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From Anthropocentrism to Ecocentrism in Teaching Science and Social Studies²

Summary: *The aim of the paper is to present the ways in which the attitudes of science, technology and society towards nature and the place of mankind in it have been reflected in the Science and Social Studies curricula from the mid-20th century up to this day. We wanted to explore the manner in which the relationship between mankind and nature (man as a master of nature or a part of it) and our role in its preservation (instrumental reasons or intrinsic value of nature) were presented in the Science and Social Studies curricula over a longer period of time. Content analysis method was implemented in our research. According to the analysis, the timeline of the Science and Social Studies curricula goes from marked anthropocentrism and antagonism between man and nature (the 50s and 60s of the 20th century), through moderate anthropocentrism with hints of ecocentrism (from the 70s up to the end of the 20th century), to the dominant ecocentrism (in the contemporary 21st century curricula). This process was slow and often out of sync with the development of scientific thought and social circumstances caused by the global environmental crisis. On the other hand, although environmental protection has been included in the analysed curricula, the reasons for its inclusion are either vague or of instrumental nature. Environmental protection arising from intrinsic values of natural entities, and not (only) serving human interests, has not found its place in the Science and Social Studies curricula yet. The opportunities for improvement of the curricula in this context have been problematised in this paper.*

Keywords: *anthropocentrism, ecocentrism, environmental protection, curricula, teaching Science and Social Studies.*

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Introduction

Anthropocentrism is a concept or belief according to which man is the superior, most important and most valuable part of nature, even its absolute master, which gives mankind the right “to treat nature as a storehouse of resources available for our benefit“ (Gunn, 2011: 10). According to this view, only human life has an intrinsic value, while plants, animals, and mineral resources are considered as resources “that may justifiably be exploited for the benefit of mankind” and not as entities possessing their own intrinsic value (Boslaugh, 2011: 15; Pavlović, 2013). In other words, given that natural resources are treated as commodities that serve human needs, and their value is determined only from the perspective of human interests, it is reduced to instrumental value only (De Žarden, 2006). As anthropocentric view of human relationship with nature was deeply ingrained in the Western philosophical and theological tradition, it offered “a justification for exploiting and dominating the natural world”, making such tradition “partly responsible for our current environmental calamity” (168).

“In terms of ethics, ecocentrism is opposed to anthropocentrism [...] It makes the ecosystem and nature central ethical issues, not the mankind“, or rather, ecocentric ethics demands that “the importance of ethics be spread onto other living creatures, even on the inanimate world in its entirety“ (Pavlović, 2013: 22-23). Despite the emergence of environmental ethics “even within the framework of European anthropocentric ethical paradigm [...] neither spiritual nor practical circumstances were in place to support its wider popularity“ (Kirn, 2013: 153). It was only when the environmental crisis broke out in the 60s of the 20th century that the reconsideration of the anthropocentric attitude towards nature, which is the root of the excessive exploitation of the environment, became intensified. The general conclusion of many scientists in the 70s was that people had always done harm to nature and harmed themselves in the process (Segof, 2012).

During this period many warnings were voiced that human society had exceeded both the productive capacity of Earth and its ability to absorb the consequences of human activities (Look in: Commoner, 1971; Ehrlich & Holdren, 1971; etc.). It became evident that the anthropocentric concept, with all its consequences for the environment, could not be justified and that our attitude towards nature had to change. Contrary to the view of man as a master of nature, scientists endeavoured to prove that humans are a part of nature and that they are not entitled to Earth, but responsible for it, given that our planet, like an organism, is a complex interactive system the health of which depends entirely on the well-being of all its parts (Look in: Commoner, 1971; Naess, 1973; Lovelock, 1979).

Nonetheless, the polarity between ecocentrism and anthropocentrism has remained in the context of the arguments for the mankind’s care for nature, since the arguments in favour of environmental protection have been intrinsic on one hand, and instrumental, on the other. The first set of arguments is based on the hypothesis about the values of natural entities *per se*, while the other set is based on the mankind’s responsibility to protect the quality and diversity of natural entities “as long as they serve human interests“ (Kirn, 2013: 153). What we have here is a difference in environmental perspective which Norwegian philosopher Arne Naess characterises as a difference between deep and shallow environmental movements: while the former paints “the relational, total-field image“ of the world in which organisms represent “knots in the biospherical net or field of intrinsic relations“, the latter represents “the fight against pollution and resource depletion“ to protect the health and affluence of people in the developed countries (Naess, 1973: 95). Finally, there are also other authors who advocate a reconciliation between the two opposing approaches. According to Vukašin Pavlović, environmental ethics, valid for all living and inanimate entities, “does not exclude the need for some elements of anthropocentric ethics” (Pavlović, 2013: 31), while Mary Midg-

ley stresses that care for other people does not harm green causes, and adds that the measures for saving the human race are identical to those undertaken for saving the rest of the biosphere (Midžli, 2012).

