

## Does Outdoor Education Make any Difference in Environmental Literacy of Pre-service Classroom Teachers?

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### ABSTRACT

The aim of this research is to determine the effects of various teaching methods and activities, which are used in environmental education lessons, on the environmental literacy level of classroom pre-service teachers. This study was carried out including the classroom pre-service teachers, who took the environmental education course in the academic year of 2012-2013. In this study, an experimental design was used. The Environmental Literacy Scale and the Evaluation of the Environmental Education Outcome Scale, which was developed by the researchers, were utilized as data collection instruments. The implementations were carried out throughout the semester. During the semester, traditional teaching methods (lecture type) were used in the control group, while teaching methods in which the pre-service teachers were active in the outdoor and indoor were used in the experimental group. Regarding the quantitative data, descriptive analysis, paired-samples t-test, Independent Samples T-Test analysis were utilized. Content analysis was used for the analysis of the data obtained from the open-ended questions. The findings showed that there was a statistically significant difference in favor of the experimental group with respect to the “attitudes”, “uses,” and “concern” dimensions of the environmental literacy. When the pre-test and post-test results of the control group were compared within the group, no any significant difference was found. Yet, a significant difference in the dimensions of “attitudes” and “uses” was found when the pre-test and the post-test results were compared within the experimental group. The classroom pre-service teachers in the control group gave very positive feedback on the issues of “the outcomes they obtained from the environmental education course”, “teaching topics related to environmental education when become teachers,” and “environmental problems.” Richer codes and higher frequencies were obtained from the experimental group on these categories.

### KEYWORDS

Environmental education, environmental literacy, classroom pre-service teachers, teaching methods, outdoor education

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## Introduction

Global environmental problems, whose influences are felt in various ways in different regions, are directly related to life styles and preferences of human beings. The environmental education has an important role in preventing the environmental problems and helping people acquire positive attitudes and behaviors towards the environment (Eroglu, 2009). Unfortunately, unsustainable lifestyles hinder the resolution of environmental problems each passing day. For this reason, people should go through an effective training in environmental education in order to make more conscious decisions and take the required actions.

A society where quality of life of future generations are secured with the protection of natural resources can only be possible with lifelong education provided for individuals both in formal and informal environments (Tuncer, Tekkaya, Sungur, Cakiroglu, Ertepinar, Kaplowitz, 2009). Environmental education aims to educate individuals to acquire “environmental literacy.” (Teksoz, Sahin & Ertepinar, 2010-a). Although there are different definitions of “environmental literacy”, the main focus in the context of this term is to help people gain knowledge, awareness, sensitivity and responsibility related to the influences of human activities on the natural resources of the world.

Ways to improve environmental education and environmental literacy is on the agenda of higher education institutions (Moody et.al, 2005; CELP, 2005; Kaplowitz & Levine, 2005). University graduates are expected to have effective roles in the construction of sustainable environment both in their daily and professional lives. Accordingly, they should be equipped with sufficient knowledge, attitude, value and skills. Therefore, universities should have the target of educating individuals to acquire environmental literacy regardless of their academic field (Teksoz, Sahin & Ertepinar, 2010-a).

The environmental literacy of the students is determined as the first step of offering an effective environmental education in higher education institutions. There are various research studies related to the determination of the students’ environmental literacy levels. For example, some research studies conducted in USA (Kaplowitz Levine, 2005; Moddy, et al, 2005) showed that university students did not have satisfactory environmental literacy as targeted. Based on this information, the environmental education policies and approaches of the universities are looked over. Thomas and Nicita (2002) in their study emphasized the significance of determining the environmental literacy levels of individuals. These researchers also stated that the level of environmental literacy is an important indicator of sustainable environment and development. In Turkey, Teksoz, Sahin and Ertepinar (2010) determined the environmental literacy levels of students (teacher candidates) studying in the education faculties of the public universities in Ankara. The environmental literacy levels of the teacher candidates were examined with respect to the dimensions of “knowledge on environment,” “attitudes toward environment,” “concern”, and “uses.” The findings of this research showed that the teacher candidates are in an expected level in terms of these cognitive and affective attributes. On the other hand, their level of “knowledge on environment” was found unsatisfactory. This study implies that individuals should be equipped with adequate environmental knowledge which can help them make right decisions on behalf of improving the quality of environment for a sustainable future.

