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Students' Views on the Ethnobotany-Based Nature Education Program and Their Attitudes towards the Plant *

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Abstract

The aim of this research is to determine Students' Views on the ethnobotany-Based Nature Education Program and the impact this program makes on their attitudes towards the plant. The research was conducted on 7th-grade students in a state school in İstanbul. 15 ethnobotany based activities were performed throughout Nature Education. The data collection tools were: an activity evaluation form composed of open-ended questions and conducted at the end of each activity, a Plant Attitude Questionnaire conducted both before and after the implementation and semi-structured student interviews (n=5) performed at the end of the implementation. The answers students gave on the evaluation form and in interviews were analyzed qualitatively in order to determine their views on the activities. The themes formed as a result of data analysis were demonstrated within the tables. The data collected through the Plant Attitude Questionnaire were analyzed quantitatively. At the end of the research, it was found out that most of the students have positive views on ethnobotanic based activities. Moreover, it was revealed that students' scores of the attitudes towards the plant demonstrated a meaningful change throughout the study. The data collected with the help of the research were discussed and some suggestions were presented.

Keywords: Nature education, middle school students, plants, attitude

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* This study was conducted within the Tübitak 4004 Nature Education and Science Schools Project.

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INTRODUCTION

For years, the human being has benefited from plants in various fields such as nutrition and health. Even though it evolved within time, this knowledge acquired through the method of trial and error has been continuously used and every region has its own plants reckoned as useful. (Ecevit Genç, 2003). Especially in Anatolia, the use of plants has been a culture and continued through centuries (Demirci, 2010). Every culture has used plants in its own way and a plant benefited in health in culture has been used only as food in another. Turkey has a rich culture in terms of making use of plants.

Ethnobotany can be briefly explained as the knowledge possessed by residents of a region to be used to benefit from the plants around them. Ethnobotany is a branch of science that puts importance on issues such as health, nutrition and things to be done for the preservation and sustainable use of natural resources (Demirci, 2010). It is essential to preserve the plant species used for various intentions for many years in Anatolia for our new generations and to transmit this knowledge to them more effectively (Kızılarslan, 2008). So, it is necessary to give our new generations the consciousness of using plants in different fields and to prevent this culture to disappear.

Today, the unwanted side effects of the medicines used for the treatment of ailments caused to rethink the use of plants in health. The plants we use for treatment are being used throughout the world, essentially in Europe and The US (Saya et al. 2000). There are almost 600 plant species grown in Turkey that are used for treatment (Öztürk & Özçelik, 1991). Using these plants properly has great importance so as not to end up in bad results.

The number of scientific works on the use of wild plants with the aim of treatment, nutrition, and others has been rising day by day (Aktan, 2011). Therefore, there are many programs on the media about beneficial plants. However, the fact that the information is not always given by an expert has made it necessary for students and so the society to be cautious while choosing what they watch.

In order to provide students with meaningful and permanent learning in science, their learning environments both in and out of the school are designed according to the learning strategy based on investigating and questioning. Within this context, informal learning environments (science museums, art museums, and archeology museums, zoos, natural environments, etc.) are being benefited (MEB, 2013).

Informal learning contains all kinds of daily life activities such as the family, workplace, various communities and sightseeing activities (Golding, Brown & Foley, 2009). According to Çavuş, Topsakal, and Kaplan (2013), informal learning is the sum of all learnings that occur naturally and comes through the experiences of the individual. So, learning environments out of school are evaluated as informal learning. Out of school education contains the activities that are difficult or impossible to perform within the class and it is a set of teaching methods and strategies used for reaching the aims at the curriculum (Payne, 1985).

The goal of Education is not only to make a change in students' behavior but also to help them gain the consciousness to fight against the problems they face and the appropriate behavior to reach a solution (Yücel & Morgil, 1999). When we take a look at the learning fields in Science lesson curriculum which was prepared with a constructivist approach, it can be observed that environmental education has been given more importance in recent years. According to Erol and Gezer (2006), with environmental education, students are aimed at acquiring essential skills to perceive ecological balance and their roles in this balance, to have an idea on how to live in harmony with the environment and to become an active and a responsible individual.

