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The Original Activities for Environmental Education and Their Effects on Students (A Case Study in Bursa)

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ABSTRACT. The present study investigates the effects of the environmental education through original activities on the development of children's environmental consciousness. For this purpose, a 6-week study program was prepared to apply with elementary school 5th grade students as based on a theme for each week, and the students were given environmental education doing some original activities. The answers they gave to the open-ended questions addressed at the beginning and end of the study, the papers containing their thoughts on what they studied during every preceding week, and the reports submitted after the activities they did every week, were all evaluated and it was found that they enjoyed the activities and what they learnt about the topics studied was at the desired level.
Key Words. Environmental education, elementary schools, original activities

INTRODUCTION

One of the main approaches in preventing the environmental problems is environmental education. To Belanger (2003), environmental education is achieved when an individual knows about the environment as based on the experiences from his surroundings, actively learns about it focusing on a local problem or an ecological risk, finds solutions for new problems adapting the knowledge he has gained through several educational and communicational processes, and furthermore, when he is able to influence others with his sensitivity and his realization that he is a part of the environment. It would be achieved a sufficient and efficient environmental education for children would be the most important step taken on the way to prevent the probable serious environmental problems in the future and develop the technologies to solve the already existing ones. However, the place, content and methods of environmental education in syllabuses are still a controversial matter. The studies on how formal and informal (Wojcik, 2004) educational processes treat the issues such as children's sensitivity to environment and environmental consciousness (Yılmaz & Andersen, 2004; Jinliang, Yunyan, Ya, Xiang, Xiafei & Yuanmei, 2004), the place and scope of environmental education in syllabuses (Ünal & Dımışkı, 1999; Pace, 2003; Grodzinska-Jurczak, 2004), and the shortcomings in the sources and practices (Goussia-Rizou & Abeliotis, 2004; Shaw, 2003), attest to the importance of environmental education and the necessity that it be given a broader scope in syllabuses.

In Turkey, like in many other countries, the topics about environment are covered in syllabus within the framework of Science Education courses (Kiziroğlu, 2000). Several institutions (the organizations of the Ministry of Environment and Forests in cities, Local Administrative Units, Universities, some institutions of Ministry of Education) conduct localized environmental education studies based on some projects (Külköylüoğlu, 2000; Şimşekli, 2001; Şimşekli, 2004). Naturally, those efforts make some little contributions towards the solution of this serious and big problem. Despite the fact that creating the desired behavioral changes in students requires more effective and broader programs, those studies could shed light on how to structure the programs in question.

In a study based on the above-mentioned approaches done with secondary and high school students with the aim of enabling them to understand the items of agricultural and environmental information easily (Poudel, Vincent, Anzalona, Huner, Wollard, Clement, DeRamus & Blakewood, 2005), the researchers indicate that they aimed to improve students' skills to realize the environmental problems and find the ways to solve them. And for that, the researchers made the student groups do hands-on

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activities at theme stations designed considering some agricultural and environmental features that would inspire their motivation and attention.

Environmental education, in a compatible way with their levels, should aim to make children know the components and functions of the environmental factors starting from their own surroundings and equip them with the perspectives to see how different pollution in different area has occurred and how the environment could be cleaned. Environmental education programs can be developed with a holistic approach under some different titles for the students at different levels at elementary schools as well. Xuehua (2004), gives the basic environmental topics in a systematic list and stresses the importance of teaching them to also children. In the 6-week environmental education program planned by the researcher for both contributing to the environmental education methods and giving children a didactic and enjoyable environmental education, the topics covered are a) natural surroundings, b) water, c) soil, d) consumption and recycling.

