AN ASSESSMENT OF THE PARTICIPATION OF THE CHEMICAL SOCIETY OF ETHIOPIA (CSE) IN THE SECONDARY SCHOOL CHEMISTRY CURRICULUM DEVELOPMENT PROCESSES

BY

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Acronyms

AAU	Addis Ababa University
ACS	American Chemical Society
BSE	Biological Society of Ethiopia
CSE	Chemical Society of Ethiopia
ESDP	Educational Sector Development Program
ICDR	Institute of Curriculum Development and Research
MAE	Mathematical Association of Ethiopia
MOE	Ministry of Education
MOJ	Ministry of Justice
NEA	National Education Association
NSF	National Science Foundation
RSC	Royal Society of Chemistry
SACI	South African Chemical Institute
SOSAN	Social Studies Association of Nigeria
STAN	Science Teachers Association of Nigeria
TGE	Transitional Government of Ethiopia

ABSTRACT

The purposes of this study were to assess the participation of the Chemical Society of Ethiopian (CSE) in the secondary school Chemistry curriculum development processes; and to identify the factors that impede the participation of CSE in these processes. Instruments used to collect data were questionnaire, interview and document analysis. Forty two members of CSE who were selected by available sampling technique involved in the study. The collected data were analyzed both qualitatively and quantitatively using percentage and mean value. The outcome of the analysis reveal that the participation of the CSE in Chemistry curriculum planning, implementation and evaluation processes was insignificant, except performing limited activities which could be useful to support the implementation of the curriculum. The major identified factors that impede the participation of CSE in the curriculum planning, implementation and evaluation processes were the financial problem; lack of commitment of the executive committee and members of CSE to participate in the planning, implementation and evaluation; the absence of considerable communication between CSE and the government bodies like schools, Regional Education Bureau and ICDR; and CSE was not considered as potential source of information by ICDR and other concerned bodies. Finally, constructive recommendations were suggested to improve the participation of CSE in curriculum planning, implementation and evaluation processes.

CHAPTER ONE

1. Introduction

1.1 Background of the Study

In Ethiopia, the provision of secular education was started about 100 years ago (TGE, 1994). There were several factors that necessitated introducing modern (secular) education in the country. The major reasons were the expansion of state apparatus, the establishment of a central state authority and permanent seat of power, the development of the modern sector of the economy and readiness to accept innovation, particularly, in the scientific and technological fields (Wube, 2005).

The provision of modern (secular) education was the base to prepare skilled manpower to the country. Of course, the country has attempted to acquire skilled manpower by both the traditional education and sending students abroad. However, all these activities were not enough to satisfy the country's need in terms of skilled manpower. After 1954, the College of Addis Ababa upgraded to the rank of a university college. The numbers of graduates increased and that may create favorable conditions for the establishment of professional associations.

Associations that are established by group of people within the same occupations or field of specialty considered as professional associations. The establishments of professional associations require certain conditions. First and for most it demands the existence of pool of trained manpower in specific profession. In addition, its importance has to be felt among professionals themselves and the Government. Moreover, the policies formulated by the Government should take the importance of these associations into consideration and should facilitate conditions for their legal existence (Science and Technology, 2003).

The one that provided a more conducive environment for the flourishment of professional associations was the civil code of the empire of Ethiopia, proclamation No. 165, 1960 (Science and Technology, 2003). The Ethiopian Teachers Association was the first to be established as a professional association with its glaring trade union features in 1948 (Ibid).

However, associations with more clear professional sentiments began to appear in the 1960s and onwards. The Chemical Society of Ethiopia (CSE) was established in November 1983 by forty chemists from various schools, province education offices, Addis Ababa University, the Central Laboratory and Research Institute, and the Ethiopia Science and Technology Commission. These members were attended a UNESCO sponsored workshop organized by the Ministry of Education (MOE) on "Modernization of Chemistry education in Ethiopia" (CSE, 2007).

According to unpublished document of the Ministry of Justice (MOJ, n.d) there are more than one hundred and thirty associations which are organized under the regulations set by the Ministry. Among these associations, there are about thirty professional associations that were established based on specific field of specialty and education.

Carr Saunder has described the roles of professional associations as having three folds: to guarantee professional competence; to guarantee professional conducts of its members; and to raise the status of the profession (Stunner, 1968: 66). These roles could be applicable, if the associations related their activities with education; because education can be used as a tool to guarantee professional competence and to raise the status of the profession.

Professional associations can contribute to educational development activities like curriculum formulation and publication of educational materials. Specially, their participation in the planning, implementation and evaluation of secondary school curriculum is very vital. This is because secondary school education mainly focuses on providing basic concepts of the subjects which enable the

learner to specialize on specific subject area when they join university and become professional. In addition to this, education grows out of life, and is supplementary to and preparatory to life, it seems only reasonable to recognize and use all educative forces present in the community (including professional associations) to meet life needs of school population (Vashist, 2005: 13).

It may be difficult to make secondary education universal, thus some scholars recommended that the overall enrolments in secondary education should be broadly governed by the needs for trained manpower. To make education job oriented and useful to life, it is suggested that work experiences should be introduced at the school stage (Koal, 2006: 42).

The needs of participation of professionals and their associations in the curriculum planning, implementation and evaluation processes, could be justified for: to select and decide on contents that enable students to identify their interest and become professional after the appropriate education at higher education levels; to support the implementation of these contents; and to set devices and techniques of evaluation of the learning materials.

In U.S America different professional associations like the National Education Association, the National Science Foundation, the American Chemical Society and others perform different activities in relation to the school curriculum planning, implementation and evaluation processes. As it is indicated in Science and Education Policy for sustainable reform (ACS, 2004), the American Chemical Society (ACS) participates in curriculum planning and national policy preparations by providing advices to the American congress, various Federal Agencies and schools. ACS is also involves in curriculum implementation and evaluation processes by providing supports for nation wide efforts to implement standard based science education; to provide life long professional development opportunities for science teachers; to ensure the availability of resources required for science education in the schools; and to use assessment instruments that measure students understanding of science and uses of methods of science.

In Nigeria, there were two most effective instruments for curriculum change and implementation in the country. These were the Science Teachers' Association of Nigeria (STAN) and the Social Studies Association of Nigeria (SOSAN) (Urevbu, 1999: 112). The STAN project in integrated science was more than any other indigenous curriculum experiment in Nigeria, and it was very successful in terms of mass teacher involvement, widespread adoption, self-funding and influence at examination (Ibid).

In Ethiopia the objectives of certain professional associations were clearly indicated the intentions of the associations to participate in the curriculum planning, implementation and evaluation processes (Science and Technology 2003). Of course, some of the associations have limited activities in this regard. The CSE, for example, was participated in the secondary school curriculum preparation by suggesting constructive ideas to improve the prepared secondary school Chemistry curriculum. In addition to this, it is possible to observe from document of the CSE, there was working group on Chemistry education in high schools established in 1995 to analyze the contents and organization of Chemistry text books in high schools (CSE, 1996). Based on its research results, the working group suggested constructive measures to improve the Chemistry textbooks in high schools.

All the above explanations clearly illustrate that the participation of professional associations in curriculum planning, implementation and evaluation processes is important and should be taken as a series issue.

1.2 Statement of the Problem

Education is one of the basic factors that determine the physical, intellectual and moral development of human being. It is also the major tool that can be used to bring all round development of a society and its members. Education, in addition to the above functions, is used to transform and transfer the accepted and respected values of society to the next generation. The functions of education are met through curriculum that addresses the learners as a

responsible human being and citizen (Neil, 1996: 118). This implies the curriculum planning, implementation and evaluation processes require carefully planned and organized procedures with the participation of politicians, parents, students, teachers, different professionals and other stakeholders.

The Education and Training Policy of Ethiopia (TGE, 1994: 12) indicates that a mechanism is created to participate teachers, professionals from major organizations of development and beneficiaries in the preparation, implementation and evaluation of the curriculum. Specially teachers as curriculum implementers and as professional educators can directly or indirectly participate in the curriculum planning, implementation and evaluation.

Similarly, in the first five years plan of MOE, ESDP-I, it was indicated that mutual partnership was expected to build among education stakeholder (Regional Education Bureaus, colleges, universities, teachers training institutes and relevant NGO's), to effect the smooth implementation of the Education Sector Program (MOE, 1997: 13).

In addition, it is possible to observe the activities of professional associations, which was organized by themselves on the base of the same area of specialty, focused towards the school curriculum planning, implementation and evaluation.

Though professional associations have contribution in curriculum planning, implementation and evaluation their role is not well documented.

Of course, enhancing and empowering professional association contribution in curriculum development processes would counter balance the top-down activities of national education policies and curriculum practices.

Furthermore no significant study was made so far to see the role played by professional association in school curriculum planning, implementation and evaluation. Therefore, the researcher would like to assess the participation of

the CSE in the secondary school curriculum planning, implementation and evaluation processes.

1.3 General Objectives of the Study

The general objective of the study is to assess the participation of CSE in the secondary school Chemistry curriculum development processes.

1.4 Specific Objectives of the Study

The specific objective of the study is to assess the contribution of CSE in the secondary school curriculum practices. These includes

1. To assess the participation of the CSE in the curriculum planning, implementation and evaluation.
2. To identify those factors that impede or facilitate participation of the CSE in the curriculum planning, implementation and evaluation processes.

1.5 Research Questions

To achieve the above stated objectives of the study the following research questions were addressed. These includes:

1. To what extent CSE participate in the secondary school Chemistry curriculum planning process?
2. What actual practices (activities) made by CSE to indicate participation in the curriculum implementation processes?
3. Does the CSE participate in the evaluation processes of the secondary school Chemistry curriculum?
4. What factors impede or facilitate the participation of the CSE in the secondary school Chemistry curriculum planning, implementation and evaluation processes?

1.6 Significance of the Study

The purpose of this study was to assess the participation of the CSE in the secondary school Chemistry curriculum development processes. As far as the knowledge of the researcher is concerned no full-fledged research has been done in this area, therefore, this research will be significant:

- To indicate the existing practices of CSE in the curriculum planning, implementation and evaluation processes; to its members as well as to the concerned Government bodies like ICDR/MOE.
- To identify the gaps that is observed between the mission and objectives of the CSE and participation in the curriculum planning, implementation and evaluation processes; to the executive committee of CSE.
- To suggest constructive measures that should be taken to fill the observed gaps to the CSE and concerned Government bodies;
- To serve as starting material for further studies concerning the participations of CSE and other professional associations in the curriculum development processes.

1.7 Delimitation of the Study

Although other professional associations like the Ethiopian Teachers Association had some practice in this regard, they are not included in this study. The study was delimited to assess the participation of the CSE in the secondary school Chemistry curriculum planning, implementation and evaluation processes using data sources which are present in Addis Ababa.

This is because it is very difficult to include all professional associations and all members of CSE in other regions in the study due to time, resource and other constituents. In addition, this study was done on the CSE, which is recognized professional association by MOJ and organized based on Chemistry subject specialty.

1.8 Limitation of the Study

The limitations of this study arise from lack of comparative research studies made on this area; the data collected from the questionnaire are dependent upon the interpretation of the available members of the CSE around Addis Ababa; and the interview was not conducted with the previous presidents of the CSE and was not conducted with the current president of the CSE, because the president was not able to give his opinion due to the nature his occupation.

1.9 Definition of the Terms

- Curriculum development is a process that mainly includes curriculum planning, implementation and evaluation processes.

CHAPTER TWO

THE REVIEW OF LITERATURE

2.1 A Profession

The seventh edition of Oxford advanced dictionary (2006) described a profession as a type job that needs special training or skill, especially one that needs a high level of education. A profession, according to Vollmer and Mills (Myers, 1974: 19) is an 'ideal type' of occupational organization which does not exist in reality, but provides the model of the form of occupational group become completely professionalized, that is when the occupation shows changes of certain crucial characteristics in the direction of 'profession'.

In general, a profession is an occupation or career such as law, medicine or engineering that requires considerable training and specialized study. Most of the time classifying occupations as profession or non profession create argument among scholars (Culloch et al, 2000: 5). Teaching, for example, was considered as non-profession unlike law, medicine and engineering. However, some scholars described that teaching is an occupation with a high potential social value. The effective teacher can vitally influence for the better lives of adult citizens of tomorrow (Stinnett, 1968: 64) Therefore, it is an occupation that can be taken as a profession.

Characteristics of a Profession

To categorize occupations as profession, scholars suggested some characteristics of a profession. Flexner (in Bowman et. al, 2004: 21) suggested that professional activities were basically intellectual, carrying with a great personal responsibility; were learned, based on great knowledge not merely routine; were practical rather than academic or theoretical, its techniques could be tough; were strongly organized; were motivated by altruism and professionals views them selves as working group.

T.M Stinnet (1968) and Bowman et. al (2004) also suggested characteristics of a profession. The characteristics can be summarized as: a profession involves activities essentially intellectual; commands a body of specialized knowledge; required extended professional preparation; demands continuous in service growth, afford a life career and permanent membership; set up its own standards; exalts service above personal gain; and has a strong, closely knit professional association. This characteristic includes all criteria that should be fulfilled by occupations to be a profession. But there are some cases that not all the suggested characteristics satisfied by the occupation, but considered as profession.

Professions through their organizations (associations) perform functions like guarantee the professional competence; guarantee professional conduct of its members; and work to raise the status of the profession (Stinnett, 1968: 66). Von Hipplel (1978) strengthens this idea by suggesting the activities of professional associations related primarily to the advancement of technical skills and economic status of their members. To perform their functions and involved in the advancement of technical skills, the associations should participate in educational activities including school curriculum planning, implementation and evaluation processes at different levels. Professional associations provide organizing structures that support the creation and distribution of knowledge; the sharing of best practices; a frame work for solving programs and obtaining advice; and a forum to debate what is a professional means (national business education association of America, 2006).

The members of professional associations are essential to perform the very functioning of a society. The society's business principally conducted by professionals who are specially trained to carry out that business, whether it be educating children, diagnosing and curing disease, judging and punishing who violate the law and the like (Schon, 2003: 3).

Teachers as members of teachers associations or together with other professionals in special interest associations can perform their duty in the

education system of a society by participating in curriculum planning, implementation and evaluation.

2.2 Curriculum Planning

Curriculum is defined by different scholars and educators in a number of ways. Ronald Doll (1986: 327) defined curriculum as "the accumulated tradition of organized knowledge contained in school subjects." Similarly Dale L. Brubaker (1982: 2) defined curriculum as "what a person experience in a setting. It includes all of the interactions among persons as well as the interaction between person and their physical environment." Curriculum definitions could be either narrow or broad. When defined narrowly, curriculum was conceived as "a specific set of skills, knowledge and activities to be delivered to students" (Cheng, 1994: 26); it is "a subject matter taught to students under the guidance of school" (Hass and Parkays, 1993: 2).

