EFE GÜNTÜRKÜN

ENVIRONMENTAL EDUCATION PREPARATION IN PRE-SERVICE TEACHER PROGRAMS IN TURKEY

A MASTER'S THESIS

BY

EFE GÜNTÜRKÜN

THE PROGRAM OF CURRICULUM AND INSTRUCTION
İHSAN DOĞRAMACI BILKENT UNIVERSITY
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2016

To my family

ENVIRONMENTAL EDUCATION PREPARATION IN PRE-SERVICE TEACHER PROGRAMS IN TURKEY

The Graduate School of Education

of

İhsan Doğramacı Bilkent University

by

Efe Güntürkün

In Partial Fulfilment of the Requirements for the Degree of

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İHSAN DOĞRAMACI BILKENT UNIVERSITY

GRADUATE SCHOOL OF EDUCATION

Environmental Education Preparation in Pre-service Teacher Programs in Turkey

Efe Güntürkün

May 2016

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Curriculum and Instruction.

Asst. Prof. Dr. Jennie Farber Lane

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Curriculum and Instruction.

Assoc. Prof. Scott Ashmann

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Curriculum and Instruction.

Prof. Dr. Margaret K. Sands

Approval of the Graduate School of Education

Director: Prof. Dr. Margaret K. Sands

ABSTRACT

ENVIRONMENTAL EDUCATION PREPARATION IN

PRE-SERVICE TEACHER PROGRAMS IN TURKEY

Efe Güntürkün

M.A., Program of Curriculum and Instruction

Supervisor: Asst. Prof. Dr. Jennie Farber Lane

May 2016

The purpose of this study is to gain insights into how environmental education is implemented into pre-service teacher preparation in Turkey. The format of the courses, their duration, the strategies that are being used, and suggestions to improve these methods were explored. In addition to these data, the missing points in the environmental education in the faculties were analyzed. Two data collection tools were used in this study. One instrument was a questionnaire that was adapted from Ashmann (2010) and the other was an interview designed to ascertain important points of environmental education delivery and to learn suggestions for improving environmental education. The questionnaire was administered to 29 faculty members from institutes that offer teacher education programs in Turkey. The response rate of the questionnaire was 24.14% with seven responses out of 29. The interviews were one with four of the instructors who responded to the questionnaire.

One of the most remarkable findings of this study is that environmental education is considered an important subject by instructors who put efforts into their courses. However, the low response rate indicates there is a lack of interest in participating in studies to assess environmental education.

Key words: Environmental awareness, environmental education, environmental literacy, pre-service teacher preparation, implementation, barriers and challenges

ÖZET

Türkiye'deki Öğretmen Adaylarına Verilen Çevre Eğitimi

Efe Güntürkün

Yüksek Lisans, Eğitim Programları ve Öğretim

Tez Yöneticisi: Yrd. Doç. Dr. Jennie Farber Lane

Mayıs 2016

Bu çalışmanın amacı çevre eğitiminin Türkiye'deki öğretmen yetiştirme programlarına nasıl dahil edildiğinin içyüzünü anlamaktır. Bu bağlamda derslerin formatı, süresi, uygulanan methodlar, bu methodların nasıl geliştirilebileceği araştırıldı. Bunlara ek olarak, çevre eğitiminde eksik kalan yönler de analiz edildi. Çalışma kapsamında iki adet veri toplama aracı kullanıldı. Bunlardan ilki Scott Ashmann (2010) tarafından kullanılan ve bu çalışmaya yönelik olarak üzerinde değişiklikler yapılan bir ankettir. Anket 29 öğretim görevlisinden veri toplamak için kullanılmıştır. İkinci veri toplama aracı ise, 29 kişi arasıdan seçilen dört kişi ile yapılan sözlü mülakattır. Sözlü mülakat verilen çevre eğitiminin önemli noktalarını detaylandırmak ve bunların hangi yöntemlerle geliştirilebileceğini anlamak için yapılmıştır. 29 kişi arasından yedi kişinin cevaplaması ile anketin cevaplanma oranı %24.14'tür.

Bu çalışma kapsamındaki en dikkat çekici bulgulardan biri öğretmen eğitimcilerinin

çabaları dahilinde çevre eğitiminin önemli bir ders olarak görüldüğü; ancak buna rağmen çevre eğitimi ile ilgili akademik çalışmlara olan ilginin oldukça az olduğudur.

Anahtar Kelimeler: Çevre farkındalığı, çevre eğitimi, çevre okur-yazarlığı, hizmet öncesi öğretmen eğitimi, dahil edilme, engeller ve zorluklar

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TABLE OF CONTENTS

LIST OF TABLES

Table Page

LIST OF FIGURES

Figure Page

CHAPTER 1: INTRODUCTION

Introduction

Environmental Education (EE) is a field of study that focuses on environmental awareness and on environmental problems and their solutions. In formal education, EE should begin at the elementary school level and continue until the end of high-school. Effective EE delivery can be provided by educated and knowledgeable teachers (Schmidt, 1996). However, education faculties in Turkey face many challenges in order to integrate EE into their four-year curricula. This study aims to identify if, where, and how EE is included in teacher education programs in Turkey.

This chapter includes background information about the study, the problem, and the purpose. The research questions are introduced in this chapter as well. The following background provides reasons for the investigation.

Background

In Turkey there is a lack of environmental consciousness. Too often, people do not respect the outdoors and litter or throw trash from their cars. Although local municipalities have some regulations and about waste management and keeping streets clean, these regulations and applications are not implemented nationally. According to Turkey's Ministry of Foreign Affairs website (www.mfa.gov.tr), the country is facing significant energy and water issues. Energy consumption is increasing and there are threats from droughts and flooding. There are a variety of ways to encourage people to behave responsibly toward the environment. The government can pass laws and enforce regulations. However, it is best if people act

responsibly because they appreciate the importance of nature and value it as a natural resource.

Through EE, people become more aware of the natural world, recognize environmental issues, and learn skills to help protect and improve the environment. For EE to be successful, effective teachers are needed. Unfortunately, according to NEETF (National Environmental Education and Training Foundation) and Roper:

> The majority of Turkish pre-service teachers do not possess enough knowledge to be classified as having an acceptable level of environmental knowledge. Slightly less than half of the pre-service teachers (49%) received a passing grade, based on the NEETF and Roper Starch grading scale (as cited in Tuncer et al., 2009, p.433).

For effective EE, teachers should be environmentally literate; however, this study reveals that pre-service teachers are not receiving the education they need to support their own environmental literacy.

Concerns about pre-service teacher environmental knowledge is not limited to Turkey. Research by McKeown-Ice (2000) in the US, where some states have EE requirements for teacher certification, identified reasons why teachers' environmental education experiences are lacking. These reasons include: budget limitations, lack of faculty interest/knowledge, institutional tradition, lack of professional association guidelines and standards, lack of state certification guidelines, and limited student interest/demand. Faculty interest or knowledge and state certification guidelines were ranked as the first two most influential factors in her study.

Problem

There are no EE certification guidelines in Turkey and no clear picture of how pre-service teachers in Turkey receive preparation in EE. In Turkey pre-service classroom teachers, who will work with grades one through four, are required to take a course related to EE (YÖK, 1998). Science and technology pre-service teachers receive an integrated environmental education in a course called "Special Subjects in Science I". For biology pre-service teacher education program, EE is not clearly described in the document that YÖK published in 1998, but many environmental topics are included in their courses.

The majority of the teacher education programs around Turkey offer EE as an optional course. Only a few consider EE as a required course that students have to successfully complete in order to graduate. Furthermore, there is not a clear picture of how these courses are conducted, including course content and what resources are used.

Purpose

The purpose of the study is to gain insights into environmental education in pre-service teacher preparation in Turkey. This will be done by predominantly qualitative research methods, supplemented with some quantitative data.

The data will launch an inventory of where and how EE is included in pre-service teacher education programs in Turkey. The intention is to understand how EE is being covered, which methods are being used and considered useful by the instructors, and what might be their opinions and suggestions about the status of EE in Turkey.

Research questions

The main research question for this study along with three sub-questions is provided below:

How do pre-service teacher education programs in Turkey prepare teachers in environmental education?

- How is environmental education included in teacher education programs?
- What teaching methods are used for environmental education in these programs?
- What resources are used for environmental education in these programs?

Significance

Children in today's world are facing major environmental problems, including water shortages, toxins entering the food supply, and global climate change. These children will need the knowledge, skills, and dispositions to face and address such issues. They will also need to learn how to prevent problems from occurring and how to live sustainably in and with the world. The main place children can learn these skills are in school and from their teachers.

Unfortunately, lack of environmental knowledge and the competency of teachers may become a challenge in providing children with a robust environmental education (EE) experience. Furthermore, these teachers do not necessarily receive the education they need to become competent during their teacher preparatory years. Khalid (2003) conducted a study to investigate challenges to effective teacher preparation in EE in the USA. From the study, he learned that pre-service high-school teachers had misconceptions about the greenhouse effect, ozone depletion and

acid rain. He also found that they had difficulties relating one environmental issue to another, indicating that even students of science were not learning the systems thinking skills needed to understand environmental issues.

The present study will gain insights into the reality of EE in pre-service teacher education in Turkey and therefore contribute to the literature related to EE research in this country. Furthermore, this study will share information about resources and practices in EE that may be of use to instructors in faculties of education in Turkey

Definition of terms

Environmental awareness

- A person has knowledge, or perception, of an environmental issue, which includes their response to these issues (Ziadat, 2010).

Environmental education

- Environmental education is a lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, ethical awareness and sensitivity for the relationship between humans and the environment, and commitment to engage in responsible individual and cooperative actions. By these actions, environmentally literate citizens will help ensure an ecologically and economically sustainable environment. (WEEB, 2015)
- Continuous and lifelong process, based on interdisciplinary approaches, active participation and individual and group responsibility for the environment. (Tveitdal, 2005).
- Environmental education aims to develop skills and attitudes that would make the human race understand the relationship between the

environment and human impact on the environment. In order to take action to conserve the environment, people should understand how their decisions and actions affect the environment (IUCN, 1970).

Environmental literacy

- Environmental literacy is essentially the capacity to perceive and interpret the relative health of environmental systems and take appropriate action to maintain, restore or improve the health of those systems. (Tuncer et al., 2009).
- Environmental literacy is a function of individuals' increased sensitivity, knowledge, skills, attitudes and values towards the environment. (Tuncer et al., 2009).

Integration

- To intentionally design lessons to include concepts from a number of disciplines, including environmental education (Lane, 2006, p.187).

CHAPTER 2: REVIEW OF RELATED LITERATURE

Introduction

This study examines how environmental education is implemented in pre-service teacher education programs in Turkey. Environmental education is a required course in some of these programs but optional in others.

There are many environmental problems in the world such as oil spills and nuclear plant accidents; yet, Turkey continues to import oil and to build new nuclear plants despite protests from environmental activists. Other concerns related to environmental problems include health, safety, and habitat loss. Teachers need preparation in environmental education to learn how to address conflicting views regarding environmental issues.

In addition to providing a background of environmental education (EE) and the importance of EE in pre-service teacher education, the purpose of this chapter is to provide a context for understanding the necessity of EE in pre-service teacher education in Turkey. This context is provided by reviewing model examples from other countries. Also the status of pre-service environmental education in these counties or regions is provided.

Environmental education issues

What is environmental education?

According to the UNEP (United Nations Environmental Programme),

> Environmental education and training includes aspects related to a wide

> variety of environment and development issues that affect and are affected by human activities and natural phenomena. UNEP recognizes education as the primary agent for social change towards sustainable development (Tveitdal, 2005, p.6).

UNEP considers Environmental Education and Training for Sustainable Development (EETSD) a strategy for continuous lifelong learning that promotes a responsive and active approach for environment and environmental education.