The study program was designed with the supposition that if the content covered the properties of the environments dealt under different titles every week and the types of pollution that could be seen in those environments, it would be pedagogically more effective and interesting for 5th grade students. Having considered the cognitive levels of 5th grade students, the concepts of environment and environmental pollution were treated as based on concrete activities. Throughout the study, the presentation of the characteristics of the natural environments chosen for every topic, their functions and importance for the living things, the types of pollution met in the environments in question, and making the students think over how to clean those pollution types, were all dealt in a holistic approach. It was planned to make the students examine a natural environment in the field, the water of a near water resource, different soil types, and do some activities about soil and water pollution; and in addition, watch a film about consumption and recycling and see the recycling facilities of the municipality themselves in an excursion.

METHOD

Sample and Participants

The participants of the present study were selected through using the method of "criterion sampling" (Yıldırım and Şimşek, 1999). In the selection of the schools, the following criteria were applied: the sufficiency and appropriacy of the school garden where most of the activities took place, the presence of half-day education so that the students did not miss their classes, and the positive attitude that the administrators hold towards the study. The reasons for selecting the students as participants were as follows: they were the 5th grade students and they participated voluntarily. The reason why the 5th grade students were selected was that they were at suitable level for the activities.

Carrying Out the Study

The study was done in six weeks in an elementary school in Bursa in 2004 between 12 March and 16 April (Table I). Two staff members from the City Directorate of Environment helped the researcher during the study. The study was conducted with the full permission of the City Directorate of Environment and that of National Education. Due to the organization made by the school administration, the fifth grade students, who had been having half-day education in the afternoons, were informed of the environmental education studies to continue for 6 weeks on Fridays between 9 and 12 o'clock am. 29 students participated in the study regularly. In the first week, the study program (Table I) was introduced to the students and they were asked to answer the 15 open-ended questions to see what they knew about the topics to be studied throughout the study. Then, the caps with an environmentalist emblem on were given to the students to increase their motivation. The study of a natural area around (the school garden was suitable) was planned to be in the second week, while the examination of a water sample was to be in the third week. The fourth week was devoted to soil analysis and the fifth week was for watching films on consumption and recycling, and then visiting the recycling facilities of the municipality. In the sixth week, the students were to answer the 15 open-ended questions again. A certain part of the study was continued in the classroom provided by the school administration while most of it was conducted in the school garden. Every week throughout the

study, the students were asked to write down their thoughts on what they had learnt during the preceding week and the studies in groups of five followed it. The reports they wrote about the studies were collected at the end of each study. The studies were recorded, and the results were evaluated in the light of the observations, interviews with the students and documents.

Table 1. *Study program*

Titles	Date	Activities	The participating students (f)
Meeting the students	12.03.2004	Meeting the students, introduction of the study program, answering the open-ended questions about the topics	29
Nature	19.03.2004	Study of a natural area around	29
Water	26.03.2004	The analysis of a water sample taken from a near source and the activities about water pollution	29
Soil	02.04.2004	Studying different soil types and the activities about soil pollution	29
Consumption and Recycling	09.04.2004	Watching a film on consumption and recycling, visiting the recycling facilities of the municipality	29
Evaluation	16.04.2004	Answering the open-ended questions about the topics	29

In the activity in which a natural environment was observed, each group of five students was given an area to study (it was minded that there were similar parts in the area of every group such as soil heaps, plants etc.), a magnifying glass, a pliers and a bag. As this activity was done in the garden of the school, the possibilities were only the ones the garden offered. The six student groups examined the appointed areas and tried to find out the diversity and density of the living things there. Using the pictures in their hands (Hampton, Hampton, Kramer and others, 1997), they tried to recognize and categorize the samples of the living things they collected in their bags (they were asked to leave the living things when they finished the study). A group discussion was stimulated by getting the students to consider the diversity and density of the living things in that area and asking them in what ways they thought those living things would be harmed if the area they had examined were polluted.