There are many reasons for expecting that the above-stated changes in the human relationship with nature have been reflected in our (national) education system and that they have been regularly upgraded over time. Education implies the adoption of the system of knowledge and values, as well as the formation of skills and habits, which is the basis for developing cognitive capacities and an overall worldview, including the preparation for life and work in a given community and profession (Trnavac, 2014). In a systematically organised educational process, education is carried out by means of educational contents which involve “an appropriate selection of content out of the entire, science-based human knowledge and generational experience“, and are transferred to the young generation by means of school subjects regulated by the curricula (Vilotijević, 2014: 497). Given that the development of science, technology, culture, as well as the changes of lifestyle and work conditions, continually make the educational contents out-dated and in need of improvement, innovation and contemporariness are the important criteria in their selection (Ibid). The responsibility and a serious approach to upgrading the curricula for all school subjects, at all levels of formal education, get a special momentum in the context of the modern-day environmental issues which resulted from the anthropocentric approach to nature, and in the context of the need to protect and improve the environment whose effectiveness largely depends on the shift from anthropocentrism to ecocentrism. This shift is one of the key issues in the field of environmental education and education for sustainable development, the concepts which are rightly perceived as prerequisites for survival on this planet. After all, the expectation that the changed approach to nature will be reflected in education is based on the fact that the importance of education for preparing young generations to cope

with environmental issues was stressed at many UN conferences where the topic of environment and, later, sustainable development, was discussed (from Stockholm in 1972, to New York, 2015).

Integrated subjects applying an interdisciplinary approach in dealing with nature and social phenomena are a fertile ground for developing an appropriate (and, in a given context, desirable) view of nature (at primary education level). The importance of environmental protection requires that this potential be used. In the education system of the Republic of Serbia, and in the first cycle of primary education, Science and Social Studies teaching³ is integrative because it encompasses didactically and methodologically transformed contents and knowledge pertaining to many scientific disciplines. The authors of the paper set out to determine the level of agility and the manner in which the Science and Social Studies curricula in our country, in the period after World War II, were aligned with contemporary trends regarding human relationship with nature. The results of the research and conclusions are presented further in the paper.

Methodology

Bearing in mind that the change of the way humans treat nature is a prerequisite for solving cur-

3 The teaching of Science and Social Studies is carried out within the framework of the following compulsory subjects: The World around Us (1st and 2nd grade) from 2004/5, and Science and Social Studies (3rd and 4th grade) from the school year 2005/6. After World War II, in what was first the Federal, later Socialist, and in the end the independent Republic of Serbia, interdisciplinary contents in the field of Natural and Social Sciences were taught in the following subjects (which in terms of content and age group correspond to today's subjects The World around Us and Science and Social Studies): in the 50s – Our World (1st and 2nd grade) and Science (grades 3-6); in the 60s – Learning about Science and Social Studies (grades 1-3), Science (grades 4-6), and Social Studies (grades 4-5); from the 70s until the school year 2004/5 – Learning about Science and Social Studies (Grades 1-3), and in the school year 1985/6 this name was changed into Science and Social Studies, Science (4th grade), and Social Studies (4th grade).

rent environmental issues, and that education and teaching Science and Social Studies play a key role in this respect, it is not difficult to grasp the importance of keeping the curricula constantly updated, but also to note the consequences of their inadequate improvement. For this reason, the aim of our research was to identify the ways in which the attitudes of science, technology and society towards nature and the mankind's place in it have been reflected in the Science and Social Studies curricula from the mid-20th century up to this day. We analysed a "sample" of the curricula dating back to the period when, due to the influence of increasingly evident environmental problems, the mankind's treatment of nature was under scrutiny, entailing new concepts ranging from anthropocentrism to ecocentrism. We wanted to determine whether and in what ways the Science and Social Studies curricula were aligned with these trends, i.e. how the process of their actualisation developed in this period. The research tasks involved determining whether the analysed curricula contained the following topics: 1. the interaction between man and nature: man as a part or a master of nature; 2. reasons for taking care of and protecting nature: intrinsic (owing to the value of natural entities *per se*) or instrumental (due to human interests, for meeting the needs of humans and/or preserving their health). Content analysis method was used in the research. The analysed materials included the curricula and guidelines for the following subjects: Learning about Science and Social Studies (*Nastavni plan i program za osnovnu školu u Narodnoj Republici Srbiji, 1959*); *Nastavni plan i program za osnovnu školu u Narodnoj Republici Srbiji, 1963*; *Pravilnik o zajedničkom planu i programu obrazovno-vaspitanog rada u osnovnoj školi, 1976*); Science and Social Studies (*Zajednički plan i program vaspitno-obrazovnog rada u osnovnoj školi, 1984/85*; *Pravilnik o nastavnom planu i programu osnovnog obrazovanja i vaspitanja: Program obrazovanja i vaspitanja za 1. i 5. razred osnovne škole, 1990*; *Pravilnik o izmenama i dopunama pravilnika o nastavnom planu i programu osnovnog obrazovanja i vaspitanja, 1991*; *Pravilnik o*

