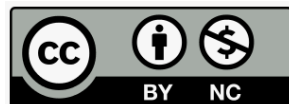


This is the peer-reviewed version of the paper:

Stanišić, Jelena, и Slavica Maksić. 2014. „Environmental Education in Serbian Primary Schools: Challenges and Changes in Curriculum, Pedagogy, and Teacher Training“. *Journal of Environmental Education* 45(2):118–31. doi: [10.1080/00958964.2013.829019](https://doi.org/10.1080/00958964.2013.829019).



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Environmental Education in Serbian Primary Schools: Challenges and Changes in Curriculum, Pedagogy, and Teacher Training

Jelena Stanišić and Slavica Maksisić

Institute for Educational Research, Belgrade, Serbia

The protection of human health and the preservation of the environment are topics that form an integral part of the primary school curriculum in Serbia. However, research studies have shown that students do not have enough knowledge to contribute to the development of a healthy lifestyle and environmental awareness. The latest changes in school policy and curricula confirm that the relevance of environmental education has been recognized, but changes in school practice are yet to come. This article discusses the challenges encountered in the implementation of the intended curriculum and offers suggestions for changes to the curriculum, pedagogy, and teacher training in order to enhance environmental education.

Keywords: developing environmental awareness, environmental education, long-term personal perspective, primary school curriculum

Environmental pollution has become the global problem of modern people, endangering human physical and mental health, life aspirations, and even personal identity. Noise, polluted water, air, flora and fauna, and polluted food can have a negative impact on human health (European Commission, 2013). The most common diseases of our civilization are largely associated with the poor quality of life and environmental pollution (Beckerman et al., 2012; World Health Organization [WHO], 2010, 2013). People living in the present time need to have the knowledge, skills, attitudes, motivation, and commitment to work individually and collectively toward solutions to the current problems and at the same time work toward prevention of new ones (Huckle, 2001; Maksić, 2002; Sterling, 1998; UNESCO-UNEP, 1976). The goal of environmental education is to contribute to the development of an environmentally literate and responsible citizen, one who can make decisions that will help restrain the environmental problems that arise in the twenty-first century (Erdoĝan, Kostova, & Marcinkowski, 2009; Hungerford, Peyton, & Wilke, 1980; Knapp, 2000; Schmieder, 1977; UNESCO, 1977, 1978).

Learning about the protection of the environment and human health is a challenge facing Serbian education for many reasons. Within Europe, Serbia is a small country, one of the successors of the former Socialist Federal Republic of Yugoslavia, with a weak economy, burdened with the problems of non-completed transition and privatization (Miletić, Miljanović, & Todorović, 2009; Savić, 2007, 2008). The further development of the country is dependent on foreign investment, which is endangered by the global economic crisis and limited by the political, juridical, and economic status of the state (Knežević, 2010; Savić & Bošković, 2011). The wars and bombing during the 1990s have had a detrimental impact on Serbian industry as well as on pollution of the land, air, and water. The big state industrial centers that used to be the mainstays of the overall development in municipalities and the surrounding area have collapsed and many employees have lost their jobs (Miletić et al., 2009). In terms of technological-technical progress, domestic industrial installations are at least 20 years behind in comparison with industrially developed countries (Miletić et al., 2009).

Energy efficiency in industry is three times lower than the international average, and the level of industrial waste per production unit is disproportionately high (Miletić et al., 2009).

Given the role of primary education in the acquisition of the basic knowledge and personal development of an individual, the focus of this article is on environmental education in primary schools. The question is: How can prescribed educational goals, related to the preservation of health and environmental protection, be implemented to a satisfactory level in the foreseeable future for the benefit of children who are at school now? The purpose of this article is to provide an overview of the current status of environmental education by examining two aspects: intended curriculum, and students' knowledge in the field. In the first part of the article, primary school curricula were analyzed in order to learn which environmental contents are prescribed; which school subjects contain ecological topics and contents; what the objectives of learning environmental topics and contents are; and what the recommendations for teaching and learning methods and teachers' professional competences are. In the second part of this article, we analyzed the results of the relevant surveys of primary school students' achievements in environmental education, as well as teachers' competences for achieving the current curricular objectives in this area. The final section contains reflection on the problems that cause difficulties for the realization of the prescribed curricula and provides recommendations on how to cope with the listed problems.

