International Electronic Journal of Environmental Education
Vol.4, Issue 2, 2014, 61-69
RESEARCH ARTICLE

Environmental Issues in the Didactic Materials in Schools in Republic of Serbia

Milutin Maravić*
University of Novi Sad, SERBIA

Sonja Ivković
University Educons, SREMSKA KAMENICA

Mirjana Segedinac
University of Novi Sad, SERBIA

Jasna Adamov
University of Novi Sad, SERBIA

Abstract

The main task of the examination is to establish environmental issues in the didactic materials for primary and secondary school in Republic of Serbia. Environmental issues in the secondary school curriculum in Serbia, according to the current educational curricula and educational programs, is limited to general subjects (chemistry and biology above all), and to the subject of Ecology in some profiles of secondary vocational education. There is no equal distribution of the environmental issues in curriculum by subjects, classes and educational levels. In general, in the didactic materials there are about 5,4% environmental issues. Because of the lack of national guidelines and institutional coordination we are not able to make a qualitative leap, and we also need to seek a holistic approach to contribute to education about, in and for the environment.

Key words: Environmental education, environmental issues, didactic materials, secondary professional education.

Introduction

The implementation of Environmental Education has started to be stressed out globally since this issue was discussed seriously in Tbilisi Conference at 1977. Argument of this issue emerges as there were several environmental destructions began to cognizant at that time. In Serbian educational context, Environmental Education refers to teaching and learning process to understand the interaction between human and the environment; and also how the environment managed wisely and responsibly towards the sustainable of life on the Earth (Official Gazette of the Republic of Serbia and Education Gazette No.1/2007).

This involves education about the environment to enhance the awareness, knowledge, and understanding on the nature management while the process was said to involve an education about the environment, through environment and for environment.

Providing environmental knowledge was one of the objective components in implementing Environmental Education other than enhancing awareness, attitude, skills and behaviour towards environmental among students. According to Tanaka (2000), environmental knowledge can be defined as individual understanding on how environment functioning; how human interact with the environment; how environmental problems arise; and in what

ISSN: 2146-0329
*Corresponding author: Milutin Maravić, E-mail: milutin.maravic@gamil.com

way this problem can be overcame. For Rohiza (2004), environmental knowledge can be explained in the context of environmental literacy component regarding to knowledge of issues related to environmental sustainability and its influence on human life. Environmental literacy according to Rowe (2002) refers to the foundation of understanding towards the concept and knowledge on relevant issues and information with health and environmental sustainable. This includes environmental issues relating to human health. For Daskolia et al. (2012) in the Environmental literature, creative thinking is implicitly considered to be either an essential quality of thinking and learning about the environment and current environmental issues, and coping effectively with them, or a prerequisite for visioning and designing alternative sustainable futures. Hungerford et al. (1994) have listed down scope of Environmental Education which should be implemented at middle school level. The scope was classified into three categories that are Ecological Foundations and Humans as an Ecological Factor; Environmental Science and environmental Health; and Issue Investigation and Citizenship Action Training. While Erdogan et al. (2009) divide environmental knowledge under three themes namely I knowledge of natural history and ecology; II knowledge of environmental issues and problems; and III socio – political – economic knowledge.

Material and methods

The subject of this research is to determine the circumstances, the requirements, and the possibilities of the formal Environmental education through didactic materials in the primary and secondary school of the Republic of Serbia. From this purpose emerges the next main task of the examination: to establish environmental issues in the student`s books, workbooks and other teaching materials as a means of achieving the goals of environmental education. The environmental issues are defined as issues which include "the interrelationship between organisms and their environment" (Andevski, Kundacina 2004.), as well as, issues "that involve and understanding human influence on the environment, suggesting actions that may be taken to mitigate that influence such as conservation, or examining values and attempting to resolve conflicting interests".

We are conscious of the width of the Environmental education, so we are limited primarily on establishing the quantitative aspect of environmental issues in the student`s books, workbooks and other teaching (didactic) materials. For this reason we have set the following three sub tasks within the main task of this study: 1. to establish environmental issues in the didactic materials by classes and educational levels, 2. to establish environmental issues in the didactic materials of different educational backgrounds in Serbia secondary schools and, 3. to establish environmental issues in the didactic materials from aspects (Ecological aspects of the nature, the living and working space, traffic and the noise) of the environment they treat.