izmenama i dopunama pravilnika o nastavnom planu i programu osnovnog obrazovanja i vaspitanja, 1995; *Pravilnik o izmenama i dopunama pravilnika o nastavnom planu i programu osnovnog obrazovanja i vaspitanja, 2001*; *Pravilnik o nastavnom planu za 1., 2., 3. i 4. razred osnovnog obrazovanja i vaspitanja i nastavnom programu za 3. razred osnovnog obrazovanja i vaspitanja, 2005*; *Pravilnik o nastavnom programu za 4. razred osnovnog obrazovanja i vaspitanja, 2006*; *Pravilnik o nastavnom planu za 1., 2., 3. i 4.razred osnovnog obrazovanja i vaspitanja i nastavnom programu za 3. razred osnovnog obrazovanja i vaspitanja, 2010*); Science (*Nastavni plan i program za osnovnu školu u Narodnoj Republici Srbiji, 1952*; *Uputstvo za sažimanje nastavnog programa za osmogodišnje škole, 1957*; *Nastavni plan i program, 1959*; *Nastavni plan i program, 1963*; *Pravilnik, 1976*; *Zajednički plan i program, 1984/85*; *Pravilnik, 1991*; *Pravilnik, 1995*; *Pravilnik, 2001*); Social Studies (*Nastavni plan i program, 1959*; *Nastavni plan i program, 1963*; *Pravilnik, 1976*; *Zajednički plan i program, 1984/85*; *Pravilnik, 1991*; *Pravilnik, 1995*; *Pravilnik, 2001*); The World around Us (*Pravilnik o nastavnom planu i programu za 1. i 2. razred osnovnog obrazovanja i vaspitanja, 2004*; *Pravilnik o izmenama i dopunama pravilnika o nastavnom planu i programu za 1. i 2. razred osnovnog obrazovanja i vaspitanja, 2010*). The following abbreviations for the names of the school subjects will be used further in the text: Learning about Science and Social Studies – LSSS, Science and Social Studies – SSS, Science – Sc, Social Studies – SS and The World around Us – WU. The obtained data were processed by using qualitative analysis.

Research Results

Dominant anthropocentrism in the curricula of the 50s and 60s of the 20th century. Our analysis showed that the concept of man as an absolute master of nature was predominant in the Science and Social Studies curricula of the 50s and 60s.

Nature was presented as a source of resources and only the positive side of using science, technology and human labour for its exploitation and achieving a higher level of production of material goods was emphasised. For example, one of the objectives set in the *Sc* curriculum in 1959 was “to make pupils understand that human race, by getting to know nature, gained experience, built technology, improved production, and created better living conditions” (*Nastavni plan i program*, 1959: 139). Moreover, the guidelines for the implementation of this programme state that man “changes the characteristics of plants and animals by putting them under special conditions. The changed plants and animals are more useful to humans [...] explain to pupils the significance and economic value of the changes caused by man” (131). The titles of the topics in the *Sc* curriculum for the 5th grade point to the instrumental value of nature “knowing and using nature’s forces and abundance”, “people change and use the flora and fauna”, and “animals and plants in human nutrition” (130), as well as the recommendation “stress the importance and use” of metals, fuel, and “specific groups of plants” in “industry”, “economy”, and “human nutrition” (*Uputstvo*, 1957: 116-117). In some tasks and contents, the anthropocentric views were on the verge of expressing an overt hostility towards nature. Humans were presented as tamers of nature who “conquer the forces of nature”, “subdue them”, exploit them (*Nastavni plan i program*⁴, 1952: 17), and “tame the rivers” (*Nastavni plan i program*⁵, 1959: 158). In the 1963 curriculum, one of the objectives of teaching *SS* was to make pupils aware that “today’s lifestyle is the result of the joint work of people and their constant struggle to conquer nature”, while similar formulations are repeated many times in the explanation for the implementation of the curriculum (*Nastavni plan i program*, 1963: 407).

In the context of the pronounced instrumental value of nature and the antagonism between

man and nature, sporadic contents and observations about the unity of the animate and inanimate nature and the interdependence of the flora, fauna and human race become pointless in the *Sc* curricula. Moreover, one guideline for teaching *Sc* proposes the observation of nature as a school activity, but, on the other hand, it is also suggested that visits to local mines, farms, and zoo-gardens should be organised as well, including the cultivation of plants “that are of higher value for the community and the area where the school is located” (*Nastavni plan i program*, 1959: 132). Obviously, such recommendation gives the guidelines an anthropocentric connotation.

Environmental protection did not feature in the *SS* curricula, whereas in the *LSSS* and *Sc* curricula it was reduced exclusively to the man’s care of his household, the goal of which is to make a more efficient use of natural resources. For instance, the *LSSS* curriculum for the 2nd grade of primary school recommends “Plant cultivation and collecting the seed and yield of plants. Destruction of plant pests.” (*Nastavni plan i program*, 1963: 352) as a practical work for pupils, while the *Sc* curriculum for the 4th grade contains an instruction how to improve the soil by using fertilizers in order to increase the yield of plants (*Nastavni plan i program*, 1959).

It can be concluded from the examples above that the rare objectives and observations relating to the development of “love for nature” and “the habit of its preservation” in the *Sc* curricula (130), with a sporadic presence of appropriate elements in the contents that would support the stated objectives, remain only declarative. Two features are clearly predominant in the curricula from this period: 1. anthropocentric view of nature; and 2. instrumental reasons for its preservation.

Anthropocentrism and ecocentrism in the curricula from the 70s up to the end of the 20th century. Back in the 70s, some elements of environmental education were introduced in the curricula: directly, in the curricula for the subjects *LSSS*, *Sc*, and *SS*, and indirectly, in the chapter entitled “Environmental

4 *Sc*

5 *SS*

Protection and Improvement“, along with the suggestions for implementing objectives and contents in all primary school subjects (*Pravilnik*, 1976).

Compared to the previous period, the positive changes in the Science and Social Studies curricula are evident, no matter how generalised, sporadic, occasionally vague, and minimal in the SS curricula, they might be. They are manifested primarily through a more frequent mention of the *dependence of man on nature*. For instance, in the LSSS curriculum for the 3rd grade of primary school, one operational task and several teaching items refer to the importance of sun energy, clean water and clear air for human health; the objectives and instructions for their implementation in the Sc curriculum focus mostly on identifying the interconnectedness of natural phenomena, and the dependence of all living beings (including human race) on inanimate nature; the guidelines for the implementation of the SS curricula include a recommendation that pupils should become aware of the dependence of human life and work on natural conditions. Within the chapter entitled “Environmental Protection and Improvement“, the suggestions referring to environmental processes and principles, and “the interconnectedness of man and his environment“ appear only in the objectives and contents suggested for the school subject LSSS (524).