Curriculum may also be defined broadly as "what a person exercises in school setting, that is, curriculum is everything that goes within the school including extra-class activities, guidance, interpersonal relationship and the like" (Aggrawal, 2004: 47). In general, curriculum includes all activities within the school system or outside the school system that are relevant to the learners. Understanding the concept of curriculum is very important to understand how it should be planned, implemented and evaluated.

It is known that education enable an individual learner to gain knowledge, skills, and attitudes and to develop her/his self to find her/his place as a worthy member of the family, community, society and of the nation. As a result of education, an individual should have inculcated himself /herself a sense of desirable social moral and spiritual values. For such type of education, a planned curriculum, which indicates the direction of involvement of both teachers and students, is very important (Vedanaygam, 1990). Curriculum planning is the process where by a person and/or a group organizes ideas as to what learner should experience in school setting (Brubaker, 1982: 3).

Curriculum planning can also be defined as 'a process of preparation of course outline for a specific subject; a process of gathering, sorting, selecting, balancing and synthesizing relevant information from many sources to design experiences that will assist learners in attaining the goals of the curriculum' (Hass and Parkays, 1993: 4).

The curriculum planning process can be done using different general and specific models. For example, Ralph W. Tyler model focused on the needs of formulating objectives; define the objectives in terms of students' behavior; and selecting the contents appropriate to achieve the objectives (Njabili, 1999: 40). In this model, the steps used to plan a curriculum indicate the participation and involvement of different bodies (learners, subject specialists and society in general) in the education system to determine the objectives; and the use of philosophical and psychological screens to select and organize contents and learning experiences.

2.2.1 Participants in Curriculum Planning Process

As it is described in the above sections, curriculum planning is a process of identifying objectives, selecting and organizing a set of experiences based on theory, research and past professional practices. It occurs at different levels of remoteness from intended learners (Niel, 1996: 12). Depending on these levels, the number of participants in curriculum planning could vary. However, curriculum planning is based on choices and all choices that curriculum planner makes should represent a point of view as to what constitute appropriate educational experiences for learning.

In addition, in order to decide who should participate in the planning process and what should be the participants' role, the following key issues could be considered: what responsibilities should various personnel take in planning and improving the curriculum? What special backgrounds, skills and abilities do they need? And how may the talents of participants is used in coordinated way? (Doll, 1975: 260).

John McNiel (1996) and Ronald Doll (1996) listed the participants who shall be included in curriculum planning process. Teaches, learners, school principals, board of education, education administrators, community citizen (lay man), state education departments or organizations, colleges and universities, minority groups, individual authors, professional associations, subject specialists and publishers could be the common participants in curriculum planning.

The levels of these participants differ from place to place. A research, made by Miriam Ben-Peretz (1980) entitled "An alternative approach" indicated that teachers are vital partners in the curriculum planning process. Without active teacher involvement, the curriculum planning process may turn out to be futile and ineffective. In addition, the study indicated that the collaboration of teachers with representatives of other bodies of knowledge is required for the articulation of the character of the problem discerned by teacher and for the seeking of alternatives.

In general, the curriculum planning process should involve those participants with the knowledge of discipline to be thought, with the knowledge of the learners characteristics; with knowledge of the milieu of school reality, the society and the community; with knowledge of the teacher who are going to uses the curriculum materials; and with the knowledge of the curriculum making process.

2.2.2 Role of Participants in the Curriculum Planning Process

The process of curriculum planning is quite complex and it requires the need to address several important questions like what responsibilities should various personnel take in planning? What special background, skills and abilities they do needs? How may the talents of participants be used in coordinated way? (Doll, 1996: 415), answering these questions as a precondition for effective planning of the curriculum.

The participants in curriculum planning generally have the following roles: define social aims; define personal development; plan for comprehensiveness; check balance; secure flexibility, select alternative procedures as well as purposes; and secure adequate resources during curriculum planning (Saylor and Alexander, 1958: 65).

2.2.3 Role of Professional Associations

Chan (1977), Niel (1996), Myers and Myers (1996), and also studies by the National Education Association (NEA), the National Science Foundation (NSF), and the Royal Society of Chemistry (RSC) indicated that professional associations participate in curriculum planning process by formulating objectives; selecting and organizing contents and learning activities; and evaluating the prepared curriculum document.

In selecting objectives, the professional associations can be used as sources of information about existing social needs, nature of knowledge, learning and development of learners, and also as consulting officials on such and other matters. In selecting and organizing contents and learning activities, the associations may participate by conducting researches and sponsoring the researches; providing information through their publications, by setting content standards as criteria that every student should attain; and by identifying what to be taught and how it is to be taught through their studies and studies by their members.

Members of a professional associations may participate in activities such as filling questionnaires and other types of surveys and studies; use publications to assist the planning program; about specific issues of their subject that may help planning process for publication in official journals, year books and reports; attendance at meetings and programs about curriculum planning and service on committee in offices (Saylor and Alexandor, 1958: 547).

In general, professional associations and their members are directly or indirectly involve in curriculum planning through different forms of

communication. Their participation guarantees the proper implementation of the curriculum.

2.2.4 Factors Affecting Curriculum Planning

The success of curriculum planning process leads to a great extent to the proper implementation of the planned curriculum. According to Vashit (2005: 301) good curriculum planning was characterized based on the facts of the situation. It is good if many alternatives were envisioned and if intelligent choice is made among them; and if it is done in such a way that the plan was accepted understandably and whole heartedly by all those who are to share in working it out. In addition to this, it is also known that there are different forces that shape the curriculum; and the planning process should be viewed from the angle of these forces and should allow the participation of the groups that represent the participations of major determinants (Stinnet, 1968: 334).

Factors which alter the above mentioned conditions will also affect the curriculum planning process. The absence of resources, finance, and educated personnel in the curriculum areas affect the planning process. In addition the absence of communication among the participants in the planning process; lack of communication between the planner and the implementer; and lack of communication between the planner and information sources affect the curriculum planning process (Saylar and Alexande, 1958).

2.3 Curriculum Implementation

Curriculum implementation was also considered differently by different scholars. Some considered it as the process that occurs after the planning process takes places, while others considered it as part of the planning process.

One way of understanding curriculum implementation is making real of that which has been planned; and a systematic process of ensuring that the new curriculum reaches its immediate beneficiaries, the learners (Shinunda and Umuland, 1992: 176). It is also defined as 'the open uses of a program through out an entire school system" (Arieh and Lewy, 1977: 22). Curriculum

implementation is not simply an extension of planning and adoption process, it is the actual use of the improved or newly prepared curriculum (Fullan and Pomfret, 1977: 336).

In general, curriculum implementation is a process by which a program is carried out using various techniques, learning approaches and administering systems which could result in expected impartation of skills. It takes place in the classroom with the active participation of students and a teacher with appropriate support of government, principals, parents, lay citizens and others. For successful implementation of curriculum, the availability of materials; change in organizational structure; change in role and behavior, knowledge and understanding; and value internalization are required (Ibid).

The process of curriculum implementation described by different scholars (Niel (1996), Shiunda and Omulando (1992) and Orstein and Hunkins (2004)). For example, Niel, suggested that curriculum implementation process includes planning, communication, cooperation, and support. The planning process of curriculum implementation should focuses on people, programs and processes; the communication among participants through different changes is important to make the participants aware of the new or improved curriculum and also to change their attitude about the curriculum. Cooperation between participants and supporting the implementation by providing materials and facilities needed by the schools with appropriate and trained personnel are vital processes for proper implementation of the curriculum.

2.3.1 Factors Affecting Curriculum Implementation

A successful implementation of curriculum results from careful planning in which all concerned bodies are involved (Ornstein and Hunkins, 2004: 300). Shiunda and Omulanda (1992: 179) also described that 'curriculum implementation to be effective, it requires continuous support which may be realized through various support services, some of which include: the development of training programs for key personnel; the establishment of local

centers where educational personnel converge in seminars and work shops to discuss and improve the new curriculum; providing staff with materials whose utilization can be discussed in relation to the implementation process; and providing continuous information on the implementation process through various means like newsletters, annual reports and others.'

This concept implies that curriculums implementation process can be facilitated by the presence of trained human resources with adequate awareness of the case and the availability of all facilities, materials and equipment. It also implies, continuous communication among all participants in general, factors that may influence curriculum implementation include:

a) **Teachers Qualification**: Teachers has important link with the educational curriculum innovation as what is going on in the classroom affects students learning, which is the end result of implementation (sounders and Vulliamly, 1983).

b) **Shortage of Instructional Time**: Sufficient time should be allocate to teach the subject matters. Shortage of instructional time (that is not allocating) influences the sufficient time for the instruction implementation and results poor achievement of students.

c) **Lack of Facilities**: school facilities like desks would greatly influence the educational process. Study conducted in Peru showed that percent of children with desk at schools was more strongly related to reading achievement than the social back ground (Fuller, 1995).

In general, curriculum implementation can be facilitated by providing resources, instructional materials as well as by allowing teachers to participate in the process together with other concerned bodies.

2.3.2 The Roles of Professional Associations in Curriculum Implementation

The participants of curriculum implementation can be classified as internal participants, those who are in the school, and external participants, those who assist the implementation in the school by being out side of the school. Gallagher et. al (2005: 131) for example state that the participation of community as well as all concerned bodies around the education system in the implementation of curriculum plays important role in students' achievement. Participation can be done by serving as member of the curriculum committees concerned with the adequacy of the curriculum.

It is indicated by Fulland and Pomfert (1977: 371) that there are different determinant of implementation process. Among them strategies and tactics devised for re-socialization of key actors were very important for successful curriculum implementation. The strategy includes in-service training, resources and professional support, feedback mechanisms and participation of stakeholders in decision making. Based on these concepts, because this study mainly focuses on, the participation of professional associations in curriculum implementation, it is possible to identify the work of professional associations in curriculum implementation.

The National Education association, in US America, with its affiliated subject and topical organizations (Doll, 1975: 266; Stinnet, 1956: 83), performed different activities in curriculum implementation. Among these activities the major one includes provide a means for exchange of ideas among teachers and others educators in relation to the subject they teach. This includes the use of conferences and convention; setting standards for teachers and their training; providing material supports like laboratory equipments and materials; publishing supplementary learning materials; funding researches made on the improvement of contents and teaching learning processes; and prepare Olympiad (question and answering competitions) among schools to develop the

participation of students in extracurricular activities and their interest towards the specific subject.

Similarly; in Ethiopia different professional associations participate in curriculum implementation process. For example, the Biological society of Ethiopia (BSE) (1992, 1997) performed different activities like preparing conferences and allowing research works to be presented on the conferences. In addition to this; in August 1993, BSE organized workshop together with the kotebe college of teacher education concerning about environmental education and natural resource utilization for teachers.

Unpublished document of the Mathematical Association of Ethiopia (MAS, 2007) also indicated that the association participates in curriculum implementation process by organizing congresses on the mathematics education, organizing mathematics clubs in schools and also as a devise to motivate the clubs, organized mathematics day in Addis Ababa every year since 1994. Though different activities were conducted, the main feature is the mathematics competition between secondary schools in different regions and Addis Ababa. The MAE also publishes a journal entitle 'Hissab' where the journal includes two sections of which one of it devoted to popularize mathematics in the schools.

In general, professional associations participate in curriculum implementation process at the school level by creating proper link with the schools. Their role is vital for enhancing students' interest towards the specific subject and also for teachers to get new information and experience on their subject area to implement the curriculum properly.

2.3.3 Factors Affecting Participation of Professional Associations in Curriculum Implementation

The participation of stakeholders of the education system of a country is very important for the achievement of intended objectives. The participation of key players in the implementation (the key players are teachers, learners, school

administrators, supervisors, parents, community members, political officials, professionals and their organizations, and the like) leads to successful implementation. But there are different factors which affect the participation of the professional associations and other stakeholders which are found out side of the school.

Townsend (1994) for example, suggested some of the factors that affect the participation of a community in curriculum implementation. From their generality these factors are also the factors which affect the participation of professional associations in curriculum implementation. Lack of administrative support for the community participation; lack of time of the members of associations to participate in curriculum implementation ; apathy of the associations and their members; reluctance of professionals in the school to regard the associations as potential problem solvers; relegation by professionals that is, participants are given only aid roles; and the lack of communication between schools and the associations are the major factors that affect the participations of professional associations in curriculum implementation.

2.4 Curriculum Evaluation

There is no one common definition of curriculum evaluation. It can be defined depending on ones' views towards the curriculum itself. According to Alkin (1974: 44) curriculum evaluation is "an evaluation of a set of intended learning outcomes." Brady, (in Kahsay, 1999: 48) also define of curriculum evaluation as the measure of the degree to which the performance of students meets behaviorally stated objectives; and as a process that uses professional knowledge to judge the ongoing processes involved in the curriculum implementation. Shiunda and Omulando (1992: 186) provided broad and narrow definition of curriculum evaluation as "the collection and provision of data for the sake of facilitating decision making at various stages of curriculum development; a process of ascertaining the area of concern, selecting appropriate information and analyzing it in order to make a summary of the data. Decision makers then use this to select between useful alternatives; and a

process of judging the ability of the actual behavior being shown by the learners."

In general curriculum evaluation is the process that involves gathering information about the curriculum from different sources concerning the relevance of the curriculum to the needs of the society and the learners; the scientific significance and validity of a new curriculum and the ability of the education program to elicit a given set of instructional materials.

2.4.1 The Purposes of Curriculum Evaluation

Curriculum evaluation is done to accomplish one or more purposes. Anderson and Ball, (in Kahsay, 1999: 48) described the purposes of curriculum evaluation as 'to contribute to decisions about curriculum introduction; to contribute decisions about curriculum improvement; to obtain evidence to rally support for curriculum; to obtain evidence to rally opposition to a curriculum; and to contribute to the understanding of basic psychological , social and other purposes.

Curriculum evaluation is used to answer question like: is it worthwhile to devote time to learning the materials in the program? Do educational materials reflect the recent development and contemporary ideas dominating a given field of intellectual or scientific behaviors? Are the study materials free from obsolete concepts and ideas? Under the Prevailing system of teaching-learning conditions can be the new program be successfully implemented? Will the students master certain skills as a result of the program? And will the students acquire certain desired attitudes and values? (UNESCO, 1977: 4-5).

