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Evaluation of Nature Awareness in Secondary School Students by Nature Education Projects with A Case Study in Bursa, Türkiye

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Abstract
The importance of education given in primary and secondary education period is very important in raising new generations who respect nature and protect nature. In this study, the results of nature education in understanding biological and cultural diversity were evaluated with the example of a Nature Education Project, which was carried out in 2022 and supported by The Scientific and Technological Research Council of Türkiye (TÜBİTAK) via 4004 Science Schools and Nature Education program for the students of the Regional Boarding School selected as the target group in the Protected Natural Areas of Bursa. The project aims to enable the students who will be the elders of the future living in Bursa and the teachers who will train the students to get to know the biodiversity and natural resources of Bursa by obtaining the information from the first source, by making observations and using the technology, to gain awareness of protection in order to ensure the sustainability of these resources, environmental pollution. It was carried out in order to enable students to establish strong bonds with nature by gaining awareness about nature. Within the scope of the project, the environmental perception scale and environmental attitude scale were applied to the participants as a pre-posttest in the project, and in addition to these tests, the natural science diaries kept during the project and the pictures they made about the activities were evaluated. The nonparametric Wilcoxon Signed Ranks Test was used to determine whether there was a significant difference between the pre-test and post-test mean scores. At the end of the project, the target audience to establish a strong bond with nature, to recognize the factors that make up ecosystems, to gain awareness of protecting natural assets, to raise awareness about the limited nature of natural resources and to increase their awareness of environmental pollution and its effects, to transfer it to the society through social interaction after the project, to raise awareness, It has been observed that in the future, Bursa has gained awareness in the form of taking social responsibility in a way that will protect its values and developing by making use of ecotourism.
Keywords: Nature Education; Regional Boarding School students; Biodiversity conservation; Protected areas; Türkiye
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1. Introduction

Interacting with nature, using and changing nature for their needs is considered as a normal event (Sadik *et al*., 2011). Humans, who cause rapid population growth, unplanned urbanization, industrialization, depletion of natural resources and the emergence of environmental problems, drag nature into an impasse just for the sake of their own interests (Ozdemir, 2010). Although some environmental problems are solved in the short term with scientific developments, a sustainable step is needed (Ferreira *et al.*, 2016). The beginning of environmental education is based on education to protect nature and natural resources.

Environmental education aims to protect and improve the entire environment, including the biosphere, biomes and ecosystems, as well as developing and protecting natural resources such as soil, water, and forests (Unal & Dimiski, 2013). Indisputably, one of the most important tasks of every society for a sustainable life is to provide children with attitudes, values, knowledge and necessary skills related to environmental protection. Environmental education has a vital importance for this. Environmental education is about ethics and actions, not only as a subject to be learned, but also as a way of thinking and a way of behavior. Ecology has been an important cornerstone of environmental education in terms of explaining how ecosystems function. Over time, environmental education has not only aimed to inform the citizens of the world about the environment, but also to make them participants with skills and hearts in environmental management. With environmental education, it is also aimed that people comprehend the ecological balance and their roles in this balance, develop views on how they can live in harmony with the planet, and gain the necessary skills for an active and responsible participation (Peyton *et al*., 1995).

Today, with the development of technology, children's addiction levels to tablets, phones and computer games have increased, and these technologies have become a part of their lives (Tuzun, 2002; Rideout *et al*., 2011). The concept of "digital childhood" has emerged to describe the effects of electronic media with the widespread use of technologies such as television, computers, internet, electronic games, smart phones (Kandir,

2016). In addition to the fact that technology has become indispensable, it is thought that the gradual decrease of outdoor playgrounds causes negative effects on children (Rosen *et al*., 2014). Digital childhood causes children to spend individual time without requiring much energy, causing children to be passive receivers and "out of touch" with the child's environment. It can also lead to disciplinary discussions between parents and children (Toran *et al*., 2016). In order to raise environmentally conscious individuals, nature education and ecological literacy awareness should be brought to children starting from childhood.