The anthropocentric elements, both in terms of treating nature as a useful human resource and, as evidenced in the curricula from earlier periods, human antagonism towards nature, persisted in the curricula for all three subjects. The 2nd grade LSSS curriculum includes topics such as “Usefulness, Cultivation, and Protection of Forests (their importance for humans)“ and “Usefulness and Harm of Wildlife“ (344), while “Man – the most perfect living being“ is present in all segments of the Sc curriculum as a user and, even more so, the master of nature (406). One objective of SS teaching is to inform pupils about the process in which people “by changing nature and knowing more about it have

been setting themselves free from depending on nature, using its resources and forces, and subduing them to conform to human needs“ (354). Unfortunately, there are more examples similar to the ones provided in this paper.

On the positive side, the references about the necessity of *environmental protection* were made more frequently than before. These elements were included in all the curricula, from recommendations about growing plants indoors, feeding birds and fish (1st grade LSSS curriculum) or preventing water pollution (3rd grade LSSS curriculum), to more general formulations such as developing pupils’ commitment to the preservation and protection of nature (LSSS curriculum) or stressing “human role in environmental protection“ in the instructions for implementation of the SS curriculum (359). As for the tasks and contents suggested in the chapter “Environmental Protection and Improvement“ for implementation in LSSS, Sc, and SS classes, we identified the prevalence of the tasks containing recommendations in the domain of environmental protection and improvement. The recommendations range from hands-on ones, to generalisations.

No significant changes were identified in the Science and Social Studies curricula from *the 80s*, while some elements of environmental education were introduced directly in the curricula, or indirectly, in the chapter entitled “Protection and Improvement of Human Health, Environment and Humane Relations among People“ (*Zajednički plan i program*, 1984/85).

More space was given to the topics of *interconnectedness and interdependence of animate and inanimate nature* (including humans), especially in terms of the goals and objectives of all subjects (except SS). In the chapter on environmental protection, the recommendations for the topic of interdependence of people and their environment were written only for the subject SSS.

However, the curricula for all three subjects still contain both ecocentric objectives, contents

and recommendations, including the ones insisting upon pinpointing only the positive effects of man-induced changes of nature, and the anthropocentric contents. For example, in the SSS curriculum for the 1st grade, the wildlife is still approached from the perspective of its usefulness to man, while the only novelty, compared to the previous curricula, is that the “usefulness and harm of wildlife” were reworded to read “usefulness and hazards” (266). The instrumental value of nature to man is emphasised, though the expression “usefulness of cultivated flora and fauna” was rephrased as “their significance for man and economy” (271), which means that no significant change was made.

The curricula written *in the 80s* also contain objectives, contents and instructions related to *environmental protection and improvement*. Compared to the curricula from the 70s, the difference is only in the scope of information. The same elements, mostly phrases such as “environmental protection and improvement” (266) and “preservation and protection of nature” (269), were included in a greater number of tasks and teaching units. Recycling activity – “collecting used paper” – is mentioned for the first time in the curricular contents for the SSS (2nd grade) (268), while the instruction for the implementation of the Sc curriculum contains information, also for the first time, about the importance of the rational use of water due to the shortage of drinking water. The recommendations given in the chapter on environmental improvement are essentially the same as the ones given in 1976. The formulations of the recommended tasks and contents for all three subjects are repeated, while a few of them are more general (activities aimed at protecting and preserving the environment were even left out from the school subject SSS curriculum).

Even the quality of the curricula from *the 90s* did not change significantly compared to those of the previous period. Some positive changes were identified, but these were not introduced systematically or consistently, because the curricula still con-

tained the elements of the anthropocentric concept of nature.

The *interconnectedness of the flora, fauna, and humans*, as well as the dependence of living beings on inanimate nature, are the topics that appear with a higher frequency in these curricula, particularly in the 2nd and 3rd grade SSS and Sc curricula (Pravilnik, 1991; Pravilnik, 1995). The curricula contain general formulations of objectives and contents (e.g. an objective for teaching SSS in the 3rd grade was to make pupils aware of the interconnectedness and interdependence of natural and social phenomena (Pravilnik, 1991)). In the Sc curriculum, in the section dealing with topics related to vegetable gardens, arable land and forests, the need to consider the significance of some animals and plants not only for humans, but also for ecological communities and nature as a whole, is stated explicitly and more directly (Pravilnik, 1995).

The positive changes introduced in these curricula are still overshadowed by the persistent anthropocentrism. Though the tasks and contents related to conquering and taming nature are excluded, the instrumental perception of nature and a form of antagonism are still present, particularly in the curricular content for the subjects SSS (1st and 2nd grade) and Sc regarding useful and harmful/dangerous animals (Pravilnik, 1990; Pravilnik, 1991; Pravilnik, 1995 – except for the Sc in the last document).

Protection of nature, especially of soil and air, is included only in the Sc curriculum, while the protection of waters, including their rational consumption, is included in the SSS curriculum for the 2nd grade (Pravilnik, 1990; Pravilnik, 1991; Pravilnik, 1995). The protection and enhancement of both school and residential spaces (waste disposal in schools, decorating classrooms and hallways with decorative plants, etc.) as forms of participation in the protection and improvement of our environment are predominantly present in the school subject SSS curricula for the lower grades of primary school. However, the need to know and understand

the reasons for environmental protection measures is not explicitly stated in any of the above cases. Moreover, in the instructions for the implementation of the curricula from 1991, no recommendation applies to environmental education content.

