Forest Education Experiences of Vocational High School Students

Esra ÇAKIRLAR ALTUNTAŞ

Hacettepe University

esracakirlar@hacettepe.edu.tr

ORCID: 0000-0002-3566-8655

Nurel BOZKURT BARUT

Ministry of National Education

nurelbozkurt@gmail.com

ORCID: 0009-004-9888-260X

Abstract

This study examined the effects of forest education on the environmental awareness and environmental attitudes of vocational high school students and their self-evaluations toward forest education. The study, in which the mixed research method was adopted, was designed with an explanatory design. Forest education was given within the scope of the experimental study carried out at the quantitative level. The importance of the education was emphasized and forest ecology, eco-social functions of forests, forest products were discussed with an interdisciplinary approach. The study group consists of 32 vocational high school students studying at vocational high schools in different provinces from the Thrace region. Data collection tools are the sustainable environmental awareness scale and environmental attitude scale at the quantitative level and structured interviews at the qualitative level. Related samples t-test was used for quantitative data and content analysis was performed for qualitative data. The results of the study show a permanent increase in environmental awareness and attitude of vocational high school students thanks to forest education. According to the self-evaluations of vocational high school students, it can be said that forest education provides positive environmental and academic contributions to them. Based on the results obtained, it can be suggested that forest education should be given importance to direct qualified intermediate staff candidates who can have a say in human-environment interaction to sustainable pro-environmental behaviors.

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Introduction

The contribution of forests, which have a large part of the terrestrial biodiversity of the world, to individual life is indisputable. Forests with different tree species provide nutrition and shelter for many species. It also allows direct observation of numerous natural phenomena (Chlposova et al., 2020). It is also known that forest ecosystems play a fundamental role in reducing environmental problems (Griscom et al., 2020).

Unconscious consumption harms forest ecosystems. In order to prevent this, pro-environmental behavior and environmental knowledge, which is a prerequisite for pro-environmental behavior, should be increased (Otto & Pensini, 2017). The knowledge, skills and common values that enable sustainable forest management can be gained through forest education (Rekola et al. 2021).

Forest education offers the ecocentric approach that is important for sustainability (Kowasch et al., 2022) and is based on learning with all the senses (Macháčková, 2021). It is often separate from the national curriculum (Grimm et al. 2011). It can be planned for all age groups with formal and non-formal education (Gabay & Rekola, 2019). Because people of all age groups benefit from the benefits of forests (Katila et al., 2017). For this reason, all individuals should take the necessary precautions for the protection of forest ecosystems.

Some measures to be taken at the local level can play an important role in protecting the ecosystem. For example, educating individuals in a certain occupational group for pro-environmental behavior may directly or indirectly lead the general public to pro-environmental behavior. One of the important professions is teachers. The teachers can reach large audiences and be role models for adults of the future. In the study conducted by Pöllænen et al. (2011) with pre-service teachers, it was determined that forest excursions positively affected the perception of forest and the view towards forest education. Another important professional group is natural resource manager. Natural resource managers need to have detailed knowledge about the ecosystem (Fisher, 2005). Because societies are dependent on nature for food and energy, natural resources must be managed correctly and sustainably. Proper management of natural resources begins with recognizing the local environment. Kudryavtsev et al. (2012) argue that people will want to protect places that are meaningful to them.

It is very important for a sustainable future that vocational high school students, who may be in a decision-making position in the management or use of natural resources in their future lives, get to know their local environment and develop a positive attitude towards this environment. For this reason, education that will develop positive environmental aspects in individuals is valuable. In addition, recognizing the close living areas and realizing the potentials there can create a foresight for their professional careers. Because, in the context of sustainable development, there is a need for decision makers who are sensitive to the environment and who care about economic and social dimensions.

It is reported in the literature that vocational high school students' environmental attitudes (Taşkın, 2009) and environmental knowledge (Uzun, 2007) are at a lower level than other high school students. Studies to determine the effects of forest education on secondary education are also limited (Rodríguez-Piñeros et al., 2020). In light of this information, the study aims to determine the effect of forest education on the environmental awareness and environmental attitudes of vocational high school students and to examine their self-evaluations about forest education. It is important in that vocational high school students can develop awareness of recognizing and protecting the natural resources in their immediate surroundings. Moreover, the education given to students, especially in the fields of electrical electronics, renewable energy technologies and health, can encourage them to alternative options (alternative energy sources, alternative medicine) in their professional career. Within the scope of this study, answers to the following questions were sought.

- What is the effect of forest education vocational high school students on environmental attitudes?
- What is the impact of forest education vocational high school students on sustainable environmental awareness?
- What is the self-evaluation of vocational high school students regarding forest education?