In 1990, Hungerford and Volk cited the objectives of environmental education from Tbilisi Intergovernmental Conference on Environmental Education in 1977. The declaration of this conference states the objectives of EE are *Awareness, Sensitivity, Attitudes, Skills, and Participation.* The authors also defined the environmentally responsible citizen as follows:

> …one who has an awareness and sensitivity to the total environment and its allied problems [and/or issues], a basic understanding of the environment and its allied problems [and/or issues], feelings of concern for the environment and motivation for actively participating in environmental improvement and protection, skills for identifying and solving environmental problems [and/or issues], and active involvement at all levels in working toward resolution of environmental problems [and/or issues] (p.258).

Their theorized Behavioral Change System stated in the study shows that knowledge, along with awareness and attitudes change, and leads into constructive and meaningful action to resolve environmental issues.

In their study with first year teacher-training students from different regions of Israel, Pe'er, Goldman, & Yavetz (2007) stated that "individuals' environmental behaviors

reflect their environmental literacy" (p.46). They also noted that environmental literacy (EL) is similar to developing responsible environmental behavior, and individuals' behaviors reflect the level of their EL. In their study, the authors defined environmental attitudes as: "Psychosocial variables – including attitudes, personal responsibility, and locus of control" (p.46). The locus of control is defined in the study as "individuals' perception of their ability to bring about environmental change through personal behavior" (p.47). As a relationship between environmental knowledge, attitudes and background, the authors found that if mothers have a good education, it positively affects their children's environmental knowledge.

Related to responsible environmental behaviors is the connection between environmental education and sustainability (environmental education for sustainability [EEFS]). In UK, Tilbury (1995) uses the definition of sustainability from the World Conservation Strategy (IUCN/UNEP/WWF, 1980), which is:

> (a) the need for reconciliation between economic development and environmental conservation;
>
> (b) the need to place any understanding of environmental concerns within a socio economic and political context; and
>
> (c) the need to combine environment and development concerns (p.197).

As a holistic curriculum approach to environmental education, Tilbury stated that "environmental education cannot be claimed as a subject itself, rather it must be treated as a 'whole' concept that requires inputs from all parts of the curriculum" (p.1). EEFS challenges pupils on a personal level to change their lives, to engage them more in sustainability.

In 1992, UNESCO defined EEFS as a "basis for action" (as cited in Tilbury, 1995, p.203), and this action is designed to solve environmental problems under six categories; negotiation, persuasion, consumerism, political action, legal action, and ecomanagement (physical activities to improve the environment, such as cleaning up litter or building a nature trail). In addition to Environmental Education (EE), some studies inquire into the status of Environmental Literacy (EL). In one study, (Srbinovski, Erdoğan & Ismaili, 2010) analyze the objectives of science education curriculum in Turkey. The researchers divided the components of EL into 40 sub-components. They also assumed that EL is the "ultimate aim of EE."

Need for environmental education

In Turkey, Özsoy (2012) summarizes the current situation of the world by saying that, "by the 20th century, humans realized that the Earth has limits and forcing these limits will impact human population negatively" (p.122). The researcher claimed that environmental problems are calling for solutions and the solution will come when we understand the consequences of our actions which cause harm to the environment. This understanding can be achieved through EE. According to Özsoy:

> increasing global population and unrestrained consumption of natural resources has resulted in increasing pollution, poor air and water quality and the extinction of animal and plant species. Environmental education is the most effective way to educate children about these issues (p.121).

From the US, Lin (2002) emphasizes that EE is "continually identified as one of the key agents of change, classroom teachers play an important part in promoting and improving the capacity of individuals to address environmental and development issues and problems*"* (p.200). The researcher also states that classroom teachers have

a great importance in the implementation of EE in schools.

Implementation of environmental education has significant importance for a sustainable future. A project called “Children’s Environments Project” in Australia was featured in a study by Malone & Tranter (2003). Their research explored the potential of school grounds to provide natural learning environments for children throughout their school day. This project is a good example of why environmental education should be implemented in education. Playing in the school grounds is considered as an environmental education and it promotes the development of social, physical, and cognitive skills. Also, children acquire environmental knowledge through direct and indirect contact with nature and natural settings.

In a study by Srbinovski, Erdoğan & Ismaili (2010), the researchers analyzed “which education objectives in the science education curriculum in Turkish and Macedonian schools addressed the EL, and how this attention differed between Turkey and Macedonia” (p.4529). They found that Turkey does not consider EE as a separate course, however in Macedonia it is an independent elective course. “In Turkey, environmental education is realized under the curriculum of science and technology course” (p.4530). In Macedonia the skill and affective components are poorly integrated and behavior is not addressed at all. The conclusion was that both countries need to examine and improve how they include EE in their children’s education.

Pe’er, Goldman & Yavetz (2007) assessed the environmental literacy of high-school graduates enrolled in teacher training programs in Israel. They learned that students do not have a strong knowledge about the environment nor know how to address environmental issues. The authors claimed that two situations may cause this kind of

problem: One of them is that current teachers may not be teaching EE effectively, the other one is that environmental studies are not a required course in K-12 curricula.

Following are several studies conducted in the United States. Khalid (2003) identified and described common misconceptions that are held by pre-service high-school science teachers about the greenhouse effect, ozone depletion and acid rain. The researcher has found that too many pre-service teachers possess misconceptions about the reasons and consequences of these three environmental problems. A study by Plutzer et al. (2016) revealed that although science teachers agree that climate change is an issue, their lack of understanding of the scientific processes involve can compromise student learning. The findings of both these studies emphasize the critical role EE plays in preservice teacher education programs.

As a result of their study of the EE teaching competencies of pre-service teachers, Schmidt (1996) supports that effective EE delivery can be provided by educated and knowledgeable teachers. Teachers need to be able to help students develop problem-solving skills to deal with environmental problems.

Powers (2004) interviewed 18 faculty members who teach social studies or science methods courses that incorporate EE. Powers says that every pre-service teacher should integrate EE into their teachings, and EE should be considered an important element at the primary school level.

Findings from a meta-analysis study of why environmental education should be included in pre-service teacher education

This section focuses on a meta-analysis conducted by Álvarez-García, Sureda-Negre and Comas-Forgas in Spain (2015). They analyzed 24 documents from around the world: 22 of them were peer-reviewed journals, and two of them were doctoral

theses. The major theme of their study was to review research that investigated the relationship between environmental education teaching competences and classroom teacher pre-service preparation. The researchers categorized the reviewed studies into four areas:

- analysis of the research on EE in pre-service primary teacher training (PsPTT)
- analysis of the research on training experiences in EE and education for sustainable development (ESD)
- proposals for models of EE in PsPTT
- integration of EE/ESD into the curriculums of PsPTT qualifications.

Their findings confirmed that EE in teacher training was essential for environmental literacy. The following are summaries of findings from selected studies in their meta-analysis. All the citations in this section are found in the reference list of Álvarez-García, Sureda-Negre, & Comas-Forgas (2015)

One of the studies they reviewed was research conducted by Miles, Harrison & Cutter-Mackenzie (2006) in Australia. Their study showed that students are interested in EE teaching, but their EE knowledge and preparation to teach it was inadequate.

Another study included in the meta-analysis was conducted by Puk & Stibbards (2010) in Canada. This study states that natural systems and the impact of social systems on natural systems are very important and they are considered as the essential elements in the training of future teachers. However, their study found that pre-service teachers lack understanding of these concepts.

A study by Goldman, Yavetz, & and Pe'er (2014) in Israel found a significant difference in environmental literacy between two groups: ones who are studying environmental subjects and the ones who are studying non-environmental subjects. The results of Goldman, Yavetz and Pe'er confirm the importance of EE being included in pre-service teacher education programs.

Authors of the meta-analysis also focused on studies that analyze effectiveness of models, programs, courses and methodologies that are implemented to train future primary teachers in EE/ESD. They analyzed the study of Bluhm & Hungerford (1976) that investigated how EE and ecology concepts are introduced into selected pre-service classroom teacher education program students in USA. According to the authors, when programs include environmental content, the EE competencies of teachers are improved.

Through their content analysis, Álvarez-García, Sureda-Negre, & Comas-Forgas (2015) were able to highlight studies that identified effective models, programs, courses and methodologies to train future primary teachers in EE/ESD. They recommended that teacher education programs should include a separate course on EE. Their overall conclusion was:

> the studies analyzed point to the undeniable role of teachers in the infusion of EE into schools as a tool to environmentally educate future citizens. However, for this education to be effective in schools, adequate training of pre-service teachers is needed so that those professionals gaining these qualifications can achieve the competencies of an environmentally educated person and the professional competencies of an environmental educator (p.81).

Turkish pre-service teachers' knowledge and perceptions

A number of studies have been conducted to learn about the environmental literacy of pre-service teachers in Turkey. Tuncer et al. (2009) examined teachers' environmental knowledge, environmental attitudes, perception of environmental uses, and environmental concern. Slightly less than half of the participants scored a good grade in environmental knowledge. On the positive side, the environmental attitudes of participants were identified as eco-centric. It is also evident that Turkish pre-service teachers have a clear understanding of how human activities affect the environment. According to Turkish pre-service teachers from the study, poor quality drinking water is the most important concern facing human society, followed by poor indoor air quality.

In a different study about environmental literacy in Turkey, Erdogan, Kostova, & Marcinkowski (2009) analyzed which science education objectives cover the six main components of environmental literacy (ecological knowledge, socio-political knowledge, knowledge of environmental issues, affect, cognitive skills, and environmentally responsible behaviors) in Bulgaria and Turkey. The authors noted that EE is one of the priorities of the European Union, where educator reformers advocate that EE is needed to raise public awareness and to prepare society to take the necessary precautions to ensure the sustainability of the future. The authors concluded, however, that unfortunately Turkey's rigid curricula and lack of teacher environmental competencies challenge effective integration of EE into school programs. Inclusion of EE into pre-service teacher education programs could address the latter challenge.

Özsoy (2012) researched Turkish pre-service science teachers' attitudes toward the

environment. She worked with 2015 pre-service elementary school science teachers at 13 universities around Turkey. The method of data collection in the study was a questionnaire that consisted of four dimensions: awareness of environmental problems, general attitudes toward solutions, awareness of individual responsibility, and awareness of national environmental problems. She found that pre-service teachers have positive attitudes toward the environment, but females expressed their opinions more strongly. Özsoy also learned that although attitudes were positive, awareness of environmental issues was limited. According to the study, pre-service teachers are aware of their own responsibilities and willing to change their lifestyle to live more sustainably.

The investigation conducted by Öztürk & Öztürk (2015) surveyed 134 pre-service teachers to ascertain their awareness of, and sensitivity about, both national and global environment problems. The questionnaire used for the study also asked teachers if they could identify activities that can promote consciousness and help find solutions for environmental problems. The results indicate that the majority of participants perceive that extensive usage of natural resources has created a number of environmental problems. The respondents credited the media (television and radio) for raising their awareness of the environment. They recognized that organizations that work to protect natural resources are important for societal well-being.

Environmental education implementation in pre-service education around the world

In Turkey, according to YÖK (1998), environmental education is already integrated into teacher education programs of two departments: pre-service classroom teacher education, and science and technology pre-service teacher education. However, in

biology pre-service teacher education the situation is not clear.

In Canada, Lin (2002) analyzed the incorporation of EE into primary and secondary school levels. Her gathered results show that EE is "incorporated as a part of science and social studies courses in elementary and secondary schools" (p.207).

A study by Nolet (2009) in the United States specified the importance of sustainability literacy in environmental education. He noted that "ecological sustainability relies on the overall moral improvement of society to bring human existence into balance with the rest of nature" (p.414). His conclusion was sustainability education is strongly related to environmental education.

In 1995, a study was conducted to understand the strengths and weaknesses of environmental education preparation in Wisconsin, USA. Lane, Wilke, Champeau, & Sivek (1995) surveyed 1,545 randomly selected teachers to assess teachers' perceived competencies in, attitudes toward, and amount of class time devoted to teaching about the environment. Strengths and weaknesses of teacher preparation in environmental education were concluded after the study. The researchers recommended that environmental education courses in teacher preparation programs should be assessed to determine how effectively they address all the components of environmental education.

The gap between actual and potential environmental education in pre-service teacher education was studied by Grace & Sharp (2000) in UK. Their study identified the aspects of actual rhetoric-reality and potential rhetoric-reality gap. They concluded that teachers have a positive attitude towards environmental education, but lack the skills to constructively involve their students in environmental activities.