The following conclusions can be drawn with regard to the Science and Social Studies curricula that were in effect from the 70s until the end of the 20th century: 1. man is (increasingly) perceived as a part of nature, while the perception of man as its master – from the tamer of nature to, at least, a superior being entitled to determine nature's instrumental value/harmfulness – is on decline, but has not completely disappeared; 2. the elements of environmental protection and improvement are more frequently included in all segments of the curricula, though their formulations are vague/general, or the reasons for environmental protection are utilitarian.

The predominant ecocentrism in the curricula developed in the early 21st century. More serious, though not entirely satisfactory, changes were introduced in the Science and Social Studies curricula developed in 2001. Anthropocentrism disappeared from the curricula for all school subjects, which means that *living beings are now viewed through the prism of their significance in nature*, and not from the perspective of their instrumental value for the mankind. This attitude is consistently applied in almost all segments of the analysed curricula. The perception of man as a part of nature is present, though indirectly, in many goals and objectives set in the curricula developed in 2001 for the subjects SSS, Sc, and SS. According to the SSS curriculum for the 1st grade, the objective of the subject is that pupils "should understand the role of man in sustaining ecological balance and changing natural and social processes" (Pravilnik, 2001: 2). Similarly, the objective set in the Sc curriculum for the 4th grade is "to expand pupils' knowledge about interactions between animate and inanimate nature on planet Earth" (5). The concept of man as a part of nature is present sporadically in the SSS curriculum for the

2nd grade and the Sc curriculum for the 4th grade, whereas it was completely left out from the content of all other curricula developed in 2001. The joint instructions for the implementation of all three curricula contain a note which generally suggests that attention should be paid to the existence of "interaction between man and his micro and macro environment" (7). The concept of man as a part of nature is more thoroughly explored in the curricula for the subjects WU (1st and 2nd grade) from 2004 and SSS (3rd grade) from 2005. In our opinion, the selection and frequency of the contents in these curricula, the purpose of which is to explore the interdependence of man and nature (and more broadly, of their interaction) is quite satisfactory. The examples of the segments of the WU and SSS curricula dedicated to the concept of man as a part of nature include: "I am a natural and social being" (1st grade) and "man as a part of animate nature and his role in preserving the natural balance" (2nd grade) (Pravilnik, 2004: 49); "Interactions between man and his environment (the manner in which man changes his environment), the impact on life and health" (3rd grade) (Pravilnik, 2005: 42).

Despite the fact that the curricula from 2001 insist on the view of man as a part of nature, the corresponding goals and objectives, contents, and instructions that would explicitly include *the protection of nature* are conspicuously absent from the curricula for the subject SSS for the first two grades, and the same holds good for the subject SS for the 4th grade. On the other hand, the contents of the subject SSS for the 3rd grade mention sporadically the idea that nature should be protected for the survival of mankind (instrumental reasons), but not for its own sake. This view is evident in the lesson entitled "Man and Forest (Relevance, Use, and Protection)" (Pravilnik, 2001: 4). However, when analysing the WU curricula (1st and 2nd grade) from 2004 and the curricula for the SSS (3rd grade) from 2005, we noticed that the protection of nature was included in the goals, objectives, and contents, but the reasons for this protection remained vague. For exam-

ple, this vagueness is obvious in the *WU* lessons entitled “The Elements of the Culture of Living: Housing, Nutrition, Clothing, Protection of Health and Environment” (1st grade); in the lesson “Man as a Part of Animate Nature and His Role in Preserving Natural Balance” (2nd grade) (*Pravilnik*, 2004: 49). Another example are lessons for the subject SSS (3rd grade) entitled “The Relevance and Protection of the Relief (arable land and inland ecological communities)” and “Relevance and Protection of Waters and Water Life” (*Pravilnik*, 2005: 41). The curriculum for *WU* from 2004 does not offer instructions for curriculum implementation that directly refer to the protection of nature. Only the SSS curriculum for the 3rd grade contains the following instruction: “The rules that humans impose and observe in order to protect themselves, others, and their environment [...] and the rules guaranteeing environmental balance) need to be stressed out” (*Pravilnik*, 2005: 43).

The following conclusions can be drawn with regard to all the segments of the curricula that were in effect in the early 21st century: 1) man is more or less explicitly viewed as a part of nature, while the relevance of natural entities is treated from the perspective of interactions between animate and inanimate nature on our planet (instead of the sole benefit for mankind); 2) the elements of environmental protection are included sporadically (they grow in number with increased modifications of the curricula), but the reasons offered for environmental protection are either unclearly defined or instrumental.