There are many lifelong learning places to receive environmental education. These places can be not only family, school or social environment, etc., but also places such as jungle, parks, botanical gardens, experiment-observation gardens, herbariums and arboretums which are equipped for

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environmental education and students can do experiments and observations in. These institutions give people information about the specifications of these plants and awareness of the environment by exhibiting the plant samples of the country (Şat, 2006). It has gained great importance to provide this awareness in our people since our country stands in an important position in the world in terms of its fauna and flora.

For individuals to become knowledgable and conscious and acquire positive attitudes about the environment, environmental education should be started at preschool and continued through primary education (Uzun & Sağlam, 2007). For children, a permanent environmental education can be provided during real-life experiences and determined by what kind of a relationship, they think, they have with the environment. Experiences in nature help students gain confidence and build relationships with the environment. This informations and skills they get, their perception of both themselves and nature, guide them through the rest of their lives for protecting the environment (Güler, 2009)

There are a number of studies on out of school learning environments within the literature (Smith, Steel & Gidlow, 2010; Bozdogan & Yalcin, 2009; Carrier, 2009; Fields, 2009; Atkins, Velez, Goudy & Dunbar, 2008; Guisasola, Morentin & Zuza, 2005). Studies on environmental education were faced within the body of literature (Eryaman,Ozdilek, Okur, Cetinkaya & Uygun, 2010; Oweini & Houri, 2006; Ozdilek et. all. 2012; Makki, Khalick & Boujaoude, 2003; Bradley, Waliczek & Zajicek, 1999; Kuhlemeier, Van den Bergh & Lagerweij, 1999; Worsley & Skrzypiec, 1998). These studies emphasize the importance of environmental education. It has been seen that environmental education helped individuals learn about nature, improve their inclination to nature, be more sensitive and conscious, become more independent and creative and think critically.

Despite the positive effects of out of school environmental education, it is observed that teachers employ few out of school activities (Carrier, 2009). This study is considered to be an example for educators and raise awareness. It is important to determine students' views on nature education. Education to be planned may be shaped in accordance with student views. Moreover, it is considered that students will love and protect nature provided that they develop a positive attitude towards the plant. The aim of this study is to determine Students' Views on the Ethnobotany-Based Nature Education Program and the impact this program makes on their attitudes towards the plant.

METHOD

Research Design

Single group experimental design was used in the study. Plant Attitude Questionnaire was conducted on students as the pretest and post test and it was evaluated if there was a difference in students' attitude towards plants. Following each activity, an activity evaluation form was given to find out students' views on nature education. And also semi-structured student interviews were performed.

The research was done in Autumn 2017-2018 school year and executed in 5 days. A six hours programme was implemented each day.

Research Group

The town for research group was determined randomly. The research group of the Project consists of 7th graders in 5 different secondary schools in Bayrampaşa, İstanbul. 6 successful students with restricted opportunity were detected by the management of each school. The reason to prefer İstanbul is the fact that in contrast to its fame as a concrete dump mega city, Istanbul owns respectable rich vegetation throughout the world. There are approximately 2500 plant species in Istanbul, which outnumbers the floras of The Netherlands and Britain.

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Research Instruments

"Plant Attitude Questionnaire", developed by Fančovičová and Prokop (2010) and adjusted to Turkish by Özel, Sürücü, and Bilen (2013), was employed to evaluate students' attitude towards plants. Turkish version of the Questionnaire contains 29 items and four dimensions. These are 1) Importance 2) Relation 3) City trees and 4) Usage. Items number for dimensions are; 9 items for "importance", 6 items for "relation", 10 items for "city trees" and 4 items for "usage". The Questionnaire is 5 point Likert scale type and items are categorized as "strongly agree", "agree", "no idea", "disagree", "strongly disagree". According to 4 dimensions obtained as a result of an adjustment to Turkish, it was found as α=.80 for the dimension "relation", α= .61 for the dimension" importance, α= .67 for "city trees" and α=.65 for "usage". The questionnaire was conducted as the pretest and post-test before and after the implementation.

Another data collection tool is an activity evaluation form. An activity evaluation form was developed to find out students' views on the activities performed. It was prepared as open-ended questions in order to examine student views deeply. Open-ended questions provide the researcher with great flexibility in going into a subject in detail (Yıldırım & Şimşek, 2005). Items of the form were checked by four faculty members expertise in science education and two science teachers. The form finally shaped by the views of the experts. There are four items in the final version of the activity evaluation form. These items are: "The things I learned during this activity or trip", "The most enjoyable parts of this activity or trip", "The points that I faced difficulty in this activity or trip " and "My suggestions for this activity or trip to be better". Students were asked to answer these questions and students were given 450 evaluation form for fifteen activities.