ENVIRONMENTAL AND HEALTH EDUCATION IN THE PRIMARY SCHOOL CURRICULUM

Serbia includes environmental education in its general statement of educational objectives at primary school level, similar to other countries in the region, as well as in the EU: Austria, Belgium, Bulgaria, Denmark, Finland, Germany, Greece, Ireland, Luxembourg, Macedonia¹, Spain, Sweden, Turkey, the United Kingdom (Erdoğlan et al., 2009; Srbinovski, Erdoğlan, & Ismaili, 2010; Stokes, Edge, & West, 2001). Among the main goals of primary education, the following bear immediate relevance for the environment and human health: developing and practicing healthy lifestyles, awareness about the importance of one's own health and safety, the need to develop and foster physical abilities (human health); raising awareness about the importance of sustainable development, the protection and preservation of nature and the environment, ecology-related ethics and the importance of animal protection (sustainable development and preservation of the environment); developing the feeling of solidarity (solidarity); and developing the capability to live in society based on the care for others (care for others) (Ministry of Education, Science and Technological Development, Republic of Serbia, 2009).

Within European educational systems, formal environmental education is provided either as a compulsory subject, as part of a compulsory subject area, or as an interdisciplinary theme. In some European countries (Belgium, Finland, Greece, France, Spain), environmental education is a compulsory subject. In Serbia, similar to Belgium, Spain, France, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Sweden, the United Kingdom, Poland, the Czech Republic, Slovakia, Bulgaria, Belorussia, Russia, Albania, Croatia, Macedonia, Montenegro, and Bosnia and Herzegovina, environmental content forms part of several teaching subjects. In Austria, Germany, Denmark, and Finland curricula present environmental education via a thematic interdisciplinary approach. In sum, in all cases where environmental education is taught as a separate subject it is also taught in some other way, primarily embedded in other subjects (Erdoğan et al., 2009; Sokoli & Doka, 2004; Srbinovski, 2004; Stokes et al., 2001).

The role of environmental education in the development of a student's ecological style of thinking was recognized at the First Congress of Ecologists of Yugoslavia², held in 1973 (Radović, 1996). In the meantime, environmental education contents and activities were included within the regular curricula of several subjects in primary school education in Serbia. Several curricula studies have

provided a survey of the ecological topics presented in the curriculum, as well as a survey on how and when certain topics were introduced (Brun, 2001; Kundačina, 2006; Nikolić,

003; Segedinac, Vojinović-Miloradov, & Štrbac, 2003). The results of the curricula analysis implied that ecological topics were present in the prescribed programs in the past 20 years, but students were not encouraged enough for practical action. It was concluded that higher integration and correlation among teaching environmental issues in different school subjects was required.

In the first decade of the twenty-first century, a reform of the education system in Serbia was introduced, with major changes to the curricula for primary school education³ (Zavod za unapređivanje obrazovanja i vaspitanja, 2012). Current school policy in Serbia envisages that environmental and health education should be implemented through curricular, extracurricular, and after-school activities at the level of primary education (Zavod za unapređivanje obrazovanja i vaspitanja, 2012). Table 1 shows the subjects involved, where they are compulsory or optional and the grades for which they are prescribed. It is prescribed that students in all primary schools across Serbia start learning about the environment and health within the compulsory subject The World Around Us, which comprises topics such as living and non-living nature, housing, human activities, and motion in space and time. The aims of this course are to provide students with the opportunity to get to know themselves and their environment and develop abilities for a responsible life within it. The subject Nature and Society has the same aims, but the previously studied topics are deepened and new ones introduced, such as getting to know one's place of birth, heritage, the links between living and non-living nature, and studying natural phenomena. Courses in biology, geography, and chemistry include areas and contents directly related to the preservation of human health and the environment. In the eighth grade, we single out the study of the human right to a healthy environment, a modern way of life, health, and the culture of living, which occupy the major part of the biology course.