Modern curricula were developed in 2006 for the subject SSS for the 4th grade, in 2010 for the subject *WU* for the 1st⁶ and 2nd grades, as well as the SSS for the 3rd grade. The goals for the subject *WU* “that pupils should get to know themselves better, their environment, and develop skills for living a responsible life in it” (*Pravilnik o izmenama*, 2010: 1) and SSS “that pupils should get to know themselves better, their natural and social environment, and devel-

op skills for living a responsible life in it” (*Pravilnik o nastavnom planu*, 2010: 5) are defined in very general terms. The same holds good for the set objectives and *the place of man relative to nature* remains unclear. The elements of ecocentrism are indirectly present in the objectives set for different grades (for *WU* in the 2nd grade and for SSS in grades 3 and 4). An objective for the 3rd grade SSS curriculum involves “developing responsibility towards oneself, the environment, and cultural heritage” (*Pravilnik o nastavnom planu*, 2010: 7), and similar formulations appear in the grades 2 and 4. Ecocentrism is more directly included only in the objective of the school subject *WU* for the 1st grade: “to understand the fact that man is a part of nature and that his actions have an impact on nature, as well as to develop the ability for recognising human impact on health and the environment” (*Pravilnik o izmenama*, 2010: 1). Compared to the 2004 and 2005 curricula, there are no significant differences in terms of the selection of ecocentric contents for the first three grades of primary school. However, according to our analysis, the interactions, interconnectedness and interdependence of humans and other natural entities are given a lot of space in the contents of the contemporary curricula for both subjects and for all four grades. Apart from the examples of such curricular contents for the first three grades of primary school, which were included in the 2004 and 2005 curricula as well and provided earlier in the paper, here are some examples from the SSS curriculum for the 4th grade: “Man as a part of nature – a conscious and social being” and “The influence of natural [...] factors on human life and work” (*Pravilnik*, 2006: 44). The instruction for the implementation of the SSS curriculum for the 4th grade contains only several general and indirect notes (on the need for realising “the connections between animate and inanimate nature” or about humans as regulators of “interactions among different ecological communities” (*Pravilnik*, 2006: 45). On the other hand, the instruction for the implementation of the *WU* (1st and 2nd grade) and SSS curriculum (3rd grade) uses

⁶ The new curriculum for *WU* for the 1st grade has been in effect since the start of the school year 2018/19. This curriculum was not included in our analysis.

the identical phrasing to point out directly the importance of ecocentrism: “It is important that pupils do not view the place and role of humans in their environment from the anthropocentric perspective, but that they should develop the ecocentric worldview, considering that human beings are a part of nature and should act in unison with it” (*Pravilnik o izmenama*, 2010: 3; *Pravilnik o nastavnom planu*, 2010: 6). Our conclusion is that ecocentric elements are included to a considerable degree in the curricula, but this inclusion was done unsystematically and without clearly set goals. Similar results were obtained in the research exploring the selective representation and inadequate interconnectedness of elements from a broader context of education for sustainable development in the Science and Social Studies curricula (Veinović, 2017).

The reasons for the protection of nature were unclearly defined in many segments of the analysed curricula. For instance, an objective for the school subject *WU* reads as follows: “developing pupils’ awareness about the need and opportunities for personal involvement and contribution to environmental protection and sustainable development” (*Pravilnik o izmenama*, 2010: 1). The curricular contents related to the protection of nature generally do not offer explicit reasons for its protection (neither intrinsic nor instrumental). The following examples are illustrative of this fact: “Pollution of water, air and soil (forms of pollution and consequences) in the 2nd grade *WU* curriculum (*Pravilnik o izmenama*, 2010: 2); “The relevance and necessity of recycling and rational consumption of glass, plastic, and metal products” in the 3rd grade SSS curriculum (*Pravilnik o nastavnom planu*, 2010: 6); “The flora in our country (its importance, typical, rare and endangered plants; variety, abundance, protection, and revitalisation)” in the 4th grade SSS curriculum (*Pravilnik*, 2006: 44). The same principle applies to the instructions for the implementation of the *WU* curriculum for the 1st and 2nd grades. Though several practical measures for environmental protection are recommended (“cultivating plants at

school and at home”; “collecting and selecting waste for recycling”) and a responsible attitude towards nature and “participation in various environmental initiatives” are generally suggested, the reasons for undertaking the recommended activities are not clearly defined (*Pravilnik o izmenama*, 2010: 3). On the other hand, the analysis of the instructions for the implementation of the 3rd and 4th grade curricula revealed that the concept of sustainable development had been introduced rather arbitrarily⁷, emphasising instrumental reasons for the preservation of nature. For instance, a note in the instructions for the implementation of the 3rd grade SSS curriculum from 2005 regarding the rules that people make and should observe to protect themselves and their environment, was amended with the rules “guaranteeing” ecological balance in the environment and “sustainable development for future generations” (*Pravilnik o nastavnom planu*, 2010: 7). Therefore, stating that ecological balance in the environment and sustainable development for future generations must be provided means that instrumental reasons for caring for nature (for future generations and mankind) are offered, instead of the reasons concerning the value of nature *per se*. Instrumental reasons for protecting nature are provided in the 4th grade curriculum as well. Statements such as: “to examine the important role of man in the protection and restoration of the living world – maintaining the ecological balance for his own survival” (*Pravilnik*, 2006: 45) and “the available resources must be taken into consideration [...] as well as the need for rational consumption” (46), clearly indicate instrumental reasons for preserving nature.

7 An important change that was first made in 2006 in the 4th grade SSS curriculum, and later, in 2010, in the *WU* (1st and 2nd grades) and SSS (3rd grade) curricula was the introduction of the concept of sustainable development. This change was an institutional response to the fact that the period 2005-2014 was defined as the *Decade of Education for Sustainable Development* (UNESCO, 2005).

The following observations were made after the analysis of the modern curricula: 1) man is clearly treated as a part of nature, but ecocentric elements were introduced unsystematically and inconsistently in different segments of the curricula. There is no clear link among them across the grades; 2) protection of nature is present in almost all segments of the curricula, though mainly without a clear indication of the reasons for its protection. Only the instructions for the SSS curricula for 3rd and 4th grades are formulated by stating instrumental reasons for preservation of nature.

