PRESERVICE AND INSERVICE SCIENCE TEACHERS' PERCEPTIONS ABOUT OUTDOOR EDUCATION

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ABSTRACT

PRESERVICE AND INSERVICE SCIENCE TEACHERS' PERCEPTIONS ABOUT OUTDOOR EDUCATION

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The purpose of this study was to investigate the perception and experiences of preservice and inservice science teachers about outdoor education (OE) in terms barriers, motivations, opinion, and educational opportunities. Survey and correlational research designs were used. A total of 95 inservice science teachers and 181 preservice science teachers participated in the study. The data were collected by using the ''Outdoor Education Perception Survey", which was developed by the researcher. Data were analyzed by using quantitative and qualitative analysis methods. The survey included closed-ended and open-ended questions. The responses for open-ended questions were analyzed qualitatively first then the data were transformed into quantitative data. For data analysis, descriptive statistics and inferential statistics (t-test and multiple regression analysis, two-way ANOVA) were used. Descriptive statistic showed different tendencies of preservice and inservice science teachers' preferences, barriers, and motivations about OE. Inferential analysis showed that there were statistically significant differences between the nature relatedness scores (NR-Score) of inservice and preservice science teachers. Moreover, there was no significant difference in participants' nature relatedness scores in terms of outdoor setting type preferences and human influence attribute. Multiple regression analyses revealed that perceived difficulty in using natural settings and intention to use maintained outdoor settings predicted the intention to

use natural settings with their students for both inservice and preservice science teachers.

Keywords: Outdoor Education, Preservice Science Teacher, Inservice Science Teachers, Nature Relatedness, Landscape Preference

ÖZ

FEN BILGISI ÖĞRETMENLERININ VE FEN BILGISI ÖĞRETMEN ADAYLARININ AÇIK HAVA EĞITIMI HAKKINDAKI GÖRÜŞLERI

Sandıkçıoğlu, Soykan
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Bu çalışmanın amacı, fen bilgisi öğretmen adayları ve öğretmenlerinin açık hava eğitimine (AE) ilişkin algı ve deneyimlerini engeller, motivasyonları, görüşleri ve eğitim fırsatları açısından incelemektir. Anket ve korelasyonel araştırma desenleri kullanılmıştır. Çalışmaya toplam 95 fen bilgisi öğretmeni ve 181 fen bilgisi öğretmen adayı katılmıştır. Veriler araştırmacı tarafından geliştirilen "Açık Hava Eğitimi Algı Anketi" kullanılarak toplanmıştır. Veriler nicel ve nitel analiz yöntemleri kullanılarak analiz edilmiştir. Ankette kapalı uçlu ve açık uçlu sorular yer almaktadır. Açık uçlu sorulara verilen yanıtlar önce nitel olarak analiz edilmiş, ardından veriler nicel verilere dönüştürülmüştür. Veri analizi için tanımlayıcı istatistikler ve çıkarımsal istatistikler (t-testi ve çoklu regresyon analizi, iki yönlü varyans analizi kullanılmıştır. Betimsel istatistikler, fen bilgisi öğretmen adayları ve öğretmenlerinin açık hava eğitimi ile ilgili tercihleri, engelleri ve motivasyonlarının farklı eğilimlerini göstermiştir. Çıkarımsal analiz, fen bilgisi öğretmen adayları ve öğretmenlerinin doğayla ilişkililik puanları (Dİ-Puanı) arasında istatistiksel olarak anlamlı farklılıklar olduğunu göstermiştir. Ayrıca, katılımcıların doğa ile ilişkililik puanlarında açık hava ortam türü tercihleri ve insan etkisi niteliği açısından anlamlı bir fark bulunmamıştır. Çoklu regresyon analizleri, doğal ortamları kullanmada

algılanan zorluğun ve yapılandırılmış dış mekan ortamlarını kullanma niyetinin, hem hizmet içi hem de fen bilgisi öğretmen adaylarının öğrencileriyle doğal ortamları kullanma niyetini yordadığını ortaya koymuştur.