In accordance with the object and the task of this research, and in the interest of proving the set hypothesis, we applied a method of theoretic analysis and empirical – non experimental method. Taking into consideration Berelson`s definition of content analysis, we applied it on the basis of her main characteristics. Environmental issues are classified into 10 environmental categories (according to Kundačina) and modified by the author. These categories meet the following requirements: they are unambiguous; they are mutually exclusive; they cover all the possible responses and so on. (Kundačina, 2006)

We analyzed entire student`s books, workbooks and other didactic materials by all the levels in the primary and secondary schools in Republic of Serbia. In this way, we included 67

student`s books, workbooks and other didactic materials, mainly published from 2004 – 2012 (Table 1.)

Educational levels	Degrees	N	%
Lower primary	1 – 4	15	22,39
Upper primary	5 – 8	28	41,81
Secondary classes	I – IV	24	35,80
Total	12	67	100

Table 1. Review of the analyzed didactic material by educational levels

We can see that about one third of the analyzed didactic material is assigned to pupils from the secondary schools, and only about a fifth to the ones from the lower primary schools. The most of analyzed didactic material (41,81%) is intended for the students in the higher classes of the primary schools.

Results and discussion

In the first primary education cycle of the Republic of Serbia, environmental content can often be found in almost all subjects, using correlation. However, this content is present in the subjects called the world around us during the first and second grade, Nature and societies in the third and fourth grade of primary education. Ecological content in the higher grades of primary education, from grades 5 to 8, is represented in science subjects: Biology, Geography, Chemistry and Physics.

For the first time, environment appears at the level of secondary education as a separate subject and as a subject in some secondary vocational schools. It should be noted that in addition to this separate subject, environmental content is being taught through general education subjects (chemistry, physics, biology, geography) in a number of areas of work and educational profiles. The status of subjects through which environmental content is being taught depends primarily on occupations for which students are being educated. High school is one of a general education secondary schools, so that ecology as a separate subject does not appear there, but the ecological content is present in the subjects of natural sciences: chemistry, biology, physics, geography and according to the nature of these subjects and the object of their studies, they are directly or indirectly related to the environmental contents.

Our first task was to establish environmental issues by classes and educational levels (*Fig.1*.).

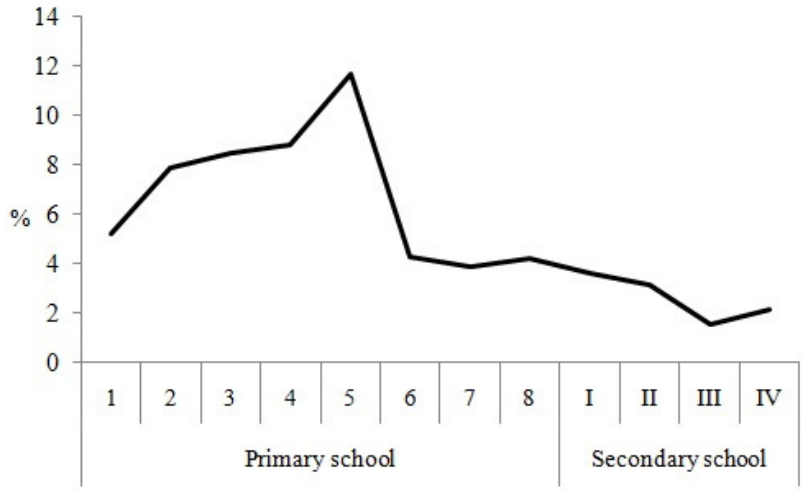

Figure 1. Environmental issues by classes and educational levels

We can see from the figure that there is unequal distribution of environmental issues by class and level of education. So, didactic material in the fifth grade is the richest in these issues (11,69%), and the other hand, the poorest is in the third class of secondary school (1,57%). It is obvious that the distribution of these contents (except from first to fifth grade) decline toward upper classes of primary and secondary school.