TABLE 1
Environmental and Health Education Issues in Serbian Primary School Curricula (2012/2013)

<i>Subject type</i>	<i>Subject</i>	<i>1 class</i>	<i>2 class</i>	<i>3 class</i>	<i>4 class</i>	<i>5 class</i>	<i>6 class</i>	<i>7 class</i>	<i>8 class</i>
Compulsory	The World Around Us	✓	✓						
	Nature and Society			✓	✓				
	Biology					✓	✓	✓	✓
	Geography					✓	✓	✓	✓
	Physics						✓	✓	✓
	Chemistry							✓	✓
	Technical and Computer Education					✓	✓	✓	✓
Optional	Physical Education	✓	✓	✓	✓	✓	✓	✓	✓
	Nature Protectors	✓	✓	✓	✓	✓	✓		
	Household							✓	✓

The protection of geo-heritage and the chemistry of the environment are prescribed as part of Geography and Chemistry. The risks of radioactivity and the protection of human health and the environment from these risks are contained in the physics syllabus. The prescribed program for Physical Education includes ecological and health issues, which refer to the achievement and development of pupils' consciousness about the value of their own health and that of others as well as measures for health preservation. It is prescribed that the subject Technical and Computer Education provides contents concerning responsibility in traffic, protection measures at work, saving natural resources, electrical risks, etc.

Optional courses include a subject called Nature Protectors, which includes topics about natural phenomena and changes in the environment, pollution, and the protection of the environment and health, natural resources, and biodiversity. This subject is aimed at developing awareness about the need and possibility of personal engagement in the protection of the environment, as well as the acquisition and application of the sustainability principle, ethics, and the right of future generations to the preserved environment. The operational elaboration of the content has been left to teachers, who are in charge of creating the time, place, and number of classes dedicated to certain topics. Students can also choose a second optional subject—Household. It focus on acquiring knowledge about the importance and characteristics of water, the importance of consuming healthy and organic food, as well as the importance and harmful effects of chemicals used in the household.

In addition to the curricula that prescribe the goals and contents of environmental and health education, the standards for its evaluation in primary education were also defined within a reform of the educational system in Serbia (Zavod za vrednovanje kvaliteta obrazovanja i vaspitanja, 2011a, b). After completing the fourth grade, students are expected to be able to: recognize and value natural resources, distinguish between favorable and unfavorable human actions for the preservation of the environment, and have knowledge of the basic measures of protection of living and non-living nature as natural resources, as well as of the sources of danger and methods for the preservation and enhancement of human health. At the end of the eighth grade, students should be capable of recognizing, understanding, and knowing the consequences of human development on nature and the most important types of water, air, and soil pollution, as well as the processes in the protection and preservation of the environment and biodiversity (Biology). Additionally, students have to master the prevention measures for preserving health, understand and know how to correctly combine and preserve food, and know and understand the symptoms and mechanisms of physical, mental, and developmental disorders. Students should learn about the importance of the safe handling of substances and how they should be stored properly, with the aim of preserving health and the environment (Chemistry). As part of the course in Geography, students should be able to explain the physical and geographic laws in the Earth's mantle and state measures for its protection, renewal, and enhancement. As part of Physical Education, students should practice sports expressing their own personality while respecting others, learn and abide by safety rules, and be able to give first aid to the injured.

The Ministry of Education prescribed that environmental education should be taught by general teachers in the first cycle (from first to fourth grade), and subject teachers in the second cycle (from fifth to eighth grade) of primary school education. The intended curriculum contained recommended modes of teaching and learning ecological issues which integrated teaching, learning through experience, learning through research, etc. The analyses of the prescribed primary school curriculum revealed that 18.62% of the total number of regular classes taken from the first to the eighth grade addressed ecological issues (Šehović, 2012). The following analyses were related to the presence of ecological topics within the students' extracurricular and free activities. Experience from school practice shows that the implementation of the prescribed activities depended on the interests and motivation of particular teachers, as well as of that of particular schools (Šehović, 2012).

The analysis of the primary school curriculum in Serbia carried out by the authors of this article shows that teaching and learning ecological content is envisaged through natural science subjects. Earlier analyses of primary school curriculum in the field of arts and humanities subjects (music, art, history, Serbian language) showed that they did not include contents related to the environment, although these could contribute to the development of the desirable values, and emotional and conative components of students' environmental awareness (Stanišić, 2008). In sum, environmental

education is aimed at developing environmental awareness in students as well as readiness to act in order to contribute to the preservation of the environment and quality of living, as well as at raising awareness about the importance of the rational usage and disposal of various substances in everyday life.