Anahtar Kelimeler: Açık Hava Eğitimi, Fen Bilimleri Öğretmen Adayları, Fen Bilimleri Öğretmenleri, Doğayla İlişkililik, Peyzaj Tercihleri

To My Family

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LIST OF ABBREVIATIONS

ABBREVIATIONS

OE: Outdoor Education

CFA: Confirmatory Factor Analysis

NR: Nature Relatedness

ERB: Environmentally Responsible Behaviors

MoNE: Ministry of National Education

CHAPTER 1

INTRODUCTION

The outdoor environment plays a massive role in our daily life. In their daily life, people face a variety of scientific phenomena, such as weather events, environmental disasters, and global warming. Numerous scientific concepts and phenomena, such as climate change, renewable energy sources, endangered species etc., are being extensively investigated by researchers by conducting research in the outdoor environment. Social and natural sciences have increasingly investigated human-caused environmental issues and problems to find out solutions such as deforestation, climate change and excessive usage of natural sources. Researchers in the education field focused on improving the quality of environmental education in schools to raise future citizens who have an awareness of these environmental problems and develop pro environmental behaviors.

These problems and issues require innovation and creative solutions by integrating various scientific disciplines. The interdisciplinary and multidisciplinary characteristics of environmental and outdoor education, which situate the intersection areas of society and environment, offer the opportunity to investigate problems faced by society today in depth to reach possible solutions. (Higgins, 2009; Orr, 2004). In this regard, Outdoor Education (OE), which aims to improve individuals' psychosocial, physical and interpersonal skills development and increase their environmental awareness, has accepted as an effective tool for the stated purpose (Neill, 2008).

Outdoor education (OE) can be defined as an experiential, interdisciplinary and multi-sensory discipline incorporating students' physical skills, personal growth and interpersonal interactions in an outdoor context (Priest, 1986). The development and changes in the formal, non-formal and informal settings of educational philosophy

and practices over the centuries provided the baseline for OE (Gilbertson et al., 2006; Smith & Knapp, 2011). At the end 19th, educators understood that classroom out of school could be improve students' skills, values and attitudes (Öhman & Sandell, 2016).

Although changes and development of educational philosophy took centuries, the term "outdoor education" is relatively new, has only been started to use since the late 1970s (Neill, 2002). Until to date, Definition of OE was changed on the context, purposes and locations (Dyment et al, 2018). In generally, OE defined as learning that take places outdoor (Ratinen et al., 2021). Outdoor education has three main benefits. First, help develop the student's physical capability increase social interaction and well-being. Second, spending time in nature and curriculum content related to nature increase students understanding about nature and issues related to environment. Thirdly, outdoor activities improve student's cognitive capability and increase the academic performance. Because of this, outdoor classrooms integrated increasingly into school programs over time and have been investigated in different contexts, samples and cultures (Fančovičová & Prokop, 2011; Joyce & Farenga, 1999;; Chang et al., 2018; Blatt & Patrick, 2014; Sjöblom et al., 2023; Borsos et al., 2022Henriksson, 2018; Sjöblom et al., 2021; Ratinen et al., 2021; Yılmaz et al., 2016, Ernst & Tornabene; 2012).

In the literature, OE was investigated different context of teachers perspective such as barriers (Blatt & Patrick, 2014; Ernst & Tornabene, 2012; Shume & Blatt, 2019; Yılmaz et al., 2016), perception (Barfod, 2017; Borsos et al., 2022; Borsos et al., 2018; Sjöblom et al.,2021), motivation (Mullenbach et al.,2018;Yıldız et al., 2016) and nature connectedness.(Barrable & Lakin, 2019; Ernst & Tornabene, 2012: Yılmaz et al., 2016). In generally, studies are related to early childhood and elementary inservice and preservice teachers. Therefore, there are few studies conducted with inservice and preservice science education teachers about OE. In order to fill this gap, in this study, preservice and inservice science teachers' perceptions about outdoor education were investigated.

1.1 Background of the Study

Some research argued that even limited exposure with nature benefits both individuals and the environment (Conn, 1998; Schultz, 2000; Thomashow, 1998). Exposure with nature fosters productive environmental and pro-sustainable behaviors (Nisbet et al., 2009; Schultz, 2002), helps individuals develop better social interaction, greater well-being emotionally and mentally, and higher academic performance (Merewether, 2015). Additionally, nature experiences in childhood-affected individual's nature connectedness in adulthood and positive experiences foster individuals' nature connection in adulthood (Bento & Dias, 2017).

