Comparative Analysis of Science Education Systems of Turkey and Canada

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SYNOPSIS

INTRODUCTION

It can be said that Turkey generally cannot have high scores in the international science education exams. In fact, according to results of work 1999 TIMMS-R (Third International Mathematics and Science Study (TIMSS-R) (http://www.timss.com) Turkey was in 33th place in science (Bağcı-Kılıç, 2002; Meriç & Tezcan, 2005). When the success of 15 year students in science was compared in PISA 2006, Turkey was in 34th place among 36 countries. In the same exam, Canada was in the second place.

The problems of science education in Turkey were realized by experts, and some serious studies have been conducted. At the end of the studies conducted by the participation of many expert scholars, 2005 Science and Technology Program had been prepared and put into practice all over Turkey in 2006-2007 academic year.

As a matter of fact, Turkey is a developing country. The ability of developing countries to make progress is directly related to their level of education. For that reason, the developing countries should follow the developed countries when building their education programs. In this context, Canada’s success in education was published in the results of the international comparative tests (URL-1, 2008; Bussiere, Knighton & Pennock, 2006).

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There are many studies about comparison of the education system of Turkey with other countries (Bursal, 2007; Cho, 1997; Gür, 2006; Kilimci, 2006; Kutay, 2006; Memduhoğlu, 2008; Meriç & Tezcan, 2005; Sezer, 2001; Uçar & Uçar, 2008; Yıldırım, 2008; Yılmaz, 1996). However, the number of studies about comparison of science and technology programs are low (Şahin & Özata, 2007; Taşar & Karacam, 2008). As such, Erdoğan (2006) states that Turkey should benefit from comparative studies while doing reform in education.

Canada has a high level of human development, and is very successful in science education according to the reports of OECD and PISA. So, a comparison of the science education systems of Canada and Turkey has been done in this research, in order to compare two countries, which do not have similar quality of education. That is why, this study is useful especially for Turkey to determine the main differences between the education systems in two countries, and to produce solutions to the problems encountered. The province of Ontario in Canada has the same level of success in science as in the entire country (URL-2, 2005; URL-4, 2005). Therefore, “Ontario 1998 Science and Technology Curriculum” was chosen to compare with Turkey’s science education system and 2005 Science and Technology Program in this study.

PURPOSE OF THE STUDY

The purpose of the study was to examine the similarities and the differences between the science education systems, and the science and technology programs of 6th-8th grades of elementary schools of Turkey and Canada (Ontario). Therefore, it was aimed to analyze Turkey’s and Canada’s (Ontario’s) science education systems and also Turkish 2005 Science and Technology Program (URL-7, 2006) and Ontario1998 Science and Technology Curriculum (OMoET, 1998) comparatively.

METHODOLOGY

This study is a cross-national comparative educational research. The questions of this research were designed within the framework of descriptive, interpretative, and horizontal approaches. Data was collected by “document analysis method”.

The first focus of the comparisons for Turkey and Canada (Ontario) science education systems was “the aims”. The similarities and the differences between Turkish 2005 Science and Technology Program (TSTP) and Ontario 1998 Science and Technology Curriculum (OSTC) were analyzed with respect to the structure, strands, and units and grade levels, contents, attainment targets in relation to the units of “Light” (TSTP) and “Optics” (OSTC). During document analysis period, the formal curriculums issued by the competent authorities of both countries were analyzed.

FINDINGS

When the findings of the document analysis were evaluated at the end of the research, it was noticed that the objectives of science education were given in 11 items with very detailed sentences in 2005 Science and Technology Program (TSTP). However, the objectives of science education for Canada were given in five items, and in Ontario1998 Science and Technology Curriculum (OSTC) they were given in three items. The main themes were emphasized in simple sentences in the Canadian documents. In both of the programs’ objectives, there was an emphasis on research, inquiry, discussion, gaining scientific process skills, understanding the relationship between science and technology, and the importance of relating it with the world. In TSTP objectives, the targeted policies related to professions were mainly emphasized. For Canada, the targeted policies related to choosing occupation in
science were more emphasized. Meanwhile in OSTC objectives, there was not any specific statement for professions. In TSTP, it was emphasized that the vision was “scientific literacy”; while in OSTC the importance of educating individuals as scientifically literate was emphasized.