The Scientific and Technological Research Council of Türkiye (TÜBİTAK) has put into practice the project studies that want a wide target group from students to public employees to touch science with a program called 4004 - Nature Education and Science Schools. The projects supported in this context offer important opportunities in terms of increasing the awareness of formal education programs on nature-environment and integrating nature-friendly individuals into society. In the trainings given within the scope of these projects, in a way that is understandable to the public in general terms, by visualizing as much as possible, with interactive applications; Information is given in order to show how scientific facts and concepts in different fields (science, social, natural, astronomy sciences) are related to daily life and that dealing with science can be enjoyable and fun (Ogurlu *et al*., 2013; Tekbiyik *et al*., 2013; Avci *et al*., 2015).

The importance of education given in primary and secondary education period is very important in raising new generations who respect nature and protect nature. In this context, with the project that applied to the Nature Education and Science Schools support program; Students living in Bursa, who are the elders of the future, and the teachers who will train the students should be aware of Bursa's ecological and cultural values, gain awareness of protecting these values, discover its potential by observing ecotourism, observe innovative forest fires and biological control practices, gain awareness of protecting natural assets, The objectives of raising awareness about the limited resources and increasing the level of awareness about environmental pollution have been achieved. In this study, the role of nature education in the comprehension of biological and cultural diversity is discussed with the example of a Nature Education Project, which was carried out in 2022 and supported by the TÜBİTAK 4004 Science Schools and Nature Education program for the students of the Regional Boarding School selected as the target group in the Protected Natural Areas of Bursa city which is located in the North western part of Türkiye.

2. Material and Method

2.1. Research Sample

Nature education, supported by TÜBİTAK 4004 Science Schools and Nature Education program, was carried out in 2022 for the students of the Regional Boarding School selected as the target group in the Protected Natural Areas of Bursa, between 3 and 7 October 2022.

The target audience of the project consists of students studying in regional boarding schools (RBS) within the borders of Bursa and teachers working in the same schools. The RBS list within the borders of Bursa was requested from the Bursa Provincial Directorate of National Education. Bursa Provincial National Education R&D department gave support letters to ensure the participation of teachers and students in the project in case the project is supported. After the project was supported, the schools were contacted and 25 students and 2 teachers from the 6^{th} and 7^{th} grades from Davut Zeki Akpınar and Turgut Yılmaz Ipek Regional Boarding Secondary Schools were selected as participants in the project. In determining the teacher participating in the project among the teachers working at the school, attention was paid to the working time of the teacher (less is preferred), whether he participated in a similar 4004 project before. Parental permission was requested from the parents of the students regarding their children's participation in the project. The project was carried out with 27 participants, including 25 students and 2 teachers from each school, whose parents expressed a positive opinion. In the selection of students, students who could not connect with nature were tried to be selected. In the selection of the participants, attention was paid to the distribution of girls and boys (12 girls-13 boys and 2 female teachers).

2.2. Research Model

Since the project was designed according to the criteria of TÜBİTAK 4004 Nature and Science Schools, there was no research project, and the experimental and control groups could not be established, the study was planned as a single-group pretest-posttest trial model without a control group. The effect of the experimental procedure is tested by a study on a single group. This trial model is generally applied in order to test the accuracy of this prediction when certain predictions are made on any subject. The measurements of the subjects regarding the dependent variable are obtained by using the same subjects and the same measurement tools as a pre-test and post-test before the application (Buyukozturk *et al*., 2008; Avci *et al*., 2015).

