UDC 37.033:502.131.1

Иновације у настави, XXIX, 2016/4 стр. 72–86
doi: 10.5937/inovacije1604072V

Paper received: 20. 8. 2016.
Paper accepted: 15. 9. 2016.

Original paper

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Environmental Impact of Consumerism from the Perspective of the Social, Environmental and Scientific Education[2]

***Summary*:** *Overconsumption is the root of almost all environmental issues, while modern generations already live at the expense of the future ones. Incorporating the effects of consumerism in school instruction is a possible way of preparing the children for the role of "sustainable" consumers, which is one of the key roles in a sustainable society. The paper looks at the aspects of the present and prospective approaches to this issue relative to the instruction of the Social, Environmental and Scientific Education (SESE) in primary schools. Theoretical analysis and scientific study of the issue resulted in a definition of a system of categories of the key competencies arising from the causality between consumerism and environmental issues and reflecting the characteristics of education for sustainable development. In addition, it was concluded that the selected requirements were adapted to suit the specificities of the school subject and the age of the children. The defined framework was a starting point for the evaluation of the quality of the current approach to the effects of consumerism on the environment in the school subjects World around Us and SESE. The results of a segment of the empirical research, carried out by testing the students' knowledge at the end of the first cycle of mandatory education in Serbia, are also presented in this paper. The respondents demonstrated selective knowledge of the facts, as well as deficiencies in understanding and application of the knowledge pertaining to the causality between the consumerism and environmental issues. The identified problem reflects not only the quality of the SESE curriculum, but also the quality of instruction which depends on how well the primary school teachers are informed about this topic. The test results confirmed indirectly the other results obtained in a wider research which included the curricula and the primary school teachers. The paper also offers possible solutions to the identified problems.*

Key words: *education for sustainable development, Social, Environmental and Scientific Education, consumerism, environmental issues*

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2 The paper is a part of the PhD thesis entitled *Consumerism and Environmental Problems in Teaching Natural and Social Sciences,* defended at the Teacher Education Faculty, University of Belgrade.

Introduction

The sustainable development perspective is inextricably linked to education in scientific and expert literature, international and national documents, and reports from international conferences on the environment and sustainable development. Education can become a tool for the promotion of sustainable development only if its values, principles and practice are integrated in all levels of educational systems and, even wider, in all forms of education and learning, which indeed was the ultimate goal of the Decade of Education for Sustainable Development (2005-2014) (WCED, 1987; UN, 1992; The Earth Charter Initiative, 2000; UN, 2002; UNESCO, 2005, etc.). Despite the fact that the elements of this educational concept have been included in the national curricula of the majority of states, none of the models of integration of its goals has proved to be perfect, universal or applicable to all situations, systems and school subjects. Many scientists and experts have criticised in their papers even the educational systems of the most developed countries - leaders and role models in terms of the quality of the achievement of the sustainable development goals – and proposed solutions for this problem. For instance, Khan (Kahn, 2010) criticises the US education for sustainable development curriculum, because it usually comes down to exeprimental instruction or outdoor classes, whereas some theoreticians (e.g. Bonnett, 2003; Gadotti, 2010) insist that the concept of sustainability be used as a platform for the reform and improvement of the quality od education. This educational concept can and must be improved, generally and in its specific aspects, in theory and in practice. The paper examines the aspects of the present and prospective approaches to causality between consumerism and the environment[3], and presents some results of the research.

The specific problems of (un)sustainable lifestyle, as well as the opportunities and the necessity of tackling these in school instruction, were evident from the very definition of sustainable development and the educational concept arising from it. There is a widely accepted definition which describes sustainable development as the development focusing on the fulfilment of needs of both present and future generations (WCED, 1987). Similarly, the definition of education for sustainable development emphasises the importance of the competencies which will enable people to improve the quality of life in the present without destroying our planet for the future generations (Sustainable Development Education Panel, 1998). These definitions, directly or indirectly, include the concepts such as: the environment-imposed limitations, satisfaction of human needs (the stress here is on the needs, rather than wants) and intergenerational responsibility. If the two definitions are juxtaposed with a definition of consumerism as a lifestyle "preoccupied with the pursuit, possession, rapid displacement, and replacement of a seemingly inexhaustible supply of things" (Smart, 2010: 5), it becomes clear that consumerism is an obstacle to sustainable development. This claim is supported by the fact that affluence, measured by per capita consumption, is one of the factors determining the impact of people on the environment (Commoner, 1971; Ehrlich and Holdren, in Ehrlich and Ehrlich, 1991), while consumption is also an underlying factor in the evaluation of the ecological (WWF, 2014) and carbon footprints (Wiedmann and Minx, 2007). Ultimately, the complexity and a global character of the environmental issues (as stated in many reports, including the WWF, 2014 - *Living Planet Report 2014*) are sufficient proof that natural resources are exploited much faster than planet Earth can renew them. In other words, consumption is in the core of al-