It was told that every living thing needs water to survive and water itself is a living environment for many living things and thus, the vitality of water for living things was emphasized. After discussing whether every water sample seeming clean is healthy or not, one taken from a lake was analyzed. Pursuing the studies with microscopes, some microscopic organisms living in water were showed (Hampton, Hampton, Kramer and others, 1997). Then, a jar of clean water was given to each student group of five members and they were asked to pollute the water with the tomato paste first (each group had a spoonful) and then a spoon of salt. After that, they added a small glass of liquid oil and a spoon of pepper into the water. Finally, they were asked to examine how the polluted water looked and discuss how it could be cleaned.

Three soil samples collected from different places were put on the newspaper sheets given to every group. The students were asked to examine the samples (in terms of color, softness, size of the grains, whether or not containing stone etc.) and make notes of their characteristics. Then, they were told to put the soil samples into filters and place them in containers to pour water on at equal amounts. The amount of the water that accumulated beneath every sample was measured and their capacities to hold water inside were discussed (Turgut, Baker, Cunningham & Piburn, 1997). After that, the water that accumulated at the bottom was filtered and the amount of the soil left was examined to attract the students' attention to the soil moved by water. The following activity was polluting the soil samples and every student group poured a spoon of salt over a certain amount of soil. Then, they added a small

glass of liquid oil and a spoon of pepper into the soil samples before mixing them with the water containing tomato paste. The last things added were tiny pieces of paper and after that, it was discussed how to clean those soil samples.

The students watched a film about consumption and recycling. After the film (prepared by the Metropolitan Municipality of Bursa), which was about the fact that waste materials increase in amount because of over-consumption and some of them can be reused if recycled, the students were taken to the recycling facilities of the municipality. There they could see how the waste materials are separated from each other and how they are pressed to be sent to the facilities for reuse and they learned which waste materials could be used in making which products.

Collecting the Data

At the beginning and end of the study, the students were handed out a sheet of paper including 15 open-ended questions prepared in relation to the programmed themes and asked to write their answers in the spaces left blank.
After the students had filled the necessary places in the sheets handed out, they were had the report of the activity written and the reports were collected at the end of the activity.
Every week before starting a new activity, each student was asked to write about what they had learned in the sheets entitled "What I learned last week".
In the interview held with the students at the end of the program, they were asked the following questions:
What are your opinions about the study?
Did you like the activities?
Did you feel bored during the activities?
The answers given verbally by the students were recorded by the researcher.
The researcher and her assistants present in each stage of the study observed that the students regularly participated in the activities lasting for six weeks, and eagerly performed the activities and then wrote their observation reports every week.

Analyzing the Data

The correct answers given by the students both at the beginning and end of the study to the open-ended questions were identified and their percentages were calculated and arranged to show in tables.
The sheets entitled "What I learned last week" and filled by the students were examined through using the method of "content analysis" (Yıldırım and Şimşek, 1999). The statements in the sentences written by the students with regard to the theme of the week in question were put into various categories. The categories had not been specified beforehand but formed according to the statements.
For example, the statements written by the students such as
-"We saw what creatures were in the garden."
-"We examined the creatures in the soil and wrote their names on sheets of paper."
-"We learned about animals and plants; examined and wrote about them on sheets of paper."
were put into the category "What the names of the organisms we examined are**"**.
Again, the statements written by different students such as
-"We made a study of insects in the soil and plants on it."
-"We saw many different creatures under the stone on the soil."
were put into the category "Where the organisms we examined live**"**.
Similarly, all the meaningful statements written by the students were categorized in accordance with the theme of the week in question in order to present in tables.
The ratios with regard to the three different answers given by the students to the questions asked during the interview were calculated and arranged.

RESULTS

The necessary arrangements were made as based on analyzing the reports submitted after the activities, the evaluation papers handed after every preceding week, pre-study and post-study evaluation, the dialogues and interviews with the students and other recordings. When what was recorded is examined, it is seen that 29 students participated in the study. The students did all the activities with great enthusiasm, joined the discussions that followed the activities and wrote comprehensive reports.