Conclusion

School is a social institution that should follow the changes in the development of human society and respond to them in order to educate members of the society who will be able to function and work successfully in new social circumstances. The aim of this paper was to examine how efficiently and in what ways the Science and Social Studies curricula, in the period after World War II, were harmonised with modern trends when it comes to the attitudes of science, technology and society towards nature. More precisely, we were interested to see how the *interaction of man and nature* and *man's role in the protection of nature* had been presented over a longer period of time. This journey into the past proved to be useful for many reasons.

We found out that Science and Social Studies teaching was harmonised with social trends, scientific discoveries, and technological advancement. In the given period, we identified a trend that all the elements of the analysed curricula were harmonised with new scientific discoveries in terms of the need to change the mankind's treatment of the environment. The Science and Social Studies curricula development ranged from a strict anthropocentrism and antagonism between man and nature, through a moderate anthropocentrism with hints of ecocentrism, to a dominant ecocentrism. Though chang-

es were occasionally lagging behind the trends for nearly a decade, and they were often introduced clumsily and unsystematically, it is important that they were introduced, after all. Our research confirmed the fact that educational system is a big and slow system that cannot easily follow social changes.

All examples taken from the *50s and 60s* curricula indicate that Science and Social Studies teaching served to perpetuate an illusion that man is a master of nature who can use its resources indefinitely. Unfortunately, conquering nature and irrational use of natural resources turned into destruction of nature. Another inevitable conclusion is that Science and Social Studies teaching indirectly contributed to a drastic violation of natural principles, and to reducing the capacity of the environment to meet the needs of human society.

Further, we can conclude that the Science and Social Studies curricula from *the 70s* were marked by a great paradox. On one hand, there was an intention to include in the curricula (rather sporadically and unsystematically) the new findings about the environment, environmental problems, and the need for a better preservation of it. We suppose that the changes in this period were initiated under the influence of *The Belgrade Charter*, a document adopted at the UNESCO-UNEP international conference on environmental education, held in Belgrade in 1975 (*The Belgrade Charter*, 1975). However, the elements of the out-dated, and potentially dangerous for the environment, contents and attitudes from previous periods still persisted in these curricula. Despite all these detrimental factors, it is a fact that the biggest changes were introduced in the curricula written in the 70s, and they coincided with the changes in the society.

The results of the analysis of the curricula written in *the 80s* showed that little had been done in terms of their improvement with regard to environmental protection, relative to the curricula developed even ten years earlier. The results of the analysis of the curricula from *the 90s* are not satis-

factory either. More precisely, the elements of environmental education were introduced inefficiently in the Science and Social Studies teaching at the time when, and ever since the early 80s, sustainable development was a topical issue (IUCN, UNEP and WWF, 1980; WCED, 1987), while a new, and much broader concept of education for sustainable development was already in the making. Given that endangered nature and natural resources had been a hot topic in scientific and professional circles since the 70s of the 20th century, we expected that the curricula from the 90s would be much more oriented towards environmental protection. However, the analysis showed that Science and Social Studies curricula developed in this period were not significantly improved, compared to the ones developed two decades earlier in terms of the interaction between man and nature, and man's role in its protection. In this context, an adequate actualisation did not happen.

In the context of our topic, the burden and experience in developing the curricula in the previous periods influenced the development of modern curricula, as their analysis clearly showed. It is to be expected that these curricula will be a starting point in the reform of the future curricula, which means that they could indirectly influence the education of the future generations in the spirit of anthropocentrism or ecocentrism. For this reason, it was important to determine their good and bad sides. Many positive changes were introduced in the curricula written in

the early 20th century. Ecocentric views dominate in them and man is perceived as a part of nature. However, as Andevski observes (Andevski, 2016), the issue of interaction between man and nature with the goal of self-defining man *not in relation to nature*, but *in nature*, is a part of the process of environmental learning that has not started yet. Further, the elements of environmental protection are introduced in the curricula, but the reasons offered for its protection are either vague or instrumental. Unfortunately, a chance has been missed to encourage children to protect nature for its intrinsic value. In our opinion, children of age 7-11 understand intrinsic reasons for protecting nature more easily than the instrumental ones. Children feel genuine love towards nature and this love should be encouraged and nurtured. It is necessary to remove environmental education away from the anthropocentric view of sustainability and the metaphysics of mastery, and to bring it closer to a genuine, multi-sensory and receptive engagement with nature (Bonnett, 2016), i.e. personal and reflective treatment of nature, as well as to aspire towards "humane pedagogy, oriented towards man and other living beings" (Andevski, 2016: 29). We have to teach our children to value nature for its own merit and to acknowledge humanistic "and not hedonistic and materialistic" values (Jovanović i Živković, 2016: 119). But all this will have to be kept on hold until new curricula are written.

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ОД АНТРОПОЦЕНТРИЗМА КА ЕКОЦЕНТРИЗМУ У НАСТАВИ ПРИРОДЕ И ДРУШТВА

Антропоцентризам представља схватање да је човек супериоран, најважнији и највреднији део природе, па чак и њен апсолутни господар. Према том схватању, једино људски животи има интринзичну вредност, док се биљке, животиње, минералне сировине смањрају средствима која се могу експлоатисати у корист човека. Екоцентризам је супротно становиште од антропоцентризма. У средњим више није човек, већ екосистем, природа, а природни ентитети имају унутарњу (себи својствену) вредност. Од шездесетих година 20. века све чешће се чују изјаве да људско друштво премашује, како продуктивне капацитете Земље, тако и њене способности да апсорбује последице људских активности. Постало је јасно да је антропоцентрично схватање са свим постојећим последицама по животну средину неодбрањиво, те да се однос према природи неизоставно мора променити.