2.3. Data Collection Tools

2.3.1. Pre-Event and Post-Event Evaluation Forms

There are aims to improve the students' attitudes towards the environment and socio-scientific issues and their scientific discussion skills, as well as to learn some concepts related to the environment. These developments were tried to be measured with the pretest and posttest model. Before the project, students' attitudes towards the environment and their basic knowledge were determined with the Environmental Attitude and Knowledge Scale for Primary School Students, originally developed by Leeming, Dywer and Bracken (1995), and adapted to Turkish by Ulucinar-Sagir *et al*. (2008). Ethics committee permission was obtained for the scales to be used in the project. The environmental attitude scale used as a measurement activity in the project was developed by Yucel & Ozkan (2014). The scale, which consists of three parts, was used as a pre-test and post-test in the project in order to determine the attitudes of the students towards the environment. Some of the questions in the survey are as follows: II: Part: "(1.) I watch the documentaries about the environment on television, (2.) I follow the developments about the environment from the news, daily newspapers or magazines, (4.) About environmental cleaning in our school I participate voluntarily when activities are organized, (7.) I separate the recyclable garbage and throw it in the recycling bin, (12.) I turn off the lights that are left on unnecessarily at home or at school" III. Chapter: "(1.) Our country is rich in natural resources, (2.) Environmental courses should be taught in schools, (4.) Less water can be used while taking a bath to save water, (12.) It is our responsibility to prevent environmental pollution (14.) I like to participate in afforestation works, (21.) The rapid consumption of natural resources in our country worries me for our future".

2.4. Data Analysis

In order to ensure content validity, care was taken to include enough questions to ensure that opinions about behavior, thoughts and emotions are fully received. With this scale, it is desired to determine the attitudes of the participants towards the environment. The first part is prepared to collect personal information, the second part to collect various behaviors towards the environment, and the third part to collect thoughts and feelings about the environment. While the scale results were evaluated, the nonparametric Wilcoxon Signed Rank Test was applied since the number of students was less than 30. This test is the equivalent of the parametric t test. It was checked whether there was a significant difference between the pre-test and post-test mean scores.

2.5. Diaries and Pictures Kept in the Scope of the Event

The process followed by using qualitative data collection methods such as observation, interview and document analysis in a holistic and realistic way in a natural environment is called qualitative research. On the first day of the project, a notebook was distributed to the target audience and students were provided to keep a diary throughout the project. At the end of the day or during the day, they were asked to express their achievements during the project, their views on the project, and their feelings and thoughts in their diaries. In this study, the pictures they made about the activities were also compiled and interpreted in order to see how the target audience perceived and experienced the trainings implemented in the project. In this respect, the study also has a qualitative dimension.

2.6. Holding activities

Expert and well-equipped academics and trainers in the field of nature education introduced the ecosystem, endemic and rare species of that region in ecologically important locations (fresh water, sea, forest, mountain, floodplain forests) of Bursa, climate change, forest fires and biological control. Information was given about innovative solutions related to tourism, bird watching, and information about ecotourism practices.

3. Results

The environmental attitude scale developed by Yucel & Ozkan (2014) was applied in the project in order to determine the attitudes of the students towards the environment. Since the number of students was less than 30, the nonparametric Wilcoxon Signed Rank Test was applied. Since the 1st part of the test contains the personal information of the students, statistical evaluation was not made. In the second part, the behaviors towards the environment and in the third part, the feelings and thoughts towards the environment were measured. In the second part of the scale, it was aimed to determine the environmental behavior of the project participants. Since the p value of Wilcoxon Signed Rank Test result was <0.005, a positive and significant change was observed in the students' feelings and thoughts about the environment (Table 1). They gained awareness in their perspectives on environmental documentaries, newspapers and magazines, in participating in activities related to environmental cleaning, in terms of what they can do with water and electricity savings in their homes, about recycling waste, and in giving water and food to animals such as cats, dogs and birds they see around them. can be seen in the survey results. Since the p value of Wilcoxon Signed Rank Test result was <0.005, a positive change was observed in students' behavioral attitudes towards the environment (Table 2). They gained awareness

in their perspectives on environmental documentaries, newspapers and magazines, in participating in activities related to environmental cleaning, in terms of what they can do with water and electricity savings in their homes, about recycling waste, and in giving water and food to animals such as cats, dogs and birds they see around them. can be seen in the survey results.