In recent years, higher education institutions have taken important steps regarding the roles undertaken for sustainable development and environmental sustainability. Some universities signed the “Tallories Declaration” in 1990 in order to support the initiations that were carried out for the future of the environment (Wright, 2002). Therefore, these universities accepted to have active roles in the design of sustainability education programs, research and policies. Besides, in 2005 United Nations declared “a decade period” as the period of “education for a sustainable environment” ([www.unesco.org](http://www.unesco.org)). McKeown (2002) stated that regardless of the methods chosen to reach the targets of education for sustainable development, the priority should be given to raise individuals with environmental literacy.

Individuals of today should have information, skills and values necessary for sustainable environment. Therefore, many research studies as stated above emphasized the significance of determining and enhancing the environmental literacy of a society. Thus, the current study aimed to concentrate on classroom pre-service teachers as a target group and seek to find an answer to the following question: “How can literacy of classroom pre-service teachers, who are trained to educate the future generations, be improved?”

This study focuses on classroom teachers because as stated by Eroglu (2009), the sensitivity of students to the environment accelerates in primary education level and these teachers are expected to educate and shape the students as the adults of the future. Higher education institutions have important roles in educating teachers to have knowledge about environmental education (Eroglu, 2009). The classroom pre-service teachers who are expected to teach environmental issues to their students should be sensitive to the environment and have the necessary information about it. In Tbilisi Conference Commission Report (UNESCO UNEP, 1977: 20) active learning strategies are suggested for students in the primary education for the aim of improving environmental education in that *“In primary school, for instance, a few useful directions for the promotion of environmental education would be: programmes of visits, the use of free time for activities in close contact with the environment, the development of a critical faculty and ability to see things in the round, and the transcending of cultural and scientific levels so as to gain an awareness of the relations with the community and move towards solutions”*. In the same commission report (UNESCO UNEP, 1977; p.21), it is stated as follows: *“All these educational activities call for research on the use of methods of instruction that will facilitate the learning, teaching and assessment of environmental education”*. This statement implies the importance of the use of instructional methods in environmental education. Therefore, the current study intended to contribute testing the effect of teaching methods on environmental education in terms of classroom pre-service teachers’ environmental literacy.

In this study, outdoor education model was used for the aim of improving the environmental literacy of the classroom pre-service teachers. Recently, outdoor education has received a great deal of concern. Ozaner (2004), Uzun and Keles (2012) stated that the aim of outdoor education is to provide individuals some opportunities for learning in a natural setting. This way, students can use each part of the nature as a tool for their environmental learning and raise their awareness. The individuals with the environmental literacy should be equipped with scientific knowledge in order to be able to make correct decisions about the



environment, be aware of the influences of the daily human behaviours on the nature and the environment, and be able to analyse the local environmental problems and offer solutions to these problems. At this point, outdoor education provides appropriate settings for the application of theory into practice and the improvement of awareness and attitudes (Balkan Kiyici, Atabek Yigit, and Selcen Darcin, 2014). Field trips as part of the outdoor education help students apply theory into the real life, be aware of the natural circles and the influences of the human beings on these circles. Outdoor education also provides individuals some opportunities to determine the environmental problems, create alternative methods for struggling with these problems and take responsibilities (Erentay and Erdogan, 2009). In other words, the experiences outside the school foster the awareness, attitudes and values regarding the environment.