Powers (2004) listed the methods that 18 social studies or science methods course

instructors from different regions of the United States use to teach EE concepts to pre-service teachers. In this study, participants were asked to discuss the possible methods to more systematically integrate EE into pre-service programs. A number of themes emerged from the analysis of the data, including the emphasis on EE as a vehicle for teaching all subjects. Powers also identified the following barriers to integrating EE into pre-service curriculum: limited time, student dispositions, and loss of EE when it is ineffectively or insufficiently integrated into methods courses. She noted that these challenges would need to be addressed to facilitate EE implementation.

The study of Van Petegem, Blieck, & Pauw (2007) gives the results of EE implementation in two Belgian teacher education colleges. The goal of this study was to enhance the EE awareness and competencies of future teachers. Many teachers lack insights into complex environmental issues. On the other hand, they see EE as an instrument for environmentally responsible behavior. The authors recommended that "to enhance future teachers' EE competencies, teacher training colleges must make long-term environmental education implementation (EEI) a priority in teacher education" (p.48).

In the study of Lin (2002), some of the Canadian pre-service teachers who participated in the study stated that their institutions offer separate EE methodology courses in their institutions, however the majority of the participants reported that in their institutions EE methodology is not given as a separate course. The participants of this study were asked to identify other methodology courses that are dealing with ecology or environmental concerns, the majority (60%) of the institutions stated that they do not offer such courses. In Lin's study, compared to other subjects in teacher preparation programs, EE was selected as a low priority for the participants.

Financial problems are identified as the most common barrier into implementing environmental education courses, which is followed by lack of time/space in pre-service teaching programs.

Studies that inventory implementation of environmental-education in pre-service teacher programs

In addition to studies about how EE is included in pre-service teacher education programs, several researchers have conducted studies to inventory institutions throughout a specific region (e.g., country, district, state) to gain a comprehensive understanding of EE implementation. Mastrilli (2005) was one of these researchers who identified the methodologies and strategies that are most frequently used by the faculties of environmental education in Pennsylvania, USA. In addition to the methodology and strategies, the author listed the instructional methods of environmental education in classroom pre-service teacher education students with their percentages of how frequently they were used. Educating about environmental issues was rated as the most often used method in EE which was followed by introducing environmental issues in class. Philosophy and history of EE, and conveying EE action strategies were rated as the least often used strategies in classroom pre-service teacher training.

McKeown-Ice (2000) identified and ranked the factors that influence environmental education in pre-service teacher education programs in the U.S. Her study included a sample of 446 institutions. The researcher concluded that EE is not generally institutionalized in pre-service teacher education programs and that implementation varies greatly among different institutions. She concluded that, sadly pre-service teacher education programs in the US are not preparing future teachers to be

effective environmental educators.

In 2004, a study by Heimlich, Braus, Olivolo, McKeown-Ice & Barringer-Smith identified how environmental education might be better incorporated into the teacher education curricula in U.S. They found that the most appropriate course to incorporate environmental education is the method courses. They noted that awareness of resources to teach EE is low. When they examined how different areas of EE were being addressed, they learned that principles and methods of environmental education were not being covered well in pre-service courses. They also analyzed the perceived barriers to integrating EE into the curricula and learned time is the most challenging factor.

Another implementation study was done in Belgium by Van Petegem, Blieck, Imbrecht & Van Hout (2005). The goal of the study was to build awareness of the importance of EE in teacher education programs. The study was conducted in two colleges, one with a long history of cross-curricular education and the other which had just started cross-curricular education. Two institutions were analyzed by using questionnaires, interviews, and focus-group discussions. The study focused on seven criteria for the implementation progress: participant engagement, instructor credibility, intention, functionality, self-efficacy, school climate, and evaluation. According to the researchers, the participants said that everyone should be involved in EE preparation but they are aware that this is not always the case. The faculty and students cited challenges with time and teachers' lack of knowledge in EE. The researchers said a positive finding was that the schools are collaborating to support each other's effort. They recommended that students and teachers work together in a team to integrate EE into the curriculum.

To date, no inventories of how EE is implemented in Turkish teacher education programs have been found in the literature. Although inclusion of environmental topics is required by the Council of Higher Education (YÖK), it is unclear if and how they are included. The current study is designed to provide a comprehensive view of how EE is implemented in teacher education programs in Turkey. To guide this research, the study by Ashmann & Franzen (2015) conducted to inventory EE pre-service teacher preparation in Wisconsin, USA was used as a model; therefore, their research is going to be reviewed more extensively below

Ashmann and Franzen conducted their research because "environmental problems are becoming more prominent in our society" (p.1). They also stated that there is an urgent need to develop the awareness, knowledge, attitudes, and environmental ethic of K-12 students to overcome environmental problems.

The goal of their study was to review the environmental education preparation of pre-service teachers in Wisconsin. The researchers first investigated the websites of teacher education programs within the state to identify the participants. Environmental educators, science education, and natural sciences faculty members, teacher education program chairperson or another administrator were chosen according to the presence in the faculty. Environmental educators were the primary option to choose for data collection. If an environmental educator was not present in the faculty, then a different faculty member would be chosen – most likely the science methods instructor.

The researchers sent an electronic questionnaire via e-mail to all selected participants. The recipients were asked to consider several issues. The main question was whether there was a specific course for EE or was EE integrated into all their

courses or both? If there was a specific EE course, the respondents were asked to provide information about how the course was organized, how long it lasted, and what methods were featured. Furthermore, if EE is a required course, was it only for science teachers or for all teachers? Regarding EE integration, the questionnaire included items to learn where and how EE was included in the program. In other words, into which courses were environmental concepts integrated?

Ashmann and Franzen worked with 33 different institutions around Wisconsin. The researchers compiled the data from both questionnaires and interviews. The questions from interviews were expected to clarify certain responses from the questionnaire and understand further ways of EE preparation taking place in their institutions. The researchers offered a stipend to keep response rate high for both survey and interviews.

There were some institutions that did not respond to the questionnaire even though the researchers sent a reminder twice. The researchers investigated the websites of these institutions for more information about their EE preparation. As a qualitative data analysis method, researchers used a coding technique to classify the collected data from the questionnaire and investigations of websites into a category: course-based or activity-based ways of EE. "Course-based means that EE components are included as a part of a course" and "activity-based way means that engaging in an activity (or set of activities) that may either be a part of a course or not will meet this requirement" (p.8). From the results of the data four trends emerged:

- there is no separate EE course in many of teacher training programs;
- it is up to the instructor whether to integrate EE into one of his/her courses or not;

- the connection between EE and social studies are weak; and
- most institutions do not track the impact of their EE.

The next chapter includes information about how their instrument was acquired and adapted to inventory EE implementation in Turkey. The methods include how Ashmann and Franzen's research design also guided the analysis of the data.

CHAPTER 3: METHODOLOGY

Introduction

The purpose of this study was to gain insights into environmental education preparation in pre-service teacher programs in Turkey. In pre-service teacher education for classroom teaching there is a required course called environmental science in the fourth semester of a four-year teacher preparation program. In science and technology pre-service teacher preparation, there is a course called "Special Subjects in Science I" in the seventh semester. Environmental science is addressed in this course (YÖK, 1998). Although the Council of Higher Education (YÖK) requires that pre-service classroom, science and technology, and biology teachers receive EE preparation, it is not known if and how these courses are implemented.

This chapter describes the methods that were used to collect data to address the research questions for this study. In addition to the research design, this chapter provides information about study population, the data collection instruments, and how the data was analyzed.

Research design

The current study was predominantly qualitative research, supplemented with quantitative data from a questionnaire. Deeper insights were gained from follow-up interviews that were recorded, transcribed, and analyzed qualitatively. In addition to these data collection methods, the non-responding institutions' websites were researched to learn contextual information about their EE courses. Since the purpose of this design was to gain preliminary insights into EE teacher preparation

nationwide, rather than to compare or contrast institutions, comparative statistical analysis was unnecessary. Permission to conduct this study was granted by the ethical committee of İ.D.F. Bilkent University.

Context

The context for this study is pre-service teacher education programs in Turkey. Throughout Turkey, teacher education programs are offered in many universities. This study identified 29 institutions that provide teacher preparation for classroom teachers, science and technology teachers, and biology teachers. They include four-year undergraduate programs and two-year graduate programs within the faculties of education. In particular, the study population included representatives from departments responsible for subject area teacher training.

Sample

For this study, participants were purposefully selected based on whether they met certain criteria; specifically, if they taught in an education department of a Turkish university and if, according to Higher Education Council or the university's website, they should be offering EE preparation to pre-service teachers. The universities were manually selected by searching the YÖK webpage (www.yok.gov.tr/web/guest/universitelerimiz),

After finding the institutions, the next step was to identify the appropriate contact or instructor of the environmental education course. Contacts were chosen by looking at the yearly programs of the instructors and seeing if he or she taught an environmental education course. The outcome of the search included course instructors and researchers. Based on this process, the researcher identified 29 instructors from 19 cities. Of the selected participants, 25 were from state universities, four were from

foundation (private) universities. The sample included biology pre-service teacher educators, middle-school science and technology pre-service teacher educators, and classroom pre-service teacher educators. Figure 1 represents the cities of the participants, some cities have more than one university.

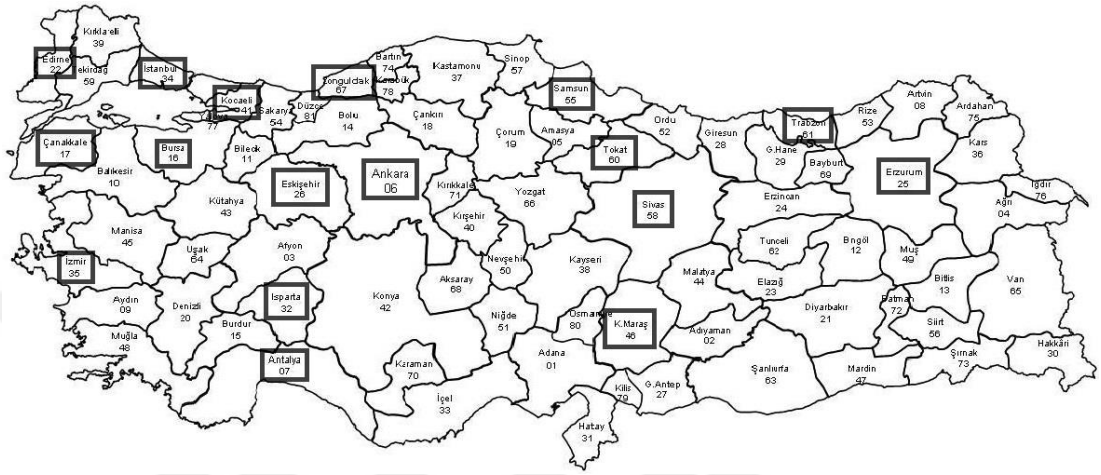

Figure 1: Map of location of cities to where the questionnaire was administered

Interviews were conducted with four participants, purposefully selected, who had responded to the questionnaire. These participants were contacted via e-mail for follow-up interviews to ascertain further information about the environmental education in their institute. The researcher contacted each interviewee via e-mail to set interview times. The interviews' duration varied between 10 to 25 minutes depending on the interviewee. One interview was done face-to-face in Ankara, the rest were done via telephone. Each interview was recorded and partially transcribed in order to ascertain and analyze the main ideas. Table 1 summarizes the information about interviewees and their area of study.

Table 1
Profile of chosen faculties for interview

Interviewee	Type of faculty/institute	Duration of education
Interviewee A	Graduate School of Education	Two years
Interviewee B	Classroom teaching pre-service teacher education undergraduate faculty	Four years
Interviewee C	Classroom teaching pre-service teacher education undergraduate faculty	Four years
Interviewee D	Graduate School of Secondary Science and Mathematics Education – Biology education	Two years

Instrumentation

Questionnaire

A 25-question questionnaire was adapted for the study. The original tool for data collection is from the study of Ashmann (2010) in Wisconsin, USA. Ashmann assessed the validity and reliability of the instrument he used. With his permission the tool was translated into Turkish and some questions were modified to better relate to the Turkish university education system. Appendix A is the Turkish version of the questionnaire and Appendix B is the English version of the questionnaire.

