

STUDENTS ENGAGEMENT IN ECOLOGICAL ACTIVITIES IN SCHOOLS

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Ecological education is gaining importance at the time when environmental crisis is getting wider and wider. Education is one of the most powerful resources of society in dealing with problems and challenges of the future. The paper presents results of research related to students' attitudes about the activities they would prefer to engage in, which independent variables their willingness to engage depends on, and how the knowledge that students possess and their willingness to engage in ecological activities are related. The survey was conducted on a sample of 324 seventh grade primary schools students in urban and rural areas, polluted and unpolluted environment, urban area - 180 students; rural area - 144 students). The sample of students was adjusted according to two criteria. The first criterion was the place where students live so we took into account the urban and rural areas; the second criterion was the level of pollution, i.e. non-contamination of the environment in which students live. The structure of the sample of students was presented with respect to gender, place and environment in which students live. Results indicate that students are more interested in activities that occur in nature where they are direct participants and they have a subjective feeling of really doing something to protect the environment. In addition, the results show that girls from both samples and students from the country are more willing to engage in environmental activities. Life in polluted and unpolluted environment is not a statistically significant variable that would affect the willingness of students to engage in these activities. We believe that the most interesting result of this research is the finding that a higher level of environmental knowledge of students and life in a polluted environment do not guarantee a greater willingness of students to engage in environmental protection activities.

Keywords: ecological education, nature, descriptive method, urban and rural areas, students

In this study, we used the descriptive method of research. For data collection, we used two research techniques: testing and interviewing. Both techniques were accompanied by relevant instruments: Test for students and for Questionnaire for students (anonymous).

At the end of XX and the beginning of XXI century humanity is faced with the fact that the expansion of needs and consumption patterns,

techniques and technologies, as well as of such rapid wear and uncontrolled exploitation of natural resources led to the disruption and distortion of the relationship between nature and man. Studies have shown that disrupting the ecological balance, especially when taking into account the increase in all forms of pollution, endangered people's health and the quality of life. In order to bring about significant changes in the views of people, it is necessary to offer them knowledge, facts and information that will influence the development of their environmental awareness. In this regard, environmental education has an important role. Education, either academic or extra curricular, is necessary if we want people to change their attitudes and comprise and resolve issues related to the environmental crisis and sustainable development (Conseil des ministres de l'Éducation, Canada, 1999). Man's actions in his environment are directly related to the knowledge he possesses and which is the function of certain behaviors. Timely and adequately designed environmental education today is an essential investment of mankind into future life.

Ecological education should be based on global, holistic and systematic principles. The basic concept of reality is based on the fact that all phenomena and processes on our planet interact and are mutually conditional, that every action produces a reaction, and that in a set of living systems these reactions are not always entirely predictable. In addition, each individual phenomenon, all processes and relationships on the Earth are directly affected by each person whose actions change the environment and disturb more frequently and intensely the natural equilibrium. Everyone must understand and accept responsibility for one's lifestyle and individual impact on the planet Earth. Understanding of personal responsibility and transfer of this knowledge to students is one of the most important tasks of ecological education.

Farmer and colleagues (Farmer, Knapp & Benton, 2007) point out that environmental education is a process that attempts to increase understanding of the environment and promote ecological values. The goal is to motivate the citizen/student to act both individually and collectively and to encourage environmentally conscious behavior that balances social, economic and environmental needs of present without compromising the needs of the future.

The ultimate goal of environmental education is to produce environmentally educated and responsible citizens, or someone who can make decisions that will curb environmental problems which are increasing in the new century (Knapp, 2000). As defined by UNESCO, environmental education aims to develop an environmentally responsible citizen who has the knowledge, skills, attitudes, motivation and ability to work individually and collectively toward solutions of contemporary problems, while also preventing the formation of new ones (Zak & Munson, 2008).

When we place the so formulated goals in the context of school, the goals of environmental education are:

- ❖ that students, in line with the achievements of modern science and practice, acquire basic knowledge of the human environment and the processes that threaten it;
- ❖ for students to develop awareness of the importance of the protection, preservation and improvement of environment;
- ❖ to actively engage students in solving practical problems in protecting and improving the living environment.