3 The Social, Environmental and Scientific Education encompasses two school subjects, *World around Us* and *SESE*, which examine natural and social phenomena, with a focus on the interdisciplinary approach. The subjects are included in the Serbian national curriculum for the first two grades (*World around Us*) and the third and fourth grades (*SESE*) of primary school. They are taught at the ages 7-11.

most all environmental issues, and present generations are already living at the expense of the future ones. To conclude with, if environmental issues are mostly the consequence of consumerism, then their solution may lie in a different system of education and values, as well as in a changed behaviour of people as individual consumers. Education is one of the crucial factors in the realisation of this goal. Education is a powerful tool in developing a responsible and respectful attitude towards the nature and in shaping a different, sustainable worldview which includes the development of the competencies necessary for dealing with environmental issues.

The possible ways of treating the relationship between overconsumption and environmental issues in the school subject Social, Environmental and Scientific Education (SESE)

Treating the relationship between overconsumption and environmental issues in a school subject (in this case SESE) may be the way to prepare the children for the role of "sustainable" consumers, their key role in sustainable society. Several problems must be addressed to determine the quality of the approach to this topic and provide the guidelines for the improvement of SESE instruction. More particularly, a successful integration of the topic in the SESE instruction, provided that it is properly adjusted to the specificities of this school subject and the children's age, should reflect the characteristics of education for sustainable development.

1. *Interdisciplinary and holistic approach to the topic.* The above-mentioned concept is a segment of the education for sustainable development reflecting the goals of the economic component of sustainability. However, insisting solely on its integration in the instruction of a school subject is disputable, given that the elements of this complex educational concept make a functional whole only in mutual interaction. This unity, and the corresponding approach, arise from the fact that the interaction of the sustainable development components, environmental protection, economic development and social equity is the prerequisite for an integrative, holistic approach along with dealing with a number of problems pertaining to different areas (WCED, 1987). The solution to one problem may lead to the solution or alleviation of other problems within the same or different components of sustainable development (ibid). For this reason, the improvement of the educational concept in its entirety requires that specific goals be addressed as well, including the ones selected in our research. In order to accomplish this, interdisciplinary approach must be applied in problem solving, coupled with a constant awareness of the system as a whole. In other words, every segment of the complex educational concept must reflect the specificities of all sustainable development components. The problems of modern society are interrelated, interdependent and unpredictable, and only a holistic, systemic mindset can guarantee successful solutions (Hodson, 2003; Gadotti, 2010 et al.). Some authors recommend that environmental education/education for sustainable development should be based on sustainability as a frame of mind (Bonnett, 2003).

To achieve an interdisciplinary and holistic approach in this research, the sources were studied dealing with the environmental laws and the consequences of depletion of natural resources. In addition, the relevant literature from various areas (philosophy, psychology, sociology, marketing, economics), describing the characteristics of consumption and the underlying mechanisms of consumers' motivation and their consumption-related activities, was also analysed. For the purposes of this paper, several key problems were identified as the root causes of overconsumption: 1. Apart from basic human needs, there are also wants or surrogate needs. This system of "artificial", "inhuman", "false" or synthesised needs was created and supported by the industrial society (Rousseau and Marx, in Ackerman, 1996; Marcuse; 1964, Fromm, 1989; Galbraith, 1998; Campbell, 2005, and others), while the creation of

new and bigger consumers' wants is conditioned by the increase in production and the priorities set by production companies (Galbraith, 1998); 2. Apart from the basic needs, there are also higher-order or meta-needs, such as the need for love and belonging, esteem, creation, freedom (Prescott in Tyler, 1969; Maslow, 1982; Max-Neef, 1991). Nowadays, (particularly in more affluent societies) there is a growing tendency that the fulfilment of these needs implies material consumption, and goods are increasingly becoming the objects for the channelling of these needs (Belk et al., 2003); 3. Consequently, consumption in modern society is commonly viewed as a means of communicating and expressing one's identity (Lin, 2008; Jackson, 2005). This is a social or disfunctional demand for the goods which has its own meaning beyond its functional value (Marx, 1867; Veblen, 1899; Leibenstein, 1950; Marcuse, 1964; Baudrillard, 2004, and others); 4. Despite the fact that many studies indicate that there is very little correlation between the level of economic growth and happiness, or satisfaction with one's life (Max-Neef, 1991; Scitovsky, 1992; Wright and Worcester, in Jackson, 2005), conventional economics views the multiplication of consumer goods, choices and opportunities for consumption as an opportunity for positive growth (Lin, 2008); 5. The media and advertising play a powerful role in a continuous stimulation of consumption (Baudrillard, 2004; Campbell, 2005; Smart, 2010, and others), while the youngest population is particularly vulnerable to manipulation (Mendelson et al., 1992). We have already written extensively about the consequences of overconsumption on the environment. These consequences can be explained partly by the fact that people, intoxicated by their power over the nature, have completely forgotten that they are biologically only one segment of the environment (Commoner, 1971). Based on all stated facts, we created a scheme of the key problems pertaining to the topic of the paper which have to be addressed (holistically) from the perspective of education.