Various research studies supported the ideas that outdoor education provided individuals with the required knowledge, attitudes, and concern pertinent to environmental problems and issues. In the context of outdoor learning opportunities delivered by protected area management agencies, Black (2013) investigated issues surrounding the planning and delivery of outdoor learning programmes in outdoor settings and emphasized outdoor education has many benefits and can contribute to student's physical, personal and social education so that it deserves qualified resources, and priority to be valued and supported legislatively. Supporting such a perspective, Uzun and Keles (2012) in their study applied a 10-day program in which outdoor education model has been used to train 25 teacher candidates from 11 different departments. The results showed a statistically significant improvement in the attitudes, awareness and behaviours of these individuals. Palmberg and Kuru (2000) in their study found that the environmental education program that included activities such as field trips, camping and walking outdoors improved the childrens' interaction with their natural environment, their sensitivity to the nature and social communication skills.

The aim of the current research is to determine the impact of the outdoor education on the environmental literacy of the classroom pre-service teachers. For this aim, answers were sought to the following questions:

1. Is there any significant difference between the experimental and the control groups according to the pre-test scores of the "knowledge", "attitude", "uses" and "concern" dimensions of the environmental literacy?
2. Is there any significant difference between the experimental and the control groups according to the post-test scores of the "knowledge", "attitude", "uses" and "concern" dimensions of the environmental literacy?
3. Is there any significant difference between the pre-test and the post-test scores of the experimental group in terms of the "knowledge", "attitude", "uses" and "concern" dimensions of the environmental literacy?
4. Is there any significant difference between pre-test and post test scores of the control group in terms of the "knowledge", "attitude", "uses" and "concern" dimensions of the environmental literacy?
5. What are the outcomes of an environmental education program for teacher candidates in the experimental and the control groups?
6. What are the ideas of the teacher candidates in the experimental and the control groups about integrating environmental education into their teaching?

## Method

### Research Design

In this study true-experimental design, which is one of the quantitative research methods, has been used. There are randomly selected two groups in pretest ( $O_{1.1}$ ,  $O_{2.1}$ )-posttest ( $S_{1.2}$ ,  $S_{2.2}$ ) design. One of them is the experimental group and the other is the control group. In both groups pre-experimental and post-experimental quantifications are made (Karasar, 2005:97).

In this study, the groups have been randomly selected; The experimental group comprises the teacher candidates who study at the Department of Classroom Teaching in Nizip Education Faculty of Gaziantep University; The control group includes teacher candidates who study at the department of Classroom Teaching at the Faculty of Education (at the campus center) in Gaziantep University. The Environmental Literacy Scale (Tuncer, Tekkaya, Sungur, Cakiroglu, Ertepinar, Kaplowitz, 2009) was utilized in both groups as a pretest to determine the similarity levels of the groups and the environmental literacy levels prior to the implementation.

When the implementations were completed at the end of the semester, the Environmental Literacy Scale was read ministered in both the experimental and the control groups as a posttest. At the end of the semester, data were also collected from the open-ended questions prepared by the researchers and administered together with the posttest.

### Sample

Teaching Sample of the study comprises sophomore classrom pre-service teachers studying in two different education faculties of Gaziantep University and enroll in the Environmental Education course. The control group includes the teacher candidates from the Classroom Teaching Department of the Education Faculty located at the campus center, while the experimental group comprises the teacher candidates who study at the same department of the Education Faculty located in the provincial campus.

The demographic features of the classroom pre-service teachers in the sample are presented in Table 1.

**Table 1.** The Demographic Features of the Sample

Variables/Groups	F	%	Mean	Std. Dev.
Experimental	45	54.5		
Control	54	45.5		
Age			19.59	3.67
18	2	2		
19	24	24.2		
20	42	42.4		
21	15	15.2		
22	7	7.1		
23	5	5.1		
24	1	1		



### ***The Steps of the Implementation in The Experimental Group (16 Weeks)***

This research was carried out in the academic year 2012-2013 with the classroom pre-service teachers who studied in two different education faculties of Gaziantep University and took the Environmental Education course. This course is normally offered in the third semester in education faculties. In this study pretest-post test control group model of the experimental design was used. The education program was applied into the experimental group by the researcher. The researcher as a “participant observer” (Glesne, 1999) prepared an appropriate setting for the experiment and collected data for the research. Besides, the researcher did not do any data analysis until all the data were collected in order to avoid any possible bias in her teaching role that could arise from the influences of the research.