At the same time, the research has shown that current environmental education that exists in primary and secondary schools in the Republic of Serbia does not have a permanent character. This considers the teaching system as a whole as well as the particular – teaching subjects. It is necessary that environmental education starts from the childhood and to go on during the life. In average, didactic material for lower classes is the richest in the environmental issues (7,6%) compared to higher (6,02%) and those of the secondary school (2,66%). Analysis of the didactic materials showed how little time (5,43%) is spent on ecology as a means of achieving the goals of environmental education.

Taking into account the significant position of the biology (Biology as a subject taught in Serbia, from 4 to 8 grades of primary school and all four years of high school) in terms of Environmental education in Serbian educational system, we decided to show the distribution of environmental issues in this subject by classes (*Fig.2.*).

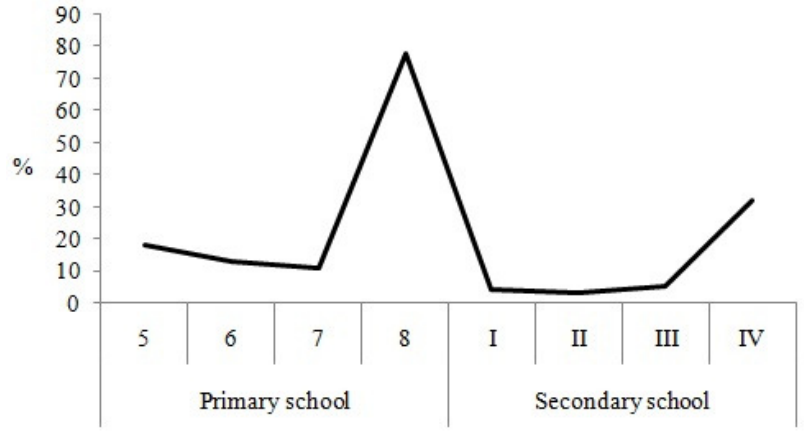

Figure 2. Distribution of environmental issues in biology by classes

The Figure shows that the whole textbook eighth graders related to environmental issues, according to the curriculum of the Republic of Serbia in the eighth grade are studied the contents that are related to environmental issues. The next conclusion is that biology textbooks for secondary schools are poorer (10,98%) compared to primary school (30,56%). In average, about 19,38% of the biological issues are ecological.

Secondary schools in the educational system of the Republic of Serbia cover a number of areas of work with a wide range of educational profiles. Areas of work of high schools that educate students are: High school; Agriculture; Geodesy and Civil Engineering; Food Production and Processing; Chemistry, nonmetals and graphics; Mechanical Engineering and Metalworking; Textile and Leather; Geology, Mining and Metallurgy, Electrical Engineering; Transport; Forestry and Wood Processing; Health Care and Social Protection; Economics and Law; Culture and Art; Trade and Tourism. In four – year educational attainment, in almost all areas of work, contents related to ecology are being studied through general subjects (Chemistry, Physics, Biology, Geography), whereas through the vocational subjects ecology is studied in those educational profiles that are directly related to the issues of ecology and environmental protection. During three – year educational attainment, in almost all areas of work, environmental content is often taught through general education subjects (Chemistry, Physics, Geography). As a separate subject, Ecology and Environmental Protection occurs for the first time. In most of the educational profiles, this course is taught during one school year. Representation of environmental content in secondary schools in Serbia is given in *Figure 3*.