It is seen in the reports written about nature that they could write the living and non-living components of the environment they had examined, the places where the living ones were living (underside of stones, plant trunks, on soil etc.), and the names of the living things. In the reports about water, it can be seen that they wrote down the names of the species living in water, the things that could pollute water and added their thoughts on the consequences of water pollution. When it comes to the reports about soil, they wrote about the properties (color, softness, having big or small grains etc.) of the soil types they had examined, the soil transported by water, the things that could pollute soil and the possible consequences of soil pollution. In their reports on recycling, they wrote down which waste materials can be recycled, added the ways they could be used and the necessity that the recyclable wastes be collected separately. The documents about what they learned during every preceding week were made into Table 2.

Table 2. *The categories including the statements by the students about what they learned during the preceding week*

Theme	The categories including the statements by the students about what they learned	Percentages of the students (%)
Natural Area	1.That lots of living things live in a small area	93
	2.Where the organisms we examined live	72
	3.The groups the organisms we examined belong to	54
	4.What the names of the organisms we examined are	41
Water	1.That not every water that looks like clean might be healthy	97
	2.That water is an environment to live in	72
	3.How different materials pollute water	72
	4.That it is so hard to clean contaminated water	70
	5.That water is vital for living things	55
	6.That chlorine kills the microorganisms in the drinking water	10
	7.That such wastes as petrol and oil prevent water to have air	7
Soil	1.What pollutes soil	86
	2.The importance of soil for living things	79
	3.That soil is an environment to live in	66
	4.In which soil erosion occurs more frequently	62
	5.That different soil types have different rates of fertility	59
	6.That soil pollution is a very serious problem	55
Recycling	1. That recyclable wastes should be distinguished from rubbish	80
	2. Which wastes are turned into which products	76
	3.Which wastes are recyclable	59

N= 29

In Table 2, the topics stated as learnt by the students are given as based on percentages. 93% of the students wrote that during the study about natural environment they learnt that "lots of living things live in a relatively small area". 97% of the students wrote that during the study about water they learnt that "any water seeming to be clean might not be that healthy" while 72% of them stated they learnt that "water is a living environment". 86% of the students wrote that thanks to the study about soil they learnt "what pollutes soil" and 80% of them wrote that in the study about recycling they learnt that "recyclable wastes should be distinguished from rubbish".

The answers the students gave to the 15 open-ended questions at the beginning and end of the study were examined and the percentages of the students who could answer the questions correctly are given in Table 3.

Tablo 3. *The Percentages of the students' correct answers to the open-ended questions at the beginning and end of the Study*

Questions	Correct Answers (%)	
	Pre-study	Post-study
1. What is a natural environment?	53	93
2. What exists in a natural environment?	37	75
3. Give an example of a natural environment.	57	85
4. How is soil formed?	27	31
5. Why is soil important?	31	70
6. What pollutes soil?	42	93
7. How can we distinguish different soil types?	34	75
8. What would the extinction of the plants on soil cause?	90	93
9. Why is water important?	46	86
10.Is any water that looks to be clean healthy?	71	100
11.Which living things live in water?	51	75
12.What pollutes water?	37	93
13.In what ways does over-consumption affect the environment?	22	65
14.Of what would a responsible consumer take heed?	38	71
15.What is recycling?	24	74

N=29

It can be seen in that Table 3, that before the study, the question about erosion (the eighth question) was the one with the most correct answers while the question about consumption (the thirteenth question) was the one with the least correct answers. At the end of the study, the question about whether any water is drinkable or not (the tenth question) became the one to which all the students gave correct answers. The questions about the definition of a natural environment (the first question), the things polluting soil and water (the sixth and twelfth questions) and erosion were the other ones answered correctly by many students as well. The question to which the least correct answers were given was the one about the formation of soil (the fourth question). When the correct answers given at the beginning and then at the end of the study are examined, it is seen that, except for the answers given to the questions about soil formation process and erosion, the changes in the rates of the correct answers given by the students are very interesting.