After the groups were randomly selected, the Environmental Literacy Scale (Tuncer, Tekkaya, Sungur, Cakiroglu, Ertepinar, Kaplowitz, 2009) was administered in both groups as a pretest in order to determine the similarity levels and the environmental literacy levels prior to the experiment. Throughout the semester, traditional teaching methods were used in the control group. The lecturer of the course taught the subjects took place in the curriculum. On the other hand, in the experimental group, the teaching strategies in which students took active roles (with the assistance of the lecturer) was utilized. This was planned as follows: At the beginning of the semester, students were divided into three or four small groups. Totally 12 groups were established. Each group was assigned an environmental issue (e.g global warming, biodiversity, renewable energy resources, sustainable natural resource use) from the curriculum. First of all, the groups prepared research questions related to the environmental issue that they were assigned. Then, they designated which scientific resources they need to search in order to find answers to their research questions. In the next step, the groups scientifically shared the information they obtained from the resources in order to shed light on an environmental problem as part of their research questions.

In this process, the role of the lecturer is to be an effective moderator. The groups consistently had interactions with the lecturer and found their rotation with the feedback provided by the lecturer. The aim of these procedures is to help the teacher candidates advance information and awareness of the topics and problems related to the environment. It is expected that such an experience can give the teacher candidates an encouragement of doing secondary environmental investigation and help them gain communication skills.

The lecturer continued to teach until the groups have completed the investigation process. Occasionally some visual materials like documentaries related to environmental problems and issues (e.g Planet Earth, Biodiversity, Volcanic Eruptions) were watched after the teacher candidates shared their minor research findings. At the same time, some activities suitable for the outdoor education model were planned. For example, field trips to Bald Ibis reproduction station in Sanliurfa-Birecik were organized. In the station, the experts gave some information about the lifestyles, breeding and protection of the Bald Ibis. Old Halfeti, the city in Rumkale, has settlements which remained under the rising water of the local dam. This region with its authentic stone houses and splendid



natural views attracts many tourists. Here, some activities were carried out for the aim of raising awareness of irregular urbanization and sustainable development.

After the field trip, the evaluations were made by the brain-storming discussion technique, based on the perspective that the environmental issues have many dimensions, involve people with differing beliefs and values, and the interaction of different disciplines. The aim of these activities is to raise awareness and provide opportunities for consistent and stronger attitudes and values. In addition, the teacher candidates at regular intervals visited the classroom teachers who teach in the primary schools of the region and exchanged information about the environmental education. These visits were thought to improve the vision of the teacher candidates about the current status of the environmental education and what they can do about it before they start their teaching profession.

The teacher candidates were encouraged to learn how to plant trees, observe birds, and walk in the open air as part of the outdoor education model in order to help them improve their physical experiences with the nature and be integrated with it. The procedures were applied into the experimental group as mentioned above. The procedures covered one semester (16 weeks). At the end of the semester, The Environmental Literacy Scale (Tuncer et al., 2009) was readministered to the experimental and the control groups as a posttest. Detailed and holistic data were collected from the experimental and the control groups through the Environmental Education Outcome Scale which was prepared by the researcher and applied together with the posttest.

### ***Data Collection Instruments***

In this study, two different measurement scales, the Environmental Literacy Scale and the Environmental Education Outcome Survey were used.

#### ***The Environmental Literacy Scale***

The Environmental Literacy Scale (ELT) was translated into Turkish, adapted into the cultural, economic and environmental conditions by Tuncer, Tekkaya, Sungur, Cakiroglu, Ertepinar & Kaplowitz, (2009). The researchers also piloted and tested the reliability and validity of the scale. The permission was obtained prior to the application of the scale (Tuncer et.al, 2009).