THE KNOWLEDGE OF PRIMARY SCHOOL STUDENTS ABOUT THE ENVIRONMENT AND HEALTH

Only a few research studies have been conducted in Serbia to assess the knowledge and activities of students in the field of environment and human health preservation (Martin, Mullis, & Foy, 2008; Martin, Mullis, Gonzales, & Chrostowski, 2004; Pavlović-Babić, Baucal, & Kuzmanović, 2009; Stanišić, 2008, 2009a, b). Hence, our analysis of the research findings was started within the framework of two international study projects: Trends in International Mathematics and Science Study (TIMSS)⁴ and the Programme for International Student Assessment (PISA)⁵. Both studies are carried out by means of standardized tests on representative national samples, which facilitates international comparison. In the TIMSS studies conducted in 2003 and 2007, in terms of achievement in natural sciences, Serbian eighth grade students were placed below the average scale (Martin et al., 2004, 2008). In the TIMSS 2003 study, Serbian students (N = 4,296, from 149 primary schools) had the poorest scores in environmental science in comparison with life science, chemistry, physics, and geography; they were equally successful as their international peers in ecology at factual knowledge and conceptual understanding, but did not perform as well in reasoning and analysis (Antonijević & Janjetović, 2005). The 2007 findings showed a similar tendency: Serbian students (N = 4045, from 147 primary schools) showed the greatest achievement in the cognitive domain of knowledge than in applying it, while their score was lowest in the cognitive domain of reasoning (Gašić-Pavišić & Stanković, 2011). The data from the 2006 PISA study on the representative sample of 15-year-old students (nearly 5,000 students mostly from secondary schools) from Serbia indicated that the majority of students were successful at drawing conclusions and providing explanations based on literal data interpretation, while they were unsuccessful in using scientific knowledge and argumentation in order to account for the decisions on a personal, social, or global level (Pavlović-Babić et al., 2009).

Similar conclusions can be inferred from the findings of the study assessing the knowledge of students related to the preservation of health and environmental protection at the end of primary education in Serbia (Stanišić, 2008). The sample included eighth-grade students (N = 278, age 15) who answered multiple-choice and open-ended questions referring to the ecosystem, soil, air, and water pollution, harmful emissions in nature and the household, recycling, natural resources, radiation, and diseases. The majority of students provided correct answers to the questions that called for factual knowledge and content reproduction. However, when it was necessary to apply their knowledge and use it to reach conclusions, the same knowledge ceased to be functional for them. Many of the students were not ready to participate in desirable ecological actions and events when they were asked about their engagement in ecological activities in a questionnaire. The students' self-reports suggested that they did not have a clear picture about their role and possible contribution to the conservation and enhancement of the environment with the aim of preserving their own health. The author concluded that the students did not achieve the level of understanding of the essence of environmental protection, or of the causes and consequences of human acting in nature. Such knowledge does not encourage students to become engaged in environmental activities.

The research findings from the discussed empirical studies could lead to the assumption that the Serbian science curriculum, including environmental issues, placed more emphasis on the

acquisition of information at the expense of developing cognitive abilities. The problem of the quality of knowledge was detected in the countries in the region that share similar social, political, and cultural backgrounds (for example Macedonia and Bulgaria), as well as in other countries such as Turkey (Erdogan et al., 2009; Sribnovski et al., 2010). The research results indicated that Turkey, for example, placed the major emphasis on knowledge-based teaching, with very little attention to the skills and practices related to ecological subjects. In Macedonia and Bulgaria the curricula recognized the skills and affective component, but not practice, as one of the major components of environmental education.