Curriculum evaluation helps in deciding to accept or reject a program; the modifications needed; and the best conditions under which to use the education program. Therefore, the evaluation process is very important to make appropriate decisions at all level of curriculum development.

2.4.2 The Role of Professional Association in Curriculum Evaluation Process

Curriculum evaluation is conducted either by those most directly connected with the curriculum like teachers, learners, policy makers and education experts (example, from MOE) or external agencies like evaluation experts, individuals and professional organization (James, 1990). Professional associations can be involved in curriculum evaluation by assessing the curriculum products like courses of study, syllabi, textbook, etc.

Sylar and Alexander (1958), Doll (1975), and Niel (1996) indicated that professional associations participated in curriculum evaluation by conducting research to assist decision makers or participate in the evaluation teams for identifying problems in the objectives, contents, learning experience, text books and their accessories, instructional materials and the like. They also involved in the evaluation process by providing standard tests to evaluate the achievement of desired out comes by students.

2.5 Experiences of Some Selected Professional Associations

2.5.1 The National Education Association (NEA)

The National Education Association (NES) was established in 1857 with the name of National Teachers Association (Cambell et. al, 1965: 260). It is the over all professional teacher association in U.S.A. A local association like the NEA, served different purposes such as provided teaches a medium for the study of their own problems; provided a means for the exchange of ideas among teachers; provided a medium by which teachers are enabled to participate in the formation of policies for the local school system; and provided a local organization to support and influence state and national programs (Stinnett, 1956: 89).

The NEA research division provided one of the major services of the association which was conducting continuous inquires in to school problems and makes

available to the profession recent data on all phases of the work of the public schools. Many of the sub divisions of the NEA worked directly towards improvement of curriculum and instruction.

The educational policies commission, which was established in 1935 by NEA, was an example of one commission that has been well regarded among teachers and non-teachers a like for its contribution to improve education. It was used to serve several purposes including long-range, planning leading to the adaptation of education to social needs, critical appraisal of existing conditions in education, consideration of recommendations for the improvement of education, the dissemination of information about best practices, and the development of better understanding and cooperation among various groups interested in Education (Cambell, et al, 1965: 264)

The departments of the NEA include representation of all major subject matter areas. A constant stream of published materials flows from these departments dealing with curriculum and instruction in the various subject fields.

2.5.2 The American Chemical Society (ACS)

The American Chemical Society had it origins in small group of 35 chemists that met on April 6, 1876 at the New York University (Wikipedia, 2007). It is the world's largest professional association. To fulfill its missions as a congressionally chartered scientific and education society, ACS has developed nationally acclaimed programs that support on going reform efforts in science education at all levels. ACS education program begin at the pre-school level, continue through elementary middle and high school, and include undergraduate and graduate instructions in chemistry. ACS also offers continuing professional development workshops, short courses, and internet courses for elementary and high school teaches. The society continues to play an important role in the development of national policies related to science education by providing advice to congress and various federal agencies. The society also provides comments on the annual begets of the national science

foundation (NSF) education and human resource directorate, and the U.S department of education.

ACS has been involved in the education reform movements in America for many years (ACS, 2004). ACS was planned to continue to supply nation wide efforts in its science education policies for sustainable reform (ACS, 2004).

The plan includes the following:

- implement standard based science education at K-12 level;
- Provide life long professional development opportunities for science teachers and those who practice the chemical science;
- Encourage schools to use assessment instruments that measure a students' understanding of science and use of the methods of science, not just the student's ability to recall science facts;
- Develop national assessments of science achievement at the K-12 level that are in-line with the national science education standard in terms of scope, content, and assessment of broad range of understanding and abilities expected from effectiveness science learning;
- Ensure that the resources are available with in schools to encourage and support excellence in laboratory based courses; and
- Develop introductory Chemistry courses for both general students and science students that emphasize the current and future solution of real world problems.

2.5.3 The Royal Society for Chemistry (RSC)

The Royal society of Chemistry in the UK Professional body for chemical scientists and on international learned society for chemical science; the growth of the Royal society of Chemistry has mirrored the growth in importance of Chemistry in the world, with the entry of more people in to the profession of chemistry, but its origins lie in the first half of the nineteenth century and

formation of the chemical society of London in 1841. A century and a half from its beginnings, the Royal society of Chemistry today has a global membership of over 44,000. It is the sole heir and successor to four well known and long-established bodies: the chemical society (founded in 1841), the society for analytical Chemistry (founded in 1874); the royal institute of Chemistry (founded in 1877), and the Faraday society (founded in 1903).

The Royal society of Chemistry fulfils the roles previously undertakers by all four of this bodies. It is actively involved in the spheres of education qualifications and professional conducts. The education branch of RSC has the following main roles:

- Producing curriculum materials;
- Working with organization to develop context based learning materials for Chemistry in secondary science courses;
- Providing professional development courses for science teachers, especially for Chemistry teachers;
- Providing information about the many career pathways in chemistry; and
- Developing activities for the secondary school students to engage interest in learning chemistry.

The RSC also seeks to influence the Government on issues relating to chemical science education by commissioning reports to submit as evidence to parliament and responding to consultations (RSC, 2008).

2.5.4 The South African Chemical Institute (SACI)

The SACI was established in 1912 with the objective to promote the practice of natural science professions in south Africa, to exercise control over the standard of professional conduct of natural scientists; to monitor the standard of education and training of natural science and to recognize education and

training which is a prerequisite for registration in terms of the education Act. (RSC, 2008).

The ASCI was planned to participate in the following activities;

- to raise the profile of chemical education amongst professional chemists involved in teaching chemistry;
- to explore issues of teaching and learning related to the subject;
- to share new ideas on teaching and learning;
- to disseminate information on conferences, meetings and seminars related to chemical education.
- To increase participation in the chemical education division of the ASCI biennial convention.
- To encourage research in to the scholarship of teaching chemistry.
- To encourage publication in the education section of the South African journal of chemistry.
- To reward achievement in the field of chemical education

2.5.5 The Biological Society of Ethiopia (BSE)

The need for the formation of the Biological Society of Ethiopia was recognized as far back as the early 1970s. After 20 years of extensive efforts the BSE was founded by 30 members in 1989. The BSE was formed at a critical moment when many issues related to biology were revised. Among these, the conservation development issues, population and food security, degradation of life support systems and the like were the major issues (BSE, 2007).

The objectives of BES are to create awareness on environmental development issues is the formal and informal education sectors and among the general public, to promote the biological research and encouragement particularly to biology teachers, to enable biologists to interact with their local as well as international counter parts through seminars, workshops, symposia,

publication, etc; to popularize biological science through publications and the mass media, to provide consultancy services and conduct collaborative investigation on issues that require biological expertise; and to publish scientific journals and other documents as media for communication among its members and the general public (Ibid).

The major activities of the BSE are organize conferences, workshops, seminars, panel discussions and film shows; support the existing environmental education school clubs and encourage the establishment of others; publish background reading materials on biological topics to improve the understanding of biological issues for students, teachers, and the general public; create networks with sister societies and organizations of national and international levels on matters of common interest; and seek for funds to support the society's activities.

In addition to the above activities, the BSE in its congress allowed the presentation of research papers on the high school biology curriculum. Among them the following were the research papers presented on the congress: "Biology teaching in rural Ethiopia with special emphasis and experience from high school in Bale region." Workenh Endazenew (1992). 'the need for restructuring secondary school biological science curriculum in Ethiopia' Hiwot Hibiste (1992); 'the dogma of meat consumption and the role of biological education in Ethiopia' Melaku Tefera (1997); 'High school biology curriculum in the eyes of high school students and their teachers' Nugusu Aklilu (1997); ' The multi-dimensional concept of biodiversity in the contemporary school biology curricula' Dr. Zemed Asfaw (1997); 'the status of biology education Ethiopia high school' Zewdu Bebrekidan (2006); and the like were the major research works presented in the congresses of the BSE. Furthermore, the biological society was assigned a person to be the members of 'science education training and research committee' which was organized by MOE in 2000.

2.5.6 The Chemical Society of Ethiopia (CSE)

The chemical society of Ethiopia (CSE) was founded in 1983 with the following objectives; to develop and promote Chemistry education and research; to provide a forum for the exchange of ideas through professional publication and regular meetings; to popularize chemistry, especially in schools; to enhance participation and collaboration of professional chemists in matters pertaining to national policies in curriculum development and training of chemists; to established close relationships between chemists and other professional engaged in chemistry-related fields of activities, so as to increase the role of Chemistry in national development; to promote the improvement of the qualification of members; and to establish and strengthen links with other societies; national and international, which purpose similar aims (CSE, 2008).

The CSE organized workshop, symposium panel discussion and annual congresses. Some of them includes; science education in high schools, April 1995; science education in view of the new education and training policy, November 1996; the Chemistry open day competition among high school students since 1997; participation of female students in the science fields April 1999; the teaching of Chemistry in high school, October 2000; and teaching high school chemistry, September 2003, were the major (CSE, 2008). In addition to this the CSE publishes and disseminates findings and information through the bulletin of the chemical society of Ethiopia and solution, a biannual newsletter of the chemical society of Ethiopia.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Method of the Study

There are different types of descriptive methods of study. The major types are survey study, causal comparative studies and case study (Koal, 2006: 442). Descriptive studies collect and provide information about what exists with respect to variables or conditions in a situation; about what we want by identifying standards or norms to compare the present conditions or exploring possible ways; and about means on the basis of the experience of others or the opinions of experts (Ibid).

Among the above listed descriptive method of studies, case study method was used in this research. A case study research is the research method that typically observes the characteristics of an individual unit: a child, a class, a school or a community (Cohen and Manion, 1989: 124). Sturman (in Bassey, 1999: 26) wrote that 'case study' is a generic term for the investigation of an individual, group or phenomenon. While the techniques used in the investigation may be varied, it may include both qualitative and quantitative approaches.

Different categories of the case study method were provided by scholars. Among the categories, the descriptive case study was used in this study. Yin (in Bassey, 1999: 29) explained that a descriptive case study presents a complete description of a phenomenon within its context. Therefore, to describe and assess the participation of professional associations in the secondary school curriculum planning, implementation and evaluation, the CSE was taken as a case for the study. This enabled the researcher to understand the level of participation of CSE in curriculum development processes by collecting information within the CSE.

3.2 Source of Data

The primary sources of data for the study were the members of the CSE, member of executive committee of CSE, the concerned officials from ICDR and Addis Ababa City Education Bureau. Officials from ICDR and Education Bureau of the City included to cross check the information obtained from the CSE and its members

The secondary data sources for this study were the CSE documents that include: the journals, congress minutes, magazines, news letters, etc. produced by CSE.

3.3 Population of the Study and Sampling Procedure

By the time that the questionnaire was distributed, the members of the CSE were two hundred and seven. This constitutes the total active populations of the study, out of which forty two members (20.3% of the total population) were selected as sample of the study.

The sampling technique employed to select research participants to answer the questionnaire was purposeful sampling technique.

Members of the CSE were contacted from four high schools, two Government organizations, two higher education institutes (one university and one college), five factories and others working by their own or students at higher institute. In general ten high school Chemistry teachers, six chemists from industries, twenty one higher institute Chemistry teachers, three experts from Government organization and other two, working by themselves and a student at university, were the study samples.

3.4 Data Collection Instruments

Case study research has no specific method of data collection which is unique to it as a method of inquiry. Researchers use whatever methods that seem to them appropriate and practical (Bassey 1999: 69). However, this research

employed questionnaire, interview and document analysis from both primary and secondary data sources.

Two types of data gathering instruments were used to obtain data from primary sources: questionnaire and interview. A questionnaire is a device consisting of a series of questions dealing with some psychological, social, educational, etc topic sent or given to an individual or a group of individual, with the objective of obtaining data with regard to some problems under investigation (Koul, 2006: 146). The questionnaire was prepared to gather data from members of the CSE with the following eight sections:

Section I: Personal information

Section II: Education level of the respondents

Section III: Activities and objectives of the CSE

Section IV: Participation of CSE in the secondary school curriculum planning.

Section V: Participation of CSE in the secondary school curriculum implementation

Section VI: Participation of CSE in the Secondary School Chemistry curriculum Evaluation.

Section VII: Factors affecting participation of CSE in the secondary school Chemistry curriculum planning, implementation and evaluation.

Section VIII: The opinion of the respondents.

The semi structured interview items were used to secure relevant information from the vice president of the CSE, director of ICDR and Chemistry subject specialist in ICDR. Interview was also held with Addis Ababa City Administration Education Bureau curriculum expert. An interview provides an opportunity to the interviewer to question through certain area of study. It permits greater depth of response which is not possible through any other means (Koul, 2006:179). Based on this understanding the researcher used the interview to question about the participation of CSE in the curriculum planning, implementation and evaluation as well as the opinion of the

interviewees on the factors that hinder the participations of CSE in these processes.

Gathering data by studying documents follows the same line of thinking as observing or interviewing. Documents serve as substitutes for records of activity that the researcher could not observe directly (Stake, 1995: 68). Therefore, a document analysis which makes use of compilation of data from records, reports and letters was done in the CSE office.

3.5 Procedure of the Study

After data collection instruments were designed based on the available literatures and peer review, instruments were presented to the advisor and used to collect data. The questionnaire was distributed to research participants of the study by the researcher himself. The interview with the above mentioned interviewees was carried out in such a manner that the interviewees were visited and briefed on the objectives of the study and upon agreement as to the day and time of their convenience to hold the session.

3.6 Data Analysis

The collected data from the questionnaire were organized and framed to suit analysis and interpretation was made by categorizing the level of rates of the respondents to each item as positive (those items rated by participant as strongly agree and agree); as neutral (for undecided options); and as negative (for those items rated by participants as disagreed and strongly disagree) in order to provide answer to the basic questions. Percentage and aggregate mean were employed to describe the data quantitatively and tables were used to summarize the data. Data obtained from document analysis and interview was used to complement and support the quantitative data. The responses of the interviewees were presented with pseudo names in order to render anonymity.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

The purpose of this study was to assess the participation of CSE in the secondary school Chemistry development by focusing on the curriculum planning, implementation and evaluation processes.

In this chapter the data collected through questionnaire, interview and document analysis were presented with the help of tables followed by descriptive statements to give answer to the four basic questions raised in the study.

The first part presents the background information of the respondents, the level of participation of the respondents and the members' response about objectives and activities of CSE; the second and the main part deals with analysis and interpretation of data based on the results of questionnaire, interview of the respondents and analysis of documents.