2. *The potential of the school subject in which the selected goals are to be integrated should be determined, and the goals should be adapted according to the characteristics of the subject*. Social, Environmental and Scientific Education is potentially a good medium for the promotion of the values of education for sustainabe development (Veinović, 2007). The definition of the goal of SESE already includes "getting to know oneself, one's natural and social environment, development of skills and competencies for a responsible lifestyle", while the list of objectives includes statements such as "acquiring knowledge about civilisational legacy and how it can be preserved, used rationally and improved" and "developing ecological awareness and understanding of the fundamental elements of sustainable development" (Nastavni program za predmet Priroda i društvo, 2010). The main characteristics of SESE, its interdisciplinary content and orientation towards scientific literacy of pupils, contribute to the fact that this subject provides a lot of room for integration of sustainability values. Consumption and the effects of consumerism on the environment are indeed the topics studied in many scientific disciplines included in the school subjects *SESE* and *World around Us*. Moreover, the interdisciplinary character of the topic of this paper and the need for the holistic approach fit perfectly in the concept of both school subjects. On the other hand, scientific literacy is developed in the SESE instruction at elementary level, and it includes teaching and learning about the fundamental concepts, phenomena and processes in the natural and social environment, as well as the functional application of the acquired knowledge. This educational goal is not easy to pursue, given a constant advancement of science and technology, the constantly changing scientific perception of the nature and our place in it, as well as the volatile character of human society and the expectations of the society and economy in terms of education (Hodson, 2003). Nevertheless, the subject Social, Environmental and Scientific Education has the potential, and should use it, to contribute to the development of the compe-

tencies for sustainable living. This potential, which has to be used well, arises also from the fact that SESE is taught to primary school children of ages 7-11. This age is the right time for learning about responsible and sustainable consumption, because the children of this age develop very intensively and early childhood is the time when the first choices in terms of consumption are made.

3. *Goals adapted to the age of children*. One of the tasks was to determine whether the objectives suit the cognitive ability of the children of ages 7-11. Some of the key objectives pertaining to the topic of this paper include: development of knowledge and understanding of the causality between consumerism and environmental issues, development of appropriate attitudes and application of the knowledge in the real life situations. To determine whether these objectives are suitable for the given age group of children, we consulted several cognitive theories underpinning the modern perception of teaching and learning. According to Piaget (Piaget & Inhalder, 1978), children of this age understand causality more intensively: 7 and 8-year-olds are able to grasp the causal relationship between two facts and between intention and action. However, the connection between two ideas or two opinions is not fully perceived before the age 9; Vygotsky (Vigotski, 1977) established that at this age children's thought processes shift towards scientific thinking characterised by: the existence of a system, the hierarchy of concepts arranged according to generality, a logical relationship between the general and the specific, while the grouping is carried out on the basis of an abstractly selected trait or a uniform criterion; Bruner claimed that in the lower grades of primary school, children are able to apply the concepts, arrange them in a hierarchical order and combine them (in Vilotijević, 2000). He also observed that a school subject is more easily learned if its content is taught in line with the structural requirements, because it is systematised (ibid). In Vygotsky's opinion, learning can and must precede development, it should encourage and accelerate development, relying not only on mature and developed mental functions, but also on the ones beginning to develop (the zone of proximal development). Learning about scientific concepts with the assistance of adults impacts the development of thinking in general. In conclusion, these theories confirmed that children of ages 7-11 are mature enough to respond to the requirements of education for sustainable development, and proved that the author of this paper correctly assumed that a holistic approach to this topic in teaching SESE can contribute to the overall development of children. More particularly, if sustainability concepts are appropriately structured in the SESE instruction, they will not only stimulate the understanding of the causality between consumerism and environmental issues, but also encourage the adoption of appropriate attitudes, implementation of the knowledge in real life situations, and the intellectual development of pupils.

Teaching Social, Environmental and Scientific Education to develop sustainable consumption: defining the framework

Theoretical and in-depth analysis of the topic resulted in the definition of the key competencies[4] relevant for the area of causality between consumerism and the environment which can and should be developed through SESE instruction. The competencies were identified, analysed and listed under four separate categories: 1. *dependency* of human beings upon the nature; 2. environmental *issues* and their consequences; 3. *causes* or the relationship between consumption and environmental issues; and 4. *measures* related to consumer behaviour that could solve or prevent environmental issues. The proposed system of categories is essentialy holistic[5] and firmly structured,

4 Competence is here understood in the broadest sense. It encompasses knowledge, (meta)competencies, skills and a value system (Weinert, in Palekčić, 2007).