Method

Research Design

This study is a mixed method research in which qualitative and quantitative research methods are used together, and an explanatory design is used. In the explanatory design, qualitative data is collected to explain the quantitative data obtained (Creswell & Plano Clark, 2011). In the

research, one-group experimental design (forest education) was used in the quantitative step, and structured interviews were used in the qualitative step.

Study Group

The study group consists of 32 vocational high school students. 50% of the participants were female (f=16) and 50% were male (f=16). The students in the study group were selected from vocational high schools located in the Thrace part of the Marmara Region of Turkey.

Research Instrument and Procedure

For quantitative data, two scales were used. The Sustainable Environmental Awareness Scale was developed by Derman and Senemoğlu (2015), and the Environmental Attitude Scale was developed by Uzun and Sağlam (2006). The data collection tools used in the study are valid and reliable.

The Sustainable Environmental Awareness Scale consists of 10 items. In the scale, there are 3 options arranged as "desired (3 points)", "partially desired (2 points)" and "undesirable (1 point)" for each sample situation. The factor loads of the items are between 0.585 and 0.735. The Cronbach α reliability coefficient calculated for this scale is 0.87. The Environmental Attitude Scale consists of two subscales called "Environmental Behavior Subscale" and "Environmental Thinking Subscale". The 5-point Likert-type scale includes 27 items. The load values of the items in the factor are between .386 and .819. The Cronbach-α value of the overall scale is 0.80.

Before the forest education, the students were informed about the education to be done. Next, Environmental Attitude Scale and Sustainable Environmental Awareness Scale were applied. Then, forest education began in the Igneada Longoz Forests, which is important for the Thrace region of Turkey.

Igneada Longoz Forests are in Kırklareli, a province of Turkey on the Bulgarian border. It has the most important wetlands of the Thrace. Due to its geographical location, the Longoz Forests are located on the bird migration route that migrates from north to south and south to north (Kaya, 2016). Moreover, it has rare ecosystems as it contains marshes, freshwater lakes and coastal dunes (Keçeli & Ursavaş, 2017; Uslu & Keçeli, 2019).

In this education, which lasted for 3 days, the importance of the forest, which is close to the students' own living spaces, was emphasized and forest ecology, eco-social functions of forests, forest products are discussed with an interdisciplinary approach. Activities performed are listed in Table 1. Field expert academics, members of the Mountaineering Sports Club, and the personnel of the Nature Conservation and National Parks Branch Office in the district took part in the education as educators.

Table 1. Activities in forest education

Activity	Aim	Method- Strategy
Why the Sun is the Source of Life	To be able to comprehend the contribution of the sun to forest sustainability	Predict-Observation-Explain
Photographing Techniques in the Forest	To be able to comprehend photography techniques in the forest.	Demonstration
Plants in Longoz Forests	To be able to comprehend the plant diversity in the Longoz forests.	Field Study
Natural Habitats	To be able to comprehend the habitats of the creatures living in the forest	Field Study
Bird Migrations	To be able to comprehend bird species using wetlands	Field Study
Global warming	To be able to relate the ecosystem and climate change	**Small Group Tasks**- Art
Sustainable forest-Trewing	To be able to develop respect for natural life and love for nature	**Small Group Tasks**

Photo 1. Photos from forest education

The scales were applied three times before (pre-test), after (post-test) and 6 weeks after the end of the forest education (retention test). Qualitative data were obtained through structured interviews. In the structured interview form, there were questions to determine the contributions of education to vocational high school students.

Data Analysis

In order to test the difference between the obtained measurements, the related samples t-test was used. In addition, descriptive statistics of the data set were calculated. Content analysis was used in the analysis of qualitative data. The obtained data were coded by two researchers. Using the reliability formula "consensus/(consensus+dispute) x100" reported by Miles and Huberman (1994), the inter-coding agreement was calculated as 94.6%.

Results

The Effect of Forest Education on Environmental Attitude

Environmental attitudes of vocational high school students were determined by the Environmental Attitude Scale. The t-test was performed to determine the difference between the results of the scale applied in 3 different time periods. The results are given in Table 2.

Table 2. Results of the related samples t-test

Test	N	X	t	p
Pretest-Posttest	32	72.34-79.03	-4.71	0.00
	32			
Posttest-Retention test	32	79.03-78.50	.38	0.70
Pretest-Retention test	32	72.34-78.50	-3.47	0.00

As a result of the analysis, a statistically significant increase was observed between the pretest (X=72.34) and the posttest (X=79.03) (t (31)= -4.71, p<0.05). The difference between the pre-test (X=72.34) and the retention test (X=78.50) is also significant (t(31)=-3.47, p<0.05). Thus, it can be said that forest education positively affects students' environmental attitudes and permanence.