4.1 Background of the Respondents

The respondents included in this study were members of the CSE. The background information of these respondents is summarized in table 1 below:

Table 1: Background information of the respondents

No	Item		Respondents	
			No	%
1	Sex	- Male	42	100
		- Female	0	0
2	Age	- 20-29	4	9.5
		- 30-39	21	50
		- 40-49	12	28.6
		- 50 and above	5	11.9
3	Education level	- 12 + 3	1	2.4
		- Student at higher institute	1	2.8
		- diploma	1	2.4
		- 1st degree	21	50
		- 2nd degree	14	33.3
		- Ph.D	4	9.5
4	Occupation	- High School teacher	10	23.8
		- Higher institute teacher	21	50
		- Chemist at industry	6	14.3
		- Other	5	11.9

All of the respondents (100%) were males. But it does not mean that all the member of the CSE are male (see table 1). Those members who were available during the data collection period were male. Of course, this data indicates the number of female members is not comparable with the male members.

Regarding the ages of respondents, 21 (50%) of them fall in age category 30-39 years. The remaining 12 (28.6%), 4 (9.5%) and 5 (11.9%) were found between 40-49 years, 20-29 years and 50 and above years respectively. This implies that the large number of members of the CSE was adult age group and could able to be the member for another long period of time in the future.

With respect to educational background (Education level) majority of the members 21 (50%) had first degree; 14(33.3%) had second degree; 4 (9.5%) had Ph.D, 1(2.8%) was a student at Addis Ababa University; 1(2.4%) had diploma in Chemistry and 1(2.4%) had 12+3 qualification. The two students had first degree, but they were following their education for further education level. The data implies that most of the members the CSE have first degree, especially in chemistry.

Concerning their occupation, about 21(50%) of the available samples were teachers at higher institute (Addis Ababa University and Kotebe College of Teacher Education). The other 10 (23.8%) were high school Chemistry teachers; 6(14.3%) Chemists at various industries and the rest 5(11.9%) were working at Government organizations, working independently and following their further education. This data implies that the majority of available respondents were people working in area of teaching Chemistry in high schools and in higher institutes.

Table 2: The level of participation of respondents in the activities of CSE

No	Item	In No	In %
1	Year of Membership		
	1-5	15	35.7%
	6-10	13	31.0%
	11-15	5	11.9%
	15 and above	9	21.4%
2	Attendance in the congresses, workshop, conference and other meetings organized by CSE		
	Yes	42	100%
	No	0	0%
3	Frequency of attending the workshops meeting organized by the CSE		
	- All the time when there is a meeting	13	31.0%
	- Some times	27	64.3%
	- Only annual congress	2	4.8%
4	Receiving the publications of the CSE		
	Yes	33	78.6%
	No	7	16.7%
	Others	2	4.8%

Regarding years of membership of the respondents, 15 (35.7%) of them were fall in the year group 1-5 years; 13 (31.0%) were fall in the year group 6-10 years; 5 (11.9%) of the respondents were fall in the year group 11-15 years; and 9 (21.4%) of them were members of the CSE for 15 and above years. The data implies that most of the respondents were members of the CSE from 1 to 10 years and this indicates that the number of members increased for the last ten years.

The CSE organized a number of workshops, symposium, panel discussion and a series of uninterrupted annual congresses under various themes since its inception. According to table 2, all the respondents, 42(100%) were attained meetings, congresses, workshops, conferences, or the like. This indicates that the respondents are active in there association and could tell about the activities of CSE that will contributes to the reliability of the data.

Regarding the frequency of members attending these meetings, 13 (31%) of them attended all the meetings organized by the CSE; 27(64.4%) attended the meetings sometimes and only 2(4.8%) of them attended the annual congresses.

The society has two publications the Bulletin of the CSE that is published biannually since 1987 and the 'solution' which is also publishing biannually starting for 1993 (CSE, 1994, 2008). These publications were sent to actively participated members through their postal address. When it comes to receiving publications of the CSE majority of the respondents, 33(78.6%), did receive the publications; about 7(16.7%) did not receive the publications; and only 2(4.8%) did receive for few times.

In general, from the questionnaire and information obtained from the CSE office the two publications of the society were received by most of the members. This implies that the members obtained information about scientific research findings; about CSE; and about other information focusing on chemistry.

Objectives and Activities of CSE

It is known that any form of association is organized based on certain objectives. To achieve its objectives, the association plans activities and performs its duties or functions. In line with this understanding, research participants were asked to what extent they agree or disagree with various statements that describe objectives and activities of the association and their responses presented in table 3 below.

Table 3: Members Response Regarding the Objectives and Activities of CSE

No	Item	Alternatives									
		5		4		3		2		1	
		No	%	No	%	No	%	No	%	No	%
1	The CSE has clearly stated objectives	24	57.1	16	38.1	1	2.4	-	-	1	2.4
2	The objectives of the CSE are related with Chemistry education.	13	30.9	22	52.4	6	14.3	1	2.4	-	-
3	The activities of the CSE in relation to Chemistry education are clear and can be easily recognized	9	21.4	19	45.2	8	19	5	11.9	1	2.4
4	The publications like journals, bulletins, news letter and the like, indicate the role of the CSE in promoting the Chemistry subject	10	23.8	23	54.8	7	16.7	2	4.8	-	-
5	Congresses or conferences prepared by the CSE are relevant for Chemistry education in secondary schools.	2	4.8	24	57.1	12	28.6	4	9.5	-	-
6	CSE gives services for the members to share their experiences about the Chemistry education.	2	4.8	17	40.5	13	31	6	14.3	4	9.5
7	Current and new information about activities of CSE provided to the members easily	6	14.3	18	42.9	6	14.3	8	19	4	9.5

The first two items of table 3 were about objectives of CSE. Item 1 state that the CSE has clearly stated objectives and item 2 states that the objectives of CSE are related with Chemistry education. For the first item, almost all respondents, 40 (95.2%), positively described the extent of their agreement, except 1(2.4%)

respondent who was undecided and another 1(2.4%) respondent negatively expressed his agreement.

Similarly, for item 2, majority of the respondents, 35 (83.3%), were positively responded. Few respondents, 6(14.3%) were undecided and only 1(4.8%) respondent negatively responded to the item. From the document analyzed, CSE has the following objectives:

> *To promote and develop Chemistry education and research; to provide forum for the exchange of ideas through publication and meetings; to popularize chemistry, especially in schools; to enhance the participation and collaboration of chemists in matters pertaining to policies in curriculum development and training of chemists; to establish close relationships among chemists and other professionals engaged in Chemistry fields so as to increase the role of Chemistry in national development; to promote the improvement and the qualification of members; and to establish and strengthen links with other societies, national and international, which pressure similar aims (CSE, 2007).*

Both data obtained from questionnaire and document indicates that the CSE has clearly stated objectives and the objectives are related with Chemistry education. This implies that CSE stated objectives have enabled the society to work around the development of Chemistry profession, popularization of Chemistry and improvement of its members. However, a certain limitation was observed in the objective of CSE. Though the intention of the society to participate in curriculum development and training of chemists was indicated no indication has made its intention to participate in Chemistry teachers training. To popularize Chemistry at school levels, the role of Chemistry teachers is not questionable, and not having a statement about the training of the teachers implies the weakness of the society to participate in Chemistry education at school level. Moreover, more recognition was given to the professional role of chemists, but not to Chemistry educators.

Regarding item 3, which state the extent to which the activities of CSE in relation to Chemistry education were clear and be easily recognized. The majority of respondents, 28(66.7%) indicated their agreement positively. On the other hand, the rest of research participants, 14(33.3%), were either undecided or negatively indicated their disagreement. The analyzed document showed that the activities of CSE which include organizing chemical science research findings and information exchange forum; and publishing and disseminating findings and information through annual scientific conference, workshops, panel discussions, seminars, lectures, symposiums, anniversaries, Chemistry open day competition and other CSE sponsored activities (CSE, 2007). These data indicate that the activity of CSE in relation to Chemistry education were clear and can be easily recognized.

Item 4 of table 3 refers about the publications of CSE in relation to promoting Chemistry education. From the questionnaire it was obtained that around 33(78.6%) research participants positively expressed their agreement, whereas few of the respondents, 7(16.7%), were neutral (undecided) and only 2(4.8%) respondents negatively respond. Similarly, the analyzed documents indicated that the two major publications of the CSE provide information about scientific findings; and information around chemical education to the members and other interested bodies. These data imply that the publications indicate one of the activities of CSE in promoting Chemistry education.

Item 5 in the same table requested the research participants to indicate the extent of their agreement on the relevance of conferences and congresses prepared by CSE to the secondary school Chemistry education. More than half of the respondents, 26(61.9%), were positively expressed their agreement. However, the rest of the respondents, 16(38.1%), were either neutral or negatively responded. The analyzed document was also showed that congresses or conferences were organized by CSE. Especially, the annual congresses took place from the establishment of CSE until this year, February, 2008, for 24 times (CSE, 2008). The congresses had the following sessions: the basic

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research; Chemistry in industry; Chemistry in agriculture; environmental chemistry; and chemical education. These data reveal that the congresses organized by the CSE were relevant and directly or indirectly contributed to Chemistry education at school level. However, comparing to the emphasis given to scientific session, the emphasis given to Chemistry education was marginal.

Regarding item 6, that is, CSE gives services for the member to share their experiences about Chemistry education, less than half of the respondents, 19(45.2%) positively expressed their agreement, but around 23 (54.8%) of the research participants were either neutral or negatively responded. This data contradicted with the five items which were positively agreed by majority of the respondents above. This implies that members were either expected especial services from the society to share experiences or they did not consider existing activities of CSE as service rendered to its members and other concerned bodies.

Concerning item 7 of table 3, current and new information about activities of the CSE provided to the members easily, more than half of the participants, 24(57.1%) were positively responded, but the rest of the participants, 18(42.9%), were either neutral or responded negatively. Even if more than half of the respondents agreed on the statement, considerable numbers of them were not. This shows that the members were either considered the information provided by CSE not enough or did not read the information provided. The analyzed volumes of "Solution" the news letter of CSE, (look at appendix D) presented information about performed and planned activities of the CSE.

In general, majority of the respondents positively showed the extent of agreement on most of the items listed in table 3. This implies that CSE was organized with moderately clear objectives and performs important activities to promote and develop the Chemistry profession and the chemical education in Ethiopia. It is also possible to see from the above results that the objectives and the activities of CSE were known by the members of the society. However, as a professional association that stands for popularization of Chemistry in the

country, the emphasis given to training of Chemistry teachers in the objectives and listed activities of CSE was very weak.

4.2 Participation of the Chemical Society of Ethiopia in the Secondary School Curriculum Planning, Implementation and Evaluation

Under this section data from questionnaire, interviews and document analysis were presented and analyzed to assess the level of participation of the CSE in the secondary school curriculum planning, implementation and evaluation processes.

4.2.1 The Participation of CSE in the Secondary School Chemistry Curriculum Planning Process

The participation of professional association in the curriculum planning process has a number of advantages. Among these advantages the following are major one: identify the needs of the society using researches; provide experiences from actual environment of practice to be included in the contents; provide information about new findings from researches in a given subject area, and providing information about how to evaluate students performance.

Based on this understanding the responses of the members of CSE concerning the participation of the CSE in the secondary school Chemistry curriculum planning process were presented in table 4 below.

Table 4: Members Response about the Participation of the CSE in Secondary School Chemistry Curriculum Planning

No	Item	Alternatives										Mean
		5		4		3		2		1		
		No	%	No	%	No	%	No	%	No	%	
1	CSE participates in the current secondary school Chemistry curriculum planning.	3	7.1	7	16.7	25	59.5	4	9.5	3	7.1	3.07
2	Members of CSE fill questionnaire or other survey relevant to get information about required needs.	2	4.8	7	16.7	15	35.7	12	28.6	6	14.3	2.69
3	CSE participates in the evaluation process of the curriculum planning process.	-	-	8	19	22	52.4	12	28.6	-	-	2.90
4	CSE sets standards for the contents and learning experiences of the secondary school Chemistry to help the curriculum planners.	1	2.4	4	9.5	15	35.7	20	47.6	2	4.8	2.57
5	Members of CSE participate in the planning process by sharing their work experience to curriculum planners through publications or meetings.	1	2.4	12	28.6	13	31	11	26.2	5	11.9	2.83
6	Members of CSE participate in the planning process by writing, editing and assessing the textbooks, syllabus, etc during planning	3	7.1	22	52.4	6	14.3	4	9.5	7	16.7	3.24
7	CSE did not participate in the planning process because planning is the duty of MOE/ICDR	9	21.4	10	23.8	12	28.6	4	9.5	7	16.7	3.24
	Aggregate Mean											2.93

For item 1 of table 4, research participants were asked whether CSE did participates in the current secondary school Chemistry curriculum planning. Only 10(23.8%) of respondents were positively agreed with the statement. Majority of research participants, 25(59.5%) were neutral and the rest of them, 7 (16.7%), were responded negatively; similarly, item 7 of the same table states that CSE did not participate in the planning process because planning was taken as the duty of MOE/ICDR. Considerable number of respondents, 19(45.2%) positively expressed their agreement. However, majority of the respondents, 23(54.8%), were either neutral or responded negatively.

This situation becomes clear when R1 the vice president of CSE refers the case of participation when he said:

> *The participation of CSE in the curriculum planning process was not direct participation, means the CSE was not in the committee or other forms of Curriculum planning group. However, the participation was indirect, that is, its members were participants in curriculum planning process, not by representing the CSE (27/03/08).*

Similarly, the director of ICDR described the participation of CSE or other professional associations in curriculum planning processes as follows:

> *At the beginning, professional associations were participants as stakeholders of the country's education during the preparation of the secondary school curriculum. Of course, professional associations were not participated in all processes of the curriculum planning, but they were invited to comment on the prepared curriculum in relation to their subject area. Again, before four years ago, at the time that the curriculum was improved, they were invited to present their ideas". (R2, 14/04/08).*

The data obtained from the questionnaire reveal that majority of the respondents, 32(76.2%) for item 1 and 23 (54.8%) for item 7, were either responded neutral or responded negatively. Similarly the information from the interview indicated that the participation of CSE in the secondary school Chemistry curriculum planning process was not direct and it was only in the workshops prepared to improve the curriculum. In the curriculum for grade 9 and grade 10 Chemistry; and curriculum for grade 11 and grade 12, it was

indicated that there were workshops prepared by ICDR to improve and finalize the curriculum using constructive comments, proposals and recommendation of participants (ICDR, 1999, 2000). There were two representatives of the CSE in these workshops.