Table 1. Nonparametric Wilcoxon Signed Ranks Test results of the second part of the environmental perception scale and the pretest and posttest application

Features	N	Mean	SD	Min.	Maks.	Z	p
Pretest Part 2	27	4,0171	,63695	2,77	4,85	-3,500[b]	,000
Posttest Part 2	27	4,2308	,58036	2,92	5,00		

Table 2. Nonparametric Wilcoxon Signed Ranks Test results of environmental attitude scale and pretest and posttest application

Features	N	Mean	SD	Min.	Maks.	Z	p
Pretest Part 2	27	3,6984	,71930	2,14	4,86	-3,225b	,001
Posttest Part 2	27	4,0079	,77777	2,50	5,00		

During the project, students were asked to keep a diary. The students' thoughts about the project activities are about the themes of excitement, fun, happiness and gratitude. In addition, although they are children living in Bursa, it is seen in the diaries they keep that they make new discoveries that they have not been to before, and gain knowledge and experience in different subjects related to nature.

In order to see how the target audience perceived and experienced the trainings implemented in the project, the pictures they made about the activities were also interpreted. The pictures made by the students are mostly nature, plant, animal, historical buildings, wetlands, conservation themed pictures (Figure 1). Within the scope of the project, it is observed that the love of nature and awareness of conservation are formed in children.

Figure 1. Some examples of the pictures made by the target audience in the project

Within the scope of the project, participants were introduced to the ecosystem, endemic and rare species of that region in ecologically important areas of Bursa (fresh water, sea, forest, mountain, floodplain forests) and informed about innovative solutions related to climate change, forest fires and biological control. Observations were made and they were provided with information about ecotourism practices (Figure 2; Figure 3). The training and activities included in the project are listed in Table 3 along with the days they were held.

Table 3. Training and activities carried out in the project

Days	Education and Events
1. Day	Arrival and Check-in at the Hotel
	Opening
	Application of the Pre-Test
	Warm Up Event Musical Balloons
	Drama Through Nature
	Aquatic Ecosystems and Living Resources
	Yaren Stork Short Film Screening
	Bird Feeder and Bird Nest Construction

Days	Education and Events
2. Day	Karacabey Animal Rehabilitation Center Visit
	Floodplain Forest Trekking And Coastal Ecosystems Beach Study
	Trout Breeding
	Forests and Drone Technologies
	Forests and Drone Technologies
	Leylekkoy Bird Watching
	Withered trees
	Water travel game
3. Day	Panorama 1326 Conquest Museum Visit
	Bursa Forestry Museum Trip
	Bursa Regional Directorate of Forestry visit
	Latest Technologies Used in Combating Forest Fires
	OBM Insect Production Laboratory
	Biological Control and Current Control Methods
	OBM Nursery Visit
	Ornamental Plants and Cultivation
	Minecraft Extinct Creatures: Roller Coaster
4. Day	Uludag National Park Endemic and Rare Plants Field Trip
	Forest Ecosystem and Forest Zones
	Uludag National Park Source of Life Natural and Wild Species Field Trip
	Ecotourism in Bursa Cumalikizik
	Rural Landscape And Our Home/Our Country/Our World
	Garbage Collection Activity (Plogging)
	Guess Waste And Climate Change
5. Day	Changing Climate and Our World-2
	Protected Natural Areas
	Combating erosion
	Application of post-tests
	Interviewing and Collecting Natural Science Diaries
	Certificate Presentation and Project Closing

Figure 2. Some photos of the activities - 1

Figure 3. Some photos of the activities - 2

4. Discussion and Conclusion

In this study, the educational activities of the project numbered 122B707 “Regional Boarding Schools (RBS) Know Sustainable Environment in Bursa, Draw the Boundaries of the Growing World” supported by TÜBİTAK 4004 Nature Education and Science Schools, and to reveal the opinions of the participants at the end of the project.

Projects supported by TÜBİTAK's 4004 - Nature Education and Science Schools program are important in terms of instilling a love of nature in individuals and raising their awareness of nature. There are some studies in the literature after the completion of the projects supported within the scope of TÜBİTAK 4004-Nature Education and Science Schools.

