

The Effect of Active Learning Based Science Camp Activities on Primary School Students' Opinions Towards Scientific Knowledge and Scientific Process Skills

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Abstract

It is important for people to be able to judge the nature while actually living in it to gain the scientific perspective which is an important skill nowadays. Within this importance, the general purpose of this study is to examine the effect of active learning based science camp activities on sixth, seventh and eighth grade students' opinions towards scientific knowledge and scientific process skills. In order to achieve this goal, the natural, historical, archeological and the cultural sources of the Cappadocia area were used as a teaching tool. One group quasi-experimental design with pretest and posttest was used in the study. 17 boarding primary school students participated to research. Opinion survey on scientific knowledge, scientific process skills scale, conceptual comprehension survey on environmental problems and observation form were used as a data collection tools. Descriptive and Man Whitney-U analysis techniques were used during assessment of the data. As a result of the study, significant difference was found supporting the students' post-test results of scientific knowledge survey, the number of students' post-application explanations were more than students' pre-application explanations of conceptual knowledge survey on environmental problems.

Key words: Environmental education, active learning, science camp, scientific knowledge, scientific process skills.

Introduction

In recent years, awareness toward environmental education and sustainable development issues has increased both in public institutions and public opinion (Binbaşaran & Tüysüzoğlu, 2005). Many environmental organizations strive for creating public awareness about current negative impacts of ecological disasters on human life and the disasters that would occur in the future (Harting, Kaiser & Bowler, 2001). Free courses, programs, camping trainings that are becoming widespread by the efforts of these organizations, are important developments in raising environmental awareness of families, children and other participants. The number of these organizations giving only informal education is increasing with each passing day (Meydan, Bozyiğit & Karakurt, 2012). Although the trainings on environmental education and sustainable development are important for all groups, there are studies that show the trainings given especially to the children are more important. For instance, when formal education curriculums of different courses used in primary education schools in Turkey are examined, it can be seen that environmental education is included in these curriculums (Altın & Oruç, 2008). As achievements towards nature education have a multidisciplinary content and include

topics concerning both physical sciences and social sciences curriculums in Turkey, they are included in units of Life Sciences, Social Studies and Physical Sciences courses (Köşker, 2013; Erentay & Erdoğan, 2009).

In addition to the importance of starting the environmental education with the children, the content of the education is also essential. It was concluded in the research conducted by Palmer, Suggate, Robottom & Hart (1999) that environmental education experiences gained in childhood period affects perspectives of individuals towards nature on future ages. Also, Zelezny (2010) found in his meta-analysis study, activities done in the classrooms with young participants (under 18 years old) can be more effective to develop environmental behaviors. In addition, Hinds & Sparks (2008) stated that people having nature experience earlier would have more positive affective characteristics towards nature when compared to those having less nature experience. Therefore, it will be the best step to begin nature education with children in terms of recognizing, protecting nature and creating awareness (Köşker, 2013; Chawla & Cushing, 2007).

In order to understand multiple structure of environmental problems, Ozdemir (2007) suggests that it is important to include processes that would enable students to comprehend facts and processes with an “interdisciplinary enlightenment”. Therefore, teaching methods and techniques that will be included in learning-teaching processes is another important factor like beginning environmental education in early ages. While choosing the methods that will be followed in environmental education, learning should be associated with real life, individual requirements should be met and students should be motivated first of all. A teaching process, as it is put forward by Bonwel and Eison (1991), on which is thought and researched, should be put into practice with mastered teaching techniques (Bonwel & Eison, 1991).

When this approach defined by Bonwel and Eison (1991), who are leading names of active learning, is adapted to environmental education, environmental education processes should be arranged according to “research and discovery” teaching strategy and learning processes that would enable students’ active participation should be focused on. Because in active learning, students are educated as individuals knowing about the usage of learnings in real life and aware of real cases instead of acquiring knowledge about irrelevant facts (Seeler, Turnwald & Bull, 1994). Therefore, students are enabled to take active role in using and applying the knowledge about environmental education (Dufresne et al., 1996).

Harting Kaiser and Bowler (2001) concluded that ecological behavior is related to constructive environmental experiences as a result of study they carried out with university students. Similarly, as a result of study carried out by Hartig, Kaiser and Bowling (2001) it is clear that ecological behavior can be gained with students’ constructive experiences. Also Duerden and Witt (2010) stated that environmentalist behavior is consisted with effects of individuals’ knowledge and attitudes towards environment and they also claimed that changes in attitude and knowledge can be gained with behavior that is concretely put into practice.

Active Learning Based Environmental Education

Active learning includes all the activities that students do and think about what is done. In active learning students not only learn about topic or course subject but also they apply the concept they have learned, search about and apply relationship between facts and compare the cases that contradict with their pre-learnings. Owing to these activities students construct their own knowledge instead of the knowledge that teacher transmitted (Chickering & Gamson, 1987; Mattson, 2005). Proposing alternative active learning activities to students instead of traditional methods will give them an opportunity

to discover different learning styles (Cook & Hazelwood, 2002). Students will be able to achieve faster and more permanent learning by the activities in which many senses are used in the application and observation environment that active learning based environmental education activities provided (Erdoğan, 2011). Therefore, by the active learning based environmental education, individuals will not only acquire high level thinking skills towards environmental education topics but also apply this point of view that they developed to cases in which they face in daily life (Özdemir, 2007). It is ascertained that activities done in natural area provide a renewal and an increase in mental attention level, a decrease in stress level and also they create relaxation, curiosity and sense of exploration besides those skills (Elliott & Davis, 2008).