The relationship between knowledge and environmental activities was studied more in other countries (Courtenay-Hall & Rogers, 2002; Kollmuss & Agyeman, 2002; Krnel & Naglič, 2009; Negev, Sagy, Garb, Salzberg, & Tal, 2008; Van Petegem, Blicck, & Van Ongevalle, 2007). Krnel and Naglič agreed with Courtenay-Hall and Rogers (2002) that the gap between environmental knowledge and environmental action may be seen as a specific variety of the more general gap between knowledge and action. Krnel and Naglič pointed out further that Van Petegem, Blicck, and Van Ongevalle (2007) described a new perspective on this complex relationship, in which environmental concern influences behavior indirectly. The authors explain that a personal belief is more likely to be converted into action if this involves little cost in time and effort, or if this action serves the person's needs directly. They concluded that the ultimate behavior is triggered by knowledge and situational factors.

Effective education greatly depends on the teachers and their motivation and quality of training (Kassas, 2002). This has been confirmed in a large number of research studies on environmental education in different countries (Du Plessis, 2013; Esa, 2010; Hall, 2004; Hamalosmanoglu, 2012; Lindemann-Matthies & Knecht, 2011). Negev et al. (2008) highlighted the important role of teachers or other adults who mediate in children's relationships with nature and have a crucial impact on their attitudes and behaviors. The teacher is an important factor in the development of the environmental attitudes of students. He is the one who organizes and leads the process of adopting ecological knowledge, forming the attitudes and habits of students, thus directly affecting their personality through his actions. He is required to be the initiator and organizer of extracurricular and after-school environmental activities (Živković & Jovanović, 2010). It is necessary to ensure the adequate environmental, as well as pedagogical and methodological training of school staff in order to provide the prescribed and system-based environmental education of students.

Several studies pointed out an insufficient level of training of Serbian teachers for environmental education (Kundačina, 2006; Mišković, 1997; Pejić, 2002). Problems have occurred due to the current teachers' basic education where environmental and health education is not still represented or developed to a sufficient extent. Moreover, the preparation of teachers for teaching environmental education and the protection of human health was entirely a matter of additional training at seminars or their own personal, internal motives and activities (Stanišić, 2011). Under these circumstances, it can be argued that teacher education and training in ecology and the preservation of the environment is a starting point for the successful realization of environmental education and that of young generations.

In sum, the analysis of the curricula and the findings of the research on primary school students' achievements in Serbia pointed to several challenging issues. It is difficult to accomplish the intended objectives of environmental education when the teachers are expected to teach new information in a novel, different way, without any appropriate education or training. In addition, students are expected to apply knowledge and to be proactive in relation to ecological problems both in the local and global surrounding without appropriate education within their school, where greater

emphasis is placed on theory rather than on practice, with learning for grades being their main goal. Furthermore, the prescribed ecological topics in the curriculum are numerous and frequently overlap. Such content is repeated in different subjects, without horizontal or vertical connections, which results in an inefficient learning process. The expected outcomes (standards) are very ambitious and demanding. The question remains how to connect more school-based environmental education with real life, and to encourage young students who learn about ecological issues to be personally responsible and prepared to participate in solving ecological problems.

THE DEVELOPMENT OF THE LONG-LIFE PERSPECTIVE OF THE LEARNER

The effect of global changes on sustainable development presents a challenge to education—one of the pillars of modern society—which may be said to be more important than natural resources, because their usage depends on what people know, can, and desire to do. Sustainable development at international level is the result of sustainable development at national and local level, but that can be achieved by citizens attaining their personal sustainable development. The first step of environmental and health education should be raising personal awareness of the interrelation between the protection of the environment and human health. The role of teachers should be to teach their students that humans protect nature in order to protect themselves. The main objective of education thus becomes the development of the long-term personal perspective of the learner: the attitude that life is of value in and of itself, the consciousness that each individual has a crucial role in preserving the environment, and dedication to solidarity while facing natural disasters (Maksić & Stanišić, 2012).

At legislation level, the situation seems satisfactory: it can be argued that Serbian education is keeping up with the current trends in environmental and health education and participates in them. However, the analysis of the curricula points to the need for harmonization of the aims, objectives, and teaching content. For example, children should be educated to: recognize pollution and not contribute to it; develop awareness about the risks involved in pollution and minimize their own contribution to it. It is necessary to further operationalize the objectives of health and environmental education so that they can be accomplished and their achievement evaluated. The greatest objection to the current conditions refers to the order in which activities are undertaken: the environmental science curriculum whose implementation is compulsory has been defined first, while teachers are supposed to be trained for its implementation afterward.