The Effect of Forest Education on Sustainable Environmental Awareness

Sustainable Environmental Awareness scale was used to determine the effect of forest education on sustainable environmental awareness. The difference between the measurements obtained with the scale was tested with the related sample t-test. The results are given in Table 3.

Table 3. Results of the related samples t-test

Test	N		X	t	p
Pretest-Posttest	32	32	26.84-28.16	-5.21	0.00
Posttest- Retention test	32		28.16-29.44	-3.31	0.00
Pretest- Retention test	32		26.16-29.44	-5.83	0.00

As a result of the t test, the difference between the pre-test (X=26.84) and the posttest (X=28.16) (t (31)= -5.21 p<0.05) is significant. When the effect on permanence was examined, it was determined that the difference between the post-test (X=28.16) and the permanence test (X=29.44) (t(31)=-3.31, p<0.05) was also statistically significant. Based on this result, it can be said that forest education increases the environmental awareness of vocational high school students and even provides permanence.

Self-Assessments on Forest Education

The self-evaluations of vocational high school students about forest education were obtained through structured interviews. The data were subjected to content analysis. The results are presented in Table 4.

Table 4. Content analysis results

Theme	**Code**	**f**	**%**
Environment (%70,27)	Environmental information	9	24,32
	Environmental awareness	7	18,92
	Pro-environmental behavior	6	16,22
	Environmental attitude	3	8,12
	Energy-saving	1	2,70
	Subtotal	26	70,27
Academic (%29,73)	Deep learning	8	21,62
	Terminology	2	5,40
	On-site learning	1	2,70
	Subtotal	11	29,73
Total		37	100

In Table 4, it is seen that environmental gains are more intense (70.27%). Statements about providing deep learning (21.62%) come first in the academic theme (29.73%). Based on the qualitative data, it can be said that forest education can contribute to the academic success of vocational high school students as well as their affective and cognitive skills towards the environment.

Discussion and Conclusion

In this study, the positive effects of forest education on vocational high school students who can have a say in human-environment interaction were determined. The data obtained with the

environmental attitude scale show that forest education permanently increases the environmental attitude of vocational high school students. An increase in environmental attitude can form the basis of a pro-environmental behavior. There are studies in the literature reporting the positive effects of forest education on affective aspects. Brown (2003) reported that when individuals' interest in the forest increases, their participation in forest-related decision-making processes increases. It has been stated that recognizing the forest and exploring ecosystems contributes to developing emotional bonds with nature (Kohler et. al., 2005; Hæggström, 2019; Harris, 2021). Kowasch et al. (2022) emphasized that forest education increases self-responsibility.

When the effect of forest education on sustainable environmental awareness is examined, the score increases in both the post-test and permanence test are significant. These results suggested that the students internalized sustainable environmental awareness through forest education. This finding is compatible with studies in the literature (Hadjichambis et al., 2020; Evans & Achiam, 2021) reporting that out-of-school education supports environmental awareness. Kurtulus et al. (2019) stated that the level of environmental awareness affects the consumption of organic products. Increasing environmental awareness among vocational high school students may lead them to pro-environmental initiatives in their professional careers.

Vocational high school students stated that the forest education they experienced mainly contributed to the environment. This finding supports the quantitative increase in environmental attitudes and sustainable awareness levels. Pöllænen et al. (2011) determined that pre-service teachers' forest perceptions were positively affected after they received forest education. In addition, the qualitative data obtained show that forest education, which is designed independently from the curriculum, provides academic contributions. Indeed, if the individual is properly motivated and supported, he or she can learn actively through observation (Bandura, 2001). In order for vocational high school students to be able to make pro-environmental initiatives in their professional careers, it is important that they can see the relationship between their professional fields and the environment, as well as environmental knowledge. As a result, it can be said that forest education designed with an interdisciplinary approach positively affects the environmental awareness and attitudes of vocational high school students who can be the decision makers of the future. Öhman and Sandell (2015) determined that outdoor learning

encourages individuals to act pro-environmentally. Furthermore, people's recognition of nature is an important step in reducing environmental problems (Ives et al.,, 2018).

It is very important to recognize the close ecosystems where economic, social and environmental factors coexist. The contribution of forest education to different age and occupational groups can be examined. In order to encourage sustainable behaviors towards the environment, the gains to be obtained with forest education can be included in vocational high school education programs.

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