When the two tables are examined, it can be seen that the students' correct answers in Table 3 and the Table 2 rates of what they told they learnt confirm each other. The percentages of the questions and answers about the students' opinions on the study are given in Table 4.

Tablo 4. *The students' opinions about the study*

The students' answers	(%)
I'd like to continue the studies	100
I both learnt and enjoyed much during the environmental education	83
I liked the studies	17
The studies were boring	0

N=29

In Table 4, all of the students marked that they desired to continue the study and they declared that desire orally too. None of them found the study boring, they conveyed their positive impressions to teachers and parents as well and consequently, there were some parents participating in the final excursion. Some of the science education and classroom teachers of that elementary school expressed their wish to have information and experience about some of the activities. The school administration declared to be content with the studies as well.

DISCUSSION and CONCLUSION

As Xuehua (2004) stated, more fundamental environmental knowledge and sensitivity to environment could be achieved through the teaching techniques and materials that would make students more interested. The study of a natural environment in the field enabled the 5th grade students to realize more easily the relationships between the living and non-living components of nature. They found the opportunity to observe the fact that diverse and numerous living things live in a rather small area. They tried to recognize the living things they collected using the living things pictures in their hands as a key and that contributed to their developing positive approaches towards those living things. Having had information about the diversity and density of the living things in the environment examined, the students could express conscious thoughts about the extent to which the living things would be damaged if that environment were polluted.

Concretization of the pollution factors with some materials used in daily life helped the students perceive more easily the soil and water pollution caused by some similar materials and made it easier for them to produce solutions. They observed that such a pollutant with dyes in it as tomato paste makes water more turbid, that the pollution caused by such soluble chemicals as salt is not visible, and that the pollutants such as oil cover the surface of water. During the activity of polluting a sample soil, the students could observe the fact that soil is polluted to even its deep layers with such pollutants as salt and oil that dissolve with liquid pollutants. The students who suggested removing the oil off the surface of the water and cleaning it through vaporization thought that soil pollution is a more serious type of pollution.

The findings of the present study reconfirm the fact that the environmental education given as based on concrete practices provides efficient and enjoyable learning. The changes in the correct answers the students gave to the evaluation questions attest to the efficiency of the learning. One of the questions about which not much change occurred was on soil formation. The reason for it might be that the topic was not a part of the hands-on activities after being mentioned theoretically. The other question was on erosion and the slight change about it is quite natural as the rate of correct answers given to it was already high at the beginning of the study. The rates of the correct answers given to the other questions show that the method used in this study is reusable if improved and expanded.

The students enjoyed the studies and desired to continue them, which shows that those studies could be done after school time as well. Summer courses to be offered by environmental education specialists could give elementary school students the possibility to have efficient and enjoyable environmental education. Similar courses are offered in China under the name of "Natural Sciences" (Hua, 2004). Much more students could be educated with the methods in question in environmental education centers to be founded with the support of universities and local administrative units.

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Çevre Eğitimi İçin Özgün Etkinlikler ve Bu Etkinliklerin Öğrenciler Üzerindeki Etkileri (Bursa'da Bir Durum Çalışması)

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ÖZ. Bu çalışmada amaca yönelik aktivitelerle yapılan çevre eğitiminin öğrencilerin çevre bilincinin gelişimine etkisi incelenmiştir. Bu amaçla İlköğretim okulu 5. sınıf öğrencilerine her hafta bir tema kapsamında olacak şekilde 6 haftalık çalışma programı hazırlanmış ve özgün etkinlikler yaptırılarak çevre eğitimi verilmiştir. Öğrencilerin çalışmanın başında ve sonunda çalışma konuları ile ilgili açık uçlu sorulara verdikleri cevaplar, bir önceki hafta öğrendikleri ve düşüncelerini içeren çalışma kağıtları ve her hafta yaptıkları etkinlikler sonunda hazırladıkları raporlar değerlendirilerek yapılan etkinlikleri eğlenceli buldukları ve işlenen konular ile ilgili öğrendiklerinin amaçlanan ölçüde olduğu sonucuna varılmıştır.
Anahtar Sözcükler: Çevre eğitimi, ilköğretim, özgün aktiviteler