In this point, nature relatedness (NR) is important term that focuses on the human-nature relationship in the line of individual's affective, cognitive, and experiential connections with nature (Nisbet et al., 2009).Nature relatedness reveals differences in individuals' views of their relationship with nature (Nisbet et al., 2009). The nature relatedness (NR) term was created by Nisbet et al. (2009) to describe individual's level of connectedness with natural world. In addition, Beery and Wolf-Watz (2014) described the nature relatedness as individual's nature connection to human relationship with nature that covered ecological identity, self-identity, and familiarity of nature and sensitivity of nature. Until to date, the human relationship with nature was described in different context such as biology, environmental psychology and environmental education in the terms of affective, cognitive, and physical dimension of human relationship with nature by using different terms such as affinity, nature sensitivity, ecological identity, nature relatedness and human-nature connection (Barthel et al., 2018; Berry & Friedberg,2022;Mayer& Franz, 2004; Ives et al. 2017; Sampson, 2013; Nisbet et al., 2009) . In this study, Nisbet et al., (2009) definition was selected because this definition explains the differences in individuals' views of their relationship with nature.

To assess individuals' views of their relationship with nature researchers used different measurement instruments. Mayer and Franz (2004) published Connection to Nature Scale to measure the individual's affective connection with the nature.

Clayton (2003) developed Environmental Identity Scale to evaluate individual's self-identification related with the nature. Although these scale evaluated individual's nature connection affectively, they did not evaluate experience and emotions. Thompson and Barton (1994) developed the scale that differentiate individual's values related with nature (ecocentric vs anthropocentric). Inclusion of Nature in Self (Schultz, 2002) assessed the individual's motivation on environmental concern but did not asses the connection with the nature. In addition, the Nature Relatedness (NR) Scale developed by Nisbet et al. (2009) identified the nature relatedness with three structure. These are nature related self (NR-self), experiences (NR-experience) and perspective (NR-Perspective). "NR-self" expresses the individual's identification with nature in terms of personal feelings and thoughts. "NR-perspective" reflects one's worldview about how individuals interact with other living things in nature. Particularly, "NR-perspective" emphasizes the human use of natural resources and interaction with animals. "NR-experience" expresses individuals' feelings about physical familiarity with nature, such as desire and comfort to be in nature. While different scales assessed single dimension, Nature Relatedness Scale assessed the human-nature relationship from multidimensional perspectives and assessed the connectedness of nature. Nature relatedness (NR) Scale mainly related to biophilia hypothesis and ecopsychology, which explains the individual's desire to being in nature, to explain individual's relationship with nature to promote environmentally responsible behavior (Nisbet et al., 2009).

The high nature relatedness, which indicates a strong individual's connection with nature, reflected the greater environmental concern and environmental happiness (Corazon et al., 2019). Additionally, individuals who strong connection with nature, feel a desire to protect nature (Zelenski & Nisbet, 2014). In this regard, examining an individual's connection with nature might be an indicator of how the individual interacts with the environment (Sahin & Alıci, 2019). Also, Gill (2014) argued that spending time in nature or exposure nature increase the interaction individual's interaction with nature and promote more positive felling, behaviors and attitudes in and about nature.

At this point, the characteristics of OE, which provides direct experience with nature and allows the development of individual relationships with the natural world, gives a chance to students explore nature and helps to construct a connection with nature (Beames, et al., 2012; Maynard & Waters, 2007).

Nature relatedness is important explanatory component for environmentally responsible behavior, environmental concern and pro-environmental behaviors (Nisbet et al., 2009; Schultz, 2002). Positive experiences, belief and values in and about nature directly affected the teachers intentions to use OE (Sjöblom et al, 2023). Teachers are expected to play a significant role in students 'interest in the environment (Tuncer et al., 2007). In this respect, education quality and application of OE depends on teachers-related aspects such as interest, motivations, behaviors and attitudes in the nature (Sahin & Alıci, 2019). In this regard, nature relatedness might be significant key point for understanding perception of inservice and preservice teachers about OE.

In that vein, preservice and inservice teachers' nature relatedness were investigated different context, culture and sample (Barrable and Lakin, 2019; Ernst & Tornabene;,2012; Karakaya et al., 2017;Şahin and Alıcı, 2019; Yılmaz et al., 2016). While preservice and inservice teachers have positive nature related worldview, some study also indicated that nature relatedness and their intention to teach in outdoor (Barrable and Lakin, 2019; Yılmaz et al., 2016)

In general, OE improves students' understanding about nature and increases their level of knowledge of their environment (Jose et al., 2017). Also, OE increases spending time in nature and builds individuals' connection with nature (Beames et al., 2012). Therefore, students explore nature and develop experiences in nature (Maynard & Waters, 2007). These experiences help students to promote their environmental literacy, motivations and skills related to environmental issues (Torquati et al., 2013).