As a result, it necessary to include learning experiences that would give students opportunity to recognize living and non-living creatures, comprehend the relationality and integrity in the nature by directly interacting students with the nature (Özdemir, 2010). When considered from this point of view, students make relations taking physical characteristics of the place they are situated in consideration and learn the region, which they live in, in biochemical, cultural and social aspects by relating the past, present and future of the region. Students develop an awareness of responsibility towards their environment by seeing and noticing the important key relations in this learning and teaching process (Szczepanski, 2006).

Nature education in non-traditional settings that are main focus of this study have come into prominence in Turkey in recent years and have become a popular topic chosen as a research subject in education studies (Erdoğan, 2011). Nature education projects in non-traditional settings are based on the basis of teaching natural and cultural values that protected areas and the around offer to us, with a participative education that is with the contributions of instructors and other professionals (Meydan, Bozyiğit & Karakurt, 2012).

Nature education activities towards youth and young learners in Turkey accelerated with TÜBİTAK's (The Scientific and Technological Research Council of Turkey) application of environmental education program in national parks in 1999 (Ozuner, 2004). These programs that were started with the aim of exploring the language of nature in the national parks by ecology founded nature education programs, in which teachers, graduate and postgraduate students were included at first, have been planned and applied for teacher candidates and primary education students in recent years (see: www.tubitak.gov.tr). These programs for primary education students (especially 4-8 grades) are planned within nature educations and science camps. Moreover, in addition to Ministry of National Education and Ministry of Environment and Forestry which are in the opinion that nature and environmental education should be given in early ages, some non-governmental organizations also carry out projects and works for preschoolers, primary school students and high-schoolers (Erdoğan, 2011). Especially nature protection areas offer important opportunities in activities towards nature education besides the vital importance they have in terms of nature protection works. As a result, regions with nature protection areas are usually preferred for nature education projects (Oğurlu, Alkan & Gündoğdu, 2010).

In recent studies carried out, the most effective environmental education programs' characteristics are defined as being long-termed, giving opportunity to apply and the level of reaching target aims (Chawla & Cushing, 2007) and are also compared as success, deficiencies, content of application and the ways of application in general (Collado, José & Corraliza, 2013).

The courses in the Turkish education system have the purposes to improve the students' scientific perspectives. Therefore, in this study students are expected to understand the language of nature and evaluate the running of nature scientifically by active learning

based activities. The National Science Education Standards (NSES), which is one of the most important studies in science education, stated that teaching strategies aiming all children to grow up as a science literate were required to be used at schools (McCain, 2005). When primary science teaching program in Turkey are examined in terms of its general objective, it is seen that the program emphasis on requirement of growing all the individuals in the society as a science literate, similar to NSES. Science literacy is described as knowing the nature of sciences, understanding how the knowledge is obtained, accepting that the knowledge in sciences is related to known facts and can change as evidences gathered, comprehending main concepts, theory and hypothesis in sciences, perceiving the difference between scientific proof and personal opinion (MEB, 2005). This is the thing meant by scientific perspective in the present study.

Relationship between camp activities and students' opinions towards scientific knowledge and scientific process skills

Students' developing observation skill is important for them to recognize the difference between lifelong learning skills, scientific knowledge and personal opinion; in other words, the ways that scientific knowledge is obtained and characteristics of scientific knowledge (Gürses, Doğar & Yalçın, 2009). Activities based on examination and observation that were realized during the study were aimed to lead students' constructing building stones of scientific knowledge towards nature and learning scientific thinking. Therefore, by the museum visits and field works done in Göreme-Kapadokya historical national park and Aladağlar national park and also my pet activities, students were enabled to make observation in nature and encouraged to make scientific activities in nature by awakening their sense of curiosity towards nature. Within this aim, students would be encouraged to acquire the knowledge and skill of doing research in the case of recognizing mysterious change in nature, life forms of flowers, leaves, insects and living creatures and also activities of animals around by observing in nature.

Environmental problems that occurred because of destruction of natural sources for centuries reached to an uncontrollable dimension in this day and time. Overutilization of natural sources by human causes unconscious consumption of nature sources and rapid destroy in the balance between nature and life that was longstanding. Therefore, the earth without nature, animal products in supermarket and extemporary drama activities were done in this study. Students would be able to informed about the importance of making individual attempts on protecting environmental values by recognizing the importance of ensuring sustainability by using natural resources properly for sustainability of technological developments and leaving a livable world to next generations.

As it is mentioned by Altuğ (2010), we can handle with environmental problems by increasing the number of nature lover and pure-minded people. So, nature art integration, mountaineering, herbarium activities were included in this project. As a result, people would notice the methods of using nature without harming. Thus people are expected to develop skill of struggling against environmental pollution and factors that harm nature at the present time.

Diversity is one of the main characteristics of a healthy nature. Because creatures in a definite common living space evolve altogether. Each species needs another species to sustain its existence. Extinction of one of the species causes biological downfall, breaking food chain that is vital for system which means the breakdown of ecosystem (Yıldız, Sipahioğlu & Yılmaz, 2000). Thinking about the importance of biological diversity on sustainability of life, ecological environments and human, butterfly collection, insect training sections were included in this study. In this section, students watched various

short documentaries and discussed about the documentaries. Therefore, students could evaluate the relationship of human-nature noticing the importance of nature protection.

