File viruses • Partition Record Viruses		- discuss the classification of viruses		- discuss the classification of computer viruses