2005 TSTP was a document of 412 pages, and OSTC was a document of 110 pages. TSTP was more detailed according to OSTC. Although TSTP has two separate documents, one for 4th and 5th grades and the other one for 6th, 7th, and 8th grades, OSTC has been constructed as one document for the grades from 1st to 8th. In this study analyses were done just for 6th, 7th, and 8th grades science and technology program. 2005 TSTP has 7 strands and these strands were categorized in two branches as “Subject Content Strand” and “Skill, Understanding, Attitudes and Values Strand”. The units were constructed under the strands of “Organisms and Life”, “Matter and Change”, “Physical Events”, “The World and the Universe” and all of these were placed under the “Subject Content Strand”. A separate unit was not configured for “Science-Technology-Society-Environment Relationships”, “Scientific Process Skills” and “Attitudes and Values” strands and these were placed under the “Skill, Understanding, Attitudes and Values Strand”. These three strands are given in relation to the attainment targets of the first four strands. In 1998 OSTC the units were constructed under the strands of “Life Systems”, “Matter and Materials”, “Energy and Control”, “Structures and Mechanisms” and “Earth and Space Systems”. While in TSTP the units are designed spirally for each grade, in OSTC the units are not designed spirally.

The unit of “Light” in 2005 TSTP has been located in “Physical Events” strand and taught at 7th grade. The unit of “Optics” in 1998 OSTC has been located under “Energy and Control” strand and taught at 8th grade. There are some common and some different subjects in both of the units. Although the number of subjects in the unit of “Optics” in 1998 OSTC are more than the number of subjects in the unit of “Light”; there are 31 attainment targets in the unit of “Light” in 2005 TSTP and there are 22 in the unit of “Optics” in 1998 OSTC.

**CONCLUSION and DISCUSSION**

When the findings of the comparison of both science and technology programs of TSTP and OSTC were evaluated at the end of the research, it was observed that they had major differences in construction, although there were similarities in approach. Main differences were; TSTP was a document of 412 pages and OSTC was a document of 110 pages, thus, TSTP was more detailed according to OSTC. TSTP had 7 strands, OSTC had 5 strands. While in TSTP the units were designed spirally for each grade, in OSTC they were not designed spirally. There were differences in the grade level, content and the attainment targets of the unit of “Light” (TSTP) and “Optics” (OSTC). Beside these differences, there were similarities between TSTP and OSTC in adopting constructivist approach, student-centered teaching, the vision of scientific literacy, the importance of scientific process skills and the relationship between Science-Technology-Society-Environment, the teaching of how to use technology and knowledge, and the importance of students’ differences.

Taşar and Karaçam (2008) compared 2005 Science and Technology Program of Turkish Republic with Science and Technology/Engineering Curriculum Framework of Massachusetts with respect to objectives, essential principles for implementation, and contents. Some of the results of the comparison of objectives of 2005 TSTP and 1998 OSTC are similar to some of the results of Taşar and Karaçam (2008)’s research. In Taşar and Karaçam’s research it was expressed that the objectives of TSTP were presented more clearly according to the compared curriculum document. In this study, it was also concluded that the objectives of TSTP were clearer and more detailed compared to OSTC’s objectives.
Şahin and Özata (2007) compared theoretical structure of 2005 TSTP with science programs of Canada, New Zealand, Ireland and New Jersey (USA). The findings of this research are consistent with the research of Şahin and Özata (2007). In both of the studies the similarities between Turkey’s and Canada’s science and technology programs were given as; the common aim of the programs were to educate scientifically literate individuals, both of the programs were based on the constructivist approach, and science and technology co-operation formed the structure of both of the programs. According to the literature, comparative studies of science and technology programs are not enough. Orpwood and Barnett (1997) are also reported that the comparative studies are not enough and countries still have much to learn from each other.
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