Unfortunately, nowadays, children spend less time in or near outdoor environments, which negatively affects children's cognitive, affective, and physical development

(Chawla, 2015; Silverman & Corneau, 2017). The less exposure to outdoor environments has detrimental implications for children's cognitive development, well-being and health (Malone, 2008). Additionally, when children spend less time in outdoors, they become unaware of the natural world (White, 2004). Therefore, children have a lack of connection with nature, which causes some problems such as depression and hyperactivity (Louv, 2008).

Louv (2008) called this problem as *nature deficit disorder* that identified as "human costs of alienation from nature". Nature-deficit disorder emphasizes the difference between spending time indoors and outdoors to address children's social and developmental problems. To eliminate this phenomenon, the Vitamin-N (n for nature) term was created by Louv (2016), which is identified as individuals' exposure to and engagement with the natural world. Also, research shows that attention-based disorders, obesity, and depression can be reduced by exposing more nature-based experiences by helping the cognitive, physical and emotional development of children (Driessnack, 2009; Otto & Pensini, 2017). Therefore, several researchers and theorists argue that outdoor learning should be integrated into the education system to develop students' cognitive, physical and emotional intelligence (Gedzune, 2015; Orr, 2004). In that vein, an education program should promote the "adapting exposure of nature into the learning environment" and "learning in and about nature" (Bragg et al., 2013).

Although there were many significant impacts of being in nature on students, most of teachers are not willing to use outdoor because of barriers and limitations such as lack of knowledge, classroom management problems, administrative and parental support and difficulty on planning and preparing outdoor activities (Blatt & Patrick, 2014; Ernst & Tornabene, 2012; Shume & Blatt, 2019;Yılmaz et al., 2016). In this point, understanding of teachers' perception to OE was critical to implementation of OE (Simons, 1993). Many researches argued that teachers belief, motivations, attitudes on outdoor directly influence their teaching and their practices about the OE. (Blatt&Patrick, 2014;Borsos et al.,2018 ;Borsos et al, 2022; Ersnt,2013 ;Ernst

&Tornabene ,2012; Karaarsslan,2020;Shume&Blatt,2019;Simon, 1993;Yılmaz et al., 2016).

Although several studies existed on preservice and inservice teachers perceptions about OE, there are few studies especially in Turkey have yet explored nature relatedness of science inservice and preservice teachers in terms of perception of OE. Therefore, this study aims to fill the gap in the literature by exploring preservice and inservice science teachers' perceptions about OE.

1.2 Purpose of Study

The purpose of the present study was to investigate the perception and experiences of pre-service and in-service science teachers about outdoor education (OE) in terms of different concepts, such as barriers, motivations, and educational opportunities. In this regard, the following research questions addressed the present study;

1. Do the preservice and inservice science teachers consider outdoor education important and effective?
2. What are the preservice and inservice science teachers' perceptions of outdoor education?
3. What are the differences between preservice and inservice science teachers' perceptions of outdoor education?
4. Is there a difference in inservice science teachers' and preservice science teachers' nature-relatedness?

1.3 Significance of Study

Despite outdoor education offered many opportunities for students to improve knowledge, positive behavior about nature, connectedness and sensitivity with nature (Borsos et al.,2022,Beames et al.,2012,Bento&Dias,2017), most of teachers do not want to take outside the students and they feel uncomfortable with this idea

due to some barriers such as lack of knowledge, lack of confidence ,lack of ability to plan organize outdoor , management problems (Classroom management, loss of classroom control), administrative problems(lack of support of school and parent, school policy and expert need) and problems in logistics organization (cost ,safety concern, time and limited access to nature (Blatt & Patrick, 2014;Ernst & Tornabene, 2012;Glackin,2018;Shume&Blatt,2019;Torquati& Ernst,2013).

Different barriers and challenges affect teacher's action and teachers teaching (Henriksson, 2018). Wilhelmsson (2012) indicated that teachers' classroom practices and implementation are affected by teachers' values, perception, belief and attitudes (Haney et al., 2002). In addition, Carrier-Martin (2003) teachers' perceptions especially in nature concept might be directly affected students' attitudes in nature both negatively and positively. In that vein, teacher's perception is important about outdoor education to improve students' positive feeling, awareness and knowledge about environment (Rickinson et al., 2004).