5 The proposal is conceptually similar to and based on the programme of the holistic approach to environmental issues in the

containing the inter-connected concepts with causal, horizontal and vertical relations (the categories and their constitutive elements are interrelated). Interdisciplinary and holistic approaches are reflected in the system, as well as the intention to stimulate the intelectual development of the pupils and address different aspects of their personalities. Though a detailed description of the system is beyond the scope of this paper, a few remarks must be made. The competencies in the category of *dependency* of human beings and their progress upon natural resources and healthy environment were cited as a prerequisite for understanding the seriousness of environmental problems, as well as for the development of motivation for making sustainable choices. The second category consists of the competencies related to the *problems* in the environment (depletion of natural resources, pollution, endangered biodiversity), their interconnection and complex consequences (such as global climate change). Understanding the seriousness of the negative phenomena, concerns about the current problems and development of empathy for the rights and needs of the present and future generations – these are all very important prerequisities for encouraging the students to take their role in this context with more responsibility. The category of the *causes* of environmental issues, the common denominator of which is an excessive exploitation of natural resources and synthesised materials, is even more imortant than the previous one. If not taken seriously, the integration of education for sustainable development will very likely be reduced to dissemination of information or, at best, to the meer study of the problems, without a very significant element of discovery or going into the motives behind actions (e.g. Bonnett, 2003). In other words, problems are solved by tackling their causes, not the symptoms. The proposed competencies in the domain of the causes have been adapted to reflect typical consumer activities in a daily life of the children ages 7-11. The responsibility for environmental problems cannot be built on the general awareness of children about industry, agriculture, traffic and transportation as the causes of problems, because the "culprit" will forever be "someone else" and will remain "out there" (Veinović, 2007). Changes will be brought about only if every child becomes aware of how his/her actions contribute (directly or indirectly) to deterioration of the environment. The category of the causes includes the request for the media literacy of children, in order to enable them to critically interpret information they receive through advertising and make them more "resistant" to commercial manipulation, and therefore more receptive to sustainable consumption[6]. Finally, the *measures* related to consumer actions that should solve the present environmental issues and prevent the potential future ones are formally grouped under one category, but they are partly present in other categories as well, which is indicative of their strong inter-connectedness. Expert and scholarly literature offers various suggestions how to motivate people to abandon consumerism. In our view, the argument referring to the preservation of the environment and, at the same time, the improvement of the quality of life which is not based on the possession of material assets is most suitable for the approach to the given topic used in teaching SESE (IUCN, UNEP and WWF, 1980; Jackson, 2005). For this reason, some of the proposed measures refer to rational consumption and consumption of ecologically acceptable products. This implies that individuals must be able to distinguish between their needs and wants, give priority to the fulfillment of their needs, and satisfy the "higher-order" needs (belonging, esteem, self-realisation) with adequate (non-material) "satisfiers" (developing one's full po-

instruction of SESE: the approach is holistic in terms of the selection of issues to be taught, approach to pupils' personalities and the concept of teaching (Veinović, 2010).

6 The topic cannot be fully elaborated in the paper, but there are some points to be made: the goals related to development of the aspects of media literacy are not included in the school subject *SESE*. However, the analysis of the curricula clearly showed that these goals should be included and that this school subject has a great potential for that.

tential, good relationships with other people, ethical actions). The suggested ways of shifting the focus from wants to needs, and then on the meta-needs, include incentives for sports activities, outdoor activities, and participation in activities supporting socially vulnerable groups, the elderly and the sick[7].

The defined framework served as a starting point for the evaluation of the quality of the current approach to the effects of consumerism on the environment in teaching SESE, and for creating the guidelines for its improvement.

Methodological framework of the research

As pointed out earlier, this paper is a report on the part of a wider research. The goal of the wider research was *to determine and analyse the efficacy (functionality) of the SESE curricula, the competencies of teachers in informing pupils and enabling them to collect, understand and interpret information related to the causality between consumerism and environmental issues, as well as developing their motivation and skills for underatking appropriate actions in this context.* The research tasks and the results regarding the pupils' knowledge (types of knowledge) are presented further in the text. These results mostly reflect other research results, such as the quality of the SESE programme or the role of the primary school teachers in the context of the topic of the paper. The tasks included: 1. analyse how well informed the pupils are (knowledge of facts), how well they understand[8] and are able to implement the acquired knowledge[9] related to the causality between consumerism and environmental issues, and establish if there is a statistically significant correlation between the levels of the pupils' achievement in completing the tasks requiring these types of knowledge; 2. determine potential statistically significant differences in the knowledge of the children who were taught the subject *Guardians of the Nature*[10] for three and more years and children who did not have this school subject; 3. determine whether there is a connection between the pupils' grades in the SESE and their scores at the test of knowledge.