Importance of the study

Environmental problems became a current issue of human since the second half of 20th century. The reasons, results and suggestions about these problems have been discussed increasingly (Özey, 2001). As a result, activities on ecology games and creating an eco-city were included in this study. During the activity of creating an eco-city, students with a group work constructed an ecological and modern city on sand pit by using stationery such as cardboard, scissors etc. in this study. In ecological games activity, funny games were played towards ecological problems and solutions to these problems. By means of these activities, students were prevented to remain insensitive or be deaf (ignore) to environmental problems that they face so they were encouraged to state opinion about solution of environmental problems. Besides they would become aware of the importance of local efforts towards these environmental problems and they would also encourage the people around the environment that they live in to develop conscious behaviors towards solving environmental problems

Thus, this study aims to examine the effect of science camp activities on regional primary boarding school students' opinions towards scientific knowledge and scientific process skills Within this main goal, the sub-goals below are searched for answer:

- a) Do the active learning based science camp activities have an impact on primary school students' views on scientific knowledge?
- b) Do the active learning based science camp activities have an impact on primary school students' scientific process skills?
- c) Do the active learning based science camp activities have an impact on primary school students' conceptual knowledge towards environmental problems?

Methodology

Single grouped quasi-experimental design with pretest ant posttest was used in the present study. The semi experimental designs with pretest and posttest with a single group are the studies in which it is not possible to form control groups and this research design forms the research group through some measurements and criteria instead of forming the research group arbitrarily (Bishop-Clark & Dietz-Uhler, 2012). The study was carried within the project called 'Ecology Founded Summer Camp in Cappadocia Region' with the support of TUBITAK..

Implementation of Camp Curriculum

In this study, theoretical parts of environmental activities were realized in Niğde University and field works were done in Cappadocia-Göreme Historical National Park and Aladağlar National Park. Before implementing the real camp study, a pilot camp was conducted and evaluated. As a result of the pilot evaluations, a general camp program for 5 days was prepared under the titles stated above.

In general, the content of the camp was realized under 15 titles. These are (1) drama in nature, (2) nature-art integration, (3) museum visits, (4) pet care, (5) ecology games, (6) ecological environments and human, (7) mountaineering, (8) herbarium, (9) insect training, (10) the world without human, (11) eco-city, (12) animal products in supermarkets, (13) butterfly collection, (14) field work in Aladaglar, (15) field work in

Cappadocia-Goreme historical national park. Active learning based science camp lasted for 5 days and was realized between 18-22 July 2012. 8 trainers were included in the study.

Working Group

Participants chosen as target group within the framework of main objective of the study were regional primary boarding school students at sixth, seventh and eighth grades (11-14 ages) that were studying at various provinces of Turkey. In primary education level in Turkey, students face Physical Sciences and Social Studies courses that mostly include gaining topics on nature.

There are two reasons why the project was carried out with regional primary boarding school students. The first one is that scientific studies towards regional primary boarding schools in which students with limited opportunities study in general are limited. The second reason is to develop activity samples of that developed education program and that kind of science camp works that would be applied to all primary schools when desired.

Primary school level is a compulsory education level that all individuals have to receive. For individuals that will not continue their education, the only way providing them with the knowledge on “nature” will be environmental education that they received in primary education. As it is stated by Gökçe (2004), primary school students are always on the move and inclined to participate actively into activities that will be done for learning purpose. So an education program that will be developed for primary school students should be based on active learning approach that is in accordance with their learning inclination. Therefore, the region should be introduced to students with active learning approach based learning activities by using natural, historical, archeological and cultural sources of Göreme Historical National Park and Aladaglar National Park that are in Cappadocia region as an educational instrument and students should be given opportunity to have a conscious view towards nature discovering the running basis of nature, the processes and relationships in nature by observation. As a result, a study that reaches the aims stated above should be provided for primary school students by using active learning methods and techniques.

Geographical area sampling method, which was usually used in qualitative research, was used while selecting the students that would participate in the project. The reason why this sampling had been chosen was to create a study group enabling maximum diversity in terms of students’ characteristics as target population of the study was wide. According to geographical area sampling method, during the study, the primary school students that volunteered by filling in the application form on the website of Nigde University was grouped according to the seven geographical areas of Turkey. After this study 17 students that applied where selected- by using the project budget in the most efficient way-.

Gathering Data

In the study, students’ cognitive, affective and psychomotor skills were evaluated one by one. Students’ gains in cognitive level were revealed by applying ‘conceptual knowledge survey on environmental problems’, affective domain gains were revealed by applying ‘Scientific Knowledge Survey’ and ‘scientific process skills scale’ and their behaviors towards application were revealed by using ‘observation form’.

The first data collection tool was “Scientific Knowledge Survey”. This data collection tool was applied to evaluate students’ opinions on the nature of scientific knowledge

quantitatively. 'Scientific Knowledge Survey' that was developed by Küçük (2008) included totally 16 items and students were supposed to prefer one the answers changing among I agree, I have no idea, I disagree. The scale was applied twice; the first one was before starting camp activities (the first day of the study) and the second one was after applying summer camp activities (the last day of the study). The survey lasted approximately for 10 minutes.