Развој науке, технологије, културе и промене у начину живота и рада људи утичу на социјално заснавање наставних садржаја и намећу потребу њиховој конципираној актуелизације, па су неки од значајних критеријума у њиховом избору критеријуми иновативности и савремености. Одговорност и озбиљан приступ у осавремењавању наставних програма свих предмета на свим нивоима образовања добијају посебну димензију у контексту савремених еколошких проблема, који су настали као последица антропоцентричног односа према природи, као и у контексту потребе заштите и унапређивања животне средине, чија ефикасност зависи најпре од заокрепа од антропоцентризма ка екоцентризму. Овај заокреп представља једно од кључних питања из области образовања за животну средину и образовања за одрживи развој, концепција који се с правом примењују као предуслови за остваривање нашој планети.

Циљ истраживања је био да се утврди начин на који су се однос науке, технологије и друштва према природи и месту човека у њој одражавали на програме наставе природе и друштва у периоду од шездесетих година 20. века до данас. У анализираним програмима истраживали смо следеће: 1. односа човека према природи: човек као део или господар природе; 2. разлога за бригу и заштиту природе (интринзични или инструментални разлози). У истраживању је примењена метода анализе садржаја. Као материјал за анализу користили смо програме наставе природе и друштва од шездесетих година 20. века до данас.

У периоду који смо истраживали уочили смо јор али доследан и конципиран тренд усклађивања свих елемената анализираних програма са новим научним сазнањима у области потребе за измененим односом човечанства према животној средини. Пути који су решени програмима наставе природе и друштва текао је од изразито антропоцентризма и анти-

їонизма између човека и їрироде, їреко умереної анїїроїоценїїризма са їримесама екоценїїризма, до доминанїїної екоценїїризма. Са груїе сїїране, їонекад су їромене долазиле и са деценијом закашињења, честїо су увођене несїретїно и недовољно сисїематїично, али их је било. Образовни сисїем је велики и сїор сисїем коїи не може лако да исїраїи їромене које се дешавају на друшїивеном їлану, а ово исїраживање је їо їоїїврдило.

Анализа їроїрама из педесетих и шездесетих година указала је на улоїу настїаве їрироде и друшїїва їої їериода у одржавању илузије да је човек їосїодар їрироде, с їравом да је неоїраничено корисїи. Тако је неизбежан и закључак да је настїава їрироде и друшїїва индирекїно доїриносила нарушавању законїїосїи које владају у їрироди, їе уїрожавању сїосодносїи живоїїне средине да їодржи захїеве људскої друшїїва.

Анализа је їоказала да је їроїраме настїаве їрироде и друшїїва седамдесетих година обележио велики їарадокс. Са једне сїїране, їрисуїно је настїојање да се нова сазнања о живоїїној средини, еколошким їроблемима, као и їоїїреби їојачане дрїе о њој уврсїе у їроїраме (додуше, сїорадишно, несисїематїично). Са груїе сїїране, у їроїрамама су їаралелно настїавили да еїзисїирају елементїи їревазиђених и за сїїање живоїїне средине оїасних знања и сїїавова из їретїходної їериода. Иїак, чињеница је да су се највеће їромене десили уїраво у їроїрамама седамдесетїих їодина, као и да је до њих дошло у слично време са їроменама у друшїївеним околносїима.

Резулїїаїи анализе їроїрама из осамдесетих година указали су на слабе їомаке у їоїледу њихової унаїїређивања са сїїановишїїа їоїїреде зашїїїїе живоїїне средине. И резулїїаїи анализе їроїрама из деведесетих година нису задовољавајући. Полазећи од чињенице да се већ од седамдесетїих їодина 20. века у научним и јавним круїовима їоворило о уїроженосїи їрироде и їриродних ресурса, очекивали смо да ће їроїрамама из деведесетїих їодина биїи значајно више у функцији очувања живоїїне средине. Међуїїим, анализа је їоказала да настїавни їроїрамама їрироде и друшїїва у овом їериоду нису значајније најредовали у їоїледу односа човека и їрироде, као и човекове улоїе у зашїїїїи їрироде.

У їроїрамама їочетїком 21. века уочавамо досїїа їозиїїивних їромена. У њима доминира екоценїїризам, односно сїїав да је човек део їрироде. Међуїїим, наша анализа їроїрама настїаве їрироде и друшїїва је їоїїврдила да је їиїїање односа човека и їрироде са задатїком самодетинисања човека не спрам природе, неїо у природи, део їроцеса еколошкої учења коїи још није ни їочео. Такође, їроїрамама су обухваћени елементїи зашїїїїе їрироде, али са разлосима коїи су или неодређени или су инсїрументїалної каракїїера. Зашїїїїа їрироде збої инїїринзичне вредносїи їриродних енїїїїеїа, а не (искључиво) збої човекових инїїереса, још нису нашли месїо у їроїрамама настїаве їрироде и друшїїва.

Кључне речи: анїїроїоценїїризам, екоценїїризам, зашїїїїа їрироде, настїавни їроїрам, настїава їрироде и друшїїва.