Ecological education should enable students to express their personal views and ideas regarding their responsibility to learn the procedures that

others perform to improve the environment, and to apply these ideas and actions in their own lives. Students must be encouraged to develop values that will be beneficial both to them as individuals and to society as a whole. They must understand that it is not possible for people to manage nature, because nature is stronger than man and man's survival depends on nature. Students must also be aware that we cannot solve all environmental problems by technical means. Environmental problems will have to be solved with sincere understanding and appreciating of the relationship between man and nature. Aesthetically, value and emotional contents can be helpful in conveying these ideas to students. It is necessary to present a healthy and positive way of life (Shapiro & Pilsitz, 1995). It is important that environmental education is basically positive, that it gives hope and offers solutions. If we focus too much on environmental disasters, it can be frustrating for students.

Ecological education is a complex and lengthy process. Concrete results can be visible only after several years, but the process should last throughout all levels of education, from kindergarten to university. It is known that children of younger ages (3 to 6 years) have a strong sense of ecological and environmental awareness developed, but they later lose it under the influence of modern technology, consumer-oriented way of life and urban environments. It is therefore necessary to start with environmental education from pre-school and implement it throughout the educational process. In addition to the direct impact of environmental education on children and youth, the direct impact of children's parents is also very important. This makes the benefit of ecological education multiple (Shapiro & Pilsitz, 1995).

Within the frames of their interest in environmental issues educators are particularly focused on the formation of ecological consciousness, the change in environmentally undesirable behavior of young people, on the adoption of new habits at the micro level, and the construction of ecological culture. Ecological education should provide the knowledge, habits and feelings that will contribute to the development of environmental consciousness and thought, to the development of emotional, moral, aesthetic and legally regulated behavior toward the environment. The task to be realized is the development of environmental responsibility and the encouragement of behavior that is compatible with environmental laws, nature, its protection and preservation (Nikolić, 2003).

Along with the development of ideas about the importance of ecological education of children and young people in the world, particular attention is paid to systematic environmental education of teachers (educators, teachers, professors and research assistants). Teacher education in the area of ecology and the environment has become a top priority since the end of the 20th century. Since then, according to Van Petegem et al. (Van Petegem, An Blicck-Boeve & De Pauw, 2007), teachers and pedagogues have become more aware of the role they must play in the conceptualization of the contents of the environment and in developing a cognitive framework of students concerning environment. Based on this, new theories and teaching techniques have emerged for applying skills and strategies of translating education about the environment into practical contents and contexts (Ballantyne, 1995). So, both in our country and in the world, the teachers were unaware of the importance of such contents.

Activities organized by the teacher in the classroom are primarily related to the students' listening in order to acquire new knowledge, for repetition and practice. The teacher can implement a particular content from the curriculum outside the classroom. For teaching environmental contents it is best to take the students outside into the nature; however, environmental

contents can also be covered in computer centers, libraries, museums, national parks etc. All these places allow students to explore nature, to explore and actively learn about the properties of certain plants and animals by using the Internet, in libraries or museums, to learn about the latest discoveries, laws and obligations concerning the protection of the environment. However, some knowledge of nature, its phenomena and resources, should be gained by means of direct experience.

Many authors emphasize the importance of experiential learning and research has shown positive results and the significance that experience has in environmental education and education of students.

In addition to school activities, extracurricular activities (excursions, outdoor schools, recreational classes, and visits to social institutions) are highly significant for environmental education. It is important to emphasize that just because some of the activities are carried out outside the school premises it does not necessarily mean that they are not coordinated with facilities provided by the curriculum. Extracurricular activities are an opportunity for students to get out of the school and gain knowledge and experience in the natural environment.

Extracurricular activities provide a wide range of options for processing environmental content. For this reason, they are extremely important for students' environmental education. The biggest advantage of extracurricular activities is that students do not perceive learning as a pressure and they are exempt from the formalities which classroom teaching carries. One of the basic requirements of ecological education is that the nature and the environment are experienced rather than formally learnt. Formal learning itself often has no effect on attitudes, habits and behavior of individuals, and learning of environmental content must have exactly such effects.

According to some authors (Harvey, 1993), richer collaboration and communication between students, teachers, parents and other subjects in the local community contributes to better environmental planning and programming activities and the development of interests of children and adults in environmental issues.