ÖZET

Araştırmanın amacı ve önemi: Çevre eğitimi ilköğretim öğrencilerinin seviyesine uygun, özgün etkinliklerle verilirse öğrencilerin hem eğlenmelerini, hem de etkili ve kalıcı bir şekilde öğrenmelerini sağlayacaktır. Bu çalışmada öğrencilerinin seviyesine uygun, amaca yönelik aktivitelerle yapılan çevre eğitiminin ilköğretim 5.sınıf öğrencilerinin çevre bilincinin gelişimine etkisi incelenmiştir.

Yöntem: Bu amaçla öğrencilere her hafta bir tema kapsamında olacak şekilde 6 haftalık çalışma programı hazırlanmış ve özgün etkinlikler yaptırılarak çevre eğitimi verilmiştir. Araştırmacı tarafından programlanan çalışma Bursa'da (Türkiye) bir ilköğretim okulunda öğretim saatlerinin dışında 29 öğrenciye uygulanmıştır. Çalışma; Doğa, su, toprak ve geri dönüşüm temalarından oluşturulmuştur. İlk ve son hafta öğrencilerin çalışılan konularla ilgili açık uçlu soruları cevaplamaları sağlanmıştır. Eğitim sürecinde her hafta öğrencilerden bir önceki hafta yapılan çalışmalarda öğrendiklerini ve düşüncelerini yazarak anlatmaları istenmiştir. Daha sonra beşerli gruplarla yapılan etkinliklerin sonunda etkinliklerle ilgili rapor yazmaları ve araştırmacıya vermeleri sağlanmıştır.

Bulgular: Çalışmanın başında ve sonunda çalışma konuları ile ilgili açık uçlu sorulara verdikleri cevaplar, bir önceki hafta öğrendikleri ve düşüncelerini içeren çalışma kağıtları ve her hafta yaptıkları etkinlikler sonunda hazırladıkları raporlar değerlendirilerek çocukların işlenen konular ile ilgili öğrendiklerinin amaçlanan ölçüde olduğu sonucuna varılmıştır.

Tartışma ve Sonuç: Yerinde yapılan doğal alan incelemesinin öğrencilerin doğanın canlı ve cansız bileşenleri arasındaki ilişkiyi kavramalarını kolaylaştırdığı gözlenmiştir. İncelenen ortamdaki canlı türlerinin çeşitliliği ve yoğunluğu konusunda bilgi sahibi olan öğrencilerin "böyle bir alanın kirlenmesi sonucunda ne kadar canlının zarar görmüş olabileceği" sorusuna net cevaplar üretebildikleri tespit edilmiştir. Yapılan etkinliklerle, toprak ve suyun insanlar için öneminin yanında bir çok canlı için yaşama ortamı olduğunu da farketmişlerdir. Toprak ve su ortamlarında kirlilik etmenlerinin günlük hayatta kullanılan maddelerle somutlaştırılması işleminin öğrencilerin benzer maddelerle olabilecek kirliliği kavramalarını ve çözüm üretmelerini kolaylaştırdığı gözlenmiştir. Geri dönüşüm teması ile ilgili etkinliklerin ise zaten bu konuda duyarlı olan çocukların geri dönüşümlü ürünleri daha bilinçli olarak ayırdetmelerine katkıda bulunulmuştur. Öğrencilerin çalışmaları eğlenceli bulmaları ve devam etme konusunda isteklilikleri bu çalışmaların okul saatlerinin dışında da geliştirilerek sürdürülebileceğini göstermiştir.

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