The second data collection tool was 'Scientific Process Skills Scale'. This data collection tool was used aiming to define the impacts of nature activities on students' scientific and creative thinking skills. With this aim, 'Scientific Process Skills Scale' that was developed by Okey, Wise and Burns (1985) and adapted to Turkish by Geban, Aşkar & Ozkan (1992) was used.

The third data collection tool was 'Conceptual Knowledge Survey on Environmental Problems' which was used in order to define contribution of nature activities to students' knowledge and comprehension. Conceptual Knowledge Survey on Environmental Problems was used before and after the study. The survey was prepared within the framework of main topics that would be mentioned during the study and four-point grading system was applied. Under each topic item, there was given space to enable students to make explanations.

'Observation Form' was used to define students' psychomotor skills towards scientific views on environmental issues in the project. The observation form was filled by two observers observing 4 primary school students in different times. While evaluating data gathered from observation form, point averages of the two observers were used. (All the items in the form are positive and there is a 3 point evaluation scale which means that students were scored as 3, 2, 1 according to cases in which students exhibited the behavior stated in each item).

Analyzing Data

Descriptive and Man Whitney-U analysis techniques, which are used in quantitative and qualitative researches, were applied during assessment of the data collected in the study. In the analyses of qualitative data that would be gathered from 'Scientific Knowledge Survey' and 'Scientific Process Skills Scale', Man Whitney-U analysis techniques were applied. SPSS program was used for this analysis and .05 was accepted as significance level in interpretation of results. Descriptive analysis technique was applied for 'Conceptual Knowledge Survey on Environmental Problems'. While analyzing these forms the data gathered were coded with numbers. For example, the first student was coded as S1 (Student one) and the second students as S2 (Student two). The data coded with numbers were examined by two researchers. And finally, all the answers that students gave were tabularized after calculating frequency values. In the assessment of "Observation Form" frequency analysis technique was used.

Findings

Findings Obtained from the Analysis of Scientific Knowledge Survey

In this study 'Scientific Knowledge Survey', which was developed by Küçük (2008) was used in order to evaluate students' opinion on scientific knowledge quantitatively. The survey included totally 16 items regarding scientific knowledge. Mann Whitney U- Test analysis technique was used on pretest and posttest results obtained as a result of applications and the results were shown on Table 1.

Table 1.

Mann Whitney U-Test results of primary school students' 'Scientific Knowledge Survey' Pretest and Posttest Results

	N	MeanRank	Rank Sum	U	P
Pretest	17	20.35	488.50	188.5	.038
Posttest	17	28.65	687.50		

When Table 1 is examined, it is seen that mean rank of pretest scores of 'Scientific Knowledge Survey' participating primary school students is 20.35, rank sum is 488.50, mean rank of posttest scores is 28.65 and rank sum is 687.50. When p values ($P = .038 < .05$) are examined, it was seen that there is a significant difference between two groups. As students' posttest mean ranks are higher than pretest mean ranks, it is seen that this difference is in favor of students' posttest scores.

Findings Obtained from the Analysis of Scientific Process Skills Test

Scientific Process Skills Scale, which was developed by Okey, Wise and Burns (1985) and adapted to Turkish by Geban, Aşkar and Ozkan (1992), was used to evaluate students' scientific process skills in the study. During the study, data gathered by the scales' validity reliability studies done by Aktamış (2007) were used as they were more current. In the studies carried out by Aktamış (2007), the version of the scale that constitutes of 26 items and has Cronbach Alpha coefficient .80 was used. The scale was applied to students in the first and the last day of the study. Pretest and posttest results obtained from applications are shown on the Table 2.

Table 2.

Mann Whitney U- test results of pretest and posttest scores towards primary school students' scientific process skills scale

	N	MeanRank	Rank Sum	U	P
Pretest	17	16.65	283	130	.634
Posttest	17	18.35	312		

When Table 2 was examined, it was seen that mean rank of pretest scores of participating students' scientific process skills scale was 16.65, rank sum was 283, mean rank of posttest scores was 18.35, rank sum was 312. When p values ($P = .634 > .05$) were examined, it was seen that there was not a significant difference.

Findings Obtained from the Analysis of Survey on Conceptual Knowledge on Environment Questionnaire

'Conceptual Knowledge on Environment Questionnaire' was used to define contributions of camp program applied on students' knowledge and comprehension. The

questionnaire was used in the study was applied before and after the study to students. Results were presented in Table 3;

Table 3.