Feyzioglu *et al*. (2012) stated that as a result of the "YIBOs Think Scientifically in Natural Environment" project, students' sensitivity towards the natural environment they live in, environmental pollution, and living species has increased. Ogurlu *et al*. (2013) in their study on the example of “Ide Projects”, they determined that the transformation of the knowledge gained in the projects carried out in nature through field studies into behavior is easier and more permanent. Marulcu *et al*. (2014)'s "Little Scholars Science School" project evaluation, it was stated that the majority of the students found science school fun, they were able to do activities that they could not do at school, and the activities made allowed them to associate the lessons they saw at school with daily life. Akay (2013) stated that the “I'm Learning, I'm Learning Summer Science School” project made a positive contribution to the science perspective of secondary school students who participated in scientific activities focused on active learning by doing, experiencing and learning.

Avci *et al*. (2015) observed that interactive applications and visualization of information had a positive effect on students and increased their desire for research and learning, in their studies containing the results of the “Our Sea Mediterranean” project. Buldur *et al*. (2018) investigated the change in environmental awareness and affective tendencies of secondary school students participating in supported nature education projects. According to the findings of the study, it was determined that at the end of the nature education project, the participants reached the targeted levels in terms of environmental affective characteristics and environmental awareness, and significant increases were achieved in terms of these variables. In Evcan *et al*. (2020)'s work, which includes the results of the "Mathematics in Our Lives: Agriculture" project, it has been observed that agricultural and mathematical applications have a positive effect on students, and students' awareness of the use of mathematics in daily life has increased. When we look at the studies in which the results of supported nature education projects are evaluated, it supports the results we obtained in our study.

When we evaluate the results of the project we have realized, children who recognize the natural resources, biodiversity and cultural values of Bursa, gain awareness of protecting them, and discover the ecotourism potential that will add value to them and their environment in the future, will help children protect the city they live in and adapt to nature with the awareness they will gain in the future thanks to the project. It is envisaged that they will take responsibility for the sustainable protection of resources by living in The target audience of

the project was chosen from the teachers working in the Regional Boarding Schools in Bursa, sharing the project experiences and project outputs with the other students who could not participate in the project at the schools where they work, increasing the knowledge and experience level of the teacher who will train many students over the years, and transferring these to the students, thus the widespread effect of the project. will increase. It is anticipated that the project will increase its widespread impact, as teachers will interact with a large number of students in many different schools over time.

The reason why children from families with low socioeconomic profile, especially coming from rural areas, are chosen is that it is difficult for these children to participate in the trips and activities to be held within the scope of the project by their own means. The project is also important in terms of meeting the needs of such children for more morale and motivation through trips and observations, as well as for greater awareness of their environment.

People with a scientific culture are individuals who care about science, support science and gain the habit of scientific thinking. In order to gain a scientific culture, individuals in the society need to feel the effects of scientific developments in their daily lives. In this case, people's belief in the usefulness and necessity of science will increase. Through the project activities, nature education, which aims to make the participants aware of the ecological and cultural values in the regions they live in, how to protect these values and ensure their sustainability, and to question the effects of climate change in their daily lives, needs to be done and supported more. Thus, it will contribute to the training of the participants as individuals with a scientific culture.

References

Akay, C. (2013). The Opinions Of The Secondary School Students Towards Science Concept Following TÜBİTAK 4004 "Learning By Doing Summer Science School. Mersin University Journal of the Faculty of Education **9,** 326-338.

Avci, E., Su Ozenir, O., Kurt, M. & Atik, S. (2015). "Assessment of "Bizim Deniz Akdeniz" Project Planned For Secondary School Students Financed By TUBITAK Under 4004 Nature and Science Schools Program. *Amasya Education Journal* **4**, 312-333.

Buldur, S., Bursal, M., Yucel, E. & Yalcin Erik, N. (2018). "The Impact of an Interdisciplinary Nature Education Project on Environmental Attitudes and Environmental Consciousness of Middle School Students". *Journal of the Human and Social Sciences Researches* **7**, 284-303.

Buyukozturk, S. (2008). *Scientific Research Methods*. Ankara: Pegema Press.