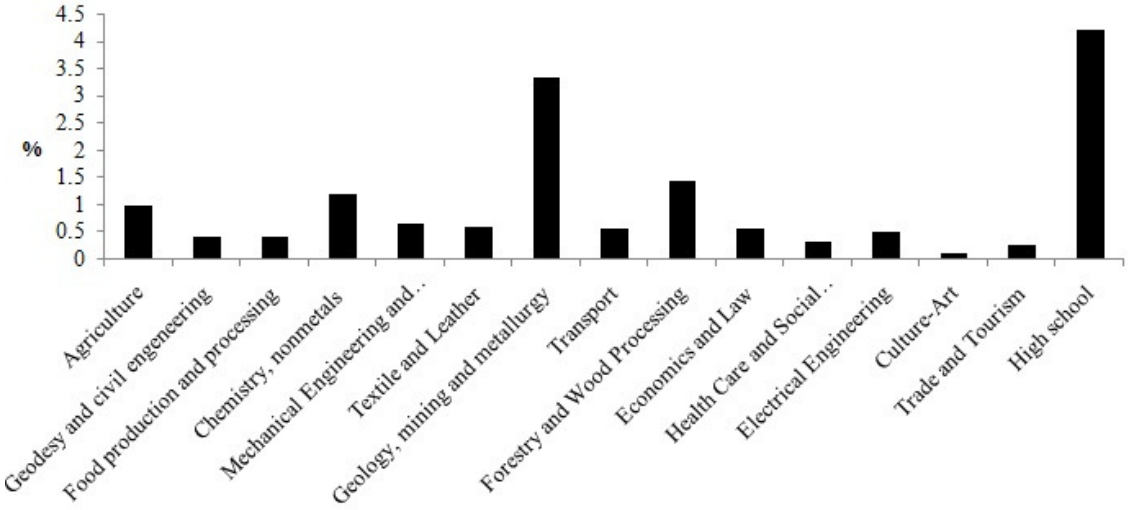

Figure 3. Environmental issues in the didactic materials of secondary schools in Serbia

According to the results, it can be noted that the share of educational content related to ecology and environmental percentage is unreasonably low. The need for environmental education is evident when we consider all educational profiles, and all people, because it relates to the environment in which we live and work, and which is growing more vulnerable and more polluted. Environmental education is particularly important for educational profiles that are directly aimed at the production and processing of foods, or at workers in the chemical industry. Since workers in the food production and processing need to know all the procedures for the safe handling of food, ways and means of their pollution, environmental and health risks involved in the ingredients that are used in foods as

additives, as well as measures for the safe disposal of biological waste materials. The low proportion of content related to ecology in the three – year and four – year educational profiles (which ranges from 0.26% to a maximum of 1%) is not sufficient for the acquisition of the knowledge necessary for future workers in the food production and processing. The situation is similar when it comes to other education levels – i.e. because the future chemical industry workers also have a small number of hours devoted to ecological content in their curricula. In the chemical, graphic and non – metal education attainment, the highest incidence of this content appears with education profiles rubber and plastic technician, up to 1.15%, and the lowest incidence appears with educational attainment in the printing field, only 0.13%. Since this is about jobs at risk, it is essential that chemical workers and graphics professionals be more aware of the environmental and health risks of their profession.

Of all the curricula shown above, the largest share of ecological teaching content have the future workers of mining and geology, up to 3.43%, as well as some sections of agricultural education profiles (e.g. veterinary technician) and mechanical engineering profiles (thermal power plant mechanic, Heating and cooling equipment mechanic, Ship mechanic, Shipbuilder). However, in neither one of the educational profiles that educates workers for the industrial production, the ecological content is represented with more than 4.5% in general education subjects, general professional subjects and strictly professional subjects.

It was very important to define the aspects of the environment included in the didactic materials, according to the one of the aims of Environmental education: "to enable human beings to understand the complex nature of the environment as this results from the interaction of its biological, physical, social, economic and cultural aspects", in terms of "maintaining a dynamic between the quality of the live and quality of the environment" (UNESCO, 1994).

Environmental issues in the didactic materials in Republic of Serbia do not treat equally all aspects from the environment (Fig. 4).