The data implies that the participation of the CSE in the secondary school curriculum planning was insignificant. The result also implies that the CSE did nothing to participate in the curriculum planning process and also the ICDR did not allow the participation of the CSE in major curriculum planning stages except commenting on finalized curriculum document.

During curriculum planning, the planners collect information about required needs from different sources and one of the sources of information is subject expert. Such kind of experts can be easily accessed through their professional association. As the member of the association, they cooperate in filling questionnaires and other type's surveys and studies (Saylor and Alexander, 1958).

Item 2 requested research participants the extent of agreement on whether members fill questionnaire or other survey to get information about required needs of the subject. For this item considerable number of participants, 15(35.7%) were neutral and also other considerable number of respondents, 18(42.9%) responded negatively. Only 9(21.4%) of the participants positively answered the questions.

This data indicated that, questionnaire or other survey studies were not used. Of course, most of the participants of this study, 28(66.7%), were members for ten or less than ten years as indicated in table 2. Therefore, they may not have chances to fill such questionnaire. However, since the curriculum planning and improvement of the curriculum are not one time processes, different instruments should be applied to gather information continuously from sources like subject experts.

Item 3, item 4 and item 5 of table 4 refer about the forms that CSE participated in curriculum planning process. Item 3 was about the participation CSE in the evaluation of curriculum planning process. Hence, majority of research participants, 34(81%) were either neutral or negatively responded with only 8(19%) participants who responded positively. Item 4 was about standards setting by CSE for the contents and learning experiences of secondary school chemistry. Most of the respondents, 15(35.7%) and 22(52.4%) were responded neural and negatively respectively. Only 5(11.9%) participants were positively indicated their extent of agreement. Item 5 was about the participation of the members in the planning process by sharing their experiences through publications or meetings. For this item 29(69%) of research participants were either neutral or negatively responded while 13(31%) of them positively rated the item. Regarding the forms of participation of CSE in curriculum planning process, the vice president of CSE said that:

> *As I have said before, the participation of CSE was not direct. In other word direct involvement or engagement was not exercised. However, informal experience sharing occurs all the time. The CSE was not requested by the concerned authorities to directly involve in curriculum planning process. The CSE showed its interest to carry out such responsibilities different times, but no request or invitation from the concerned Government organization was reached to the CSE to directly involve in curriculum planning process". (R1, 27/03/08).*

Although filling of questionnaire is an important input for planning the publication of CSE were considered as important input as filling questionnaire. This fact was reflected by the words of the vice president as:

> *The publications of CSE could be useful for the planning process, because they include information about chemistry; research findings are presented in the publications; and also CSE uses the publications to inform its activities and communicate with those which are interested on Chemistry education. Therefore, I believe that the publications are very important for curriculum planning processes. Not only for planning they are also important for the implementation and evaluation of a curriculum (27/03/08).*

In relation to the above items, the analyzed document indicated that, there was invitation from ICDR to CSE to participate in workshop related to science and technology education. In addition the first edition of the high school Chemistry textbooks were edited by some selected members of CSE, of course, not representing the society.

Furthermore, the abstracts of research papers presented on twelve annual congresses (look at appendix-E) indicate that twenty six papers were presented on Chemistry education and all these papers can be used as source of information for planning process. Similarly about sixteen volumes of "solution," the news letter of CSE, were analyzed and all the analyzed volumes include information about contents, learning experiences and methods of evaluation in Chemistry education; and all of them can be used as sources of information for curriculum planning.

The results obtained so far indicate that the participation of CSE in the curriculum planning process, either by evaluating the process or by providing information through publications, was not considerable. This implies that, CSE was not directly engaged in curriculum planning processes even if it was indicated in its objective. The CSE did not act proactively and expected invitations to participate in the planning process.

The results also imply that the concerned Government body, ICDR, did not use CSE as potential source of information for the planning process. There were no indications that showed ICDR used publications of CSE as sources of information for planning process, even if the officials of ICDR believed the publications are very important sources of information.

4.2.2 Participation of the CSE in Secondary School Chemistry Curriculum Implementation

The expected activities of CSE in curriculum implementation process were identified from literatures and experiences of similar professional associations. Under this section data from questionnaire, interviews and document analysis were presented to assess the level of participation of the CSE in the secondary school Chemistry curriculum implementation. The responses of the participants were summarized and presented in Table 5 below.

Table 5: Members Response on the Level of Participation of CSE in Secondary School Curriculum Implementation

No	Item	Alternatives										Mean
		5		4		3		2		1		
		No	%	No	%	No	%	No	%	No	%	
1	CSE works together with schools to promote the Chemistry education according to the objectives of the society	6	14.3	20	47.6	12	28.6	4	9.5	-	-	3.67
2	CSE provides consultation service to school teachers on the Chemistry subject	4	9.5	8	19	14	33.3	12	28.6	4	9.5	2.9
3	CSE provides new information about the Chemistry subject through publications.	11	26.2	20	47.6	5	11.9	6	14.3	-	-	3.86
4	CSE assist schools by preparing supplementary materials like reference books, laboratory manuals, work sheets, solved problems and others	2	4.8	12	28.6	11	26.2	12	28.6	5	11.9	2.86
5	CSE organizes and supports school Chemistry (science) clubs.	3	7.1	20	47.6	12	28.6	7	16.7	-	-	3.45
6	CSE prepares (organizes) meetings between members including teachers to share their experiences	8	19	15	35.7	8	19.0	8	19.0	3	7.1	3.40
7	CSE prepares Chemistry Olympiad (question and answering competitions) and other experiment competitions among schools.	21	50	18	42.9	2	4.8	1	2.4	-	-	4.4
8	CSE prepares workshops and other trainings to teachers.	3	7.1	7	16.7	17	40.5	10	23.8	5	11.9	2.83
9	The CSE prepares Chemistry teachers professional standards	1	2.4	2	4.8	21	50	12	28.6	6	14.3	2.53
10	CSE supports the pre-service and in-service trainings for Chemistry teachers.	1	2.4	8	19	18	42.9	10	23.8	5	11.9	2.76
11	The participation of the CSE in the implementation of the Chemistry curriculum improves the attitude of students towards the subject.	7	16.7	13	31	14	33.3	7	16.7	1	2.4	3.43
	Aggregate Mean											3.28

Item 1 of table 5 states that CSE work together with schools to promote the Chemistry education according to objectives of the society. Most of the respondents, 26(61.9%), were responded positively, where as some of them, 12(28.6%), were neutral and few of them, 4(9.5%) expressed their disagreements.

Participants were further asked to rate the level of participation on some forms of collaboration between CSE and the schools. For example, consider item 2 and item 4 of the same table. Item 2 refers provision of consultation service to the school teachers by CSE and item 4 refers the preparation of supplementary materials to the subject by CSE. For both items, majority of the respondents, 30(71.4%) for item 2 and 28(66.7%) for item 4, were either neutral or disagree with the statement. Although most of the research participants positively agreed on the collaboration work between CSE and schools, there are some contradictions on the agreements of the respondents in the forms that CSE works together with schools. In relation to this the vice president of CSE said that:

> *CSE was not again directly involved in the curriculum implementation process. However, there were different activities it performed with schools to support the curriculum implementation. CSE prepared open day Chemistry computation to secondary school students; encouraged secondary school teachers and students to get experiences from AAU Chemistry department (because the students will enter higher education after completing secondary education); by finding sponsors, the CSE provided training on the laboratory experiments and donated laboratory kits to secondary schools; and the like were major activities that CSE worked with schools. Of Course, to make such activities continuous and strong, the request should come from the schools not from CSE; because it is difficult to CSE to reach to all schools unless the schools initiate the communications (R1, 27/03/08).*

The analyzed documents (CSE, 1998, 1999, 2005) also indicated the presence of some forms of activities that the CSE performed with schools to promote Chemistry in the schools.

All these data imply that there were few activities that CSE worked with schools as it was stated in its objectives. However, provision of consultation service to Chemistry teachers and preparation of supplementary materials like reference books, laboratory manuals and work sheets and the like were not emphasized. Experiences of other nations revealed that professional association were active in this regard. The National Science Foundation (NSF) was worked with scientists and teachers, and developed materials like textbooks; equipments designed for learning; and teaching aids like educational film and television presentations, sources books and guide book for teaches, paper back books on supplementary topics for students, and correlated combination of all these (NSE, 1958). Comparing to such kinds of activities, the CSE performed insignificantly.

Item 5 of table 5 members were asked support CSE provides to schools. Regarding this item, most of the respondents, 23(54.8%) were agreed positively and considerable number of research participants, 19(45.2%) responded to the item either undecided or negatively. Similarly, the vice president of CSE, in relation to the above fact, suggested that:

> *Some science clubs were obtained support from CSE, even if CSE does not financially support schools. The CSE has a financial problem, because of this, supporting of school clubs did not include financial support" (R1, 27/03/08).*

The analyzed documents indicated that some school clubs that initiated communication with CSE obtained support. A letter which indicates a two hundred birr donation to the Holeta secondary school science club and a letter indicates a five hundred birr donation to Sebeta secondary school to support the Chemistry day ceremony were some documents that showed the support and communication of CSE with schools science or Chemistry clubs.

The results imply that there were communications between the CSE and few science clubs from three schools. But the communications were not as such significant and continuous. The activities of CSE reveal that its involvement in

the organizing and supporting of school clubs was weak and mainly initiated by the school clubs rather than by the CSE. This may imply that the society not accomplishing one of its objective-popularizing Chemistry especially at school level.

Item 8 of the same table requested the research participants to indicate the extent of their agreement on CSE prepare workshops and other trainings to teachers. Among the research participants, only 10(23.8%) were positively supported the item. On the other hand, majority of them, 32(76.2%) were either neutral or negatively responded to the item.

The CSE organized workshop, symposium and panel discussion to support curriculum implementation. Among these activities the following were major workshops and panel discussions organized so far (CSE, 2008).

- Demonstration experiment in Chemistry (January 5, 1994);
- Science education in high schools (April 5, 1995);
- Science education in view of the new education and training policy (November 30, 1996);
- Chemistry open day competitions between high school students since 1997 (takes place six times);
- Participation of female students in the science field (April 17, 1999);
- Teaching Chemistry in high school (October 7, 2000);
- Teaching high school Chemistry (September 26, 2003);
- The green Chemistry (January 5, 2005).

The result implies that most of the workshops and training prepared by CSE were not specifically prepared to teachers. The number of workshops and panel discussions on the chemical education were not significant comparing to the workshops and panel discussions prepared on scientific researches and related fields. Even, no evidence obtained to see the participation of CSE in training of Chemistry teachers.

Professional associations perform functions like guarantee the professional competence; guarantee professional conduct of its members; and work to rise the status of the profession (Stinnett, 1968: 66). This can be achieved by providing and organizing trainings, workshops and the like to the members of the associations. In this regard the activities performed by CSE were inadequate, unless Chemistry teachers were not considered as the member of CSE.

Regarding setting of Chemistry teachers' professional standards, majority of the research participants, 39(92.9%), were unable to decide or negatively respond on the statement. Only 3(7.1%) of the participants were positively agreed on the statement.

To improve the quality of education and to facilitate the implementation of curriculum, it is believed that setting professional standards (code of ethics) for the teachers is important. Based on this understanding, the Regional Education Bureau (or MOE) made an attempt to prepare code of ethics to Chemistry teachers and perform their activities.

The Addis Ababa Education Bureau curriculum expert said the following about their relation with the CSE to perform activities useful for curriculum implementation.

> *The Education Bureau, as far as I know, did not work with CSE in any of the mentioned ideas. We know the presence of the society and we heard about their activities through different media. But the CSE did not allow us to work with it, and I do not think that the bureau also allowed the involvement of such association in the implementation matters. Of course, it is known that working with such associations (societies) is important to facilitate the implementation process, but there was no considerable communication with them. (R3,16/04/08).*

In addition to the Education Bureau curriculum expert, the vice precedent of the CSE said the following in relation to code of conduct (professional standard);

There is no professional standard or code of ethics to Chemistry teaches prepared by CSE. This is out of the competence of the CSE. The role of CSE could have played was advices the concerned bodies, (R1, 27/03/08).

Since professions have a monopoly on the knowledge associated with their field, only persons within the profession can determine standards of education and training necessary to ensure that the knowledge of the field is attained. This includes determining standards for all specialists within a profession (Bowman et. al 2004: 25). Therefore, the CSE, as a professional association working for the development of Chemistry in the country, should participate in the preparation of code of ethics or professional standards, especially for Chemistry teachers. However, the results from questionnaire and interviews indicated that there were no professional standards prepared by CSE. This may be either because the CSE was expected invitation from other bodies, like MOE or Regional Education Bureau, instead of showing its initiation to participate in such activities, or because the concerned Government bodies had no clear understanding about the functions of the CSE as professional association and expected more initiation from the CSE.

In general, results obtained from the research participants in table 5 and information from document analysis and interview indicated that there were some activities that show the level of participation of the CSE in curriculum implementation activities. However, provision of consultation services to teachers; organization of trainings for teachers; preparation of supplementary materials; and preparation of professional standards to Chemistry teachers, were not performed by the CSE in significant ways. In addition, the concerned governmental bodies did not recognize the activities of the CSE in the curriculum implementation process. These all imply that the participation of the CSE in the secondary school Chemistry curriculum implementation was not adequately visible.

4.2.3 Participation of the CSE in Secondary School Chemistry Curriculum Evaluation

Curriculum can be evaluated from several points of view such as evaluation of overall students' achievement; evaluation of materials; evaluation of specific objectives; evaluation of learning difficulties and conceptual demands of the curriculum; and evaluation of examinations as a tool for curriculum evaluation (Njabili, 1999: 55). According to Tyler (in Abebe, 1999: 95) curriculum evaluation is used to make periodic check of effectiveness of the program; to verify the hypotheses upon which the curriculum operates; to provide a sound basis for public relations; and to help both teaching staff and students clarify their purposes and see more concretely the direction in which they are moving forward.

Based on these concepts the level of participation of the CSE in secondary school Chemistry curriculum evaluation was assessed and the data from the questionnaire, interview and document analysis were presented in this section.

The expected activities of the CSE in the curriculum evaluation process were identified and presented to the research participants. The extent of agreement of the participants on the listed items was summarized and presented in table 6 below.