Also, in this study, semi-structured interviews were used. Each interview was about 15 minutes. One most interested student was chosen from each school and five students were interviewed totally. Students' views on the trips, experiments, and activities were obtained verbally by the help of interviews. The interview is a technique to gather information via verbal communication (Karasar, 2008). It is emphasized that interviews are an effective method of acquiring data on an individual's attitude, views, complaints, emotions and believes (Briggs, 19986). There six questions in a semi-structured interview form: "What have you learned during the trips in terms of valuing and caring about the environment?", "What is the moment that you were most impressed during the project? Please tell us", "What do you think about out of school science activities?", "When did you have difficulties during out of school science activities? How did you overcome these difficulties?", "What did you learn at the end of the Project?", "What would you like to be changed if you were to attend a Project like this again?". Interviews were recorded and analyzed with a content evaluation method.

Procedure

During the implementation, trips were organized to Zeytinburnu Medical Plants Garden which is the first medical plants garden in Turkey and Nezahat Gökyiğit Botanical Garden. During these trips, in addition to the observations they made in plants' own environment, students also attended various activities in which they had a chance to witness different use of plants. Furthermore, ISTE ethnobotany collection and herbarium collections were visited and students were given an awareness of ethnobotany. Various experiments were conducted in addition to the trips. some different methods such as computer-assisted visual materials and games, in which students are supposed to participate actively, were used in the activities.

In this study, fifteen activities were developed to help students gain an awareness of ethnobotany. Each activity was performed by an expert in the field.

The activities performed during nature education and their goals are given in the order in Table 1.

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Table 1. Activities performed during the programme and their goals.

Name of the activity	The goal of the activity	Place of the activity
1. Let's explore the world of plants	To make students observe outer morphological features of plants and perceive that they have very different morphological features from each other.	Laboratory
2. Travel to the inner world of plants.	To make students perceive that plants have anatomical and invisible structures different from each other even though they have same visible outer features and so, that they should receive help from an expert while making use of plants.	Laboratory
3. The game of plant diagnosis method: Is every needle-leaved a Pine tree?	To make students perceive that plant names as known among people may be misleading sometimes. To make them realize that plants with the same regional names may be different plants. So, to teach them they ought to be careful while using plants for health or nutrition.	Campus Garden
4. How do we use plants?	To tell students how people make use of plants, by having them see ethnobotany collection which exhibits the plants' usage features.	Ethnobotany collection visit
5. Medicines and Plants	To make students perceive the importance of plants in medicine and to teach how people have benefited from plants for health.	Laboratory
6. Health-friendly wools	To find an answer to the question of where and how to use natural herbal wealth and to dye wool with natural methods by using different parts of different plants, to teach that plants can be used for various goals.	Laboratory
7. Let's learn about Herbarium	To show the samples of medical plants at Herbarium, to make them perceive what herbariums are.	Herbarium Visit
8. Let's see the first medical plants garden in Turkey	To introduce medical plants, to teach effective and safe use of medical plants, to raise awareness of making use of medical flora.	Medical Plants Garden visit
9. I've been Gardener	To have students experience gardening such as wiping out feeds, dead leaves, plantation, cleaning out and ornamenting tree bowls, compost blending, watering, planting, reproduction of perennials and replacing plants.	Medical Plants Garden
10. Which organ of the plant is it that I eat?	To give the awareness that plants have various fields of use and food is one of those.	Medical Plants Garden
11. Hidden heaven in the middle of a highway	To make students perceive the scientific way of the botanical garden and by visiting and observing the garden, to teach them different motives of nature, the effect of the climate on plants and the scientific works done in the garden.	Botanical garden visit
12. Let's make paper	To strengthen the consciousness that trees are used in making of paper which is one of the fields of plant use. To teach what recycling and how necessary it is by making papers.	Botanical garden
13. Treasure hunt	To strengthen the consciousness in students on plant diversity, plant parts, protection of nature and improve creativity with art designs.	Campus Garden
14. Let's learn about the plants	To teach what starch is and that it is used for medicines and nutrition. To introduce the plants which are a source of starch.	Laboratory
15. Fragrant teas	To show and make them perceive that teas we drink are prepared from different parts of plants and the points to be careful with while using medical herbal teas.	Laboratory

The tools used in the activities can easily be found and used. With discussion parts during the activities, active participation was managed. Each activity was performed in its most suitable place. While some activities were held in laboratories, others were done at trips or out of the school environment.