Overall, the questionnaire was designed to gain insights into how teachers were prepared in EE at the respondent's institution. Respondents were asked whether their program had a specific environmental education (EE) course or integrated into another teacher preparation course. There were also questions about how EE lessons were delivered (face-to-face, online, and mixed). A number of questions focused on

types of activities and resources that were used to prepare the pre-service teachers for EE courses. Near the end of the questionnaire, participants were encouraged to freely express their thoughts about the implementation of EE in pre-service teacher education, if their program does not have any requirements for EE. The last question asked the demographic data. The participants were informed that all information that provided would be kept confidential, neither their name nor the university name would be published.

A copy of the final questionnaire in Turkish and in English is provided in Appendix A and B, respectively. Below, the research question and the sub-questions are listed and the questionnaire items that address each question are identified.

- How do pre-service teacher education programs in Turkey prepare teachers in environmental education?
    - How is environmental education included in teacher education programs?
        - This research question is addressed by items 2, 3, 4, 6, 7, 8, 21, 22.
    - What teaching methods are used for environmental education in these programs?
        - This research question is addressed by items 5, 10, 11, 12, 13, 15, 17, 18, 19, 20, 23.
    - What resources are used for environmental education in these programs?
        - This research question is addressed by items 9, 14, 15, 16.

The face validity of the tool was reviewed by a Turkish professor who is an expert in

teacher education. After review and revision, the tool was converted to an online format using Survey Monkey. The revised tool was further validated through a pilot-test with three different methods instructors working in teacher education programs in Turkey. After their guidance and recommendations, some questions were revised and the tool was modified again.

Interviews

The interview questions were developed based on the results of the questionnaire. One of the main points in this process was to create an opportunity for interviewees to explain the current situation in their department, express their opinions about EE in their faculty, and offer possible ways of improving EE in Turkey. One item asked interviewees to share an interesting experience that could be useful for improving EE in teacher education programs. Finally, they were asked to share opinions as to why the response rate to the questionnaire was so low. The questions used for the interview are provided below in English and also can be found in Turkish in Appendix C:

- Please clarify if EE is taught as a separate course or part of another course.
- If it is a separate course, please clarify the duration of the EE course in your program.
- Would you please provide more information about the resources that are used for EE preparation in your program?
    - What kind of resources would help pre-service teachers to improve their EE preparation?
- Please share the most interesting lesson or activity that can be used as a strategy for further EE preparation courses.

- What learning outcomes can be expected from the pre-service teachers?
- This questionnaire is sent to 29 instructors that are capable of delivering EE. You are only one of seven professors who responded. If you don't mind, I would like to learn possible reasons for the low response rate.
- Why did you respond?
- Why do you think others did not respond?

Data collection

Questionnaire

The questionnaire was sent by the online surveying tool, Survey Monkey. In the cover letter of the questionnaire e-mail, the participants were informed that their participation was voluntary and that their responses would be used as data for further studies. The first item of the questionnaire provided space for participants to acknowledge their consent.

The cover letter requested that the participants submit their completed questionnaire within three weeks with a reminder e-mail at the end of the second week. They were also requested to inform researcher if they were not the appropriate recipient and to forward the questionnaire to the correct person. The consent form was included with the email (see Appendix D).

The questionnaire was sent twice to the sample at different times. First, it was sent at the beginning of the summer of 2015, but had a low response rate as 3.44%. One reason for the low response rate may be that it was the start of the summer vacation. Therefore, the questionnaire was sent out again in the fall of 2015. After a three-week period, a response rate of 24.14% was achieved (N=7).

Interviews

Before beginning the interviews, the four participants were e-mailed to specify the day and time of the interviews. Three interviews were done by phone calls, and one was done face to face. The approximate duration of the interviews varied between 10 to 25 minutes, depending on the background information and suggestions to improve EE in Turkey that the interviewee would like to give. The interview questions were sent to the interviewees beforehand for them to get prepared.

The interviews started by asking for the consent of the interviewees for recording it. The status of EE in their faculty, how it is delivered to pre-service teachers, and their ideas in developing EE in Turkey were discussed in interviews. Also, the last three questions were to provide a suggestion for further studies about how to keep the response rates high in electronic questionnaires. Many ideas were provided by the interviewees about the reasons of low response rate in Turkish universities.

Data analysis

Questionnaire

Similar to Ashmann & Franzen (2015), this study used Miles & Huberman's (1994) data analysis method. Miles and Huberman described that the coding is a qualitative data analysis method that provides tags or labels of meanings to written materials. The results of the questionnaire, interviews and website research of the institutions will provide data for understanding the EE status in Turkey.

According to Ashmann & Franzen (2015), themes can emerge from qualitative data. One of the two themes found in their study was course-based (theory-based) ways of EE in pre-service teacher education. Course-based themes include aspects such as

whether the EE course is a must course or not, the format of the course, the course credit, course duration, student requirements to prepare for EE and many others.

The other revealed theme that Ashmann and Franzen's study found was activity-based ways of EE preparation. To gain insights into this theme, participants were asked to define the ways of EE preparation other than in-class activities. They were given a list of strategies including inviting guest-speakers, field-trips, or community services.

After the data were collected, the responses were compiled and reviewed. All the answers from the seven respondents to the questionnaire were translated from Turkish into English. The answers were read several times to become familiar with the repeating themes and interesting points related to EE in different faculties of education. Through descriptive analysis, each response was discussed by the researcher. The analysis revealed comparable themes to those found by Ashmann & Franzen (2015). These themes helped the researcher envision how the respondents prepare teachers in their institutions in EE.

Interviews

The interviews were transcribed in order to find the main ideas analyzed and compiled under each question, together with original quotes of interviewees. Recurrent listening and transcribing key comments rather than the whole interview is a strategy to save the time and energy of the researcher (Flick, 2002; Strauss, 1987). "Familiarization" approach was used in data analysis which is reading the key comments several times to become familiar with the data, to identify repeating themes and other interesting points to comprehend the broader meaning of interviews (p. 221) (Ritchie, Spencer & O'Connor, 2003).

The researcher used the words of the participants from the interviews to represent a better image of the concepts and to help reveal the actual situation of EE preparation in Turkey. During the interviews the interviewees were not limited only to the questions. The process continued like a discussion and some interviews took almost 25 minutes, because they wanted to describe the real situation in their faculties and their EE delivery methods. They presented their suggestions for improving EE in Turkey. They also criticized the approaches to scientific studies in Turkey when they were presenting their opinions about the response rate. The results of the data analysis are presented in detail in the next chapter.

CHAPTER 4: RESULTS

Introduction

The purpose of this study is to gain insights into how environmental education is delivered in pre-service teacher education programs in Turkey. Throughout the study, two strategies were used to collect data from the academic personnel of the faculties of education: a questionnaire and interviews. This chapter shares information about the results of the data analysis. Aside from some descriptive statistics related to the response frequencies, the data is presentative qualitatively as described in the previous methods chapter. The results include responses to the questionnaire that address the research questions for this study along with outcomes of the interviews with four participants.

Results

The analysis of the insights about environmental education in pre-service teacher education in Turkey addresses the following research questions:

1. How do pre-service education programs in Turkey prepare teachers in environmental education?
    a. How much environmental education is included in teacher education programs in Turkey?
    b. What teaching methods are used in environmental education programs in Turkey?
    c. What resources are used in environmental education programs in Turkey?

The participants were given the opportunity to freely share their opinions about environmental education and also, with full confidentiality, critique their university and their own effort in environmental education. The results are presented below based on the resource or strategy used: 25-questions survey and one-on-one interviews with selected participants.

Questionnaire

Following is the information of seven respondents provided in the questionnaire.

Demographics

The response rate for the survey was 24.14%, meaning only seven people completed the questionnaire. Within the seven respondents, two of them are from the same city and five of them are from other cities.

The next map shows the cities of seven participants who submitted the questionnaire within three weeks. The reason for six cities being represented on the map is that two respondents are from same city (see Figure 2).

Figure 2: Map of location of questionnaire respondents

The questionnaire started with a question that asked permission from the respondents for their answers to be used in academic studies. It ended with a question asking for the contact details of the respondents to help determine where EE preparation is occurring in different regions of Turkey, and for follow-up interviews.

EE delivery

To help explain the analysis of the responses, some terms used to identify three different formats for EE courses are given below:

- *Specific EE course*: an independent EE course within the teacher education program.
- *Included EE course*: when EE is integrated into another teacher education course within the program; EE is not offered as an independent course.
- *External EE course*: where environmental topics are included in other courses of university, but are not part of the methods or formation courses.

Participants were asked whether their program has a specific environmental education course (specific EE) or not. Six respondents out of seven indicated that there is a specific EE course in their education faculty. Participants shared their ideas about the importance of environmental education in teacher education in the comments section under the responded question. Here are some of the comments:

- It is really important in Science and Technology Teacher Education Program.
- It is called “Environment Science” and is a must course in Science and Technology Teacher Education Program.
- This course has to be given in a context that includes social and economic aspects rather than only ecological points.

In the following question, respondents were asked to indicate if EE is included in a different teacher preparation course (included EE course) or not. Six of the participants agreed that EE is also included in other courses in their program. They also noted in the comments section that EE is included in the following two required courses: Education and Awareness for Sustainability and Climate Change Education for Sustainability. Another respondent said that in general, EE is integrated into Biology, Geography, and Science Teacher Education Programs. This individual stated that he does not feel comfortable that environmental education is limited to only these teacher training programs, saying that all teacher training programs need environmental education.

Finally, the instructors were asked to clarify whether EE is included in courses other than teacher education programs (external EE course). Two of the respondents agreed that EE is given in a separate course other than teacher training courses. One respondent did not know and another said EE used to be included in the curriculum of the faculty of agriculture as an elective course.

Course design

Respondents provided information about the design and delivery of the EE courses. There were three missing responses for this question. The instructors that did respond stated that face-to-face, online, and mixed methods are being used for teaching the EE courses. The specific EE course is mostly delivered to students face-to-face, although one respondent said the course is given online. For included EE courses, the delivery is face-to-face according to four responses. One instructor said that both online lecturing and mixed methods are used. The instructors indicated that the external EE courses are offered in both formats, online and face-to-face.

The duration of these three differently-formatted courses is mostly one semester. Five instructors indicated that their specific EE course lasts one semester. Three individuals said that integrated EE course last one semester. External EE course lasting one semester duration is supported by two responses. One explanation for this response was given by one instructor who commented that there is no serious environmental education program in teacher education programs and it is delivered by mixing environmental science course with EE.

Course credits

In another question, the respondents were asked to clarify the number of credits students can earn from these three different formatted EE courses. Two instructors reported that specific EE courses are worth two credits and three said it was three credits. Also, integrated EE courses have three credits in their program (N=2) and external EE courses have two credits in their programs (N=2). One respondent noted that it was not easy to determine the number of credits for the courses.

EE support materials and resources

Another section of the survey included questions about the kinds of research and resources that are used in preparation of pre-service teachers in terms of planning, teaching, and evaluation of EE. Within the seven responses of this question there were seven different explanations. The most common response was using up-to-date textbooks from both national and international sources. In addition to textbooks, the instructors give pre-service teachers academic studies from the field of EE to review. These materials include scientific articles and documents from UNESCO or similar organizations' documents. In their courses, the academic personnel state that they also use visual materials to deliver EE, for example they show BBC documentaries

and ask pre-service teachers to prepare posters about environmental issues. In addition to these kinds of visual materials, one faculty of education noted that there are investigations of websites that use EE, such as National Geographic, NASA, The Guardian, and the UN. Another shared that they take pre-service teachers on field trips and invite guest speakers to present about environmental issues. One said that they analyze both science and technology education and biology education syllabuses. In addition to syllabus study they also analyze intended behavioral changes, and conduct various activities to observe behavioral changes together with pre-service teachers together.