The Environmental Literacy Scale comprises two main sections. The first section includes demographic features (gender, age etc) of the teacher candidates and the second section covers questions to determine the environmental literacy levels of the participants. The original scale was developed and applied in Michigan State University (MSU-WATER Social Assessment: Stakeholder Attitudes, Beliefs, and Uses of Water Resources, co-PI M. Kaplowitz and S. Witter, Vice President of Finance and Operations, Michigan State University, 2001-2006). As seen in Table 2, the scale evaluates the environmental literacy in 4 sub-dimensions (knowledge, attitudes, uses, concern). The internal consistency coefficients of the pilot test were found 0.88, 0.64 and 0.88 in four sub-dimensions (Tuncer et, al.2009).

**Table 2.** The Environmental Literacy Scale

Dimensions	Number of Items	Internal Consistency coefficient
Knowledge	11	0.88
Attitudes	7	0.64
Uses	19	0.80
Concern	8	0.88

### *The Environmental Education Outcome Evaluation Survey*

The outcome survey was prepared by the researchers in order to determine what gains the teacher candidates had from the Environmental Education course. The survey has three open-ended questions (Table 3).

**Table 3.** The Environmental Education Outcome Evaluation Survey (EEOES)

Question Number	Questions
1	What did you gain from studying this course? Explain.
2	Did this course affect your individual consumption behaviours? Could you please give examples of how it affected you?
3	Are you planning to teach subjects related to environmental issues/problems when you begin your teaching career? If yes, can you explain how you will do this?

## Results

### *Quantitative Findings*

Data obtained from ELT were analyzed by using SPSS 18 program. Before analyzing the data, all assumptions of the analysis were checked. Independent sample t test was conducted to investigate if there is significant difference between control and experimental groups. Results showed that there was no statistically significant difference between pre-test scores of control and experimental groups with respect to environmental knowledge, environmental attitudes, environmental uses, and environmental concern. The results are shown in Table 4.

When post test scores of experimental and control group were compared results revealed statistically significant difference between experimental and control group with respect to environmental attitudes ( $p < .05$ ), environmental uses ( $p < .05$ ), and environmental concern ( $p < .05$ ) in favor of experimental group. The results are presented in Table 5.

Paired sample t test was conducted to investigate if there was any significant difference between pre-test and post-test scores for both experimental and control groups with respect to environmental knowledge, environmental attitudes, environmental uses, and environmental concern. Results showed that in control group there was no statistically significant difference between pre-test and post-test scores for all dimensions of environmental literacy. On the other hand, in experimental group statistically significant difference between pre-test and post-test scores was found only for environmental attitude and environmental uses dimensions of environmental literacy ( $p < .05$ ). The results are represented in Table 6.



**Table 4.** Independent Samples t-test Results for Pre-test Scores

Variables/ Groups	N	Mean	SD	Std.Error	t	P
<b>Environmental Knowledge</b>						
Experiment	45	.19	.11	.01	.40	.690
Control	54	.20	.07	.00		
<b>Environmental Attitudes</b>						
Experiment	45	3.88	.48	.07	-.68	.492
Control	54	3.81	.47	.06		
<b>Environmental Uses</b>						
Experiment	45	4.08	.28	.04	-1,56	.120
Control	54	3.93	.58	.07		
<b>Environmental Concern</b>						
Experiment	45	3.77	.82	.12	-1,40	.165
Control	54	3.50	1.08	.14		

\* P< 0,05

**Table 5.** Independent Samples t-test Results for Post-test Scores

Variables/ Groups	N	Mean	SD	Std.Error	t	P
<b>Environmental Knowledge</b>						
Experiment	45	.22	.07	.01	-1.48	.141
Control	27	.19	.08	.01		
<b>Environmental Attitudes</b>						
Experiment	45	4.20	.36	.05	-3.94	.000*
Control	27	3.79	.51	.09		
<b>Environmental Uses</b>						
Experiment	45	4.27	.28	.04	-4,42	.000*
Control	27	3.74	.58	.11		
<b>Environmental Concern</b>						
Experiment	45	4.05	.66	.09	-2,06	.046*
Control	27	3.51	1.23	.23		