Research methodology

In the literature, the view that environmental education should be concentrated on the development of appropriate attitudes prevails. In this study we try to relate all the three segments of environmental awareness: attitudes, knowledge and action. In this context, the study has three objectives:

- (1) to test students' attitudes about the kind of environmental activities they would prefer to engage in;
- (2) to determine whether students' readiness for engagement depends on the set of independent variables (gender, urban / rural area, polluted /unpolluted environment);
- (3) to examine the relation of the knowledge the students possess and their willingness to engage in environmental activities.

The study sample consisted of 284 eighth grade students of primary school (urban area – primary school “Vanco Prke” - 179 students and rural area - 105 students – primary school “Straso Pindzur” in village Sokolarci. The sample of students was adjusted according to two criteria. The first criterion was the place where students live, so we took into account the urban and rural areas, and the second criterion was the level of pollution, i.e.

non-pollution of the environment in which students live. The structure of the sample of students was presented in relation to sex, place and environment in which students live.

In this study, we used the descriptive method of research. For data collection, we used two research techniques: testing and interviewing. Both techniques were accompanied by relevant instruments: anonymous Test for students and questionnaire for students.

Research results

Student questionnaire contained four questions pertaining to the involvement of students in environmental activities at school. When asked whether they participated in environmental activities, the highest percentage of students (37.7%) responded: *sometimes*. Almost the same percentage of students said they *often took part* (20%) and that they *did not participate* (19.7%) in environmental activities. However, the most alarming statistic is that 22.6% of students responded that *there were no environmental activities in their school*.

The percentage of students taking part would probably have been higher if they had had the opportunity to engage in such activities. We asked students which of these activities were most interesting for them. Most students (66.5%) said that organization and maintenance of green areas around the school, forestation and planting of plants were the most interesting activities. We can see that students think that the most interesting activities are those that primarily take place in nature and where they are direct participants. Likewise, these activities give students a sense of doing something useful for nature, for its protection and for the improvement of the quality of life. Table 2 presents the responses of students to this question. Students mentioned actions to collect paper, glass and other recyclable materials as the least interesting activities. Contrary to the expressed interests of students, activities related to collecting secondary materials for recycling are the most frequently organized in schools. Usually, these activities in schools are organized by non-governmental organizations. They do not expect significant participation on the part of teachers, and students are also not very active in them. Their only task is to throw waste paper or bottles into a container placed in the school yard. The benefit of this activity is due to material resources that schools receive for collecting recyclable materials. These funds are earmarked spending for various extracurricular activities and for equipping the school. However, the results we obtained point to the conclusion that students' interests are not taken into account when planning these activities. Unfortunately, teachers are often not prepared to respond to the needs and interests of students. The first step to a successful environmental education is to familiarize students with environmental contents and arouse their interest in the issues of environmental protection.

Table 1. *Participation of students in environmental activities at school*

Do you take part in environmental activities organized in your school?		
I often take part	57	20
I sometimes take part	107	37,7
I do not take part	56	19,7
There were no such activities in our school	64	22,6
Total	84	100

Interesting results on the willingness of students to engage in the work of the environmental movement in school and in the activities of cleaning river banks or cleaning forests (Tables 5 and 6). In both cases, about 40% of students answered that they would take part in any of these actions should they schoolmates be included also. These results suggest that students see their peers as an important factor of their own involvement in environmental activities. Peers can be considered as an important resource for including more students in environmental activities. We believe it is necessary to educate students about environmental issues so that they continue spreading their knowledge and including their friends in these activities.