Theoretical analysis method and descriptive method were used in the research. Testing is the technique used in the part of the research presented in this paper, while a test of knowledge was designed to serve as the research instrument. This test is a criterion- referenced test. It draws upon the previously defined framework of the competencies (system of categories) related to the topic of the paper, and it was designed in accordance with the objectives set in the SESE curricula. Logical validation, internal consistency coefficient (Cronbach's alpha test) and item analysis were used for determining the metric characteristics of the test. The test consisted of 24 questions. The questions measured the pupils' knowledge and understanding of the facts, their ability to apply the knowledge within the system of categories (dependency of human beings upon the nature, environmental issues and their consequences, causes and links between consumption and environmental issues, and measures related to consumer behaviour for solving and prevention of environmental issues). There were six questions per category (more precisely, three pairs of questions, while every pair covers each of the above mentioned types of knowledge). One point was allotted only to full answers. The maximum total score was 24 points.

7 Solidarity within the framework of education for sustainable development is not only an autonomous goal, but also a value which has a power to motivate and give a more complex meaning to participation in the protection of the environment and sustainable lifestyle in general (Veinović, 2009).

8 Analytical, synthetical and value-based conclusions, understanding correlations between problems, causes and solutions.

9 Implementation of the acquired knowledge in new situations, awareness of correlations between personal actions and their impact on the environment, ability to predict the effects of these actions on personal health and health of other people now and in the future.

10 This is an elective subject containing the goals, objectives and content of environmental education.

The pupils at the end of the first cycle of compulsory education were included in the research. The test of knowledge was taken by 541 pupils from 13 primary schools in Serbia.

The quantitative data analysis included descriptive statistics, t-test, Pearson's correlation coefficient and variant analysis. The research results and their interpretation were organised according to the research tasks. Some of the results are presented in tables and graphs.

Research results and interpretation

1. Given the importance of education for sustainable development, the objective of integrating it in formal education, and the potential of teaching this concept in the school subject SESE, it was expected that the pupils at the end of the first cycle of compulsory education would demonstrate adequate knowledge pertaining to this area, as well as the understanding and ability to apply the acquired knowledge. However, the test responses were not satisfactory (Table 1). The Table 1 and Graph 1 data indicate that the distribution of the pupils' achievement is positively asymmetrical (skewed), as the scunis is 0,828, which means that the scores are skewed to lower values. Kurtosis or measure of skewness is 0,767, indicating that the distribution is leptokurtic and all scores are homogenous.

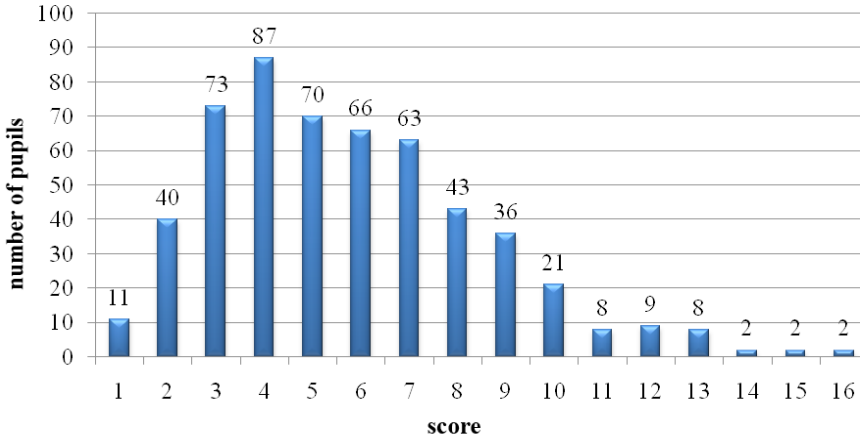
The results showing the minimum and maximum number of received points, the average score and the percentage of the solved tasks measuring different types of knowledge indicated clearly that the pupils had completed the test with difficulty. They demonstrated the insufficient knowledge of the facts related to the topic of this paper. The percentage of the solved tasks dealing with this type of knowledge was 28.56%, while the average score was only 2.28 (total number of points in this part of the test was 8). The scores were even lower in the part of the test measuring the ability to apply the knowledge (the percentage of the solved tasks was 18.79%, and the average score 1.50). The lowest score was observed in the tasks testing the respondents' understanding of the topic (the percentage of the solved tasks was 12%, and the average score 0.96). The observed differences may point at the relative orientation of instruction towards the acquisition of declarative knowledge of the subject matter which is the topic of this paper. This tendency was also observed in the research results (Blagdanić, 2009) showing that the tasks involving identification and reproduction of facts were prevalent in the objective type of the tasks formulated by the primary school teachers for the subject SESE. A similar phenomenon (the prevalence of open cloze tasks and essay tasks of memorisation in the micro-tests assessing the knowledge of SESE) was observed in the research conducted by Kundačina and Banđur (in Banđur et al., 2008). Our research proved that pupils have less difficulty in realising the correlation between their personal actions and the effects of these actions on the environment (application of knowledge), than in analytical, synthetical and value-based reasoning, awareness of the relationship between problems, causes and solutions. Given the age-specific characteristics, this conclusion was not surprising.