The findings of research studies on the intended and attained environmental curriculum in Serbian primary schools point to the need to reconsider the role of teachers in achieving the goals of environmental education. Serbian teachers need support that includes in-service training, monitoring of their work, and assistance with the difficulties they encounter (Stanković & Vujačić, 2011). Many researchers (Gayford, 1998; Mosothwane, 2002; Summers, Kruger, Childs & Mant, 2001) have established that teachers who have a sound understanding of the essence of environmental concepts are far more effective in training their students. It should be emphasized that in this particular field of education, much more than in others, unity between the contents taught by teachers and their lifestyle is important. As argued by Zak and Munson (2008) teachers play an important role in creating a society in which people develop an understanding of ecological concepts. Hence, they need a thorough understanding of the concept in question.

Teachers of environmental education should become role models who value life and practice healthy lifestyles in order to be successful teachers at school. Teachers should not only transfer relevant information about environmental issues but also provoke students' personal interests and care for environmental issues, as well as their readiness for involvement in the process of solving environmental problems. Several studies have illustrated the influence of teachers' attitudes toward the behavior of their students (Esa, 2010; Lindemann-Matthies Knecht, 2011). Bandura (1977) argued that people could learn new information and behaviors by watching other people. The attributes typically associated with effective models include power, prestige, competence, and warmth or caring. Modeling is one of the most efficient modes of learning any new skill or knowledge (Bandura, 1986).

Students learn about the protection of the environment in various courses and there is a question of their ability to integrate environment-related contents taught separately. Research studies reveal that students in various types of integrative programs score as well or better on achievement tests than those enrolled in separate subjects (Lake, 1994; Vars, 1991). In addition, integrated teaching helps students use the acquired skills; an integrated knowledge base enables the faster and easier retrieval of necessary information; the integrated approach encourages breadth and depth in learning and promotes positive attitudes toward teaching and learning (Lipson, Valencia, Wixson, & Peters, 1993; Šefer, 2005). Many authors have emphasized the importance of experiential learning and various studies have pointed to positive results and the significance of experience in environmental education (Barney, Mintzes, & Yen, 2005; DiEnno & Hilton, 2005; Hartig, Kaiser, & Bowler, 2001; Kruse & Card, 2004; Pooley & O'Conner, 2000).

Mindful learning and the pluralist concept of education are some of the ideas that can be used to accomplish health- and environment-related goals, in the sense of developing a long-term personal perspective, healthy lifestyle, and environmental awareness. The wrong orientation of the mind of modern people is rooted in school learning, where probable data are offered as absolute and only one perspective of seeing the problem is built (Langer, 1997, 2000). The development of understanding implies that school learning should encourage the ability to take on other perspectives, the readiness to take risks, doubting existing knowledge, and asking questions. Each answer is only an answer from a certain viewpoint, which involves the person providing an answer and the circumstances in which the question was answered. Conditional learning in order to nurture the disposition of mindfulness, which underlies learning with understanding, involves techniques such as: looking closely, exploring possibilities and perspectives, and introducing ambiguity.

There are numerous viewpoints used to obtain knowledge about the world. Hence, one can hardly be said to be more correct than the other. Schools should enable students to accept the plurality of ideas about one phenomenon, to accept and understand arguments supporting opposite attitudes and those inconsistent with their own and to discuss different ideas from various viewpoints (Đurišić-Bojanović, 2005). The development of non-dogmatic, flexible thinking in students is possible if they are taught to appreciate the facts, carefully consider the sources of data, provide arguments for their attitudes, and appreciate reasonable argumentation of different viewpoints, if at the same time these same principles are practiced at school. Openness of spirit implies the ability to listen to others, as well as the ability to simultaneously hold two realities in mind and compare them according to different parameters. Young people can be educated to practice it if they are taught to tolerate ambiguities and be able to delay the need for final answers.

