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Environmental literacy in the science education curriculum in Macedonia and Turkey

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Abstract

The purpose of this study was to analyze the extent to which education objectives in science education curriculum in Turkish and Macedonian schools addressed to the environmental literacy (EL), and how this attention differed from Turkey to Macedonia. The objectives / attainments taking place in science education curriculum in both countries were subjected to comparative content analysis. Content analysis of these objectives reveals that all components of environmental literacy did not get same attention. For example in both countries most attention was given to knowledge, less to skills and attitudes, and little to environmentally responsible behavior (ERB)

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1. Introduction

Like any other nations, the natural environment in the Republic of Macedonia and Turkey is deteriorating in an alarming way. The magnitude of the problems and resolutions are discussed in the various documents. Some of these documents are National Assessment Report on Sustainable development (2002), Environmental Performance Reviews - The Former Yugoslav Republic of Macedonia (2003), Strategy for Increasing the Public Awareness for Environment (2003), Environmental Risk and Impact Assessment in all provinces in Turkey (2003), National Strategy of Youth (2005), National Development Program for Education in the Republic of Macedonia 2005-2015 (2006), Self Assessment of the National Capacities for Global Management with the Environment in The Republic of Macedonia (2005) etc. Almost all of these documents include educational component and the need of the increasing the environmental education (EE). EE together with sound legislation, sustainable management, and responsible actions is an important component of an effective policy framework for protecting and managing the environment. From that, every nation needs to ensure if all aspects of life long learning is fully engaged on the provision of effective EE and education for sustainable development (ESD).

As an evolving concept, environmental literacy has been conceived as the major outcome of environmental education. This concept and its components are apparent in definitions and frameworks (Stapp et al., 1969; Harvey, 1977; Schmeider, 1977; Disinger, 1983; Hungerford & Volk, 1990; Simmons, 1995), sets of goals and objectives

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(Unesco, 1977, 1978; Hungerford, Peyton, & Wilke, 1980; United Nations, 1992), levels and strands (Roth, 1992), other reviews of the professional literature (Hart, 1981), and collections and reviews of research (Iozzi, 1981, 1984; Hines, Hungerford, & Tomera, 1986/87; Marcinkowski & Mrazek, 1996; Volk & McBeth, 1997; Hart & Nolan, 1999; Erdogan & Marcinkowski, 2007).

Based upon an evolving understanding of EL (i.e., one tied to theory, research, and practice), we assume that EL includes six main components; namely, Ecological knowledge, Socio-Political knowledge, Knowledge of environmental issues, Affect, Cognitive skills and Environmentally responsible behaviors (Simmons, 1995; Volk & McBeth, 1997). For the purposes of this analysis, we broke these six components into forty sub-components (Babulski, Gannett, Myers, Peppel, & Williams, 1999; Erdoğan & Marcinkowski, 2007) which were used as criteria in the analysis of the status of EL in the elementary schools of Macedonia and Turkey.

The foundations of environmental literacy are emphasized mainly through science education including three developing periods in Macedonian primary schools (according to nine-year primary education concept): the first period is from 1st to 3rd grade within the science is studied by one school subject- Introduction of the environment, the second one is from 4th to 6th grade within the science is studied by next school subjects: nature (4th grade), science (5th grade) and science and technique (6th grade), and the third period includes 7th to 9th grade within which the science is studied by four school subjects: biology, geography, chemistry and physics. As a responsible body, the Department of Education Development prepares goals and contents within separate disciplines and each grade level. Then, they are confirmed by the Ministry of education and science.

Environmental Literacy, which is assumed to be the ultimate aim of environmental education, seems to have been neglected in Turkey for several years. It is surprising to note that this has been receiving greater attention with the initiation of a new Science and Technology Curriculum for elementary schools since 2004 (Erdogan, 2007). This curriculum is different from the previous ones in that the dimensions of technology and environment have been added to and integrated with the science dimension. One of the key goals of this curriculum is to develop environmental awareness and consciousness, and increase scientific process skills of students (Özgelen & Yılmaz-Tuzun, 2007).

2. Materials and methods

The purpose of this study was to analyze the extent to which education objectives in science education curriculum in Turkish and Macedonian schools addressed to the environmental literacy (EL), and how this attention differed from Turkey to Macedonia.

A total nine curricula used in obligatory and elective courses in elementary schools were selected for this analysis. Of these, eight were from Macedonian elementary schools: Nature, Science, Science and Technique, Biology, Physics, Chemistry, Geography, and Environmental education. The other one was from Turkish elementary schools. In Turkey, there are some others course in which EL components are implicitly stated, such as life science course for 1st to 3rd grade, social science course for 4th to 8th grades, and agriculture course (elective course), although only a science education course was selected because of its meeting the purpose of the study. The name and characteristics of the selected books are illustrated in Table 1.

Table 1 The curricula selected from both countries for the study and their characteristics.