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Data Analysis

The data were analyzed with the SPSS program to see whether the change in students'attitudes towards plants was meaningful. Since the data distribution provided the normality hypothesis, the T-Test was chosen for analysis.

The activity evaluation form and the data gathered in the interviews were put to content analysis. The results obtained were demonstrated within the tables. The forms used during the research were firstly rated by one researcher and then 20 of them were rated by the other researcher. The interrater reliability coefficients between the scores both raters gave were found out to be 0.95.

RESULTS

The Results Related to the Plant Attitude Questionnaire

After it was discovered that the data distribution provided the normality hypothesis, Paired sample T-Test was chosen for data analysis. Table 2 demonstrates the T-Test results.

Table 2. T-Test results of the average scores for the attitude towards the plant.

	N	Mean	S	sd	T	p
Pre-test	30	85.8	5.88	29	9.05	0.00
Post-test	30	122.3	6.66			

As seen in Table 2, The Ethnobotany-Based Nature Education has a positive impact on students' attitude towards the plant.

The Results Related to the Activity Evaluation Forms

The findings related to the views of students on the activities were presented in this part. The themes obtained as a result of data analysis were demonstrated in tables. Table 3 demonstrates students' views on what they learned from activities.

Table 3. What students learned from activities.

Categories	Codes	f
Instructional outcomes	Learning morphological features of plants	30
	Learning appropriate names of plants	89
	Learning appropriate use of plants	146
	Learning how to grow plants	30
	Learning how to dye the fibre	30
	Learning what starch is used for	21
	Learning plant diversity and plant parts	46
	Learning how to make tea and use appropriately	27
	Growing plants in Botanical Gardens	5
	Learning about Herbarium	8
	Learning about Recycling	29
Individual Development	Raising environmental awareness	97
	Gaining problem-solving skills	25
	Gaining communication skills	64
	Ability to use creativity	12
	Loving plants	54
	Gaining plant awareness	72
	Learning to help each other	9

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As seen in Table 3, in the category "what students learned from the activities", the highest frequency is seen in the category of "Learning appropriate use of plants". Students think that The Ethnobotany-Based Nature Education informs about the use of plants.

Table 4, demonstrates students' views on their reasons why they found the activities enjoyable.

Table 4. Students' reasons why they found the activities enjoyable

Categories	Codes	f
The conditions related to the content of the activities	Being taught with games	156
	Group works	98
	Being taught different things	52
	Making an examination with a microscope	19
	Sticking plants on a carton	4
	Collecting plants	7
The conditions that are not directly related to the content of the activities	Producing something	12
	Going on trips	36
	Thinking freely	5
	Working at Labrotary	29
	Instructors' being entertaining	11
	Having time with friends	23

The frequency mostly seen in Table 4 is "Being taught with games". Students' learning with games helped them entertain.

"The points where students had difficulty in" was answered as "No" by the students.

Table 5 demonstrates students' views on the points they had difficulty in.

Table 5. The points students had difficulty in

Categories	Codes	f
The conditions related to the content of the activities	That it requires thinking	14
	Finding the informative part at the beginning boring	20
	Having difficulty in answering the questions	6
The conditions that are not directly related to the content of the activities	Being not able to use handcraft	3
	Focusing the microscope	2
	Short activity duration	19

As seen in Table 5, the most frequent response is that they found the informative part at the beginning boring. Students preferred interactive environment rather than presentation during content transfer. What is more, when the whole table looked at, it is seen that the number of negative responses is less.

Table 6 demonstrates students' suggestions for activities. Some of the students answered this question as "No".

Table 6. Students' suggestions for activities

Categories	Codes	f
The conditions related to the content of the activities	Shortening the informative part	15
	Increasing the number of games	51
	Increasing the time for trips	35
	The colored paper could be done in papermaking	1
The conditions that are not directly related to the content of the activities	Increasing the time	8
	Doing a second of the activity week	43

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When students' suggestions are looked at, most of the students wanted the number of games increased and the activity week to be repeated.

The Results Related to the Semi-Structured Interviews

Student responses were presented in categories with examples from student responses at the end of the interviews.