Teaching strategies in EE courses

A series of questions asked the instructors about strategies they use to teach EE. Instructors use different methods to prepare pre-service teachers in environmental education. These include the following:

- Teaching in a way in which pre-service teachers can use in the future when they teach about EE
- Outdoor organizations such as using school grounds as a field and asking pre-service teachers to conduct field trips there
- Researching projects and articles, by this way the respondent believes pre-service teachers learn how to do research and gain these skills
- Preparing posters, conducting and observing field trips.

Inquiry-based activities were done by four of these education faculties. Following are some of the activities shared by these instructors:

- Measurements of pH, dissolved oxygen parameters, analysis of these data and water quality testing
- Investigation of lake forest and waste water around Eymir Lake, Ankara
- Asking pre-service teachers to find studies about environmental education from both national and international sources
- Distributing topics about environmental education in the beginning of semester and asking pre-service teachers to prepare posters, banners, and brochures about them, followed by exhibition of the products in the end of semester
- Dalyan activity, the faculty asks pre-service teachers to collect data about water quality by using different data collection devices and to analyze them

Six out of seven faculties of education used activities from Project WILD, WET, Learning Tree, Yeşil Okul (Green School), and Eco-Schools. In addition to these projects one respondent said that they talk about a project called Green Box. Also, one shared that these kinds of projects are already explained in the textbooks that they use in classroom.

A series of questions asked the instructors about specific resources they use. Five out of seven responses indicated that they invite **guest speakers** to their lectures about EE. These included Environment Engineers from the Environment and Urban Ministry who are invited to explain the applications of their ministry about environmental issues and the importance of environmental education. One stated that they conducted studies to raise awareness about the water that we use. One of them was a seminar called “Water and Its Importance.” Another faculty invited a TEMA

representative (The Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats) and engineers from the municipality to talk about recycling. Also, there is one faculty who invited high-school teachers to inform pre-service teachers about environmental education and its importance. One respondent said that it would be too long to explain everything fully. It can be clearly seen that there are many opportunities to make EE courses more effective.

Integration of field trips into environmental education was another question of the questionnaire. With the same percentage as the previous question, five out of seven respondents indicated that they do field trips as a part of environmental education preparation in their faculties. The examples of the conducted field trips include the following:

- Observation and investigation along a coast line
- Eymir Lake in Ankara city, ITC – Integrated Solid Waste Management which works for recycling solid materials
- Working in the open forest and grassland areas belonging to METU
- ASKİ – Ankara Metropolitan Municipality Water and Sewage Authority Water Treatment Plants
- Bilkent Lake in Bilkent University
- Kızılcahamam Soğuksu National Park in Ankara for fossil site investigation
- Kaz Lake and Ballıca Cave in Tokat city
- Field trip in Dalyan, Muğla with high-school students about water quality

measurements, and *Caretta caretta* observation.

Two respondents mentioned that they take their pre-service teachers to water treatment plants. One respondent criticized the low status of field trips in the Turkish education system. He noted that field trip studies in Turkey are very few and this is a serious gap in students' learning career, starting from elementary school to university. This respondent briefly shared the results of his PhD study about EE in different countries' education programs. By comparison, he said is there is either lack of outdoor education in Turkey or no environmental education at all. Only one respondent said that he/she did not know anything about the benefits of field trips in EE education.

Another point of environmental education is service projects for the community. In this question respondents were asked to define if there were any mandatory service projects for pre-service teachers within faculty. If so, they were asked to describe it. One instructor said that service learning is offered as a separate course within their program. Three respondents stated that they did service projects for the community, two said they did service projects, and two respondents stated that in their syllabus there are no service projects. The service projects are listed below:

- Sapling planting in the city
- Placing recycling bins
- Distributing brochures
- Poster preparations around the campus.

The next question asked the aim and duration of the service projects and how they were managed. Several respondents provided more detailed information about the

community experiences they provide students. For example, the sapling planting activity had been in existence for three years and was done to raise awareness in protection of forests, and to become a model for pre-service teachers so that they can conduct it in the future with their students or a similar outdoor activity. Setting up the event, including securing permission and making arrangements, takes about two months each year. The duration of sapling planting lasts between half-day and one day depending how long it takes to get to the planting area. After planting, an evaluation study with the students is done, together with discussion in preparation for a similar activity in the future.

Other service projects were recycling bin placement, brochure distribution around the campus, and poster preparation. Each took about three days at the end of the semester. Students from the state schools were invited to the faculty to show where they placed recycling bins, distributed brochures, and prepared posters around the campus to raise awareness in these students.

One faculty's service project involved working with a volunteer group to help transfer the eggs of Loggerhead seat turtles (*Caretta caretta*) in Dalyan to safer locations. The pre-service teachers also monitored a group of high-school students were also participating in the activity. The event takes place during two nights in June. The respondent also stated that they have been doing this project since 2012

Very few of the respondents indicated that they provide reading assignments and worksheets. Only two instructors out of seven agreed that they hand-out reading materials to their pre-service teachers as part of their environmental education preparation. One said the only time they provided readings was in preparation for a field trip.

Teaching experience in EE

As with any pre-service program, students need opportunities to practice teaching. Therefore, the questionnaire included questions about the teaching practice experience provided to pre-service teachers. Of the responses, five indicated that pre-service teachers are required to co-teach in the school grounds about environmental education. Pre-service teachers may not be required to teach EE in a separate course, but during teaching practice at some point they are expected to teach environmental education in schools. They said that in this way, pre-service teaches would to be able to find opportunities to do research and develop themselves. One faculty shared information about field trips their students take to Dalyan project and Mamak, ITC – Integrated Solid Waste Management Facility. In this person's program, the pre-service teachers take part in preparing and conducting the activities and lead discussion with high-school students during the field trips.

Outdoor education experience is an important part of teacher pre-service preparation according to four out of seven respondents. Activities such as sapling planting, coast line observation, Dalyan, and Mamak field trips are considered important opportunities and the instructors believed these experiences will be useful in the pre-service teachers' future careers. However, one participant disagreed, saying that outdoor education is not a solution to the lack of environmental education in Turkey and will not be a solution in the future.

Assessing pre-service teachers' EE preparation

Pre-service teachers' knowledge, ability and skills about environmental education are mostly measured by exams, according to five respondents. Three responses, included portfolio preparation and written materials requiring the development of ideas. One

respondent believed students' lesson plan preparation experience was important in this aspect. Other strategies for observing and evaluating pre-service teachers' EE knowledge, ability and skills included co-teaching, using various types of simulations, question – answer, homework, article and project research, poster, banner and brochure design, and field trip design.

Overall inclusion of EE in teacher preparation programs

To gain an idea of how important EE was to the respondents' education programs, the respondents were asked to identify how much EE is included in their four-year faculties of education or two-year graduate schools of education plan. Four out of seven participants indicated that there was "very little" EE included in their teacher preparation program. Three of them said there was some (medium) EE was in their program. None of them said there was "a lot" of EE was in their teacher preparation program.

Interviews

The responses and ideas of four purposively selected instructors are given in detail below. The interview questions are provided below. First, the main ideas are presented and after each item illustrative quotes from each instructor are provided. Three of the participants were interviewed via telephone and one was conducted face-to-face. The interviewees will be represented as Interviewee (or instructor) A, B, C, D throughout the chapter, as it was presented in Table 1 earlier.

Analysis of interview questions with instructors

1) **Please clarify if EE is taught as a separate course or part of another course.**

Interviewee A stated that environmental education is not a separate course in their faculty of education, but is included in their Biology Methods - II course. Instructor A also added that "in addition to the Methods course, we conduct a field ecology activity in the summer."

Both interviewee B and D said that EE is a separate course in their faculty. D emphasized that it is a required course for their department.

Interviewee C stated that it depends on the program. In the science and technology teacher education program, and the classroom teacher education program EE is a separate course. Instructor C also mentioned that EE is integrated into their Biology courses, for example when students learn about biodiversity.

2) **If it is a separate course, please clarify the duration of the EE course in your program.**

Only Interviewee B, C, and D responded to this question, since in A's program it is not a separate course. B said that the EE course is given three hours in a week and it is called "Environmental Science." In addition to this required course, there are also optional courses related to the environment.

In instructor C's faculty of education, EE is a separate course offered within the third year of the Science and Technology teacher education program. This course is also given in the Biology department as a required course.

Interviewee D said that EE was a required course in Biology teacher education, but then its format changed and became an optional course with two credits. After that it was changed again and today it is a required course with two hours in a week.

3) **Would you please provide more information about the resources that are used for EE preparation in your program?**

Interviewee A uses the materials that they produce by their own, she noted, "One year we could not find any equipment to work with near the lake, so we prepared our own sampling nets from muslin and built our own quadrant samplers." Recently, they incorporated technology into their trips, they purchased digital probes to measure indicators of water quality, such as dissolved oxygen. Instructor A says they have a model for their field trip programs. When they plan to make a field trip with their pre-service teachers, they go and see the place beforehand to decide what kind of activities can be done. Then they prepare worksheets and try both worksheets and the activities to test whether they are appropriate for that field trip or not. Then, they conduct the field trip with actual high-school students and let their pre-service teachers lead the activities.

Interviewee B divides the materials that are used in the environmental science course into two: in-class materials and outdoor materials. Outdoor materials that instructor B uses are measurement devices to analyze water quality in a lake, data sheet usage, and analyzing the pollution with its parameters. Indoor materials are PowerPoint presentations, various documents, and videos.

Interviewee C uploads course materials into an online course forum (Moodle). These course materials are the related sections from a journal called TÜBİTAK (The Scientific and Technological Research Council of Turkey). Instructor C tries to give

up-to-date reading assignments and adds, “I try not to give reading assignments which has too much difficult terminology, because difficult terminology causes misconceptions.” In C’s faculty, pre-service teachers are taken to sapling planting. In addition to these, there are also written exams. The eco-school concept is another resource for this instructor. Their program asks pre-service teachers to do research about eco-schools. Pre-service teachers are also asked to design a project as a solution to garbage problems on their university campus. Therefore, experiential learning is important to their program.

In the faculty of education where interviewee D works, there are no specific materials that are used. They only use a textbook that is called *Environmental Education*, but the interviewee did not specify the author and published date of the textbook.

4) **What kind of resources would help pre-service teachers to improve their EE preparation?**

Interviewee A suggests other faculties to apply TUBİTAK projects like they did once. The 4005 Projects in particular provides support for teacher professional development. Faculties can apply for these projects and let their pre-service teachers take a role in the project; this experience provides them with an opportunity to communicate with actual teachers and experience different things. Instructor A also suggests activities like the Dalyan project that they do every year. Materials can be prepared beforehand and practiced with real students, before being an actual teacher. Interviewee A noted that any teacher can include EE in his or her lessons:

> Environmental education is not something that only biology teachers need to be interested in. It is an interdisciplinary thing. For example, this year we

> integrated Physics pre-service teachers into our Dalyan project. In fact, there should be language pre-service teachers, arts pre-service teachers because once we asked students to draw the silhouette of the lake. If we had an arts pre-service teacher there he could see the whole thing from a different point of view.

Interviewee C believes that, "within the concept of environmental education, it is unacceptable if the pre-service teacher does not step outside once." During her course, she takes pre-service teachers to a local peninsula to study ecology, but students also use place-based education. She has her students take photographs of grasslands and flowers in the campus and then they work together to identify them. C believes with this kind of education raises future teachers' awareness and better ensures that they will share similar experiences with their students.

Another approach was given by Interviewee B who uses media such as documentaries about current events, and researching about them. Interviewee D stated that "the environment itself has to be used as a resource. I wish our pre-service teachers would be educated as ecologists."

5) **Please share the most interesting lesson or activity that can be used as a strategy for further EE preparation courses.**

Respondent A spoke about field trips that their program has developed for their pre-service teachers:

> One day, one of the high-school teachers asked if we can assist them in developing a worksheet for a field trip to a nearby lake. I suggested that our pre-service teachers be given the opportunity for this and they agreed to make it a training experience. So our pre-service teachers get experience

> developing field trip resources and leading high school students on out of classroom trips.