Table 6: Members response about the level of participation of the CSE in secondary school curriculum evaluation

No	Item	Alternatives										Mean
		5		4		3		2		1		
		No	%	No	%	No	%	No	%	No	%	
1	CSE participates in the evaluation process of secondary school Chemistry curriculum	1	2.4	5	11.9	25	59.5	9	21.4	2	4.8	2.86
2	CSE evaluates the students textbooks and teachers guides and provide feedback to ICDR/MOE	2	4.8	6	14.3	26	61.9	6	14.3	2	4.8	3.00
3	CSE participates in the preparation of standard tests for summative evaluations of student's achievement	1	2.4	3	7.1	22	52.4	14	33.3	2	4.8	2.69
4	The research articles and other presentations on the congress about Chemistry education can be used as the feedback for formative evaluation of the curriculum	5	11.9	27	64.3	5	11.9	5	11.9	-	-	3.76
5	The presentation mentioned in question 4 provided to the ICDR/MOE as feedback	2	4.8	13	31	21	50	5	11.9	1	2.4	3.24
6	CSE provide standards that can be used by ICDR/MOE to evaluate the curriculum	1	2.4	8	19	22	52.4	9	21.4	2	4.8	2.93
		Aggregate Mean										3.08

Item 1 of table 6 requested the respondents the degree of their agreement on the participation of the CSE in the evaluation process of secondary school curriculum. Majority of the respondents, 25 (59.5%), were neutral and about 11(26.2%) of the research participant negatively expressed their agreements. Only 6(14.3%) of them were positively responded to the item. Regarding this idea the vice president of the CSE said that:

> *The activity or the participation of the CSE in the evaluation process was not directly working with ICDR. The members may be participating in the evaluation processes without representing the society (R1, 27/03/08).*

The document analyzed revealed that the CSE was invited to provide ideas to improve the prepared curriculum materials at different times. This was supported by the ICDR director, according to him:

> *I can not answer the question that the CSE participated in Chemistry curriculum evaluation. But subject specialists were invited to participate in workshops that were held to evaluate the curriculum. The CSE or other associations are not expected to participate directly in the evaluation process and evaluate each part of the curriculum. But when stakeholders are expected to participate at certain point, the CSE or such kind of associations were invited and comment their ideas. (R2, 14/04/08).*

The data obtained from the questionnaire as well as information from documents and interview show that the CSE did not directly participate in the whole processes of curriculum evaluation. Of course, the participation of CSE may not be in summative evaluation, but CSE could participate in the formative evaluation through different means, either by participating on the workshops organized by ICDR, as it was done before, to gather feedbacks for formative evaluation of the curriculum, or by evaluating the materials or the curriculum and providing feedback to the ICDR.

Members were asked to describe the extent of their agreement on CSE evaluation of the students' textbooks and teachers' guides, and provided feedback to ICDR/MOE. For this item again the majority of the respondents, 26(61.9%), were neutral and only 8 (19%) respondents positively responded to

the question and another 8(19%) participants were negatively responded. According to the vice president of the society:

> *Evaluation of the curriculum and its materials like textbooks, teachers guides etc, is not the duty of the CSE; because the CSE has no competence to evaluate these materials unless it is requested by the concerned bodies (R1, 27/03/08).*

On the other hand, the analyzed document showed one time effort of the CSE to evaluation the Ethiopian high school Chemistry textbook in 1995.

The CSE conducted a survey study on Ethiopian high school chemistry: content of the textbooks, by organizing a three men working group on high school Chemistry under the executive committee of the CSE (CSE, 1996).

The specific objective of the group was to assess the "Content organization" of grade 9 to 12 textbook (trial edition of 1977). The group believed that curriculum developers of the country pay due attention to the points and suggestions which were raised in the study (refer the suggestions from appendix-F).

The results obtained from all data sources indicated that the CSE had no considerable contribution in the evaluation of the text books and teacher guides and provided feedback to ICDR/MOE for further summative evaluation. The results, especially the interview with the vice president of CSE reveals that the executive committee members did not consider the evaluation of Chemistry curriculum as the function of the CSE and believed that the CSE had no competence to evaluate the curriculum. But this was not the fact. As professional association, the CSE should provide feedbacks and constructive ideas to the concerned Government body (ICDR/MOE) to improve the curriculum at the same time to keep the quality of the chemical education.

The research articles and other presentations on the congress about Chemistry education can be used as the feedback for formative evaluation of the curriculum. In this regard most of the respondents, 33(76.2%), positively expressed their agreement. Only 10(23.8%) of the research participants were

either neutral or negatively responded. This implies that the research papers and other presentation on the congresses were rated useful as feedback in order to evaluate the secondary school curriculum.

Similarly, the Education Bureau curriculum expert, the subject specialist in the ICDR as well as the ICDR director believed that the research papers presented on the congresses of CSE could be useful and used as source of feedback for formative evaluation of the curriculum. However, they did not know whether these research papers were used as feedback by their offices.

The analyzed abstracts of the papers presented on the congresses of the CSE indicate that there were relevant research findings and papers presented on the congresses of the CSE. Among those papers the following can be taken as example: "problems in science education at the high school level" by Atrsaw Tassew which was presented on the 19th annual congress of the CSE in 2002; "Alternative conceptions of eight chemical concepts of general secondary and preparatory students of Addis Ababa" by Sileshi Yitabarek presented on 20th annual congress of the CSE in 2003; "The question we ask" by Bekele Tekola and "Developing thinking skills in Chemistry class rooms" by Temechegn Engida, which were presented on the 13th annual congress of the CSE in 1996; and the like.

The results obtained from the questionnaire and information from interview and document analysis indicate that the research papers presented in the congresses were very important for formative curriculum evaluation. This implies the congresses organized by the CSE were useful inputs to improve the secondary school curriculum evaluation. However, even if the presentations were vital to evaluation process, there were no clear indications that the papers were used by curriculum evaluators; and also the CSE had not clear ways to provide the papers as feed by to concerned bodies.

In general, the results obtained from table 6 indicated that most of respondents were neutral or negatively responded to some of the items listed,

and there was one item that majority of the respondents were positively expressed their agreement. This implies that the participation of the CSE in secondary school Chemistry curriculum evaluation was not significantly visible even for most of its members to positively or negatively responded the listed items.

Similarly, the interview and the document analysis revealed that the participation of the CSE in the secondary school Chemistry curriculum evaluation was not adequate and possibly not considerable. Therefore, the CSE should consider the Chemistry curriculum evaluation as its task and provides feedbacks by creating important linkages with concerned bodies. Similarly the ICDR should recognize the works of the CSE and its members in the curriculum evaluation process.

4.3 Factors Affecting the Level of Participation of CSE in the Curriculum Planning, Implementation and Evaluation.

There are so many factors that hinder the participation of stakeholders in curriculum planning, implementation and evaluation processes. To find out the factors that affect participation of CSE in these processes, data were gathered by using questionnaire and interview.

The data collected from the participants of the study using questionnaire was summarized and presented in table 7 below.

Table 7: Members response regarding factor affecting the level of participation of CSE in curriculum planning, implementation and evaluation processes

No	Item	Alternatives										Mean
		5		4		3		2		1		
		No	%	No	%	No	%	No	%	No	%	
1	CSE does not have clear objectives to participate in secondary school curriculum planning, implementation and evaluation	2	4.8	9	21.4	10	23.8	16	38.1	5	11.9	2.69
2	CSE does not have clear action plan to participate in the secondary school curriculum planning, implementation and evaluation.	-	-	12	28.6	16	38.1	13	31	1	2.4	2.93
3	CSE president and other executive officers work for some period of time because of this they do not focus on the participation of curriculum planning, implementation and evaluation	5	11.9	12	28.6	9	21.4	12	28.6	4	9.5	3.05
4	CSE does not have enough money to participate in curriculum planning, implementation and evaluation	5	11.9	17	40.5	10	23.8	6	14.3	4	9.5	3.31
5	The curriculum planning, implementation and evaluation processes are centralized by the Government	19	45.2	11	26.2	8	19.0	3	7.1	1	2.4	4.04
6	Members of the CSE do not take the participation of the society in the curriculum planning, implementation and evolution as the task of their society.	9	21.4	10	23.8	8	19.3	12	28.6	3	7.1	3.24
7	The absence of proper communication between the CSE and ICDR/MOE	18	42.9	17	40.5	6	14.3	-	-	1	2.4	4.21
8	CSE is not decision maker to change or improve the curriculum. Therefore, the participation of the CSE in the curriculum evaluation is not important	4	9.5	11	26.2	4	9.5	15	35.7	8	19	2.71
		Aggregate Mean										3.27

The finding reveals that CSE does not have clear objectives to participate in secondary school curriculum planning, implementation and evaluation, only 11(26.2%) of the research participations were positive to the statement, but half of the respondents, 21(50%), were negatively responded to the item. Only 10(23.8%) of the research participants were neutral to the statement.

This indicates that half of the research participants agreed that CSE has objectives to participate in curriculum planning, implementation and evaluation. However, the rest of half of the participants were either neural or agreed that CSE did not have such objective.

As it was described in the first section of this chapter under table 3, CSE has objective which is related to curriculum development process and training of chemists. However, this does not indicate the presence of a clear objective to participate in curriculum planning, implementation and evaluation processes. This may be due to the lack of taking curriculum planning, implementation and evaluation as mandatory professional exercise rendered by CSE, and also lack of taking proactive role and expecting initiation on the issue.

Item 2 refers about the action plan of the CSE to participate in curriculum planning, implementation and evaluation process. Only 12(28.6%) respondents were positive to the statement that CSE has no clear action plan, but most of the respondents, 30(71.4%) were either neutral or negatively expressed their agreement on the statement. This implies majority of the respondents either did not know the presence of action plan to participate in the mentioned activities or did not believe the presence of the plan. However, the researcher could not find action plan of CSE during its document analysis at the CSE office.

Regarding item 3 of the same table comparable number of research participant, 17(40.5%) and 16(38.1%), were positively and negatively expressed their agreement respectively on the CSE president and other executive officers work for short period of time and this made them to do not

concentrate on the curriculum planning, implementation and evaluation process. Only 9(21.4%) of the research participants were unable to decide on the item.

This implies, the term of position of the executive committees has some what its own influence. In addition to this, it is possible to see the influence of the occupation of the executive members. Most of the time majority of executive committee members was from AAU Department of Chemistry. For example, out of seven current executive committee members, four of them are from AAU Department of chemistry, one from private limited company, one from chemical factory and one from secondary school (CSE, 2008). Usually university teachers concentrate on academic research than school problems and concerns, and this could influence the participation of CSE in curriculum planning, implementation and evaluation.

Item 4 refers about financial capacity of CSE and states that the CSE does not have enough money to participate in curriculum planning, implementation and evaluation. More than half of the respondents, 22(52.4%) were positive to the item. However, the rest of research participants, 20(47.6%), were either neutral or negatively expressed their disagreements. This implies, money could be the problem of CSE to participate in the mentioned activities. However, the participation of professional association should not only be financial support, rather it should be more professional (expertise) assistance which may not require money. This expertise assistance was not adequate as it was described in the previous sections of this chapter.

With respect to item 5, that is, the curriculum planning, implementation and evaluation processes are centralized by the government, majority of the research participants, 30(71.4%), were positive on the item. Only 12(28.6%) respondents were either neutral or negative on the item. This indicates majority of research participants believed that the curriculum making is centralized by the Government. Soon after the publication of the Education and Training Policy of Ethiopia, ICDR produced a document that fits between the policy and

the school curriculum (syllabus, textbook, teachers guide and other supportive materials). However, the document represents a centralized curriculum making (Akalewold, 2005: 11). A centralized curriculum making leads to lack of clear communication, collaboration and trust build between the curriculum making body and other concerned bodies like professional associations.

In addition to this, lack of acknowledgment by curriculum agencies, ICDR and even Regional Education Bureau, in recognizing the potential use of professional association like the CSE hindered their participation in curriculum planning, implementation and evaluation.

A total of 19(45.3%) respondents were positive on the items that states members of the CSE do not take the participation of the CSE in curriculum planning, implementation and evaluation as the task of the society. Only 8(19.3%) of the respondents were neutral on the statement. The rest of the respondents, 15(35.7%), were negative on the item. This implies that this issue could be considered as one factor that impedes the participation of CSE in curriculum planning, implementation.

Majority of the respondents, 35(83.3%) were positively expressed their agreement on the statement that the absence of proper communication between the CSE and ICDR/MOE was the major factor that hindered the participation of the CSE in curriculum planning, implementation and evaluation. Only 7(16.7%) of the research participants were undecided. This implies the absence of communication between CSE and the Government bodies, ICDR, MOE or Regional Education Bureau.

The majority of the respondents, 23(54.8%), were negatively expressed their agreement on the statement that the CSE is not decision maker to change or improve the curriculum. Therefore, the participation of the CSE in the curriculum evaluation is not important. On the other hand about 15(35.7%) respondents were positive on the item; only 4(9.5%) respondents were undecided. This implies that the CSE should not be decision maker to

participate in the curriculum planning, implementation and evaluation processes. The participation of CSE in these processes is to improve the quality of Chemistry education and promote Chemistry in the country.

In addition to the listed items that the respondents were asked to describe their extent of agreement on the major factors that affect the participation of the CSE in the curriculum planning, implementation and evaluation processes, they also requested to list the factors that they believe hindered the activity of the CSE regarding the secondary school Chemistry curriculum. Among the lists the following were the most frequently described factors:

- lack of commitment by the executive bodies to break through challenges;
- lack of communication between the CSE and the Government body like ICDR, MOE, Regional Education Bureau as well as the secondary schools.
- weakness of the CSE to fully involve in curriculum planning, implementation and evaluation;
- CSE was dominated by the Chemistry department of AAU and mainly focused on advanced science issues, and also the congresses were mainly focused on advanced science issues with little emphasis towards secondary school Chemistry education.
- lack of time to the members and the executive bodies of the CSE to participate in such activities;
- lack of initiatives of the members of the CSE to participate in such activities;
- Most member of the CSE did not give due attention to Chemistry education at any level, and there was no trend from the very beginning to participate in the curriculum development;
- Lack of interest and taking initiation to participate in such activities.

Regarding the factors that affect the participation of the CSE in curriculum planning, implementation and evaluation, the vice president described the factors first by indicating his position about the participation of the CSE in secondary school curriculum planning, implementation and evaluation process followed by the factors. According to him:

> *The CSE should participate in curriculum planning, implementation and evaluation. Its participation is very important and it is mandatory; because the CSE is independent of the Government and works to popularize and standardize the chemical education.* Therefore, *I say the participation of the CSE is very important. In addition to this the CSE provides constructive and independent suggestions to improve the Chemistry education in Ethiopia. It should be known that the Government works closely with the similar professional association in such kinds of matters. When we look at the factors that affect the participation of the CSE in curriculum planning, implementation and evaluation the CSE has no competence by the responsible authority (the MOE can make better use of the CSE, if the CSE has competence to involve in such activities); lack of communication and interests from the Government side; and lack of financial capacity of the CSE to expand its capacity, are I think the major factors. Of course, the CSE has planned some activities, among them it plans to open teacher training centers and analytical service and training center* for chemists (R1, 27/03/08).