Table 2 contains the results indicating a correlation between the pupils' level of success in completing the tasks and different types of the tested knowledge. According to the results, a higher sco-

Table 1. Descriptive score statistics for the knowledge test

	N	Min	Max	Mean	SE_M	SD	Skew	SE Skew	Kurt	SE Kurt
score	541	0	16	4,76	0,121	2,822	0,828	0,105	0,767	0,210

Note: N – number of respondents, Min-minimum, Max-maximum, Mean-arithmetic mean, SE_M– arithmetic mean standard error, SD – standard deviation, Skew – scunis, SE Skew – standard error scunis, Kurt – kurtosis, SE Kurt – kurtosis standard error



Graph 1. Score distribution

re in one type of knowledge entailed a higher score in another type. Low scores in the group of tasks testing the understanding and implementation of knowledge about environmental issues may be explained by the pupils' lack of knowledge of facts in this field. In other words, pupils cannot understand and apply something if they do not know the basic facts.

Table 2. Correlation between types of knowledge

	r	Sig
Knowledge of facts – understanding the topic	0,293**	0,000
Knowledge of facts – Application of knowledge	0,407**	0,000
Understanding the topic – Application of knowledge	0,383**	0,000

(*) statistical significance at level 0,05
(**) statistical significance at level 0,01

The highest scores were obtained for the responses about the measures related to consumer actions for the prevention and solution of environmental issues (the percentage of the solved tasks is 25.63%), and in the category on the dependence of human beings upon the nature (23.51%). The scores were lower in the part of the test referring to the environmental issues and their effects (17.68%), while the lowest scores were achieved for the tasks testing the knowledge of the causality between consumerism and environmental issues (12.29%). Though the responses to the questions about the dependence of human beings upon the nature were satisfactory, there is still a lot of room for improvement. The pupils know little about the origin of the products they use in everyday life (toys, clothes, food). For instance, only 33.3% of pupils know that people use plants to make objects and clothes. The same holds good for the origin of energy (only 26.8% of pupils could explain the relation between computer functioning and consumption of coal). The pupils received very few points for their responses to the questions about environmental issues and their effects, especially the responses about the causality between the issues, such as air pollution, devastation of forests and similar issues, and their effects (on human health, health of other living beings). The responses to the questions about the respondents' own perception of the future generations also received low scores (3.7% could explain the effect of depletion of natural resources on the lives of the children in the future). The lowest scores were achieved for the responses on the causality between consumerism and environmental issues. In this area, the most problematic responses were the ones referring to the perception of personal impact on the environment. The pupils do not fully understand the connection between the unsustainable models of consumption and their own day-to-day consumption-related decisions on one hand, and the negative effects to the envi-

ronment, on the other (only 6.5% of respondents were able to explain the relation between putting warm food in the fridge and the environment). The highest scores were received for the tasks about the measures related to consumer actions aimed at prevention and solution of environmental issues. Yet, the respondents' knowledge about the basic human needs is rather poor (only 5.7% of correct answers). Similarly, and much to our surprise, the percentage of the correct answers about recycling and waste sorting (28,7%) is also very low.

2. Given the concept of the school subject *Guardians of the Nature,* we assumed that there were statistically significant differences in the knowledge of the children who were taught this subject for three and more years and children who did not have this school subject. Out of 541 pupils taking the test, 528 responded whether they had been taught the subject *Guardians of the Nature* at school or not (N=171 Yes and N=357 No). No statistically significant differences were identified between these two groups in terms of their achievement at the test (t=-1,300, p=0,194). The results of the research indicate that consumerism and the environment, as a specific segment of education for sustainable development, does not fully correspond to environmental education (on which the subject *Guardians of the Nature* focuses). Nonetheless, it was expected that the respondents who had attended the classes of the above mentioned subject would provide better answers to the questions about the dependence of human beings upon the nature and environmental issues. This was the reason why an additional analysis was carried out of the respective scores of the two groups of the respondents in the area of all four categories. However, the results were the same as the previous ones referring to the full test scores. No statistically significant differences were identified between the two groups in terms of their achievement in any category of the proposed system (Table 3).