Name of the courses selected from Macedonian	Characteristics of the selected curriculum
Nature - 4th grade	The course is developed and introduced this school year in 4th grade.
Science - 5th grade	The program is under preparation and will be introduced next school year.
Science and technique - 6th grade	The program is under preparation and will be introduced in 6th grade.
Biology - 7th to 9th grade	The programs for 7th and 8th grade of nine-year primary school are developed. The program for 9th grade is under preparation. All of these programs will be introduced according to dynamics of introducing of the nine-year primary education.
Physics - 8th and 9th grade	The program 8th grade is developed. The program for 9th grade is under preparation. The programs will be introduced according to dynamics of introducing of the nine-year primary education.

Chemistry - 8th and 9th grade	The program 8th grade is developed. The program for 9th grade is under preparation. The programs will be introduced according to dynamics of introducing of the nine-year primary education.
Geography - 7th to 9th grade	The programs for 7th and 8th grade of nine-year primary school are developed. The program for 9th grade is under preparation. All of these programs will be introduced according to dynamics of introducing of the nine-year primary education.
Environmental education (elective course) - 7th to 9th grade	The curricula are developed and will be introduced according to dynamics of introducing of the nine-year primary education

Name of the courses selected from Turkey

Science and Technology Education 4th to 8th	This course was developed and piloted with elementary schools in 2004. It is for the students who are in 4th to 8th grade. The name of this course was science education before 2004.
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The selected curricula were subjected to content analysis. First, the objectives, which are called attainments in 2004 Turkish elementary school curriculum and objectives in the Macedonian curriculum, were retrieved from the selected curricula. A table including six components of EL (affect and additional determinants of ERB were combined for this analysis since their nature seems to be similar) and forty sub-components of EL was constructed for comparative analysis. This Table included one column for Turkey and one column for Macedonia across to grade level (4th grade to 8th grade). The Macedonian and Turkish objectives were analyzed against the forty sub-components of EL selected for use in this study.

3. Results and Discussion

Due to space limitations, only a few of the results of this analyses and comparisons are presented here. The comparative analysis of the objectives of the selected science education curricula indicated that environmental education in Turkey is not considered as a separate subject but is mainly infused in the science education curricula. On the other side, in the school curricula in Macedonia, there is an elective course called Environmental education. The students have opportunity to learn it in 7th, 8th or 9th grade. Different numbers of courses for science education are used in both countries. In Macedonia, EE is realized mainly in science courses, e.g. Biology, Nature, Geography etc. On the other hand, in Turkey, environmental education is realized under the curriculum of Science and Technology Course. The fundamental scientific concepts, needed for environmental literacy, are dealt with in the science curricula of both countries, and Environmental education curricula of Macedonian. Basic ecological and nature conservation concepts are accordingly developed.

These results indicated that all components of environmental literacy do not receive the same attention in both countries. For example, greater attention was paid to the environmental knowledge, relatively little attention to skill, and little attention to affective and behavior sub-components.

We were interested in knowing more about the quality of EE because some previous investigations by Abazi et al. (2008, 2009a and 2009b), Ismaili et al. (2009), Srbinovski & Palmer (2008), Srbinovski (2002/03, 2003a, 2003b, 2003c, 2003d, 2003e, 2004a, 2004b, 2004c, 2005a, 2005b and 2005c), Srbinovski et al. (2007), Srbinovski et al. (2009) etc., have shown that exist seriously gaps and weaknesses in the primary and secondary education. On the other side, The United Nations adopted 2005-2014 as the decade to recognize education and learning as the key to accelerate changes to a more sustainable way of life.

4. Conclusion

The comparative analysis of nine science education curricula taken from Macedonia (n=8) and Turkey (n=1) with regard to components of environmental literacy revealed that all the components are not considered equally in both countries. While the components pertaining to environmental knowledge are highly emphasized, the other components are partially or even largely ignored in both countries. Similar results were also observed in the study conducted for comparative analysis of science education objectives with regard to components of environmental literacy Turkey and Bulgaria (Erdogan, Kostova & Marcinkowski, 2009). For example, little attention was given to

skills and very little attention to affect and behavior in Turkey. In Macedonia, it was found that skill and affective sub-components are poorly integrated, although the component of behavior is ignored and never considered.

Considering that one of the important aims of environmental education in schools is to help students develop the abilities and capacities needed for civic participation, service, and action (Hungerford & Volk, 1984, 1990), the findings of the study refer that in both countries, this aim of EE may not be easily realized because the action component of EL is given little attention and is even ignored in these curricula. Since curriculum development and revision processes are never ended, the science education curriculum in both countries can be provided with continuous feedback through research findings. In this regard, the findings of this study serve as an in-depth source of information for (these) national curriculum revisions, particularly on the integration of all the components of EL sufficiently. The value and action components require a new approach to teaching incorporating inquiry methods and field studies, ensuring the integration of knowledge, emotion and action, i.e., “heads, hearts and hands”. This means that revision of curricula and text-books is not enough. Teachers’ guides and teachers’ qualification should also be updated in order to create stimulating learning environments.

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