Similarly the ICDR director and the subject specialist in ICDR suggested their comment on the factors that affect participation of CSE (or other professional associations) in curriculum planning, implementation and evaluation processes. According to them the lack of appropriate focuses on the professional associations and not utilizing them effectively; the absence of professionals which can cite the future and working with professional

associations; ICDR mainly focuses on routine activities and not planning to work with professional associations; the professional associations have no courage to participate in such activities; they did not push the concerned Government bodies to participate in such activities, even if, the concerned bodies resist their participation; and lack of communication between the professional association and the ICDR; are the major factors that hindered the participation of professional associations in general and the CSE in particular in the curriculum planning, implementation and evaluation.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter contains three main parts. The first part is summary, where the whole procedure of the research and the main findings summarized. The second part is the conclusion which concludes the findings of the research. The last part shows the recommendations of the researcher.

5.1 Summary

The study was done to assess the participation of the CSE in the secondary school Chemistry curriculum planning, implementation and evaluation processes; and to identify factors that affect its participation in these processes. There were four major research questions which mainly focused on the level of participation of CSE in the above mentioned processes and also on the factors impede or facilitate the participation of CSE in these processes.

The literatures related to curriculum planning, implementation and evaluation; and experiences of professional associations in different countries were reviewed.

This research employed descriptive case study method and it was conducted by taking the CSE as the case point. To gather appropriate information and data; questionnaire and semi structured interview were prepared. In addition to these, the document analysis was done to support the data obtained from the questionnaire and interview. The questionnaire was distributed to the sample members of the CSE. The sampling technique employed to select the respondents was purposeful sampling technique. The sample members were working at different places like high school, Higher Education institutes, industries, Government organizations and in their own organization. The interview was made with vice precedent of the CSE, the director of ICDR, Chemistry subject curriculum specialist in ICDR and curriculum expert in Addis Ababa City Administration Education Bureau.

The gathered data were tallied, tabulated and interpreted based on the reviewed related literature and analyzed using percentage and mean values. In addition, the information obtained through interview and document analyses were presented in complementing the data obtained by means of questionnaire.

Based on the data the following major findings were obtained.

1. Regarding the level of participation CSE in curriculum planning process:
   - The aggregate mean result of the research participants is 2.93 and this indicates the majority of the respondents was either neutral or negatively rated the items listed to determine the level of participation of CSE in curriculum planning.
   - Similarly the information obtained from interview indicates that CSE was not directly participated in the Chemistry curriculum planning except in the workshops organized by ICDR to improve the curriculum.
   - Therefore, the obtained data imply that the level of participation of the CSE in the secondary school Chemistry curriculum planning process was not adequate.
2. Regarding the level of participation of CSE in the curriculum implementation at school level.
   - In relation to curriculum implementation, the following activities of the CSE were positively rated by majority of the respondents:
     - CSE provides new information about the subject through its publication, 31(73.8%) respondents;
     - CSE organizes and supports school Chemistry (science) clubs, 23(54.8%) respondents;
     - CSE prepares meetings between members including teachers to share their experiences, 23(54.8%) respondents; and
     - CSE prepares Chemistry Olympiad and experiment competition among secondary schools, 39(92.9%) respondents.

- In general, the aggregate mean of results obtained from the questionnaire, that was 3.28, reveals that most of the items listed (item 1, item 3, item 5, item 6, item 7 and item 11) to determine the level of participation of the CSE in the implementation process were positively rated by the participants.
- Regarding activities of CSE in the curriculum implementation there was presence of certain forms of participation of CSE in the implementation process, but not adequately visible and did not have recognition of the concerned Government bodies like ICDR/MOE, Regional Education Bureau as well as secondary schools.

3. Regarding the level of participation of CSE in the curriculum evaluation process:
   - Concerning this point, the aggregate mean, 3.08, reveals that for most of the items the majority of the respondents were unable to decide their position. Regarding research articles and other presentations on the congress about Chemistry education to be used as feedback for formative evaluation of the curriculum, around 33(76.2%) of the respondents were rated it positively.
   - Moreover, information obtained from the analyzed documents and interviews also showed that there were no considerable activities made by CSE to evaluate the curriculum.
   - In general, the results level that the participation of CSE in the curriculum evaluation process was inadequate.
4. Regarding factors that affect participation of CSE in planning, implementation and evaluation.
   - The results, concerning this point, from listed items and open ended question of the questionnaire, from interview and from the analyzed documents indicated the following were possible major factors that

hindered the participation of CSE in the curriculum planning, implementation and evaluation.

- CSE does not have enough money to participate in such processes (more than 50% of the respondents positively agreed on it);
- The curriculum development process centralized by the Government (about 71.4% of the respondents positively rated this as major problem) and also the ICDR/MOE, Regional Education Bureau as well as schools gave little recognition to the CSE and other similar professional associations as important and major stakeholders of the education system;
- Lack of commitment of the executive committee and the other members of CSE to participate in curriculum planning, implementation and evaluation;
- Lack of proper ways of communication between the CSE and the concerned Government bodies; and
- Lack of understanding between the CSE and the concerned Government bodies (ICDR, MOE and Regional Education Bureau)around the role of CSE in the mentioned activities around Chemistry education.

5.2 Conclusion

Based on the literature revised, the data collected, the analysis made, the finding obtained and the discussions held the following conclusions were drawn.

It has been agreed upon by many educators that curriculum planning process is not only done by the curriculum specialist and the subject matter specialist in schools or curriculum development centers. It also requires the participation of all concerned bodies inside or out side the school system. Among the number of recommended participants professional associations in education; teachers

associations and unions; specialist groups in subject matter; and the like are categorized as stakeholders of the education system out side the school district.

These participants can directly involved in the curriculum planning process by funding the planning process; by formulating objectives; by setting standard; by organizing the learning experience; and by evaluating the planned curriculum or the planning process itself.

These bodies can also be participants in the planning process indirectly through different ways like by providing advices to the planners; by providing important information about the subject using publications; and by organizing conferences and workshops to provide information to the planners as well as to their member or concerned bodies about the planning process.

In relation to this, it is possible to conclude from the findings of the study that the CSE did not effectively performed its expected roles in the secondary school Chemistry curriculum planning process and as well as in the responsible organization related with curriculum planning (development) ICDR has failed to use the CSE as a potential source in the planning process.

The implementation of the planned curriculum at school level can be supported by those which perform their duty outside the school system. Such bodies or organizations can provide services like training programs for key personnel, organizing workshops, seminars, and other meetings to discuss on matters of curriculum implementation; providing educational materials; providing and preparing supplementary materials; and providing continuous information on the implementation process through news letters, annual reports and others.

The findings about the level of participation of CSE in curriculum implementation process, indicated that limited activities were made by CSE to support the implementation process but those activities were not significantly visible. Therefore, it is possible to conclude that the CSE was not effective in supporting the implementation of Chemistry curriculum at school level and did

not able to promote and popularized Chemistry at school level as it was stated in its objective.

Regarding the participation of professional associations in the curriculum evaluation process, different views can be identified. In some countries, like US America, professional associations were observed participating in the evaluation of the outcomes of the curriculum by preparing standardized examinations. It is also possible to see the participation of such associations in the evaluation by providing feedbacks to the concerned bodies for formative evaluation of the curriculum.

Professional associations can evaluate the curriculum by conducting research or by funding researches that could be useful feedbacks to improve the curriculum. They may not be decision maker to change the curriculum but they could provide their professional support in order to improve the implemented curriculum.

Concerning to the level of participation of CSE in curriculum evaluation process, one can conclude from the findings that the CSE was failed to perform its expected roles in the curriculum evaluation process and also the ICDR was failed to consider the CSE as source of information to formative evaluation of the curriculum.

The findings of this research indicated the factors that were impeded the participation of CSE in the curriculum planning, implementation and evaluation processes. For the identified factors, it is possible to conclude that the factors were not out of control of the CSE and the concerned Government bodies; but the problems were emerged from both of them; because they were failed to work together in the planning, implementation and evaluation processes. In addition to this, the CSE was failed to perform its duties in relation to chemical education at high school level.

5.3 Recommendation

Based on the major findings and conclusion drown from the study, the following recommendations were forwarded.

1. The CSE should state its objectives and mission statement that clearly show the CSE's concern in the secondary school curriculum planning , implementation and evaluation processes; and also in the training of Chemistry Educators (Chemistry teachers).
2. The CSE should promote itself to increase the number of its members from secondary Schools to effectively participate in the curriculum implementation process at school level.
3. The CSE should create mechanisms to provide its professional services in relation to curriculum planning, implementation and evaluation to concerned bodies like ICDR/MOE, Regional Education Bureau and schools. This is not only to the CSE but also for the ICDR/MOE, Regional Education Bureau, schools and other bodies working within or around the education system, should create mechanisms to effective communication between them and the CSE.
4. A division (committee) which performs activities, in relation to curriculum planning, implementation and evaluation processes is advisable to do the activities continuously, in ordered manner. Therefore CSE should consider the formulation (organization) of education division (committee), under it to significantly involve in the mentioned activities as major stakeholder.

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APPENDIX-A

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

COLLEGE OF EDUCATION

Department of Curriculum and Teaching Professional Development Studies

A questionnaire to be responded by members of the Chemical society of Ethiopia (CSE)

This questionnaire is designed to solicit data for a research entitled; "an assessment of the participation of the Chemical Society of Ethiopia (CSE) in the secondary school Chemistry development". The main purposes of the research are to assess the participation of CSE in curriculum planning, implementation and evaluation and to identify the factors that affect participation of CSE in these processes. To this end, you are kindly requested to express your opinion. And your thoughtful responses are sought to be a great help to the success of this research. Therefore, please extend your cooperation by responding to the item contained in this questionnaire. Be sure that your responses are kept in strict confidence and be used for academic purpose only.

Thank you in advance for your cooperation!

Note:

1. There is no need to write your names or sign on the questionnaire
2. CSE= the chemical society of Ethiopia, MOE= Ministry of education; ICDR= Institute of curriculum development and research.
3. Curriculum planning refers the process of organizing ideas as to what learners should experience in the school setting.
4. Curriculum implementation refers the uses of planned program through out the school system.
5. Curriculum evaluation is an evaluation of the curriculum and its out comes for improvement, changes and addition of new ideas.

Section I: Personal information

The following are some personal information to be filled by the respondents. Please go through each item and indicate your response by putting check mark "✓" or suitable word in the appropriate space provided.

1.1 Sex Male ☐ Female ☐

1.2 Age 20-29 ☐ 30-39 ☐ 40-49 ☐ 50 and above ☐

1.3 Education level

Students at higher institute ☐ Second degree ☐

Diploma ☐ Ph. D ☐

First degree ☐ other (please specify) _____

1.4 Your occupation

Teacher at high school ☐ researcher at research institute ☐

Teacher at higher education institute ☐

Other (please specify)_____

Section II. Level of participation

2.1 For how long you be the member of CSE?

1 year ☐ 2-5 years ☐ 6-10 years ☐

11-15 years ☐ 15 years and above ☐ other (please specify) _____

2.2 Did you attained the congresses, conferences and other meetings prepared or organized by the CSE?

Yes ☐ No ☐ other (please specify)_____

2.3 How many times you attained the meetings?

At all times when there is meeting ☐

Some times ☐

Other (please specify) _____

2.4 Did you receive the publications and others relevant documents that indicate the work done so far and future plans about CSE regularly?

Yes ☐ No ☐ other (please specify)_____

Section III: The following are list of items that are related to the activities and objectives of the CSE. Place indicate the extent of your agreement by using a check mark "✓" in the appropriate scale options.

5= Strongly agree 4= Agree 3= Undecided 2= Disagree
1= Strongly disagree

No	Item	5	4	3	2	1
3.1	The CSE has clearly stated objectives					
3.2	The objectives of the CSE are related with the Chemistry education					
3.3	The activities of the CSE in relation to Chemistry education are clear and can be easily recognized.					
3.4	The publications, like journals, bulletins, news letter and the like, indicate the roles of the CSE in promoting the Chemistry subject.					
3.5	The congresses or conferences prepared by the CSE are relevant for the Chemistry education at sccondary schools					
3.6	The CSE gives services for the members to share their experiences about the Chemistry education.					
3.7	Current and new information about activities of CSE are provided to the members easily.					

Section IV. Questions related to the participation of the CSE in the planning process of secondary school Chemistry curriculum.

5= Strongly agree 4= Agree 3= Undecided 2= Disagree
1= Strongly disagree

No	Item	5	4	3	2	1
4.1	The CSE participates in the current secondary school Chemistry curriculum planning.					
4.2	The members of the CSE fill questionnaire or other survey relevant to get information about required needs.					
4.3	The CSE participates in the evaluation process of the curriculum planning process.					
4.4	The CSE sets standards for the contents and learning experiences of the secondary school Chemistry to help the curriculum planners.					
4.5	The members of CSE participate in the planning process by sharing their work experiences to curriculum planners through publications or meetings.					
4.6	The members of CSE participate in the planning process by writing, editing and assessing the textbooks, syllabus, etc during planning					
4.7	The CSE does not participate in the planning process because the planning process is the duty of MOE/ICDR					
4.8						

Section V: The following are list of items that are related to the participation of the CSE in the secondary school Chemistry curriculum implementation at school level.

5= Strongly agree 4= Agree 3= Undecided 2= Disagree
1= Strongly disagree

No	Item	5	4	3	2	1
5.1	The CSE works together with schools to promote the Chemistry education according to the objective of the society.					
5.2	The CSE provides consultation service to the school teachers on the Chemistry subject.					
5.3	The CSE provides new information about the Chemistry subject through publications.					
5.4	The CSE prepares supplementary materials like reference books, laboratory manual worksheets, solved problems and others.					
5.5	The CSE organizes and supports school Chemistry (science) clubs					
5.6	The CSE prepares (organizes) meetings between members including teachers to share their experiences.					
5.7	The CSE prepares Chemistry Olympiad (question and answering competitions) and other competitions among schools.					
5.8	The CSE prepares workshops and other in service trainings to teachers.					
5.9	The CSE prepares teacher professional standards to the Chemistry teachers.					
5.10	The CSE supports the pre service and in service trainings for Chemistry teachers.					
5.11	The participation of the CSE in the implementation of Chemistry curriculum improves the attitude of students to wards the subject.					