Table 3. Correlation between the pupils' test score (per area) and attendance at the Guardians of the Nature classes

	t	df	Sig.
Dependency of humankind upon the nature	-1,055	397	0,292
Environmental issues and their effects	-1,583	363	0,114
Causality between consumerism and environmental issues	0,826	526	0,409
Measures in terms of consumer actions for the solution and prevention of environmental issues	-1,618	526	0,106

Note: t – statistic, df – degree of freedom,
Sig. – statistical significance

The results can be interpreted in several ways. They can be viewed as the consequence of the low quality of the curricula for the subject *Guardians of the Nature,* or of an inadequate teaching of this subject. Whatever the true reasons for this underachievement may be, they should be explored in some future research. However, there is something that should be noted. We do not support the idea that a school subject of such importance should be offered as an elective. It is not selected by all students, and frequently even the ones who select it, do not attend the classes regularly (due to poor internal school organisation, inadequate staffing, etc.). The realisation of the goals of an important educational concept such as environmental education (and education for sustainable development) should be carefully incorporated in the curricula of all compulsory subjects, the SESE curricula in the first place. These goals are relevant for the entire student population. Furthermore, this is also recommended in many international documents dealing with the said educational concepts.

3. The research results confirmed the hypothesis about the correlation between the respondents' test score and their SESE grades at the end of the 4th grade. Statistically significant differences were identified in the test scores of respondents who were awarded different grades in the subject SESE (Ta-

ble 4). The additional test for multiple comparisons (Games-Howell post hoc test, due to uneven group variants) showed that the students with higher grades in the school subject also had a better score at the knowledge test.

Table 4. Correlation between the respondents' test score and their grades in the subject SESE at the end of the 4th grade of primary school.

		Quadrant sum	df	Average quadrant	F	Sig.
Test of knowledge score	Among groups	600,892	3	200,297	28,777	0,000
	Within a group	3626,346	521	6,960		
	Total	4227,238	524			

Conclusion

The awareness of the potential effects of consumerism on the environment at global and local levels, and on the people today and in the future, as well as development of pupils' skills and competencies to enable them to live and work within the boundaries set by the environment – these are the goals that can and should be realised in the school subject *SESE*. However, the results of the research indicate that pupils at the end of the first cycle of compulsory education in Serbia have a selective knowledge of the facts pertaining to this area, as well as a limited understanding and ability to apply the acquired knowledge.The identified problem is a part, more precisely a consequence, of a wider problem. It reflects not only the questionable quality of the SESE curricula, but also of teaching the subject, in terms of the primary school teachers' insufficient familiarity with the topic of instruction. The test results of the pupils at the end of the first cycle of compulsory education confirmed indirectly the other results obtained in a wider research which included the curricula and primary school teachers. In terms of their functionality, the SESE curricula neither fully correspond to the complex objectives pertaining to the topic of this paper, nor are they appropriate for the potential of the school subjects *World around Us* and *SESE* in that context. In addition, primary school teachers are not fully competent to convey the above mentioned types of knowledge to their pupils. Given that these are the key factors in the process of an efficient integration of the specific requirements of education for sustainable development, we offer two solutions to the problem. First, the curricula must be improved in terms of topicality, more systematically structured demands, and a greater focus on the development of the relevant competencies. On the other hand, primary school teachers have a crucial role in and responsibility for a successful integration of the objectives of education for sustainable development in all phases of instruction, including lesson planning, teaching and evaluation. Therefore, the proposed curricula modifications would be ineffective without an appropriate teacher training. This training should, and indeed, must include: 1. more intensive and better inclusion of the topics and objectives of education for sustainable development in the study programmes of teacher education faculties in Serbia; 2. organisation of seminars for in-service primary school teachers. The aim of the proposals presented in this paper is to contribute to such a reform. The most important proposal is the one concerning the model of a holistic approach to causality between consumerism and environmental issues in teaching Social, Environmental and Scientific Education. The model is presented in the form of a defined framework of the key competencies which are explained in detail and incorporated in a system. It also takes into consideration the approach to the study of this topic, age-specific characteristics of pupils and the specificities of the school subject. The objectives which include mastering the relevant concept systems and developing the pupils' awareness to enable them to accept responsible and sustainable consumption are also important for their overall development. These objectives have a cognitive and functional value, and they are grounded in ethics. The latter particularly refers to the elements of

the proposed system related to the development of responsibility for oneself, other people and the environment, as well as to encouraging self-realisation in accordance with personal potential. These are the values inherent to education for sustainable development which should be included in the reform of the SESE curriculum.