\* P< 0,05

### Qualitative Findings

Content analysis technique was used to analyse the data obtained from the Environmental Education Course Evaluation Survey. The basic aim of content analysis is to reach concepts and associations that can explain the data (Yıldırım & Şimşek, 2011; p.227). For an appropriate and an accurate analysis, the answers of the participants to the open-ended questions were carefully read and coded. The researcher found associations between the codes and reached the findings. According to Yıldırım & Şimşek (2011) one of the most important criteria of validity is to report the qualitative data in detail. In the present research, in order



to support the findings, some of the statements of the participants were given quotations with an information about their gender and participation number.

**Table 6.** Paired Samples t-test Results for Groups related to Environmental Knowledge, Environmental Attitudes, Environmental Uses, and Environmental Concern Scores

Variables/ Groups	N	Mean	SD	Std.Error	t	P
<b>Experiment</b>						
Knowledge pre- Knowledge post	45	.19	.11	.01	-1,232	.225
	45	.22	.07	.01		
Attitude pre- Attitude post	45	3.88	.48	.07	-3.552	.001*
	45	4.20	.36	.05		
Uses pre- Uses post	45	4.08	.28	.04	-3.537	.001*
	45	4.27	.28	.04		
Concern pre- Concern post	45	3.77	.82	.12	-1.808	.078
	45	4.05	.66	.09		
<b>Control</b>						
Knowledge pre- Knowledge post	27	.20	.07	.01	.739	.466
	27	.19	.08	.01		
Attitude pre- Attitude post	27	3.87	.52	.10	.629	.535
	27	3.79	.51	.09		
Uses pre- Uses post	27	3.82	.74	.14	.413	.683
	27	3.74	.58	.11		
Concern pre- Concern post	27	3.35	1,25	.24	-.458	.651
	27	3.51	1,23	.23		

\* P < 0,05

### ***The Outcomes the Classroom Pre-service Teachers gained from the Environmental Education Course***

In the Environmental Education Outcome Evaluation Survey (Table 3) the answers of the participants to the first and second open-ended questions were repeatedly read and coded as shown in Table 7.

As can be seen in Table 7 the outcomes the participants had in the experimental group are quite rich (a, b, c, d, e, f, g), and there are more participants who had these outcomes than those of the control group. On the other hand, in the control group in which the traditional lecturing method was used, the outcomes are more limited (a,d,g) and the participants who had outcomes are quite a little.

As can be seen in Table 8, the participants in the experimental group emphasized various environmental issues/problems with high frequency. On the other hand, the environmental issues, which the participants in the control group emphasized, are quite less in terms of variety and frequency.

**Table 7.** The Outcomes the teacher candidates gained from the Environmental Education Course.

Outcomes	Experimental Group(f)	Control Group(f)
a. Knowledge about Environmental issues/problems	44	9
b. Concern in Environmental issues/problems and nature	45	
c. Knowing the antropogenic influences on the environmental problems	43	
d. Believing in the importance of individual awareness of the environmental issues/problems and being responsible and cautious about them	45	17
e. Knowing the duties and the responsibilities of the state and public instiutions for solving the environmental problems	8	
f. Improvement in the issues of solidarity, labour of division, taking responsibilities and socialization (communication) with the help of group work	8	
g. Having teaching experiences with the help of school visits and teaching in classrooms	45	

Not: Total frequencies are more than the sample size because, the same participant could point more than one outcome in the scale.

