A Comparative Study on Secondary School Chemistry Curriculum of Various Countries and a New Curriculum Proposal for Turkey

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1. Introduction:

The century we are in is a science and technology era. Keeping pace with the contemporary world can be managed by tracing science and technology closely. Raising and educating the human being who is expected to follow his era has been a problem for centuries. This educational problem is still in the agenda and getting more and more complicated. Thus, children have to be raised and educated towards the behavior and attitudes by which they can seek and run after solutions against any kind of problems of the society. This can only be realized by education (Sönmez, 1989:5).

Because the principal educational function service is to raise individuals according to the needs of the society, educational programmes especially science curriculums need continuously developing as changes occur in the society. These educational programmes arouse the interest of all segments in the society and this increases the importance of curriculum development studies.

Economic superiority over other countries is obtained through the superiority in science and technology. Understanding and being interested in science and chemistry, which is a sub-branch of science, is one of the ways of getting this superiority (Geban, Önal and Kayatürk, 1996:2).

The initiatives of various countries that do not want to be behind in the technologic competition, which started with the launch of the first orbit by the Soviets after the Second World War II, resulted in more attention to the science education and then, many science curricula were prepared in short time (Deboer, 1991, 147). Science literacy, the relationship between science-technology-society-

environment, science skills, knowledge and attitudes are the main points given priority and importance in those programmes, the general philosophy of which was to raise the new generations in a seeking spirit by establishing a base for science literacy for all children. As a result, those who were needed in the industry were raised and development gained impetus. Turkey is regarded as one of the developing countries in the world and in Turkey a contemporaneous science curriculum has not been prepared but, only copies of various countries' curricula have been adopted. Because of the social, economic and cultural differences between Turkey and various countries, the adaptation was not successful (Turgut, 1990, 1-14) thus; Turkey has been behind other developed countries in technologic competition. Consequently, for Turkey, to catch other countries, science education should be given importance and a science curriculum should be urgently prepared.

When examining recent studies on science education in Turkey or other countries, it is clear that science education can reach its aims by preparing a contemporaneous science curriculum which provides the ways of getting knowledge instead of traditional curricula which have given priority to the knowledge transfer (Ayas, Çepni, Johnson ve Turgut, 1997, 2.3). Thus, science curriculum should be prepared in accordance with the philosophy of contemporaneous science curriculum. In this article, secondary school chemistry curricula of various countries are

examined comparatively and Turkey's chemistry curriculum is compared with these countries and the basics of Turkish chemistry curriculum, which reflects the social and political values of Turkey, are suggested.

BASIC COMPONENTS IN SECONDARY SCHOOL CHEMISTRY CURRICULUM OF VARIOUS COUNTRIES

If one studies the literature relevant to curriculum of nine countries – USA, England, Canada, Australia, Scotland, Northern Ireland, Wales, Germany and France-, one sees that basic characteristics required for secondary school chemistry curriculum come under six headings (Bybee, 1995: 21-40; Reid and Hodson, 1987, 41; O'Donnel and Micklethwaite, 2000; Commonwealt of Virginia

Board of Education Rishmond; That's chemistry; Hector, 1994 31-32; Gaudemar, 2004; A Foundation for Implementation Transitional Curriculum Document; Curriculum Council of Western Australia).

1. ***The Vision for Chemistry Curriculum:***
   In most of the countries' chemistry curriculum under the examination, it is emphasized that all students regardless their gender and cultural background should be made science literacy.

2. ***The Organization of Chemistry Curriculum and Learning Fields:***
   In order to reach the vision stated above, it is emphasized that chemistry course learning fields and three general learning fields are as follows: Science-technology-society-environment, Scientific process Skills, Attitudes and Values.

3. ***Grounds and Objectives for Chemistry Curriculum:***
   in the chemistry curricula of nine countries, reasoning for curriculum is stated as follows: chemistry is a branch of science that examines material. Science is a human dynamic activity that aims to describe and explain physical and biologic world, and that has provided organized, tentative, objective and coherent knowledge so far, and that will continue in the future. The aims of curriculum are as follows: to help students improve and develop their skills and to make them understand the science process, to help students understand the relationship science and other disciplines, to develop the understanding of students towards the effects of technology and developments in science.

4. ***Basics for Chemistry Curriculum:***
   In the chemistry curricula of nine countries, basic characteristics are as follows: critical and creative thinking, problem-solving, Science-Technology and Society; problems, Science-Technology and Society; technology, careers in science, and the use of communication to reach aims with chemistry curriculum. These principles are put into curriculum as recommendations to teachers.

5. ***Learning Fields of Chemistry Course:***
In the chemistry curricula of nine countries, it is emphasized that the required knowledge, skills and attitudes for students' science literacy are gained through four processes: scientific study, scientific communication, the use of science and feeing responsibility.

6. ***Chemistry Course Teaching Program:***
In the most of the chemistry curricula of nine countries, chemistry is taught in accordance with the following format: demanded learning results, proposed teaching strategies, recommended measuring and evaluation strategies, recommended teaching resources.

2. BASIC COMPONENTS OF SECONDARY SCHOOL CHEMISTRY CURRICULUM IN TURKEY

The basic components of the main philosophy of the Turkish national education and its institutions referred in each course field and at all levels consists of the following principles: Atatürk's ideas about education, the aims of the Turkish national education, school level and the aims of that type of schools, school level and the educational and teaching principles of that type of schools, and implementation of program (MEB, 1992).

Conclusion:

The aforementioned six basic components of nine countries' chemistry curriculum are not seen in the Turkey's secondary school chemistry curriculum which has been implemented since 1992. Only the points concerning the course and general aims are considered.

Recommendation:

A Proposed Curriculum Framework for Chemistry for Turkey:

During and after the establishment of the Turkish Republic, many statesmen and educators expressed that a science curriculum which was suitable and necessary to the Turkish society should be prepared. However, the mentioned curriculum has so far not still been prepared.

Various (mostly developed) countries have developed their curricula in accordance with contemporary needs and requirements in order not to remain behind others. Thus, most of them have constituted a science curriculum framework suitable themselves.

In globalizing world, Turkey, which is the thread of the European Union, had followed the same science curriculum with USA until 1963. After that year, Turkey has either adapted the curriculum of various countries or has followed their course tables.

Consequently, Turkey has stayed behind technologic competition. To cope with this problem, Turkey has to prepare a science curriculum which will aim to make all students science literate.

In this study, an alternative chemistry curriculum is proposed instead of the current one, which focuses on the knowledge based results in the chemistry curriculum. This framework has five dimensions: 1-chemistry curriculum vision, 2-four general fields of chemistry curriculum, 3-the basic points for chemistry curriculum, 4-learning fields of chemistry course, 5- implementation of chemistry course teaching program

In summary, chemistry curriculum vision takes into account science literacy for all students. Four general fields of chemistry curriculum are science-technology-society-environment, skills, gaining knowledge and attitude. The basic points for chemistry curriculum consist of 4 general fields of chemistry and learning fields of chemistry course. These two learning fields are weaved. Learning fields of chemistry course are established for students to gain concepts and principles of chemistry. These learning fields determine learning contexts in which the gaining will be developed within the other three learning fields (science-technology—society-environment, skills, attitudes). Finally, chemistry course teaching program con-

sists of demanded learning results, proposed teaching strategies, recommended measuring and evaluation strategies, recommended teaching resources.

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