Table 2. Pupils' attitudes about the most interesting environmental activities

Which of the listed activities seems most interesting to you?		
Organization and maintenance of green areas around the school	131	46.1
Actions of afforestation and planting of plants in the wider environment		
Exhibition of photographs, drawings and literary works on the subject of endangering and protection of the environment	39	13.7
Monitoring and recording of events that endanger the environment	18	6.3
Organizing discussions and debates on the vulnerability and protection of the environment	15	5.3
Collecting paper, glass and other recyclable materials	13	4.6
No answer	10	3.6
Total	284	100

Table 3. Willingness of students to engage in the activities of the Environmental Movement

If an environmental movement was formed in your school that advocated for environmental protection, would you be willing to get involved in the activities of that movement?	f	%
No, I would not be interested in it	41	14.4
Yes, provided that my friends engage too	128	45.1
Yes, very willingly	115	40,5
Total	285	100

Table 4. Willingness of students to engage in a voluntary action

If your school would organize a voluntary action of cleaning a river bank or cleaning of a forest, would you engage in that action?	f	%
No, I would not be interested in it	39	13.7
Yes, provided that my friends engage too	120	42.3
Yes, very willingly	124	44
Total	285	100

In this study we wanted to determine whether there are differences by gender, place and environment in which students live and the success of the knowledge test and the willingness of students to engage in environmental activities. We measured readiness for engagement by the average score of student responses to three questions:

- ✓ Do you participate in environmental activities organized in your school?
- ✓ If in your school an environmental movement was formed that advocated for the protection of the environment, would you be willing to get involved in the activities of the movement?

- ✓ If your school organized a voluntary action to clean a river bank or a forest, would you join the action?

Differences by gender and students' readiness for involvement were tested by t-test for independent samples. The results showed that there are differences between the sexes and that girls are more willing to engage in ecological activities (Table 5). Greater willingness to engage in ecological activities is also shown by females in the research conducted by Mišković (1997).

Table 5. *Willingness of students to engage depending on the sex*

<i>Sex</i>	<i>N</i>	<i>AS</i>	<i>SD</i>
<i>Male</i>	<i>157</i>	<i>5.81</i>	<i>1.85</i>
<i>Female</i>	<i>127</i>	<i>6.40</i>	<i>1.74</i>

$t = -2.689, df = 282, Sig. = .008$

Differences by place where students live and willingness to engage were tested by t-test for independent samples. The results showed that there are differences and that students who live in villages are more willing to engage (Table 6).

Table 6. *Willingness of students to engage depending on location (rural-urban)*

<i>Location</i>	<i>N</i>	<i>AS</i>	<i>SD</i>
<i>Rural</i>	<i>105</i>	<i>6.55</i>	<i>1.81</i>
<i>Urban</i>	<i>179</i>	<i>5.83</i>	<i>1.82</i>

$t = 3.454, df = 282, Sig. = .001$

The difference between locations (rural - urban) and the willingness of students to engage in environmental activities was also examined in other studies (Stavreva Veselinovska, 2007). Practical engagement in the protection and care of wildlife is most prominent in rural, then in suburban, and at least in urban areas. As an explanation for this fact, the author Stavreva Veselinovska (2007), states that for the respondents from rural areas primary socialization took place in conditions of ecologically cleaner environment and they are therefore more willing to engage in activities aimed at protecting and promoting of that environment. According to the survey, respondents from the country are more willing to participate in environmental protection activities.

We believe that life in the country does not exclusively mean living in an ecologically cleaner environment. We believe that rural areas can have a positive impact on students in terms of students' relationship with the natural environment. Students from villages are more in position to gain experience in nature, learn about nature and understand natural processes. We also believe that the closeness the students living in villages have with nature is an important reason for their greater willingness to participate in environmental protection activities. In addition, the explanation for the greater willingness of students from villages to engage in environmental activities can be found in the fact that children in rural areas show greater readiness for all types of group activities. In rural areas in Macedonia sensitivity for joint work is traditionally developed. On the other hand, the urban environment alienates people and students from urban areas do not have the desire and the habit of participating in joint activities.

Table 7. Average value on the test in relation to location (rural-urban)

Environment	N	AS	SD
Rural	105	19.4	5.33
Urban	179	21.94	5.30

Students from the city have achieved better results on the test, which means they have more knowledge and information but they were nevertheless less willing to engage. The question is why we got such results. One would think that, based on the knowledge they possess, students have the desire to both engage in environmental protection and to prevent further development of the ecological crisis. However, as results show, knowledge and experience that students gain through life in the country and in villages are a much stronger incentive to engage than the knowledge that students acquire in school and from various (non-natural) sources.