**Table 8.** The Environmental Issues/Problems the Classroom Pre-service Teachers Emphasized in the EEAES.

Groups	Environmental Issues/Problems (f)
Experimental Group	Poverty(1), atmosphere(2), careless hunting (1), biodiversity in danger (5), environmental pollution (10), governmental agencies and authorities (3), ecology (1), power generation (1), industrial waste (3), energy saving (18), domestic waste (32), fossil fuel(2), recycling (31), air pollution (2), climate change (3), global warming (21), material cycles (1), nuclear engery (11), ozone layer (8), health problems (3), greenhouse effect (6), water waste (17), renewable energy resources (6)
Control Group	Living creatures(2), environmental pollution (1), ecologic balance(1),global warming (1)

### ***The ideas of the pre-service teachers about teaching issues related to the Environment Education when they become teachers***

The findings related to the answers of the participants to the third question in the EEAES (Table 3) are as follows: All the teacher candidates in the experimental and the control group are planning to integrate the environmental education into their teachings when they become teachers. The participants in the



control group said that the awareness of the students on the issue of protecting the environment should be raised. Therefore, they said that they would teach environmental issues in their courses but they superficially mentioned which teaching methods they would use. The following statements of the control group support the above findings:

*I am planning to teach environmental issues for sure. We should protect this natural environment. For this purpose, I should raise an awareness for it (Female, P1)*

*Yes, I am planning to teach. Sometimes, I will do practical courses and sometimes only lecture depending on the subject (Female, p5)*

*Of course I will teach. I will organize short field trips to orient my students to the environment and teach them about it (Male, p13).*

The teacher candidates in the experimental group, in which different teaching methods have been used, stated that they would teach environmental issues in their lessons in order to raise their students' awareness for the environmental issues/problems and help them gain sensitivity and responsibility about the environment. They said that they would teach the environmental issues in their courses, mainly in Life Science, Science and Physical Education. They also added that they would use the student-centered method in which students would take active roles in their learning. They would use visual materials such videos, slights, cartoons, posters, songs to make the course look entertaining since they would be working with students from 7 to 10 years of age. They added that they would improve students' concerns in the environment and the nature through activities such as field trips, tree plantations, walk in nature, observing the birds. The statements of the teacher candidates in the experimental group support the above arguments.

*I will teach the environment when I become a teacher. I will teach it like an ethical course. The topic I researched was related to "wastes." I believe that in the Basic Education Level this topic should be taught to raise the students' awareness for the environmental issues and problems. To teach this, I may place recycling boxes in the classroom. I may give my students some research topics related to the environmental problems and the negative consequences of these problems. I may either contact with the school administration or the municipality to organize tree planting activities (female, P7)*

*The children should urgently be made environmentally conscious; otherwise the world will be intolerable. I will try to teach my student the current world situation.; water problems, food shortage, hazards to living creatures, air pollution etc. I will place boxes for paper recycling in my classroom and ask everyone to put the used papers into these boxes. I will also prepare boxes for battery recycling and ask students to throw their batteries into these boxes. I will organize planting activities in the school garden. I will teach "global warming" through slights. I will teach students their responsibilities for struggling with global warming. I will emphasize the significance of energy saving in the use of water and electric. I also ask them to tell their parents what they have learnt (female, p2).*

*Yes, I am planning to teach environmental issues, especially in courses such as Life science, Science. I will place recycling boxes in my classroom. I can use drama technique in my teaching. I can ask my students to write compositions and*

*poems, perform in a drama and draw pictures related to the environmental issues/problems. We can touch on the environmental issues/problems through songs (Male, p.20)*

*Yes. I will try to inform my students about the environment in Life Science courses which deal with humans in their relations with the environment. In Physical training courses or in leisure times I will clean the surroundings of the school building together with my students. If I find time, I will organize field trips, walks in nature, bird observations in order to make my student become aware of nature. I believe that students are concerned in what they are aware of (Male, p.27).*

## Discussion and Conclusions

The aim of this study is to increase the environmental literacy levels of the classroom pre-service teachers who are also expected to teach their students about the environmental issues for a sustainable future. For this aim, the impact of the outdoor education on the environmental literacy levels of the classroom pre-service teachers studying in the education faculty of a public university in Southeastern Anatolia region.