The reflective practitioner model may prove to be a promising framework for improving in-service teacher training (Đerić, Lalić-Vučetić, & Pavlović, 2011; Korthagen, 2001; Schon, 1987). In the

past few decades, reflection has become one of the main concepts in research on the professional development of employees in education (Hatton & Smith, 1995; Korthagen & Vasalos, 2005; Krnjaja & Pavlović-Breneselović, 2011; Sellars, 2012). Reflection starts with experiencing a certain difficulty, followed by locating and defining that difficulty, as well as considering possible solutions and their implications. In the key phase of reflection, plausible solutions have to be tested through an experiment in order to verify their sustainability. This model differs from the current models of in-service teacher training because of the importance of experimenting with different teaching activities. In-service teacher training programs following the reflective practitioner model focus on the teacher's personality in order to enable them to increase awareness of the implicit assumptions underlying their teaching practice (Pavlović, 2012). The process of teachers' experimentation with new assumptions is expected to increase the quality of their work.

CONCLUSIONS

Environmental education in primary schools in Serbia is organized in a similar way to that in the region and EU countries, and is faced with the analogous problems of establishing curricular goals (Stokes et al., 2001). Environment- and health-related contents in Serbian primary schools are integrated in the curricula of different teaching subjects, predominantly those of sciences. The analysis of the curricula showed that core contents referred to scientific facts and concepts, while students were expected to acquire the provided information and facts. It was noticed that the contents of science subjects were mostly oriented toward the cognitive dimension and the acquisition of knowledge within that domain. There were far fewer issues related to students' experience and those that would serve to contribute to attitudes and habits aimed at preserving the environment and encourage students to become active and demonstrate environmentally appropriate behavior. The results obtained from research studies have suggested that the majority of Serbian primary school students were not familiar with the facts related to the preservation of human health and the environment.

The latest changes in primary education school policy and curriculum in Serbia that acknowledge the relevance of environmental education can be considered as progress in this field, but changes in school practice are yet to come. However, it is already clear that further changes within the education sector are necessary, first and foremost in the training of the teachers who implement the environmental education curricula. Bearing in mind that the health of today's young generations will be exposed to increasing risks of pollution, the afore-mentioned data pose a challenge for redefining the main goals of education. Hence, the development of the long-term personal perspective of the learner becomes the main goal of education. Some promising ideas in that direction are: the reflective practitioner model for teachers' professional development, the concept of mindful learning and the concept of multi-perspective education.

In order to further enhance environmental education, it is necessary to additionally work both on research into the intended and attained curriculum, as well as in the field of the implemented curricula. These studies should provide answers to the following questions: what are the most relevant ecological subjects and problems; how can we overcome the information overlap on one topic within different school subjects; which teaching methods are the most efficient; what form of teacher training would allow improvement of their teaching in this area, etc. Finally, it should be emphasized that the required changes need to take place in unfavorable local and global social circumstances. Thus, more favorable social and economic conditions are the essential prerequisites for enhancing the environmental education of youth, which would consequently result in the development of their environmental awareness, and end in the preservation of nature and the human being.

FUNDING

This article is the result of the projects “Improving the quality and accessibility of education in modernization processes in Serbia” (no. 47008) and “From encouraging initiative, cooperation and creativity in education to new roles and identities in society” (no. 179034), which are financially supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (2011–2014).

NOTES

1. Macedonia is the Former Yugoslav Republic of Macedonia.
2. Serbia was at that time part of Yugoslavia.
3. Primary education in Serbia is compulsory and lasts eight years. The Ministry of Education sets the curriculum which is compulsory for all primary schools in the country.
4. Trends in International Mathematics and Science Study (TIMSS) is an international assessment of educational achievement in mathematics and science at the level of fourth and eighth grade of primary school. TIMSS is coordinated by the International Association for the Evaluation of Education Achievement—IEA. TIMSS was first administered in 1995 and is conducted every four years (www.timssandpirls.bc.edu).
5. The Program for International Student Assessment (PISA) is an international assessment that measures 15-year-old students’ reading, mathematics, and science literacy. PISA also includes measures of general or cross-curricular competencies, such as problem solving. PISA emphasizes the functional skills that students have acquired as they near the end of compulsory schooling. PISA is coordinated by the Organization for Economic Cooperation and Development (OECD). PISA was first administered in 2000 and is conducted every three years (www.oecd.org/pisa).

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