It was expected that students with greater knowledge of ecology would have a desire to become active in environmental protection, but this association has not been confirmed by any research. The difference between the environment in which students live and their readiness for engagement was tested by t-test for independent samples. The results showed that there was no statistically significant difference in willingness to engage between students who live in polluted and unpolluted environment (Table 8).

Table 8. Willingness of students to engage depending on the environment

<i>Environment</i>	<i>N</i>	<i>AS</i>	<i>SD</i>
<i>Polluted</i>	<i>153</i>	<i>5.89</i>	<i>1.87</i>
<i>Not polluted</i>	<i>131</i>	<i>6.30</i>	<i>1.77</i>

$$t = -1.858, df = 282, Sig. = .064$$

However, we expected that students from polluted areas would be more willing to engage and to do something to reduce pollution of the environment in which they live. Unfortunately, no study in the literature that we analyzed, does not give pollution and non-pollution of the environment as an independent variable, so we are unable to confirm or deny such a fact with the findings of other research. As was the case with the previous independent variable, it would be interesting to compare the data obtained by linking the environment in which students live and students' achievements on the test with the willingness of students to engage in environmental activities.

Table 9. Average value at the test in relation to the environment

Environment	N	AS	SD
Polluted	153	21.62	5.27
Not polluted	131	19.68	5.67

$$t = 2.911, df = 282, Sig. = .004$$

Although students from polluted areas showed a higher level of environmental knowledge and awareness, they did not appear to be more prepared for involvement in environmental activities than their peers in unpolluted environment. Despite the knowledge and information they have, as well as the fact that they live in a polluted environment, students from such areas are not more willing to engage in environmental activities. On the other hand, students from non polluted areas have a lower level of environmental knowledge and information. However, even though they live

in an environment that is not polluted, these students show the same willingness to engage in ecological activities as students from polluted areas. Our expectations that students from polluted areas will show greater willingness to protect and improve the environment in which they live, have not been confirmed.

Conclusion

The main objective of ecological education is to develop students' environmental awareness, which does not include only a determined level of awareness of individuals or social groups, but also a high level of practical activities on individual and societal level. The components of environmental awareness are: *environmental knowledge*, *environmental attitudes*, *environmental values* – and *environmental behavior*. All the four components are interrelated and conditioned. Environmentally desirable behavior is not possible without knowledge of the laws of nature, the causes of environmental crisis and possible solutions. The knowledge that an individual acquires gives him/her an opportunity to see his/her place, role and responsibilities related to the environmental protection and improvement of quality of life. Thereby a positive attitude and positive feelings towards nature are encouraged. Likewise, based on knowledge they possess, individuals develop a value structure that is consistent with ecological principles. Environmental values – and environmental attitudes are the drive of an environmentally desirable behavior.

The school is the best place for the development of all components of environmental awareness. In this sense, it is important to cultivate environmental contents through both teaching and extracurricular activities. Students willingly participate in well-thought-out extra-curricular activities. The aim of our study was to find out which environmental activities are of interest to students, as well as which independent variables affect the willingness of students to engage in such activities. Some possible conclusions of our study are:

1. Students prefer activities that occur in nature, in which they are direct participants and where they feel that they are actually doing something for the preservation of the environment (organization and maintenance of green areas around the school, forestation and planting of crops).
2. Students find collecting recyclable materials the least interesting activity. Contrary to their interests, these activities are most often organized in schools.
3. Despite the higher level of knowledge, students from urban areas show a lower degree of willingness to engage in environmental activities. This suggests that knowledge acquired at school is not functional. Such knowledge does not lead students to appropriate conclusions with regard to their role and contribution to environmental protection. Time spent in nature and the natural environment is a significant incentive to students to participate in the processes of environmental protection, which further justifies the need for more activities that occur outside the classroom and school building.
4. Results showed that students' willingness to engage in ecological activities is not dependent on the environment in which students live. Thus, students who live in a polluted environment have not shown a greater degree of willingness to engage in activities that are

related to the protection of the environment, regardless of the fact that they possess a higher level of knowledge of students from unpolluted areas.

Our research shows that change is necessary, above all, of forms of teaching and learning environmental contents. It is necessary to improve methods of work so as to develop equally the rational, emotional and value spheres of students' personalities. In fact, environmental education should be directed both to the "mind" and to the "heart".

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