In this pre-test posttest control group experimental study, the environmental literacy levels of the experimental and the control groups, which were randomly selected, were found equal. This situation can be positive in terms of detecting the effects of the experiments applied in the experimental and the control groups.

According to the posttest scores, significant differences were found between the experimental and the control groups in favor of the experimental group in terms of the “attitudes”, “uses” and “concern” dimensions of the environmental literacy. No any significant difference was found between the pre-test and post test scores of the control group in terms of the dimensions of the environmental literacy. On the other hand, significant differences were found between the pre-test and the post-test scores of the experimental group with regard to the “attitudes” and the “uses” dimensions. These results showed some evidences to conclude that the outdoor education approach could be used as an effective way in improving the environmental literacy levels of the classroom pre-service teachers.

The researchers in the field of environmental and sustainability education (e.g Fien, 1993; Huckle, 1993) in international declarations (e.g UNESCO UNEP, 1977; Sustainable Development Education Panel, 2003) emphasized the significance of the protection of the sustainability and environmental quality for sustainable development. They proposed that social, economical and political influences on nature should be understood and natural awareness, responsible behaviours and emotional affiliation with nature should be improved. As Uzun and Keles (2012) argue, the individuals should affiliate with nature in order to understand the interaction between human and nature and raise awareness. From this perspective, it could be argued that the outdoor education approach used in this current study provided the classroom pre-service teachers with the opportunities to interact with nature and be actively involved in the learning process, which finally improved their environmental literacy levels. There are discussions on how to improve environmental education for sustainable development. Ballantyne and Packer (2005) argue that there is a need for sustainability and active involvement of environmental education. This approach can improve the positive attitudes and values of the individuals.



The strategies developed within the framework of Education for a Sustainable Development (Sustainable Development Education Panel, 2003) propose activities in which students take active roles rather than having theoretical knowledge. Besides, the significance of the use of teaching methods in environmental education, which will ease learning, teaching and evaluation process, was emphasised. The qualitative data under the category of “outcomes from the environmental education course” showed that the experimental group showed some improvement in the subcode of “improvement in the solidarity, division of labour, taking responsibilities (communication) while the same improvement was not observed in the control group. This finding coincides with the holistic and collaborative nature of the environmental education (Fensham, 1979). The experimental group had high frequencies related to the sub codes of the category “the outcomes the classroom pre-service teachers gained from the environmental education” while the control group had very low frequencies that showed that they did not develop this outcome.

The answers of the participants to the open-ended questions showed that the participants in the experimental group gave more detailed, extensive and explanatory answers while the participants in the control group had short and superficial answers. In the category of “The issues/problems the classroom pre-service teachers stated in the EEAES” which is a qualitative finding, the participants in the experimental group in their statements emphasized on 23 different environmental issues/problems with a high frequency, while the control group emphasized on four different environmental issues/problems with a considerable frequency compared to the experimental group. This finding is important in the way of exposing the influences of the teaching methods and activities used in the experimental group.

In the category of “The ideas of the classroom-preservice teachers on teaching subjects related to the environmental education when they become teachers” the participants in the control group stated that they would integrate the environmental education into their teaching, yet they did not mention how they would realize this aim. On the other hand, the participants in the experimental group stated how they would integrate the environmental education into their teaching, and mentioned about the teaching methods and activities they would be using. This finding shows that the teaching methods and the activities used in the experimental group had an important contribution into their outcomes of these methods.

### **Implications**

The findings of the study showed that the teaching methods and the activities used in the experimental group were effective in improving the environmental literacy levels of the classroom pre-service teachers. This study is limited with the classroom pre-service teachers in the experimental and the control groups. Teacher trainers and teachers, who teach environmental education, can also benefit from these findings. Environmental education researchers can use the findings of this study and design more extensive studies to determine the teaching methods to be used for environmental education.

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## Disclosure statement

No potential conflict of interest was reported by the authors.

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