Now, in addition to a trip to a local area, their pre-service teachers conduct the annual field trip in Dalyan so that both members of the faculty and pre-service teachers meet with high-school students and their school teachers. Interviewee A thinks that a partnership between the university and high-schools is a great learning opportunity for all parties.

Respondent B uses real-life stories in the lessons stating that, "There is a lot of information, politics and reality about climate change in the media." One example from B's lesson is showing a UN documentary about a young girl's life in the Philippines that has been affected by climate change.

Interviewee C states that people in Turkey cannot identify different tree species. She tries to help students become more aware of the environment. C shared that students are simply not observant:

> Everything starts with seeing. One time, I swapped three or four flower pots but none of our pre-service teachers realized it. What can I expect from a pre-service teacher in the future in a classroom of 25 -30 students who cannot even realize a few swapped flower pots now?

To improve their observation skills, interviewee C assigns students term homework. They take photographs of five living organisms and list them according to the Linnean classification system, using both the scientific and common names of the organisms. C also gives students different plants in the beginning of spring and asks them to do weekly observations, take photographs of the plants but mostly sketching them. She believes that in this way, students' observation skills are improving.

Environmental care requires good observation skills and sketching is a way of improving them, according to Interviewee C. Another personal thought of interviewee C is that, taxonomy has to be known very well, and it should be learned outdoors, thus supporting EE.

Interviewee D encourages students to work on individual projects to create things. He shared a project that they do in faculty:

> Pre-service teachers can imitate the erosion event with an artificial environment mechanism of none or few trees. Consistent water flow can be given to the mechanism and they would be able to observe the role of trees during erosion.

According to Interviewee D, pre-service teachers can understand the systems in nature clearer in this way; he asks them to design a working system like one they would find in nature so they understand the roles of each element in this system.

6) What learning outcomes can be expected from pre-service teachers?

Interviewee A said that in their program of teacher education, the learning outcomes are different than others because they are a graduate school and their students have already finished their undergraduate education in Biology. Instructor A states that raising awareness is their main learning goal; in this aspect they are at an advantage because their students already have an undergraduate degree in biology and appreciate the importance of life and natural systems. She suggests that other subject area pre-service teachers should receive a few hours of environmental education as a part of their teacher training.

For interviewee A, the human effect on nature is also important. She provided an

example of a bird watching activity they did one academic year. During bird watching, students develop skills about how to use a binocular and also hand – eye coordination skills. Interviewee A shared a memory that once she and her son were walking on a long main avenue and they started counting empty discarded cigarette boxes and plastic bottles together. They counted approximately 70 plastic bottles and 40 cigarette boxes, but found no trash bins. This affirmed her opinion that in Turkey there is a lack of environmental consciousness and that environmental education is important.

Interviewee B noted and strongly believes that, "Our pre-service teachers gain awareness about professional life. Also they gain knowledge and when they become teachers they can deliver this knowledge when they start teaching." Instructor B said that they also test the outcomes from time to time. Just like instructor A, they try to raise awareness in their courses. Different than A, however, they tend to focus on behavioral changes. As mentioned above, in B's faculty environmental education is given as part of the students' environmental science course. In this course they ask pre-service teachers to design a lecture for the class. B says that, as pre-service teachers experience professional life and understand environmental problems, they gain a general knowledge about environment. Their pre-service teachers will realize and be able to integrate more EE into some of their Science and Technology teacher education courses.

Interviewee C believes that,

> Environmental problems are caused by human ego. When there is too much ego, then there is maximum consumption. In time, the resources of other organisms' are being consumed and problems arise. Mankind has to make

peace with nature and then environmental problems will be resolved.

Interviewee C emphasizes that environmental education taken by pre-service teachers has to affect students' daily lives. "Humans have to take care of the plants and animals; they should understand what they need to survive and the importance of nature."

Interviewee D said that in their program the outcomes are related to ecology education. These can be altered to increase environmental susceptibility but unfortunately they are closer to ecological concepts on paper. He added that "The real environmental education is required in social and economic aspects, but we only cover just a little bit of it."

7) **This questionnaire is sent to 29 instructors that are capable of delivering EE. You are only one of seven professors who responded. If you don't mind, I would like to learn possible reasons for the low response rate.**

Interviewee A wanted to be sure if these 29 people are still working in their faculties. Then suggested that maybe they are not interested in the study or maybe they do not believe that things can be better. Instructor A expected people would participate who are confident in the environmental education that they deliver. According to A, maybe people do not need research like that and they believe everything is fine.

> This study is a great example to reflect the answer of "what are we doing about environmental education?" and in the end you will try find an explanation to "what can we do better?" Sometimes people are not open to see themselves analyzed about what they are doing in a specific thing. Most people do not like to see themselves in a mirror.

B suggests that people who are giving environmental education may not be specialized only in this context. Sometimes a chemist has to deliver this course and they may not feel comfortable in delivering environmental education. B says that the number of people who are capable of delivering environmental education in universities is very low and when they are asked to say something about environmental education or the environment itself, they tend to step back.

> I can see that from the published articles, people are trying hard with good intentions to promote environmental education. But this is not something that everyone can do, not something can be done briefly. There is an appreciation for the importance of EE, but they realize it is not something they are experienced in. People have to internalize environmental education and the environment itself.

In her studies, instructor C stated that she makes personal visits to everyone in her sample during data collection. In many cases, she hand delivers surveys. She also added, "Studying with instructors is an incredibly difficult thing to do. That may be the reason of the low response rate." Data for the current study's questionnaire is collected via the internet, but C said that she had not used internet for data collection before.

Interviewee D approached the question from a different point of view and claimed that in Turkey, checking e-mails from time to time is not a common thing. He said "I wish instead of using telephone, we would do our business via e-mail. This would be more beneficial for us; however, we do not have that culture yet." During D's PhD study, he said that he worked with other countries and they were very responsive to environmental education surveys, unlike Turkey. Furthermore, from his experience,

if the questionnaire was sent to the wrong person, people were good about forwarding it to the correct recipient.

8) Why did you respond and why do you think others did not respond?

Interviewee A wants to learn the status of environmental education in Turkey and added, "I wanted to see myself in a mirror (to see how I reflected in comparison to others), and also I wanted to see what other people are doing about environmental education." The main concerns of interviewee A about EE in Turkey are: What happens in the end of the course? Does what has been done throughout the course, affect actual teaching practice? What kind of progress has been made, what were the limitations? She claims that these aspects can only be analyzed if many people participate in this type of study; we can learn from our colleagues. In this way an instructor from one university can know how EE takes place in a different university and can learn something from them. Instructor A believes there has not been an opportunity for this until the current study.

Environmental education is something that interviewee B has been doing for years and thinks that she is good at it. She said, "Because, this is something that I have been doing for years and I believe I am good at this. I also think that I have enough experience to contribute." Also she believes similar studies will be improved by participating in them.

Interviewee C stated that she really liked the research topic and added, "this study is a real need in Turkey." When asked why other instructors did not respond, she thought that Turkish people trust human beings, but there is little trust in electronic platforms. Another reason may be that people are busy, she added, "They may not have understood the importance of this study."

Interviewee D said that before his PhD study, he never paid attention to his e-mails. He confides, “I used to be like your non-respondents, not taking other people’s studies seriously.” But after his PhD study, he checks his e-mails every 15 – 20 minutes. He said that, “when my students send an e-mail to me, I try to help them immediately.” Interviewee D thought the reason so few instructors responded was that people may think that questionnaires are unnecessary. They may not take environmental education seriously.

CHAPTER 5: DISCUSSION

Introduction

The purpose of this study is to gain insights into environmental education in pre-service teacher preparation programs in Turkey. This final chapter, the findings are discussed with support from the literature. In addition, implications for practice, implications for further research, and limitations are included.

Overview of the study

This research is patterned after other research, especially Ashmann & Franzen (2015), that inventoried how different regions around the world prepare teachers for EE. The general approach is to gain insights from a variety of participants from throughout the region, in this case the region is the entire country of Turkey. This strategy provides a variety of perspectives that would help identify patterns and trends and potential gaps in teacher EE preparation. Unfortunately, there was a very low response rate to the questionnaire, with only seven instructors responding after repeated requests. Of the seven respondents, six work with undergraduate pre-service teachers in a four-year program and one works with graduate students in a two-year teacher preparation program.

To gain insights into how EE is included in pre-service teacher education programs in Turkey, two methods were implemented for data collection. One of these two methods was a 25-item questionnaire adapted from Ashmann's (2010) study. The second tool was a nine-question interview designed to gain deeper insights into the questionnaire responses and to gain better perspectives from different regions and institutions in Turkey.

The 25-question questionnaire was sent to 29 instructors, 25 of whom were from state universities and four from foundation universities. Only seven instructors responded (response rate 24.14%). The interview was conducted with four of the seven respondents. Both questionnaire and interviews were aimed to answer the research questions of the study.

The interviews provided a large amount of information about effective practices in pre-service teacher education for EE. As a result, the research had findings that went beyond the research questions; in other words, more information about issues in teacher EE preparation was learned and provides an opportunity for further investigation.

Following are the research question and the sub-questions of the study:

How do pre-service teacher education programs in Turkey prepare teachers in environmental education?

- How is environmental education included in teacher education programs?
- What teaching methods are used for environmental education in these programs?
- What resources are used for environmental education in these programs?

Major findings

Perhaps one of the most notable findings this study is the low response rate, which may imply a lack of interest or experience in the field of EE among faculty of pre-service teacher education programs in Turkey. To learn if the low response rate may be a valid finding, four of the questionnaire respondents were asked their opinions as to why so few faculty members responded. They noted that time may be the main

reason instructors did not respond; they are busy and simply could not find the time to complete the questionnaire. Sadly, as one interviewee noted, other faculty may not have wanted to find time; responding to questionnaires and helping others with their research is simply not a priority. Chances are, they receive many requests to respond to surveys and they did not appreciate that they were purposefully sampled for this study because the researcher found them via the internet and checked their background information to determine that they were relevant to the study.

The interviewees said instructors might not be interested in the topic or believe that it was relevant to them. Perhaps they believed they lacked the background to provide valid or constructive responses to the questions. Even though the cover letter asked them to forward the questionnaire to the appropriate recipient, this likely was not done. One of the interviewees felt that faculty members are not comfortable using online surveys and other digital forms of technology. Interviewee D also said that many professors do not check their e-mails regularly, especially in Turkey. In time, more and more university staff will become more familiar with using technology, but in the meantime traditional pencil and paper mailed surveys might be more appropriate.

Despite all these reasons, the question that remains unanswered is, did the selected professors not respond because they are not preparing their teachers in EE? In other words, could the low response rate be an actual reflection of the quantity and quality of EE teacher preparation in Turkey?

When this study began, the hope was to paint a picture of how teachers in Turkey are prepared to include EE in their teaching practice. With this response rate, it is not realistic to assume the findings represent a comprehensive overview of teacher EE

preparation in Turkey. Nonetheless, the results provided data that shared useful information about the approaches, expectations, and realities of teacher EE preparation within several faculties. Furthermore, the data were sufficient to address the research questions of this study.

1. How is environmental education included in teacher education programs?

To address this research question, several items of the questionnaire along with interview responses were considered. Of the seven faculty members who responded, six indicated that there is a specific environmental education course for their pre-service teachers. In addition to a specific environmental education course, according to six participants it is also included in other teacher education courses as well. Therefore, in the teacher preparation programs of these respondents, pre-service teachers do receive a variety of courses and lessons related to EE.

On the other hand, four of the respondents who work in four-year institutions shared that EE was not a priority for their program. They noted that the EE course was given in one semester only, which might be another indicator of the importance of need for EE in teacher preparation faculties.

For the instructors, EE is important. The four interviewees especially expressed support for EE preparation for teachers. Interviewee A noted that their program even created a summer field ecology trip for their pre-service teachers. Responses such as this indicate that the quantity and quality of EE in teacher preparation programs is largely due to the personal efforts of the faculty members.