The students interviewed in the category of "the contribution of the activities to valuing and caring environment" expressed that they have become more caring about the environment, they have gained awareness of the environment, they have understood benefits of plants and that plants are supposed to be used appropriately to be healing.

Examples from student responses in this category are as follows:

"*From now on I know what some plants are useful for. I will use more carefully*" (Student 2, girl)

"*We have numerous beauties around, so we should know its value. We should benefit from nature in every field*." (Student 5, boy)

In the category of "the points that activities impressed students", the codes extracted from student responses are: doing gardening, dying fibre, making paper, learning the plants of the field used, herbarium visit. Some examples from student responses are as follows:

"It was interesting to make paper. They gave the paper I made to me and I showed it to my parents. I told them too." (Student 1, girl)

"I was impressed at the herbarium visit. I would like to deal with plants in the future and do studies here too." (Student 2, girl)

In the category of "students' views on the out of school activities ", it was found that all the students interviewed liked out of school activities. Students expressed that kind of activity and trips were useful and they wanted them all the time. Some examples from student responses are as follows:

"*We did a school trip only once and it was a picnic. I wish this kind of activities were always done. I would like to attend if this was done again. I have learned much.* " (Student 3, boy)

"*Out of school trips are quite useful I think. I have been to new places and learned many things.*" (Student 4, girl)

At the end of the implementation, in the category of "What students learned", they expressed that they learned about plants, they learned working at the lab, using a microscope, benefits of plants, making tea, the importance of recycling, growing plants and they have made new friends. Some examples from student responses are as follows:

"*I have used a microscope for the first time. I have learned many things at the lab. I examined plants and saw closely*." (Student 3, boy)

"*I have learnedto plant in the Let's be a gardener activity. We have seen toxic plants. So we mustn't eat every plant without knowing well.*" (Student 5, boy)

In the category of "the points of the implementation that students asked to be changed", it was concluded that they want the time of the activities presented with games be

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increased and the informative parts without activities to be shortened. Some examples from student responses are as follows:

"*It would be better if the activities in which we played games were longer. We had a great time.* " (Student 1, girl)

"*At the beginning, we were given an informative presentation. I think that part was boring. It would be better it was shorter*." (Student 4, girl)

Students made more constructive criticism rather than negative responses in this category.

DISCUSSION AND CONCLUSIONS

At the end of this study, it was found that students developed a meaningful positive attitude towards the plant. Depending on the findings of this study, it can be concluded that The Ethnobotany based nature education is effective on the attitudes of 7th grader students towards plants. Furthermore, students have positive thinking about The Ethnobotany based nature education. According to the findings both from open-ended questions and semi-structured interviews, students find the education useful. In addition, students stated that they wanted the activity week to be done again. That's why it can be inferred that students found the education useful and they loved it.

In this study with a nature education implementation, the fact that students make concretization through observations and experiments, perform activities, learn by fun may be the factor affecting their thoughts on activities and their attitudes towards the plant.

Similar to the findings of this study, Fančovičová and Prokop (2011) found out that 5th-grade students who attended out of school education program on plants had also enhanced their knowledge and attitude towards the plant.

Patrick and Tunnicliffe (2011), states that students can not learn about plants directly from the school. So, it is thought that students' attitude towards plant and their perception of nature can be changed by out of school activities related to plants during which they touch plants and obtain experiences. Students' learning by doing and experiencing will provide them with permanent knowledge.

For individuals to become knowledgable and conscious and acquire positive attitudes about the environment, environmental education should be started at preschool and continued through primary education (Uzun & Sağlam, 2007). If students are given the conscience with nature education from lower ages, they are considered to grow as more respectful individuals towards nature.

It is also essential to give individuals a conscience on the appropriate use of plants. Individuals should be educated from childhood in order to prevent unconscious or wrong plant use.

Depending on the findings of this study, by increasing the number of projects on nature education, it can be possible to raise nature awareness among students.

Teachers should inject the love of nature through nature trips and classroom activities. The number of laboratory studies should be increased. Students should be given the chance to learn freely about nature.

One of the limitations of this study is that the implementation was performed with only 7th grader students. Similar implementations may be done with other grades. Another limitation is that it was performed with only these fifteen activities. Out of school activities and trips similar to these activities may be organized by educators. In addition, there is not a control group in this study. A

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similar study may be conducted with two groups and the effectiveness of the implementation can be determined quantitatively.

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