Evcan Sezer, S., Adilov, G. , Eken, Z. , Barut, S. , Kemali, S. & Tınaztepe, G. (2020). "The Evaluation of the Project Entitled "Mathematics in Our Life: Agriculture" Conducted for 7th Grade Students within the Scope of TUBITAK 4004-Nature Education and Science Schools". *International Journal of Scholars in Education* **3**, 28-41.

Ferreira, M. E., Cruz, C., & Pitarma, R. (2016). "Teaching Ecology to Children of Preschool Education to Instill Environmentally Friendly Behaviour". *International Journal of Environmental and Science Education* **11**, 5619-5632.

Feyzioğlu, B., Ozenoglu Kiremit, H., Oztürk Samur, A. & Aladag E. (2012). "YIBO'S are thinking scientifically in natural envırontment". *Journal of Research in Education and Teaching* **1**, 65-74.

Kandir, E.H. (2016). Escape from the Bondage of Digital Childhood: Nature Education. *Ayrıntı Journal* **3**, (36).

Leeming, F.C., Dwyer, W.O. & Bracken, B.A. (1995). "Children's environmental attitude and knowledge scale: Construction and validation". *The Journal of Environmental Education* **26**, 22–33.

Marulcu, I., Saylan, A. & Guven, E. (2014). "Evaluation of The Little Scientists' Science School for 6th and 7th Grade Students". *Mustafa Kemal University Journal of Graduate School of Social Sciences* **11**, 341-352

Ogurlu, I., Alkan, H., Unal, Y., Ersin, M.O. & Bayrak, H. (2013) Contribution of Environment and Nature Education to Geography Education: Example of Ide Projects. 3rd International Geography Symposium–Geomed, Symposium Proceedings, 498-508.

Ozdemir, O. (2010). Contribution of Environment and Nature Education to Geography Education: Example of Ide Projects. Education and Science. 32, 23-39.

Peyton, B, Campa, H., Peyton, M.D. & Peyton, J.V. (1995). "Biological Diversity for Secondary Education", Environmental Education Module UNESCO- UNEP- IEEP.

Rideout, V., Saphir, M., Tsang, V. & Bozdech, B. (2011). *Zero to eight children's media use in America*. San Francisco, CA: Common Sense Media.

Rosen, L.D. (2014). "Media and technology use predicts ill-being among children, preteens and teenagers independent of the negative health impacts of exercise and eating habits". *Computers in Human Behavior* **35**, 364–375.

Sadık, F., Çakan, H. & Artut, K. (2011). Analysis of environmental problems reflected in children's paintings according to socio-economic differences. [Online] Avaliable: http://ilkogretim-online.org.tr/index.php/io/article/view/1576/1412.

Sagir, S.U., Aslan, O. & Cansaran, A. (2008). Examination of Primary School Students' Environmental Knowledge and Environmental Attitudes in Terms of Different Variables. [Online] Avaliable: https://dergipark.org.tr/tr/pub/ilkonline/issue/8601/107123

Tekbiyik, A., Seyihoglu, A., Sezen Vekli, G. & Birinci Konur, K. (2013). "Influence of A Science Camp Based on Active Learning on Students". *The Journal of Academic Social Science Studies* **6**, 1383-1406.

Toran, M. (2016). "Evaluation Of Mothers' Views Regarding Children's Use Of Digital Game". *Kastamonu Education Journal* **24**, 22–63.

Tuzun, U. (2002). "The effect of developing communication tools on the interaction of children and young people". *Düşünen Adam* **15**, 46–50.

Unal, S. & Dimiski, E. (1998). "Training of Teachers for Secondary Education Environmental Education According to the UNESCO International Environmental Education Program (IEEP)". *Marmara University Atatürk Faculty of Education Journal of Educational Sciences* **10**, 299.

Yucel, O. E. & Ozkan, M. (2014). "Development of Environmental Attitudes Scale for Secondary School Students". *Uludağ University Faculty of Education Journal* **27**, 27-48.