Descriptive values regarding survey on conceptual knowledge towards environmental problems

<i>Environmental Problems</i>				<i>Scientific applications towards solution of environmental problems</i>				<i>The methods that people benefited from nature without harming in the past</i>				<i>Threats towards biological diversity of nature</i>																			
Pretest		Posttest		Pretest		Posttest		Pretest		Posttest		Pretest		Posttest																	
I don't know any	I know a little	Average level	I know well	I don't know any	I know a little	Average level	I know well	I don't know any	I know a little	Average level	I know well	I don't know any	I know a little	Average level	I know well																
0	2	15	0	0	1	8	7	3	5	9	0	0	1	10	6	3	5	8	1	1	4	5	7	4	3	7	3	1	3	4	9
-Environmental pollution caused by human	-Global warming	-Climate change	-Air, soil, water pollutions	-Erosion	-Environmental pollution	-Gases of factories	-Undeniable energy sources	-Human throwing garbage around	-Not recycling	-Global warming	-Air, water and soil pollution	-Recycling	-Planting trees	-Not throwing garbage to around and warning people throwing garbage to around	-Carrying out works towards protecting environment as a society	-Using renewable energy sources	-Using public transportation	-Creating awareness	-I learned this issue from historical artifacts	-People less harming nature in the past	-Less technology in the past	-Gases from factories	-People with awareness	-overusing chemicals	- Destroy in places where animals live	- Environmental pollution	- Harm on living creatures	- Global warming	- Extinction of animals and herbs		

Table 3.

Descriptive values regarding survey on conceptual knowledge towards environmental problems (Table continued)

<i>Our responsibilities for protection of nature</i>				<i>Our social responsibilities to protect nature</i>				<i>Management of natural sources</i>				<i>Sustainability of natural sources</i>											
Pretest		Posttest		Pretest		Posttest		Pretest		Posttest		Pretest		Posttest									
don't know any	I know a little	Average level	I know well	don't know any	I know a little	Average level	I know well	don't know any	I know a little	Average level	I know well	don't know any	I know a little	Average level	I know well								
2	4	6	5	0	2	5	10	3	3	6	5	0	0	7	10								
- Not polluting environment - Not using chemicals - Providing recycling				-Protecting environment as a society - Respecting the nature -Creating awareness -Not cutting trees -Not overusing chemicals				-Creating awareness - Doing activities to protect nature				- Not throwing garbage to environment - being a conscious consumer -Separating garbage and recycling - Not cutting trees				- Constructing fish farms on fault lines - Getting electric energy from wind power -Building houses working with solar energy				- We should be economic while using nature sources and not waste them - We should not pollute natural sources - We should protect our sources			
6	5	4	2	6	5	3	0	6	4	7	0	6	3	7	1								

When post-application frequency values and pre-application frequency values of students were compared, it was clearly seen that there was a transition to 'I know it well' option. Besides when students' answers were examined, it was seen that the number of students' post-application explanations were more than students' pre-application explanations. 17 students that could not put forward any idea for the items that 'methods of people using the environment without any harm in the past', 'Management of natural sources' and 'Sustainability of natural sources' during the pretest application, could get an idea about the items at the end of the study.

Data Gathered from Observation Form

One of the data collection tools, which were used to define contribution of the project to students' psychomotor skills in reaching scientific knowledge, is 'Observation Form'. The observation form attached was filled by two observers observing 4 primary school students in different times. Descriptive values gathered are shown on the table below.

Table 5.

Descriptive values regarding primary school students' observation form

	1. Student	2. Student	3. Student	4. Student
1. Listened to suggestions and telling of his/her friends	3	2	2	3
2. Did the activity as trainer or our guide suggested	2,5	3	2	3
3. Encouraged his/her friends without hurting them	1	2	1	1
4. Not disturbed by the help that his/her friends offered	2	2	2	2
5. Did his/her best for success of the activity	2,5	2	1	2,5
6. Could accomplish his/her duty	2	2	1	2
7. Asked questions when he/she could not understand	2	1	1	1
8. Supported his/her group friends in their studies	2	2,5	1	2,5
9. Used the time in an efficient way during studies	1	2	2	1

As a result of the analysis of data gathered from primary school students, the lowest scores that students got among items were 'Encouraged his/her friends without hurting them' and 'Asked questions when he/she could not understand'. The item that students got the highest score was 'Listened to suggestions and telling of his/her friends'.

Discussion and Conclusion

The environment that individual is in should turn into an environment that s/he lives in and aware of rather than being something that is required to learn and nature education should be arranged to give them that opportunity (Köşker, 2013). When scientific researchers are examined, it is strongly emphasized that there is a close relationship between environmental perspectives of children and instructive experiences gained in

nature (Özdemir, 2010). Therefore, the main objective of this study is to enable primary school students at sixth, seventh and eighth grades to evaluate the environment that they live in with scientific views by using natural, historical, archeological and cultural sources of Cappadocia region as a teaching tool with active learning based activities. The first research question put to reach this general objective was that 'Do the active learning based science camp activities have an impact on primary school students' views on scientific knowledge? As a result of Man Whitney U analysis carried out regarding this sub-problem, a significant difference ($p=.038$) in favor of students' posttest scores was found. So it is concluded that active learning based science camp activities had an impact on students' views towards scientific knowledge. There are some studies in accordance with findings of this study. For example, in the research that was carried out by Köseoğlu et al. (2011) it was concluded that ecology founded nature education study done for primary school students started students' academic thinking. Şahin-Pekmez and et al. (2010) concluded that out of class science studies developed students' comprehension of the nature of science. Metin and Leblebicioğlu (2011) also concluded that students developed more scientific views towards science concepts by science camp that was realized with out of class activities.