2. What teaching methods are used for environmental education in these programs?

The responses of the study participants indicate they deliver EE in a way that can be taught in the future by pre-service teachers. As with any methods class, the instructors provide experiences that will not only increase their understanding of the topic, but build competencies in teaching the subject. Pre-service teachers are also encouraged to teach EE during their teaching practices in high-schools, and it is believed by the instructors that pre-service teachers will be able to find opportunities to do research and develop themselves. A couple of the interviewees mentioned that pre-service teachers should be prepared to work in Yeşil Okul (Green School) and Eco-Schools.

Several of the respondents noted that they take their pre-service teachers on field trips. These experiences introduce the future teachers to environmental concepts, and also help them understand what is involved in conducting field trips. Several other studies have noted the importance of including field experiences as part of teacher preparation (Ateşkan & Lane, 2016; Öztürk & Öztürk, 2015).

Some instructors provide additional experiences for their pre-service teachers that go beyond the formal class experience. Interviewee A described how their department received a TÜBİTAK project for teacher education in sustainability. They assigned their pre-service teachers to be guides in the project. These types of activities raise awareness of their pre-service teachers' about the environment and help them to estimate how EE can be delivered in a classroom when they start their profession.

Real-life stories that interviewee B suggested is a good way to help pre-service teachers to internalize the importance of environmental education. In this way, when

they completely understand and see the real examples of environmental problems around the world, they can easily reflect on them in their classroom in the future. In Özsoy's (2012) study it was mentioned that environmental problems are calling for solutions and the solution will come with an understanding of actions which cause harm to the environment.

Data gathered from participants of both the questionnaire and the interview focused on increasing pre-service teachers' awareness of their environment. This attribute was particularly mentioned by interviewee C. With this awareness, future teachers can help build their students' awareness, knowledge, attitudes and environmental ethics over time.

Realizing environmental problems and designing solutions according to current situations requires strong observation skills. The study of Ashmann and Franzen (2015), which was the model for the current study, emphasizes the importance of increasing pre-service teachers' awareness of environmental issues as well. Ashmann & Franzen mention that there is an urgent need in developing awareness, knowledge, attitudes and environmental ethics of K-12 students to overcome environmental problems.

Aspects of place-based education (PBE) are also prevalent in the responses (Smith, 2007; Sobel, 2004). PBE involves using local resources, in the community and on the school grounds, to help students become more aware of and attuned to resources and qualities of where they live. Some PBE-related activities identified by the study participants include inviting guest speakers (environment engineers, TEMA representatives, and high-school teachers) and conducting service projects in the community. There were five instructors who said that they are conducting service

projects in their program. Specific examples include sapling tree planting in the city and placing recycling bins around campus.

3. What resources are used for environmental education in these programs?

This study has confirmed that educators who support EE use a variety of resources to prepare future teachers. They use these resources to increase awareness and knowledge of natural resources and provide first-hand experiences working in natural settings.

In terms of planning, teaching and evaluating EE, regarding the questionnaire results, the most common resource in EE is using up-to-date textbooks from both national and international resources. The respondents shared a variety of other EE resources that are mentioned in the literature. These include inquiry-based activities that involve using environmental science skills to monitor the environment. They noted that popular resources developed in the United States, such as Project WILD, Project WET, and Project Learning Tree can be adapted for Turkey. However, as interviewees C and D both emphasized, the environment itself is a resource for EE and should be incorporated into EE preparation classes. It is important to step outside and notice the world and the natural environment.

In the context of EE preparation for faculties of education around Turkey, analysis of academic studies and syllabi of teacher training programs are considered as a way of EE delivery. In addition to written documents, visual materials are other sources for environmental education. During interviews, instructor B said that using daily media is an important resource in EE courses. Documentaries that were produced by the BBC is an example that interviewee C provided. In their study, Öztürk & Öztürk (2015) claimed that TV and radio are the best contributors to raise awareness in the

society about environmental issues. Regarding the responses of instructor A, worksheets are used as resources in EE preparation. They design worksheets with their pre-service teachers and ask them whether these worksheets will work or not during the activities. Handouts and extra reading materials were used to prepare pre-service teachers to upcoming field trips.

As mentioned above, scientific journals are used in EE preparation; one faculty member provides students with relevant sections from the TÜBİTAK journal for a better understanding of the environment. This respondent also stated her concerns about misconceptions caused by difficult terminology, so she said that she picks the sections carefully for her students. Another researcher, Khalid (2003), noted the importance of learning the correct terminology. This can help address misconceptions that are held by pre-service high-school science teachers about the greenhouse effect, ozone depletion, and acid rain.

Implications for practice

This study confirmed that a variety of resources and strategies are necessary to support pre-service teacher preparation in environmental education. In addition to biology, science and technology, and elementary pre-service teachers, EE should be given as a required course to every pre-service teacher during their education. More resources for EE would benefit teacher preparation in the field. There are plenty of foreign textbooks related to environmental education. These should be studied by the instructors in faculties and delivered to pre-service teachers. Future teachers need to improve their skills and competencies in investigating their local environments (Srbinovski, Erdogan & Ismaili, 2010).

Some of the resources listed by the participants in this study could help other

methods instructors improve the EE content of their courses. If they feel they lack knowledge in a certain area, they can invite guest speakers who are working in the field of the environment and know the real environmental problems. Guest speakers can sometimes deliver environmental knowledge better than the teachers because they have experience in the field of environmental studies. It is easier for them to raise awareness and provide methods to pre-service teachers in delivering EE in their future teaching careers.

Field trips are important for education about the environment; they help to see and feel the environment. In some cases, these trips can also double as service learning projects where students monitor environmental quality or take action to help protect nature.

Field experiences like a trip to unique and fragile settings, such as the Dalyan trip, should be promoted in environmental education. Through these experiences, pre-service teachers are learning how to work with high-school students in outdoor settings and enabling them to widen their perspective using the environment as a resource itself. Students will long remember seeing endangered species such as *Caretta caretta* turtles at midnight accompanied by professional volunteers who take care of the turtles and give information about them. They will appreciate that something can be done to offset humankind's negative effect on nature.

Just as valuable as long distance trips to exotic settings is helping students appreciate their local environments. Teachers can learn that the school grounds have many interesting plant and animal species to explore. As emphasized by one interviewee, it is important for teachers to recognize that their local nature is a resource that is available for the environmental education of their students.

Nearly all private high-schools are following an international curriculum in addition to Ministry of National Education curriculum which is called International Baccalaureate Diploma Program (IBDP). In IBDP there is a course completely related to environment and environmental issues which is called Environmental Systems and Societies (ES&S). Pre-service classroom, science and technology, and biology teachers should have been introduced to this course and practice its content. ES&S is defined as in IB's website:

> Through studying environmental systems and societies (ES&S) students will be provided with a coherent perspective of the interrelationships between environmental systems and societies; one that enables them to adopt an informed personal response to the wide range of pressing environmental issues that they will inevitably come to face (IBO, 2016).

Other than, IBDP there are other professional EE organizations such as the North American Association for Environmental Education that have researched and provided resources for pre-service teacher education. They have developed a set of guidelines that identifies what and how institutions should prepare for teachers to integrate EE into their lessons (NAAEE, 2010).

Implications for further research

The aim of this study was to gain insights into environmental education in pre-service teacher preparation. Based on the results of this study, it can be assumed that not much environmental education is included in pre-service teacher education. Despite the low response rate, seven pre-service teacher educators provided worthwhile insights into EE teacher preparation strategies. However, there were more than 20 instructors who did not participate as discussed above that lead to

implications for further research.

Another study could use different means to contact or learn how EE is addressed in teacher education programs. For example, they could administer paper questionnaires or visit the schools.

This study was not intended to judge or compare the effectiveness of EE preparation programs. A future study could, however, examine some of the resources and strategies to learn which methods best help improve teachers EE competencies. The findings could help improve existing EE in teacher preparation programs.

A related study could investigate the extent to which pre-service teachers actually use the resources and experiences they gained during their actual teaching practice. Teacher education programs can survey their alumni, such as Ateşkan and Lane (2016) did to learn what role their program played in developing confidence in planning and conducting field trips.

Finally, given evidence that there is very little EE occurring in pre-service programs, research is needed on how to promote more integration of EE into every teacher preparation program. This can be established by improving communication between experienced environmental educators and the ones who would like to start teaching EE in their courses. With their communication a feasible pathway can be chosen and it can be proposed to the faculty administration to add a new course based on the suggestions that experienced ones provided. The following research questions could support investigations into these issues?

- In what ways can EE be integrated into other parts of the teacher preparation program?

- How can methods instructors be motivated to include EE in their courses?
- To what extent could a shared electronic platform among environmental educators be established to provide better communication and interactions?

In conclusion, the new generation is growing up focused on their mobile devices without stepping out into the natural world. This results in people growing up being a stranger to the environment and not feeling uncomfortable in it. Teachers need to be role models of future generations for how to respect and interact with the natural world; they need to be knowledgeable about natural systems and proficient in effectively delivering environmental education to students. This is why environmental education has a clear importance in teacher education; their programs need to prepare knowledgeable teachers who help instill a sense of wonder in young children and foster this appreciation throughout the lives of learners. Furthermore, our future needs people who can do more than resolve environmental issues, they can prevent them from occurring. Ensuring a sustainable future is relevant to all subject areas; therefore, environmental education has an integral role to play throughout the professional development of a teacher.

Limitations

The study was limited to professors/instructors in education faculties in Turkey. Although permission was received from the researcher's institution to conduct this study, other universities may have needed permission from their own ethical committees to participate. It was not feasible for the researcher to travel to each institution and secure permission from all the institutions because the sample is widely-spread throughout Turkey.

The low response rate was a critical limitation of this study that compromised the

ability to gain a comprehensive inventory of EE teacher preparation in Turkey. During the timeline of the study, reminders were sent to participants twice. They were also called by phone. Some were called by their mobile phone, for some of them their faculty department was called. The ones with their mobile phone numbers provided on faculty's website, were sent an SMS also. Unfortunately, none of these attempts resulted in greater participation. Therefore, it is hoped that future studies will attempt to gain a greater insight into the quality and quantity of EE preparation in pre-service teacher education programs.

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APPENDICES

Appendix A: Questionnaire in Turkish

Türkiye'deki Öğretmen Adaylarının Çevre Eğitimi

1) Tarafımca verilen anket cevaplarının akademik çalışmalar çerçevesinde kullanılmasını onaylıyorum.

a) Evet (Evet ise, lütfen tanımlayın.)

b) Hayır

2) Programınızın belirli bir çevre eğitimi dersi gerekliliği var mı?

a) Evet (Evet ise, lütfen tanımlayın.)

b) Hayır

3) Başka bir öğretmen yetiştirme dersinde çevre eğitiminden bahsediliyor mu?

a) Evet (Evet ise, lütfen tanımlayın.)

b) Hayır

4) Çevre eğitimi, öğretmen yetiştirme programı dışında, başka derslere dâhil edildi mi?

a) Evet (Evet ise, lütfen tanımlayın.)

b) Hayır

5) Bu çevre derslerinin formatı nedir? Lütfen uygun olan seçenekleri işaretleyiniz, birden fazla seçenek işaretleyebilirsiniz.

	Bağımsız çevre eğitimi dersi (2. soru için)	Programa dâhil edilen çevre eğitimi dersi (3. soru için)	Öğretmen yetiştirme programı dersleri dışında verilen çevre eğitimi dersi (4. soru için)
Yüz yüze	☐	☐	☐
İnternet ortamında (Çevrimiçi)	☐	☐	☐
Karma	☐	☐	☐
Uygun seçenek yok	☐	☐	☐

6) Bu dersin süresi ne kadardır? Lütfen uygun seçenekleri işaretleyiniz, birden fazla seçenek işaretleyebilirsiniz.

	Bağımsız çevre eğitimi dersi (2. soru için)	Programa dâhil edilen çevre eğitimi dersi (3. soru için)	Öğretmen yetiştirme programı dersleri dışında verilen çevre eğitimi dersi (4. soru için)
Hafta sonu	☐	☐	☐
Çeyrek Dönem	☐	☐	☐
Bir dönem	☐	☐	☐
Uygun seçenek yok	☐	☐	☐
Diğer	☐	☐	☐

7) Eğer "Diğer" seçeneğini işaretlediyseniz, lütfen açıklayınız.