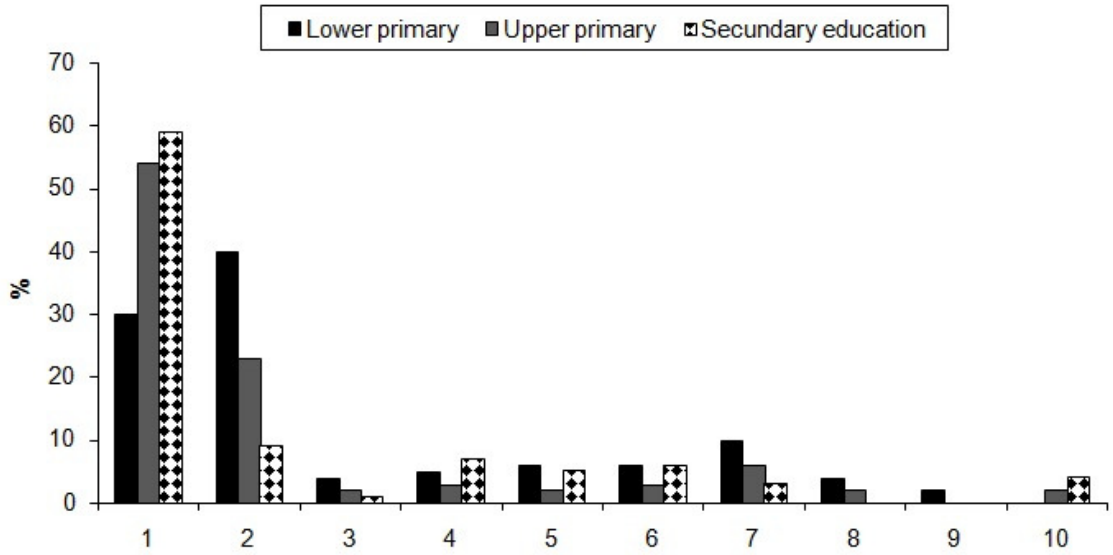

Figure 4. Aspects of the environment included in the didactic material in primary and secondary school in Republic of Serbia

Legend: 1. Ecological aspects of the nature in narrow sense, 2. Ecological aspect of the living and working space, 3. Traffic and the noise factors which imperil the environment, 4. Protection of the soil and food from destruction, 5. Protection of the water from destruction, 6. Protection of the air from destruction, 7, Rational use of the natural ressurse and energy, 8. Ecology – health problems, 9. Environmental actions, and 10. Natural and main – caused catastrophes.

The fewest teaching contents are dedicated to "the environmental actions", "the traffic and the noise as factors which imperil the environment", "the natural and the main – caused catastrophes" and "the ecology – health problems".

In the existing teaching materials great attention is paid to the living and working place but they don't pay enough attention to the pollution and protection of the water, the air, the soli, the acid rain and its effects, the greenhouse effect, ozone layer thinning and sustainable development.

We can conclude that in the didactical materials the environmental is mainly treated as a natural environment, but not as social, economic, political, cultural and historical surrounding. So, the first problem of the Environmental education in Serbia is a result of the curriculum and syllabus, as well as the didactic material. The Environmental education in them has "formal" and „superficial" position. It is necessary to promote and foster Environmental education in Serbia, especially through elaboration of national strategy of Environmental education.

Conclusions

In Serbian educational system, the teaching of science in the junior classes and biology in the senior classes of the primary and secondary education, have a dominant position in the field of the Environmental education. Most environmental issues exist in the didactic materials for the fifth grade, but the fewest in the third grade in secondary school. In general, in the didactic materials for primary and secondary school in Republic of Serbia there are about 5,4% environmental issues. There is no vertical and horizontal linking, as well as the disharmony in pressenting the width of some problems of the protections and the advancement of the environment.

The results of the analytical evaluation of the didactic materials in Serbia revealed that the criteria which emerge from the aims and the tasks of the Environmental education are not respected sufficiently, that is, it has an unsystematic and a formal character.

Integrating environmental education into school life requires a coherent approach on various fronts for there to be progress towards sustainable development in the school itself. Because of the lack of national guidelines and institutional coordination we are not able to make a qualitative leap forward, and we also need to seek a holistic approach to contribute to education about, in and for the environment. Despite the fact we must be creative and persistent because didactic material is to be variable, as well as the living environment in which we are living. It is necessary to promote and encourages more environmental education, particularly through the development of a national strategy on environmental protection. In this sense a priority should be given to the poor approach to environmental issues in the didactic materials.