Individuals are supposed to be good observers to notice environmental problems. Observation skill is just one of the stages of scientific process skills. Therefore, students are required to make a plan in accordance with the conditions of problem that they observed and to apply this plan successfully in order to realize scientific solution that they developed, in practice level (with concrete experiences) to contribute solution of environmental problems. As a result, individuals that acquired scientific process skills can find more effective solutions to environmental problems. For this reason, the second sub-problem of the study was 'Do the active learning based science camp activities have an impact on primary school students' scientific process skills? When Man Whitney U test results, which were applied on scale used to solve this sub problem, are examined, there could not be found a significant difference between pretest and posttest scores of students. The results of the study carried out by Feyzioğlu and et al. (2012) differentiate to results of this study. As a result of interviews made during qualitative study in which the impacts of activities done learning by doing on development of students' scientific process skills, it was concluded that many students were in the opinion that their scientific process skills had improved.

During this study, the reason why they did not occur a significant difference between primary education students' pretest and posttest scores could be that study duration was not long enough to create a significant difference in students' scientific process skills.

The third sub-problem of the study was that 'Do the active learning based science camp activities have an impact on primary school students' conceptual knowledge towards environmental problems?' As a result of qualitative analyses carried out to reply that sub-problem, it was clearly seen that students transmitted to 'I know well' option when students' post-application and pre-application frequency values were compared. In conclusion it could be deduced that an ecological education given with active learning based activities had an effective impact on students' conceptual knowledge. In the study that was carried out by Manzanal, Barreiro and Jiménez (1999), it was concluded that fieldwork studies enabled students to explain ecological concepts. The results of the study carried out by Erdoğan (2011) has some similar results with this study. Erdoğan (2011) searched 4th through 8th grade students' environmental knowledge, affect, skills and behavior as the main components of environmental literacy. As a result of his study, students' environmental knowledge, environmental sensitivity, intention, environmental attitudes and responsible environmental behaviors significantly increased.

Based on both applied observation results, it was deduced that active learning based science camp activities had improved students' psychomotor skills towards scientific

views on environmental issues. In the study carried out by Bexell, Jarrett and Xu (2013) it was concluded that camp program had increased students' sense of empathy and also attention and knowledge for getting into action in nature. So, that result is similar to result of this study. In the study carried out by Collado, Staats and Corraliza (2013) it was inferred that staying at camp had increased students' willingness to exhibit ecological behaviors and also their beliefs and feelings towards nature. In the study carried out by Laaksoharjua, Rappea, Kaivolab (2012), it was found out that the gardening studies are good hands on environmental education activities and that the primary school children could develop effective social skills through these activities. All these results can be the signs that the students can develop upper level learning skills on science through the nature activities.

As a result, it was found out in the present study that the camping activities in nature based on active learning are effective on the scientific knowledge and scientific process skills of students. Everything happening in the nature has a scientific angle. During the camping activities most of which occurred as field trips, the students were able to realize this science in the nature and share them through the camp leaders. They were guided to not to do this exploration randomly but in a suitable way to the nature's essence. Therefore, it was tried to help the students to gain the habit of evaluating nature through a scientific perspective via the skills, experience and the knowledge they had with the camping activities.

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References

- Aktamiş, H. (2007). The effects of scientific process skills on scientific creativity: the example of primary school seventh grade physics unit. PhD Thesis. Dokuz Eylül University, İzmir.
- Altın, B. N. & Oruç, S. (2008). Effects of beginning of nature sports in early ages to the environmental education. *Journal of Cukurova Educational Faculty*, 3 (35): 8-10.
- Altuğ, T. (2010). Butterfly wings? Nuclear energy?. *Kelebek Kanadı Mı? Nükleer Enerji Mı?* *Unlimited Education*, 10.
- Ballantyne, R., Fien, J. & Packer, J. (2001). Programme effectiveness in facilitating intergenerational influence in environmental education: lessons from the field. *Journal of Environmental Education*, 32 (4), 8-15.
- Bexell, S. M., Jarret, O. S. & Xu, P. (2013). The effects of a summer camp program in china on children's knowledge, attitudes and behaviors toward animals: a model for conservation education. *Visitor Studies*, 1(16), 59-81.
- Binbaşaran-Tuysuzoglu, B. (2005). Green BOX Project: Environmental education and education for sustainable development in Turkey *Yeşil KUTU Projesi Türkiye'de Çevre Eğitimi ve sürdürülebilir Kalkınma İçin Eğitim ön Araştırma Raporu* Research Report
- Bishop-Clark, C. & Dietz-Uhler, B. (2012). Engaging in the scholarship of teaching and learning: A guide to the process, and how to develop a project from start to finish. Sterling, Va.: Stylus Pub.
- Bonwell, C. & Eison, J.A. (2006). Active learning: creating excitement in the classroom. George Washington University. Higher Education Report No.:1 Retrieved on