8) Bu dersin kredisi nedir?

	Bağımsız çevre eğitimi dersi (2. soru için)	Programa dâhil edilen çevre eğitimi dersi (3. soru için)	Öğretmen yetiştirme programı dersleri dışında verilen çevre eğitimi dersi (4. soru için)
0	☐	☐	☐
1	☐	☐	☐
2	☐	☐	☐
3	☐	☐	☐
4	☐	☐	☐
5	☐	☐	☐
5'ten fazla	☐	☐	☐
Hiç biri	☐	☐	☐

9) Öğretmen adaylarının çevre eğitimi konusunda hazırlanmaları için planlama, öğretme veya değerlendirme gibi konularda ne tarz araştırmalar yapıldı ve hangi kaynaklar kullanıldı?

10) Çevre eğitimi konusunda derslerinize misafir konuşmacılar, sivil toplum kuruluşlarından konuşmacılar veya çevre çalışmaları ile ilgili gönüllüler dâhil edildi mi?

a) Evet (Evet ise nasıl?)

b) Hayır

11) Çevre eğitimi dersinize arazi çalışmaları dâhil edildi mi?

a) Evet (Evet is nereye?)

b) Hayır

12) Topluma hizmet çalışmaları gerçekleştirdiniz mi? Hangi ortamlarda? Lütfen uygun olan seçenekleri işaretleyiniz.

☐ Evet, kendi enstitümüze (fakültemize) hizmet çalışmaları gerçekleştirdik.

☐ Evet, toplum için hizmet çalışmaları gerçekleştirdik.

☐ Hayır, müfredatımızda hizmet çalışmaları yoktur.

☐ Diğer, Lütfen belirtiniz.

13) Eğer hizmet çalışması dâhil ettiyseniz, lütfen tüm etkinliklerden edindiğiniz deneyimlerinizi, amacını, süresini, organizasyonu ve denetimini yazınız. Eğer hizmet çalışması yapmadıysanız, lütfen "Yapmadı" yazınız.

14) Öğretmen adaylarına çevre eğitimi ile ilgili tamamlamaları gereken okuma metinleri verildi mi?

a) Evet (Evet ise lütfen başlıkları ve yazarların adlarını listeleyin)

b) Hayır

15) Dersinize katılan öğretmen adaylarının tamamlaması gereken sorgulama tabanlı etkinlikler var mı? (Örneğin; araştırma soruları, veri toplama, veri analizi, kanıtlara dayanarak varsayımda bulunma gibi.)

a) Evet (Evet ise lütfen açıklayın.)

b) Hayır

16) Öğretmen adaylarına "Project WILD", "WET", "Learning Tree", Yeşil Okul" veya "Eko Okul" gibi çevre eğitimi müfredatlarından ve çalışmalarından bahsediliyor mu?

a) Evet (Evet ise lütfen açıklayın.)

b) Hayır

17) Çevre eğitimi ile ilgili, öğretmen adaylarının birlikte okul ortamında ders anlatması gerekiyor mu?

a) Evet (Evet ise lütfen beklenti ve amaçları da dâhil ederek açıklayın.)

b) Hayır

18) Dersiniz kapsamında öğretmen adaylarının açık havada (outdoor) eğitim verme deneyimi kazanıyor mu? (Örneğin; arazi gezisi organize etme ve bu ortamda ders anlatma.)

a) Evet (Evet ise lütfen açıklayın.)

b) Hayır

19) Öğretmen adaylarının çevre eğitimi ile ilgili bilgi, beceri ve yeteneklerini değerlendirecek ne tür stratejiler izleniyor? Lütfen uygun olan seçenekleri işaretleyin.

☐ Sınav / Kısa sınav

☐ Ders Planları hazırlama

☐ Diğer öğretmen adayları ile birlikte ders anlatımı

☐ Portfolyo hazırlama

☐ Kişilere ait düşüncelerin ve fikirlerin yazılı olarak bulunduğu metinler

☐ Simülasyonlar

☐ Diğer, lütfen belirtin

20) Öğretmen adaylarını çevre eğitimine hazırlamak için uyguladığınız başka yöntemler var mı? Eğer yok ise lütfen olmadığını belirtiniz.

21) Genel olarak, öğretmen yetiştirme programınız çevre eğitimini ne kadar kapsıyor?

a) Çok miktarda

b) Orta seviyede

c) Az miktarda

22) Sizce çevre eğitiminin, öğretmen yetiştirme programlarına dâhil edilmesinin önemi nedir?

a) Çok miktarda

b) Orta seviyede

c) Az miktarda

23) Çevre eğitimi, programınız kapsamında değil ise, bu eğitimi programınıza dâhil etmenizde size yardımcı olabilecek yöntemler nelerdir?

24) Eklemek ya da paylaşmak istediğiniz yorumlarınız var ise lütfen aşağıdaki boşluğu kullanınız.

25) Anket sonuçları hakkında görüşmek için lütfen bilgilerinizi girin.

Adınız:

Soyadınız:

E-Posta Adresiniz:

Telefon Numaranız:

Yaşadığınız Şehir

Çalıştığınız Üniversite:

Çalıştığınız Bölüm:

Appendix B: Questionnaire in English

Environmental Education Preparation in Pre-service Teacher Programs in Turkey

1) I give permission that my responses can be used in further academic studies.

a) Yes

b) No

2) Does your program require a specific course in environmental education?

a) Yes (If yes, please describe)

b) No

3) Is environmental education integrated into another teacher education course?

a) Yes (If yes, please describe)

b) No

4) Is environmental education included in courses outside of the teacher education program?

a) Yes (If yes, please describe)

b) No

5) What is the format of the course? Please mark all that apply.

	Specific environmental education (For the second question)	Included environmental education (For the third question)	External environmental education (For the forth question)
Face to face	☐	☐	☐
Online	☐	☐	☐
Hybrid	☐	☐	☐
Not applicable	☐	☐	☐

6) What is the duration of the course? Please choose the time frame that best matches your offerings. Please mark all that apply.

	Specific environmental education (For the second question)	Included environmental education (For the third question)	External environmental education (For the forth question)
Weekend	☐	☐	☐
Quarter	☐	☐	☐
Semester	☐	☐	☐
Not applicable	☐	☐	☐
Other	☐	☐	☐

7) If you answered “Other” in the previous question, please describe.

8) How many credits is the course worth? Please mark all that apply.

	Specific environmental education (For the second question)	Included environmental education (For the third question)	External environmental education (For the forth question)
0	☐	☐	☐
1	☐	☐	☐
2	☐	☐	☐
3	☐	☐	☐
4	☐	☐	☐
5	☐	☐	☐
More than 5	☐	☐	☐
Not applicable	☐	☐	☐

9) What pieces of literature or research are used in planning, teaching, or assessment with respect to preparing teacher candidates in environmental education?

10) Are guest speakers from non-governmental organizations or volunteers from environmental studies invited to your courses to talk about environmental education?

a) Yes (If yes, please describe)

b) No

11) Are field trips included in environmental education preparation?

a) Yes (If yes, please describe)

b) No

12) Do you utilize service projects? In what context? Please mark all that apply.

☐ Yes, we provide a service to our institution.

☐ Yes, we provide a service to our community.

☐ No, we don't include service in our coursework.

☐ Other, please specify.

13) If you answered that service is included, please list each experience, the purpose, duration, organization, and supervision of each. If you do not use service, please write "NA."

14) Are there assigned environmental education readings students must complete?

a) Yes (If yes, please write their titles authors)

b) No

15) Are there inquiry-based learning activities students must complete (e.g., activities with a researchable question, data collection, data analysis, claims based on evidence, etc.)?

a) Yes (If yes, please describe)

b) No

16) Are teacher candidates introduced to environmental education curriculum such as Project WILD, WET, Learning Tree, Yeşil Okul, Eco-schools?

a) Yes (If yes, please describe)

b) No

17) With respect to environmental education, are students required to do any peer teaching?

a) Yes (If yes, please describe)

b) No

18) Are students involved in outdoor education experiences (i.e., organizing a field trip and teaching in that field trip)?

a) Yes (If yes, please describe)

b) No

19) What strategies are used to assess teacher candidate understanding, skills, and abilities in environmental education? Please select all that apply.

- ☐ Exams / Quizzes
- ☐ Lesson plans preparation
- ☐ Peer teaching
- ☐ Portfolio
- ☐ Written reflections / papers
- ☐ Simulations
- ☐ Other, please specify

20) Are there other things you do to prepare teacher candidates with respect to environmental education? If so, please describe.

21) Overall, to what extent does your teacher education program include environmental education?

a) Great extent

b) Moderate extent

c) Small extent

22) To what extent do you think it is important to include environmental education in pre-service teacher education programs?

a) Great extent

b) Moderate extent

c) Small extent

23) If environmental education is not included in your teacher education program, what would help you better include environmental education in your teacher education program?

24) Is there anything else you would like to comment on?

25) To discuss and set a possible interview time please fill the following information.

First name:

Last name:

E-mail:

Telephone number:

City:

University:

Department:

Appendix C: Interview Questions

1) Çevre eğitimi ayrı bir ders mi yoksa başka bir dersin içinde geçen ufak bir kısım mı?

2) Eğer ayrı bir ders ise süresini tanımlar mısınız?

3) Ders içinde kullanılan materyalleri lütfen tanımlayınız.

4) Hizmet öncesi öğretmenlerin çevre eğitimi konusunda kendilerini geliştirebilmeleri için ne tarz kaynaklar kullanılmalı sizce?

5) Çevre eğitimi konusunda ileride bir metot/yöntem olarak kullanılabilecek, başınızdan geçen ilginç bir ders tecrübesini lütfen paylaşın.

6) Verilen çevre eğitiminin öğrenim çıktıları/kazanımları nelerdir?

7) Anket, çevre eğitimi konusunda uzman 29 öğretim görevlisi ile paylaşıldı fakat geri dönüş sadece 7 öğretim görevlisi tarafından yapıldı. Sizce bu şekilde düşük bir cevaplama oranının sebebi nedir?

8) Siz neden cevapladınız ve sizce diğerleri neden cevaplamadı?

Appendix D: Consent Form

Sayın Katılımcı;

İsmim Efe Güntürkün, Ankara Üniversitesi Biyoloji Bölümü mezunuyum. Şu anda Bilkent Üniversitesi Eğitim Bilimleri Enstitüsü'nde yüksek lisans öğrencisi olarak tarafımca bir tez çalışması yapılacaktır. Bu çalışma kapsamında Türkiye'deki Biyoloji ve Fen Bilgisi öğretmeni adaylarına verilen çevre eğitimini araştırılacaktır. Türkiye genelinde yapılması planlanan bu çalışmanın amacına ulaşabilmesi için çevre eğitimi konusunda donanımlı öğretim üyeleri ile işbirliği yapılması, bilgi ve birikimlerinden yararlanılması gerekmektedir. Bu amaçla, araştırmada very toplamak için daha önce Wisconsin Üniversitesi'nde uygulanmış olan 25 soruluk bir anket kullanılacaktır.

Aşağıda yer alan linke tıklayarak ilgili araştırmanın anketine ulaşmanız ve 15 dakikanızı ayırarak ankete katılmanız bizi çok memnun edecektir. Anket yanıtları, doğrultusunda dileyen katılımcılarla röportaj da yapılacaktır.

Sizden toplanılan veriler yalnızca akademik çalışmalar için veri olarak kullanılacaktır. Anket, bunu onayladığınıza dair bir soru ile başlayacaktır.

Dilediğiniz zaman anketi doldurmayı bırakmakta özgürsünüz. Eğer çevre eğitimi konusunda daha uygun gördüğünüz birisi var ise lütfen anketi kendisine iletiniz.

Lütfen anketi en geç 3 hafta içerisinde yanıtlanız.

Şimdiden teşekkür ediyorum.

Link: https://tr.surveymonkey.com/r/C6KBN7Y

Saygılarımla,

Efe Güntürkün

0539.917.51.72

Eğitim Bilimleri Enstitüsü

İ.D.V. BİLKENT ÜNİVERSİTESİ