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Последице потрошачког начина живота на животну средину: осврт из угла наставе природе и друштва

Резиме: *Прекомерна потрошња налази се у основи скоро свих проблема у животној средини, а данашње генерације већ увелико живе на рачун будућих. Могућности и потребу третирања последица потрошачког начина живота на животну средину у настави једног школског предмета препознали смо већ у дефиницијама одрживог развоја и на њему утемељеног образовног концепта. Њима су обухваћени појмови појам ограничења животне средине, задовољења људских потреба (потреба, не жеља) и међугенерацијске одговорности. Могућности и обавезу третирања наведених проблема у настави, те тако припремања деце и младих за једну од кључних улога у одрживом друштву, улогу „одрживих" потрошача, базирали смо и на следећим претпоставкама: 1) ако су проблеми у животној средини настали великим делом као последица људских потрошачких активности, могућа решења леже у другачијем систему знања и вредности, као и променама у понашању сваког појединца; 2) у реализацији овог циља образовање представља један од најмоћнијих фактора.*

У настојању да утврдимо квалитет постојећег приступа овој проблематици и осмислимо смернице за побољшања у настави природе и друштва, важно је било разрешити неколико питања. Прво, идентификовали смо специфичности свих компоненти одрживог развоја, како бисмо обезбедили њихово целовито рефлектовање у издвојеном истраживачком проблему који представља само један од сегмената сложеног образовног концепта заснованог на одрживости. Такође, анализом еколошких законитости и последица исцрпљивања природних ресурса наше планете, те карактеристика потрошње и механизама који леже у основи мотивације потрошача и њихових потрошачких активности, формирали смо схему кључних проблема, којима би било значајно посветити пажњу из васпитно-образовног угла. Следећи корак био је сагледавање потенцијала наставе природе и друштва да доприноси развоју компетенција за живот у одрживом друштву, те прилагођавање одабраних циљева карактеристикама ове наставе. Коначно, у когнитивним теоријама, које чине основу савремене схватања учења и наставе, потражили смо и пронашли потврду о примерености одабраних захтева специфичностима деце узраста од седам до једанаест

година, као и утемељење за уверење да (холистички) приступ овој теми у настави природе и друштва може да допринесе целокупном развоју детета.

Теоријска анализа и промишљање о проблему резултирали су дефинисањем кључних компетенција у области повезаности потрошачког начина живота и животне средине које би било могуће и потребно развијати у настави природе и друштва. Издвојили смо их и уградили у систем од четири категорије: 1) зависност човека од природе; 2) проблеми у животној средини и њихове последице; 3) узроци или веза између потрошње и проблема у животној средини и 4) мере у домену потрошачких поступака за решавање и превенцију проблема у животној средини. Систем категорија је чврсто структурисан, сачињен од умрежених појмова, међу којима су утврђене каузалне, хоризонталне и вертикалне релације. У предложеном систему рефлектује се интердисциплинарни и холистички приступ, укључујући и потребу да се адресирају различити аспекти личности детета.

Дефинисани оквир представљао је полазиште за емпиријско истраживање чији је циљ био да се утврди квалитет постојећег приступа последицама потрошачког начина живота на животну средину у настави природе и друштва. У раду су изнети резултати дела ширег истраживања, који је реализован тестирањем знања ученика на крају првог циклуса обавезног образовања у Србији. Испитаници су показали селективно познавање чињеница и слабости у разумевању и примени знања у области повезаности потрошачког начина живота и проблема у животној средини. Идентификовани проблем представља рефлексију квалитета програма наставе природе и друштва, и квалитета наставе као одраза информисаности учитеља о овој теми. Наиме, резултати тестирања ученика индиректно су потврдили остале резултате ширег истраживања, којим су били обухваћени и сами наставни програми и учитељи. Функционалност програма наставе природе и друштва нити у потпуности одговара сложеним циљевима из области теме овог рада нити је примерена потенцијалу који ова настава има у том контексту. Ни компетенције учитеља у великој мери не одговарају потребама развоја наведених типова знања ученика. Решења би ваљало тражити у два смера. Прво, неопходна су побољшања наставних програма у погледу актуелизације, систематичније структурисања захтева, као и са становишта усмерености на развој одговарајућих компетенција из ове области. Са друге стране, измене наставних програма имале би слабе ефекте уколико би изостала одговарајућа обука учитеља, и то: 1) интензивнијим и квалитетнијим увођењем тема и циљева из области одрживог развоја у студијске програме учитељских факултета у Србији и 2) организацијом семинара за оне који су у радном односу. У раду су дати предлози чији је циљ управо да се допринесе једној таквој реформи. У питању је, пре свега, предлог модела холистичког приступа вези између потрошачког начина живота и проблема у животној средини у настави природе и друштва. Захтеви за овладавањем одговарајућим системом појмова, те за развијањем спремности ученика да прихвате одговорну и одрживу потрошњу имају значај и са становишта развоја ученика у целости. Они су сазнајно и функционално вредни, као и етички засновани. У питању су вредности из области образовања за одрживи развој које би свакако требало уврстити у процес реформе наставе природе и друштва.

Кључне речи: *образовање за одрживи развој, настава природе и друштва, потрошачки начин живота, проблеми у животној средини.*