Biographical statement

Milutin Maravić is PhD student in the Faculty of Sciences University of Novi Sad in Serbia. He is interested in eco-chemical education, environmental protection. E-mail: milutin.maravic@gmail.com

Sonja Ivković is currently a research assistant in the Faculty of Environmental governance and corporate responsibility, University Educons in Serbia. She is interested in the environmental protection, hazardous and noxious substances and their effects. E-mail: sonja.ivkovic@gmail.com

Mirjana Segedinac PhD, full professor in the Faculty of Sciences University of Novi Sad in Serbia. She is interested in the methods and techniques of teaching in contemporary teaching chemistry. **E-mail: iwis@neobee.net**

Jasna Adamov PhD, full professor in the Faculty of Sciences University of Novi Sad in Serbia. She is interested in Methods of teaching chemistry to work with gifted students, eco-chemical education. **E-mail: adajas@gmail.com**

• • •

References

Andevski, M., Kundačina, M. (2004). *Environmental education, care of the environment to sustainable development*, Teacher Training Faculty, Uzice, Serbia, 59 – 87.

Daskolia, M., Dimos, A., Kampylis, G. P. (2012) Secondary teachers' conceptions of creative thinking within the context of environmental education, *International Journal of Environmental & Science Education,* Vol.7, No2, pages 269 – 290.

Erdogan, M., Kostova, Z. & Marcinkowski, T. (2009) Components of Environmental Litercy in Elementary Science Education Curriculum in Bulgaria and Turkey. *Eurasia Journal of Mathematics, science and Technology Education*. 5(1): 15 – 26.

Hungerford, H. R., Volk, T. L. & Ramsey, J. M. (1994) *A Prototype Environmental Education Curriculum for The Middle School*, USA: UNESCO [Chapter 4].

Kundačina, M. (2006) *Factors of environmental education in students*, Faculty of Education, Uzice, Serbia, 102 – 118.

Official Gazette of the Republic of Serbia and Education Gazette No.1/2007.

Rohiza Jamaluddin. (2004) *Pencapaian guru sains sekolah menengah dalam pernyataan tentang isu alams sekitar*, Unpublished master's thesis. University Malaya.

Rowe, D. (2002) *Environmental Literacy and Sustainability as Core Requirements: Success Stories and Models, in W. Leal Filho* (ed.), Teaching Sustainability at Universities: Towards Curriculum Greening. Frankfurt: Peter Lang, 79–103. [Chapter 5]

Tanaka, H. (2000) Environmental chemistry education for the 21st century, *Journal of Indian Chemical Society*. 77: 531 – 538.

UNESCO (1994): A Prototype environmental education curriculum for the middle school, Environmental Education Series 29: VII – 1.

International Electronic Journal of Environmental Education
Vol.4, Issue 2, 2014, 61-69
RESEARCH ARTICLE

Sırbistan Cumhuriyeti'ndeki Okullarda Yer Alan Öğretici Materyallerde Çevre Konuları

Milutin Maravić*
University of Novi Sad, SERBIA

Sonja Ivković
University Educons, SREMSKA KAMENICA

Mirjana Segedinac
University of Novi Sad, SERBIA

Jasna Adamov
University of Novi Sad, SERBIA

Özet

Bu incelemenin genel amacı Sırbistan Cumhuriyeti'nde yer alan ilk ve ortaokullarda mevcut öğretici materyallerle çevre konularını ortaya koymaktır. Çevresel sorunlar Sırbistan'da yer alan ortaokulların müfredatında yer almaktadır. Mevcut eğitim müfredatlarında ve programlarında belirli konularla sınırlıdır (özellikle kimya ve biyoloji). Ekoloji ile ilgili konular mesleki eğitimin bazı bölümlerinde yer almaktadır. Çevresel konularla ilgili olarak ders müfredatlarında, sınıf düzeylerinde ve eğitim kademeleri arasında eşitlik yoktur. Genel olarak eğitim materyallerinin yaklaşık %5.4'ü çevresel konularla ilgilidir. Ulusal temel esasların ve kurumlar arası işbirliğinin eksikliği nedeniyle niceliksel bir sıçramaya ulaşılamamıştır. Holisitik yaklaşımla çabalayarak çevre için eğitime katkı sağlamalıyız.

Anahtar Kelimeler: Çevre eğitimi, çevresel konular, öğretici materyaller, ortaokul mesleki eğitim.

ISSN: 2146-0329
*Corresponding author: Milutin Maravić, E-mail: milutin.maravic@gamil.com