- March 2006 from
www.eric.ed.gov/ERICDocs/data/ericdocs2/contentstoragee01/0000000b/80/2a/15/f8.pdf
- Celep, A. & Bacanak, A. (2013). Yüksek lisans yapan öğretmenlerin bilimsel süreç becerileri ve kazandırılması hakkındaki görüşleri. *Türk Fen Eğitimi Dergisi*, 10 (1), 56-78
- Chawla, L. & Cushing, D. F. (2007). Education for strategic behavior. *Environmental Education Research*, 13 (4), 427-452
- Chickering, A. & Gamson, Z. F. 2009. seven principles for good practice. *AAHE Bulletin* 39: 3 (1987) <http://www.unm.edu/~oset/UsingActiveLearning.html> in 22 Feb. 2009
- Cinar, D., Dogu, S. & Meydan, A. (2008). Pre-service primary school teachers' attitudes towards to environment. Paper presented at the VII. National Primary School Education Symposium, Turkey. 2008
- Collado, S., Staats, H. & Corraliza, J. A. (2013). Experiencing nature in children's summer camps: affective, cognitive and behavioral consequences. *Journal of Environmental Psychology*, 33, 37-44
- Cook, E. D. & Hazelwood, A. C. (2002). An active learning strategy for the classroom "who wants to win...same mini chips ahoy? *Journal of Account Education*, 20, 297-306
- Dresner, M. & Gill, M. (1994). Environmental education at summer nature camp. *Journal of Environmental Education*, 25(3), 35-41
- Duerden, M. D. & Witt, P. A. (2010). The impact of direct and indirect experiences on the development of environmental knowledge, attitudes and behavior. *Journal of Environmental Psychology*, 30(4), 379-392
- Dufresne, R.J., Gerace, W. J., Leonardo, W. J., Mestre, J. P. & Wenk, L. (1996). Classtalk: A classroom communication system for active learning. *Journal of Computing in Higher Education*, 7, 3-47
- Elliot, S. & Davi,s J. (2008). Why natural outdoor play spaces?. In S. Elliot (Ed). *The Outdoor Play Space Naturally For Children Birth to Five Years* (P.1-13). New South Wales: Pademelon
- Erdoğan, M. (2011). The effects of ecology-based summer nature education program on primary school students' environmental knowledge, environmental affect and responsible environmental behavior. *Educational Sciences: Theory and Practice*, 11(4), 2223-2237
- Erdoğan, M. (2015). The effect of summer environmental education program (seep) on elementary school students' environmental literacy. *International Journal of Environmental & Science Education*, 10(2), 165-181
- Erentay, N. & Erdogan M. (2009). Nature education in 22 steps 2 Adımda Doğa Eğitimi, ODTU Publication, Ankara
- Feyzioglu, B., Ozenoglu-Kiremit, H., Samur-Ozturk, A. & Aladag, E. (2012). Yıbo's are thinking scientifically in natural environment. *Journal of Research in Education and Teaching*, 1(4), 65-74
- Geban, O., Aşkar, P. & Ozkan, I. (1992). Effects of computer simulated experiments and problem solving approaches on students learning outcomes at the high school level *Journal of Education Research*, 86(1), 5-10.
- Gokçe, E. (2004). Students' and teachers' opinions regarding active learning process in elementary education köğretimde Aktif Öğrenme Sürecine İlişkin Öğrenci Ve Öğretmen Görüşleri, Akdeniz University, *Journal of Faculty of Education*, 1,53.
- Gürses, A., Dogar, Ç. & Yalçın, M. (2005). The nature of science and higher education students ideas about the nature of science" Bilimin doğası ve yüksek öğrenim öğrencilerinin bilimin doğasına dair düşünceleri, *Journal of National Education*, 166.
-

- Hartig, T., Kaiser, F. G. & Bowler, P. A. (2001). Psychological restoration in nature as a positive motivation for ecological behavior. *Environment and behavior*, 33, 590-607
- Hinds, J. & Spark, P. (2008). Engaging with the natural environment: the role of affective connection and identity. *Journal of Environmental Psychology*, 28, 109-120
- Keles, O., Uzun, N. & Varnaci-Uzun, F. (2010). The change of teacher candidate' environmental consciousness, attitude, thought and behaviors with nature training project and the assessment of its permanence. *Electronic Journal of Social Sciences*, 9(32), 384-401.
- Keating, M. (1993). *The Earth summit's agenda for change : a plain language version of agenda 21 and the other Rio agreements*. Ankara: UNEP Turkey committee publications
- Küçük, M. (2006). *Study Toward Teaching the Nature of Science For Seventh Grade Primary Students*. PhD Thesis. Karadeniz Teknik University, Trabzon.
- Kosoglu, M., Ozdemir, A., Baysan, S., Akar-Vural, R., Inci, E., Evci-Kiraz, D., Gençsoylu, I., Boz, O., Hazir, C. & Ertugrul, E. (2011). Ecology based environmental education at Çine beekeeping museum. *Journal of Anatolian Natural Sciences*, 2(2), 24-33
- Kossak, A. & Bogner, F.X. (2012). How does a one-day environmental education programme support individual connectedness with the nature? *Journal of Biological Education*, 46(3), 180- 187
- Köşker, N. (2013). Elementary school students' and prospective elementary school teachers' perceptions of nature and thoughts of their responsibilities towards the nature. *International Periodical for the Languages, Literature and History of Turkish or Turkic*, 8(3), 341355
- Manzanal, R. F., Barreiro, L. M. R. & Jimenes, M.C. (1999). Relationship between ecology fieldwork and student attitudes toward environmental protection. *Journal of Research in Science Teaching*, 36(4), 431-453.
- Mattson, K. (2005). Why "active learning" can be perilous to the profession. *Academe* 91(1). 23-26.
- Mccain, J. C. (2005). *Qualitative study of pre-service teachers using co-teaching as a method to understand scientific process skills to teach inquiry*. PhD. Thesis, College of Human Resources and Education, Morgantown, West Virginia.
- MEB (Ministry of Education Milli Eğitim Bakanlığı) Elementary Science and Technology Courses (sixth, seventh and eighth Grades) Curriculum. Chairman of the Board of Education of the Ministry of Education, Ankara Retrieved on May, 2007 from www.meb.gov.tr
- Metin, D. & Leblebicioglu, G. (2011). How did a science camp affect children's conceptions of science? *Asia-Pacific Forum on Science Learning and Teaching*, 12 (1). Retrieved February 2, 2014 from www.ied.edu.hk/apfslt/v12_issue1/kilic
- Meydan, A. & Bozyigit, R. & Karakurt, M. (2012). Meet the level of expectation of the participants on Ecology-Based Nature Education Ekoloji Temelli Doğa Eğitimi Projelerinin Katılımcı Beklentilerini Karşılama Düzeyleri Marmara Geographical Review, 25, 238-255.
- Ogurlu, I., Alkan, H. & Gundogdu, E. (2010). *Training project-I At isparta natural protected areas: perceptions and expectations of participations Isparta Korunan Doğal Alanlarında Doğa Eğitimi Projesi -I:Katılımcıların Algı Ve Beklentileri* Paper presented at the III. National Black Sea Forestry Congress. Turkey. May 2010.
- Okey, J. R., Wise K.C. & Burns, J. C. (1985). Development of an integrated process skill test: TIPS II. *Journal of Research in Science Teaching*, 22 (2), 169-177