Sections VI: The following are list of items that are related to the participation of the CSE in the secondary school Chemistry curriculum evaluation.

5= Strongly agree 4= Agree 3= Undecided 2= Disagree
1= Strongly disagree

No	Item	5	4	3	2	1
6.1	The CSE participates in the evaluation process of the secondary school Chemistry curriculum.					
6.2	The CSE evaluates the student text books and teachers guides and provide feedbacks to ICDR/ MOE.					
6.3	The CSE participates in the preparation of standard tests for summative evaluations of students' achievement.					
6.4	The research articles and other presentations on the congress about Chemistry education can be used as the feedback for formative evaluation of the curriculum.					
6.5	The presentations mentioned in 6.4 are provided to the ICDR/ MOE as feedback					
6.6	The CSE provide standards that can be used by ICDR/ MOE to evaluate the curriculum.					

Section VII: The following are list of items that are related to the factors affecting the participation of the CSE in the secondary school Chemistry curriculum planning, implementation and evaluation process.

5= Strongly agree 4= Agree 3= Undecided 2= Disagree
1= Strongly disagree

No	Item	5	4	3	2	1
7.1	The CSE does not have clear objectives to participate in secondary school curriculum planning, implementation and evaluation.					
7.2	The CSE does not have clear action plan to participate in secondary school curriculum planning, implementation and evaluation					
7.3	The CSE presidents and other executive officers work for some period of time, because of this they do not focus on the participation of curriculum planning, implementation and evaluation.					
7.4	The CSE does not have enough fund (money) to participate in curriculum planning, implementation and evaluation.					
7.5	The curriculum planning, implementation and evaluation processes are centralized by the Government					
7.6	The members of the CSE do not take the participations of the society in the curriculum planning, implementation and evaluation processes as task of their society.					
7.7	The absence of proper communication between the CSE and ICDR/ MOE					
7.8	The CSE is not a decision maker to change or improve the curriculum. Therefore, the participation of the CSE in the curriculum evaluation is not important					

Section VIII: under this section write your opinion about the CSE its activities in the secondary school Chemistry education and about factors that affect their participation in the secondary school Chemistry curriculum planning implementation and evaluation.

8.1 Opinion about the CSE activities in the secondary school Chemistry education.

_____

_____

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8.2 Opinion about the factors that affect the participation of CSE in the secondary school Chemistry curriculum planning, implementation and evaluation.

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Thank you again.

APPENDIX- B

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

COLLEGE OF EDUCATION

Department of Curriculum and Teachers Professional Development Studies

Interview Questions for the director, and Chemistry Subject panel of the Institute of Curriculum Development and Research (ICDR)

Dear respondent, this interview is prepared to solicit data for a research entitled "An assessment of the participation of the Chemical Society of Ethiopia (CSE) in the secondary school curriculum development". The main purposes of the research are to assess the participations of the CSE in the curriculum planning, implementation and evaluation, and to identify the factors that impede its participation in the curriculum planning, implementation and evaluation. Your thoughtful response to the questions is sought to be a great help to the success of the research. Therefore, I kindly request your cooperation by frankly and honestly responding to the items contained in the interview. Be sure that your responses are kept in strict confidence and be used only for academic purpose only.

Thank you in advance for your cooperation

1. Dose the ICDR involves the CSE in the secondary school Chemistry curriculum planning?
2. Did the CSE participate in the secondary school curriculum planning with respect to
   a) Need assessment?
   b) Formulation of aims, objectives and goals?
   c) Determination of contents?
   d) Identification of learning experiences?

e) Evaluation of the curriculum planning process?

3. The following are the expected activities of CSE then which activities of these professional associations are used by ICDR in the Chemistry curriculum planning?
   a) Researches on the contents, learning experiences and the teaching learning process of the subject?
   b) Publications (journals, year books, news letters, etc)?
   c) Funding of the curriculum planning?
   d) The members of CSE to share their work experiences to be included in the contents and learning experiences of the secondary school chemistry?
4. What is your position regarding the participation of the CSE in the Chemistry curriculum planning implementation and evaluation process?
5. Do you participate (are you invited) in the congress, workshops and other meetings prepared by the CSE concerning the secondary school Chemistry curriculum? And what do you get from the meetings to facilitate the works of ICDR?
6. How ICDR allows the participation of the CSE in the curriculum evaluation process?
7. Does ICDR uses research findings made by CSE or its members in order to evaluate the secondary school Chemistry curriculum?
8. What major factors do you think affect (impede) the participation of CSE, in curriculum evaluation, implementation and planning processes?

Thank you again for your cooperation

APPENDIX-C

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

COLLAGE OF EDUCATION

Department of curriculum and teachers professional development studies

Interview questions for the curriculum experts in Regional Education Bureau.

Dear respondent, this interview is prepared to gather information for a research entitled "An assessment of the participation of the Chemical Society of Ethiopia, CSE, in the Secondary School curriculum development." The purposes of the research are to assess the participations of the CSE in curriculum planning, implementation and evaluation process and to identify the major factors that affect the participations of the CSE in the curriculum planning, Implementation and evaluation processes. Your thoughtful responses to the questions is sought to be a great help the success of the research. Therefore, you are kindly requested to respond the questions frankly and honestly. Be sure that your Reponses are kept in strict confidence and be used only for academic purpose only.

Thank you in advance for your cooperation

1. Does the Regional Education Bureau work with the CSE in the matters of secondary School Chemistry Curriculum?

2. Does the Regional Education Bureau use researches made by the CES or by its members to facilitate the implementation of the curriculum at the school level?

3. Does the Regional Education Bureau obtained feed backs about the Chemistry curriculum and uses the feed backs to evaluate the curriculum?

4. What is your position regarding the participation of the CSE in the Chemistry curriculum planning, implementation and evaluation?

5. What factors do you think affect the participations of the CSE in the Secondary School Chemistry curriculum planning, implementation and evaluation?

Thank you for your corporation

APPENDIX-D

The volumes and numbers of the "solution" (the news paper of the CSE) were analyzed: volume 2, No 1(1994); volume 3, No 1(1995); volume 4, No 1(1996); volume 4, No 2 (1996); volume 5, No 1 (1997); volume 5, No 2 (1997); volume 6, No 2 (1998); volume 7, No 1 (1999); volume 7, No 2 (1999); volume 8, No 1 (2000); volume 8, No 1 (2000); volume 9, No 1(2001); volume 9 No 2 (2001); volume 13 No 1 and 2 (2005). Volume 14 No 2 and volume 15 No 1(2007); and volume 15, No 2 (2008).

APPENDIX-E

The abstracts of paper presented in the annual congresses analyzed.

- 11th annual congress of CSE, Addis Ababa, August 5-6/1994
- 12th annual congress of CSE, Addis Ababa, August 4-5/1995
- 13th annual congress of CSE, Addis Ababa, August 9-10/1996
- 15th annual congress of CSE, Addis Ababa, August 1998
- 16th annual congress of CSE, Addis Ababa, August 6-7/1999
- 17th annual congress of CSE, Addis Ababa, August 3-4/2001
- 19th annual congress of CSE, Addis Ababa, August 2-3/2002
- 19th annual congress of CSE, Adama, August 2-3/2002
- 20th annual congress of CSE, Addis Ababa, August 1-3/2003
- 21st annual congress of CSE, Addis Ababa, August 27-28/2004
- 22nd annual congress of CSE, Addis Ababa, February 24-25/2006
- 23rd annual congress of CSE, Hawassa, February 23-24/2007
- 24th annual congress of CSE, Addis Ababa, February 22-24/2008

Appendex - F

A SURVEY STUDY ON ETHIOPIAN HIGH SCHOOL CHEMISTRY: CONTENT OF THE TEXTBOOKS

Temechegn Engida[1], Solomon Mengesha[2] and Yirgalem Yigzaw[3]

1. Introduction

At present the world society depends greatly on science and technology. The knowledge and skills which are the direct result of scientific and technological developments in the past are transmitted to the new generation through trained teachers in a structured and organized manner as embodied in a curriculum. Chemistry, which has played an important role in these developments, is part and parcel of the secondary school curriculum. Accordingly, there is a need to introduce the young people to modern chemistry. In order to do so textbooks play an unquestionable role.

Generally speaking the term textbook refers to a material employed by school or college students as a standard work on a particular skill or subject. It is usually designed for classroom use with appropriate vocabulary, illustration, student exercises, and so on. A textbook is therefore a written guide to the subject content of a course of study.

Based on the above mentioned ground a three-men **Working Group on High School Chemistry**, which was established under the Executive Committee of the Chemical Society of Ethiopia, conducted a research work on the present high school chemistry textbooks. The specific objective of the Group was aimed at assessing the "Content organization" of the grades 9 to 12 textbooks (Trial Edition, 1977). To this end, the Working Group constructed and distributed a set of questionnaire to chemists who are teaching in all Region 14 (Addis Ababa) governmental and non-governmental schools. And a response of 78% (125 out of 160) was obtained.

The questionnaire was consisting of two major parts: the first part dealing with background information about the respondents and the second part with the organization of the textbooks. Both open- and close-ended items were randomly included in the two parts of the questionnaire and the results are presented as follows.[1]

2. Presentation and Analysis of Data

As background information, the number of sections teachers are assigned to teach and the total number of students in each section were inquired. The majority of the teachers were heavily loaded and encountered with over populated classrooms. The situation is worse and might have negative impact in the organization of the teaching learning process.

Another important issue in the background information was whether the teachers in schools have taken courses dealing with evaluation of textbooks and syllabuses in particular or curriculum in general in their tertiary level education. The responses show that more than 92% of the teachers have no such training. Besides the majority (71%) of the teachers have not even participated in workshops or seminars organized for this purpose.

When teachers in the country are required to evaluate the textbooks they are using at the end of each academic year by Institute of Curriculum Development and Research (ICDR), the above results indicate that the reliability and validity of their evaluation will be questionable. Therefore, in order to gather important feedback from the teachers in schools, organization of on-job training in this aspect is mandatory for ICDR or concerned professional institutions like the Chemical Society of Ethiopia (CSE) whose primary objective is promoting chemistry education in school.

The first point raised in the second part of the questionnaire i.e, about textbooks, was the availability of the following materials:

- -Student texts
- -Laboratory manuals
- -Teachers' guides
- -Work sheets, and
- -Other reference materials.

In the majority of the schools, the materials are either not available at all or in insufficient amount, if they exist.

Another important areas of the questionnaire were:

1. Whether it is possible to cover the whole topics in the text book in the allotted period of time. In this regard 70% of the teachers indicated that it is difficult to cover the topics in time. This was particularly true for grade 11.

2. Whether there are difficult concepts to understand on the teachers part or to transmit to students. In this connection the majority of grade 11 teachers presented crystal packing and crystal lattice as examples. The discovery of subatomic particles was also another example from grade 9 teachers.

3. When the teachers were asked if the chemical concepts in the text are arranged in the order they want to teach, more than 64% of the respondents pointed out that, with some minor rearrangements, the present order of topics is reasonable.

In an attempt to avoid a big knowledge gap between the present status of chemistry in other countries and that in Ethiopia, the committee listed a number of chemical topics and asked the teachers

ether these topics are highly important, important or not nportant at all. However, the responses by a not less than 50% of the respondents indicate that the following topics are not important to be included in our textbooks: (1) Colloidal and surface chemistry, (2) Biochemistry, (3) Geochemistry, (4) Nuclear chemistry, (5) Photochemistry, and (6) Medical tests:

But it should be noted that most of the secondary school chemistry texts in other countries include, in one way or the other, most of the above mentioned topics. It seems also reasonable to say that lack of teachers familiarity with the above mentioned topics during their tertiary education may be the reason for such a negative response.

Finally teachers were asked whether the present topics in the syllabuses are over emphasized or less emphasized. Accordingly, the following responses for each grade level were forwarded by the majority of our subjects (see the table).

Grade	Less Emphasized Topics	Over Emphasized Topics
9	. Definition of chemistry . Historical development of chemical sciences . Role played by chemical science in production and society . Techniques of separation of useful compound: . The Molecules . Laws of chemical reactions . Chemical equations . Introduction to chemical calculations	
10	. The quantitative significance of chemical equations . Rate of chemical reactions . Chemical Equilibrium	. The structure of the atom and sub-atomic particles . Discovery of the electron . Discovery of of the proton . Discovery of the atomic
11	. Molecular structure . Macro-molecules . Industrial application of electrochemistry . Theoretical background of chemical reactions and industrial production of certain metals . Some important chemicals and related industries in Ethiopia	. Structure and bonding . Crystals and crystal close packing
12	. Macro-molecules . Food processing preservation and storage . Introduction to chemistry and society . Chemistry and the scientific technical revolution . Some current problems which chemistry could solve	. Introduction to chemistry and agriculture . Review of chemistry of soil . Fertilizer and their effects on agriculture . Chemicals for control

3. *Suggestions for Improvement*

The following suggestions were provided by the majority of the respondents.

1. Period allotted must be increased & depth of content should go parallel to the period.
2. The importance of extra curricular activities must be emphasized.
3. Avoid repetition of topics; reorganize topics from simple to complex.
4. Lab manual and teacher's guide are necessary.
5. Diagrams and topics must be clear and precise.
6. Sufficient exercises at the end of each topic must be included.
7. Topics that can help students to relate chemical knowledge to their daily lives should be included.
8. Text books should describe chemical processes in exact and brief manner.
9. Teachers must get proper orientation on objectives and approaches to use the text book to the maximum.
10. Clearly defined objectives for each chapter are necessary.
11. Chemical concepts must be introduced in grade 7 & 8 (symbols, formulas, balancing chemical equations, atomic particles).
12. The curriculum must emphasize that Chemistry is an Experimental Science.
13. Panel discussions and workshops on selected topics for teachers must be organized.
14. Continuous follow up of the practicality of demonstration experiments, availability of chemicals and equipment are indispensable.
15. Curriculum evaluation needs the participation of different parts of the society, especially teachers must be involved in it.

Finaly, the Working Group on High School Chemistry believes that curriculum developers of our nation will pay due attention to the points and suggestions which are raised in this study.

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[2]Investigator, Medhanealem Comprehensive Secondary School, Addis Ababa.
[3]Investigator, Addis Ababa University, Faculty of Science, Department of Chemistry (Research Unit).

DECLARATION

This thesis is my original work and has not been presented for a degree in any university, and that all sources of materials used for this thesis have been dully acknowledged.

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Signature: _____

Submitted to: Addis Ababa University

Date: June 2008

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

Name: Alcalewold Bluel

Signature: _____

Date: July 2008