- Ozaner, F. S. & Yalçın, G. (2000). Scientific environmental education in national parks. Paper presented at the V. International Symposium on Ecology and Environmental Problems. Ankara. December 2000
- Ozdemir, O. (2007). A new environmental education perspective: education for sustainable development. *Education and Science*, 32 (145), 23-39
- Ozdemir, O. (2010). The effects of nature-based environmental education on environmental perception and behavior of primary school students. *Pamukkale University Journal of Education*, 27, 125-138.
- Ozey, R. (2011). Contemporary world issues. Active Publication: Istanbul
- Palmer, J. A., Suggate J., Robottom I. & Hart P. (1999). Significant life experiences and formative influences on the development of adults' environmental awareness in the UK Australia and Canada. *Environmental Education Research*, 5(2) 181-200
- Şahin-Pekmez, E., Yılmaz H. & Kahveci, C. (2010). Influence of learning science in outdoor settings on 5th grade students' understanding of the nature of science. Paper presented at the 7th International Conference on Hands-on Science. Rethymno-Crete. July 2010.
- Seeler, D. C., Turnwald K.H. & Bull K.S. (1994). From teaching to learning. *Journal of Veterinary Medical Educatio*, 21(1), -
- Szczepanski, A. (2007). Outdoor education-authentic in the context of landscape literary education and sensory experience. perspective of where, what, why, how and when of learning environments. *Inter-Disciplinary Context and The Outdoor and Indoor Dilemma*, Retrieved on June 20, 2007 from <http://www.liu.se/esi/cmu/forskning/andersSzczepanski.pdf>
- Yildiz, K., Sipahioglu, Ş. & Yılmaz, M. (2000). *Environmental science*. Gündüz Training and Publishing: Ankara.
- Zelezny, L. 1999. Educational interventions that improve environmental behaviours: A meta-analysis. *The Journal of Environmental Education*, 31 (1): 5-14

Aktif Öğrenmeye Dayalı Bilim Kampı Etkinliklerinin İlköğretim Öğrencilerinin Bilimsel Bilgiye Yönelik Görüşlerine ve Bilimsel Süreç Becerilerine Etkisi

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Özet

Bireylerin içinde yaşadıkları doğayı anlamaları günümüzün önemli becerilerden biri olan bilimsel bakış açısı kazanmaları için önemlidir. Bu önem doğrultusunda, bu çalışmanın genel amacı, aktif öğrenmeye dayalı bilim kampı etkinliklerinin ilköğretim altıncı, yedinci ve sekizinci sınıf öğrencilerinin bilimsel bilgiye yönelik görüşlerine ve bilimsel süreç becerilerine etkisini araştırmaktır. Bu amacı gerçekleştirmek için, Kapadokya yöresinin doğal, tarihi, arkeolojik ve kültürel kaynakları bir öğretim aracı olarak kullanılmıştır. Çalışmada, öntest-sontest tek gruplu yarı-deneysel desen kullanılmıştır. Çalışmaya 17 ilköğretim yatılı ilköğretim bölge okulu öğrencisi katılmıştır. Çalışmada veri toplama aracı olarak, bilimsel bilgiye yönelik görüş anketi, bilimsel süreç becerileri ölçeği, çevre problemlerine yönelik kavramsal anlama anketi ve gözlem formu kullanılmıştır. Çalışmada elde edilen verilerin analizinde, betimsel analiz ve Man Whitney-U analiz teknikleri kullanılmıştır. Çalışma sonucunda, öğrencilerin bilimsel bilgiye yönelik görüş anketi son-test puan ortalamaları lehine anlamlı farklılık olduğu, çevre problemlerine yönelik kavramsal anlama anketi son uygulama görüş sayılarının, ön uygulama görüş sayılarından fazla olduğu sonucuna ulaşılmıştır.

Anahtar Kelimeler: Çevre eğitimi, aktif öğrenme, bilim kampı, bilimsel bilgi, bilimsel süreç becerileri.