In this regard, when the literature regarding teachers perception about the OE was examined, most of study focused on early childhood education teachers (Ernst & Tornabene,2012;Skarstein & Skarstein, 2020;Yılmaz et al.,2016,) and elementary school education teachers (Borsos et al., 2022;Borsos et al., 2018;Blatt & Patrick, 2014;Barfod,2017;Cengelci,2013;Karaarsslan-Semiz,2020;Henriksson, 2018). With a few exception (Henriksson, 2018) ,who this study was especially focuses on elementary school teachers perception about OE in terms of science education, science education teachers perception about OE not been frequently investigated. Therefore, this present study investigated the science education teacher's perception about OE, which has been rarely investigated in the OE context. Moreover, last revision the Turkish middle school science curriculum (MoNE, 2018) will planned to add the "environmental education and climate change" course within the science curriculum that is important part of OE. Within environmental education framework, outdoor education linked with the critical analysis of the natural science and build the awareness of scientific and nonscientific aspect to construct values and benefits for discussion and reflection of the pedagogical settings about recognition of the

nature. (Kyburz-Graber et al. 2006). Therefore, understanding of science education teacher's perceptions about OE will be gained different importance in the future.

Another significance of study present study investigated the preservice science teacher's perception about OE. Borsos et al., (2022) study indicated that teacher training programs play key role for successful and effective implementation the OE. In the outdoor education context, individual's nature experiences are very important since individual's nature experience influence individual's attitudes, connectedness and action on the nature (Henriksson 2018; Palmberg et al.,2018). Palmberg et al. (2018) indicated that lack of experience and lack of knowledge about outdoor during teacher training affect negatively preservice teachers intention the to use OE.

In that reasons, the present study investigated the preservice science teacher's perception about OE to might be a guide for policy-makers and teachers' educators to develop and integrate outdoor education into preservice education programs and curricula more effectively.

1.4 Definitions of Important Terms

Outdoor Education: Outdoor education is learning that takes place in the outdoors that aims to develop a deeper relationship with nature, raise environmental sensitivity, and promote an individual's connection with nature (Ratinen et al., 2021).

Nature Relatedness: The term coined by Nisbet et al. (2009), that describe individual's levels of connectedness with the natural world.

***Perceptions*:** Perception is a phenomenon that identify sensory stimuli, emotional reactions, and cognitive interpretations in how people perceive and their surroundings. (Schacter, 2012). In the current study, perception was used to describe participants' interpretations about Outdoor Education.

Preservice Teacher: In the current study, preservice teachers refer to teacher's candidate who study at university located in the Central Anatolia.

***Inservice Science teachers*:** In the current study, inservice science teachers refer to graduate teachers work in the public in the big city located in the Central Anatolia.

CHAPTER 2

LITERATURE REVIEW

The purpose of the literature review chapter is to provide overview of Outdoor Education (OE) literature. First, general characteristic of OE is presented. Then, Nature-Relatedness is explained. In the final part, teachers' landscapes preferences, motivations, and barriers in the OE are presented.

2.1 Outdoor Education

Although Outdoor Education (OE) has a long history that the origins extended to Plato, the OE term appeared in the 1940s (Knapp, 1994). Outward Bound, which is a non-profit educational organization founded by the educator Kurt Kahn, was considered as the introduction of the term outdoor education (Priest & Gass, 1997). The modern roots of OE were originated from Comenius, who argued that children learn better when using their senses and outdoor environments are the best place for these experiences. Similarly, the philosophers Rousseau and Pestalozzi emphasized the efficacy of direct learning experiences (Powers, 2004). During the Industrial Revolution, society was getting far away from nature and direct learning experiences gained importance day after day.

In this line, Froebel, who is the German educator, was influenced by Pestalozzi and Rousseau's ideas and established kindergarten as a botanic garden within this concept many things might be learned from nature (Aytaç, 1980). Then, John Dewey formed the philosophical basis of outdoor education and was considered as foundational figure for OE in the 20th century. John Dewey supported the concept of "experiential learning", which was intended to help individuals learn by experiencing. In parallel to this idea, educators argued that outdoor classrooms could improve students'

educational values, skills, and attitudes at the beginning of the 20th century (Öhman & Sandell, 2015). These goals were getting importance with the progressive education movement and integrated into American Schools (Dewey, 1986). Consequently, OE began to take part in education systems.

At the beginning of 1940, the term "outdoor education" was defined as the teaching process of natural experiences with direct experience within various disciplines (Fang et al., 2023, pp. 229-230). In the 1950s, OE was used to refer to "education in, about, and for the outdoors" (Donaldson & Donaldson, 1958). According to Priest (1986), these definitions did not reflect the OE characteristic and OE was redefined by Priest. Priest (1986) defined the OE as an experiential, interdisciplinary and multi-sensory discipline incorporating students' physical skills, personal growth, and interpersonal interactions in an outdoor context. This definition is composed of six major points and reflects all forms of education about the outdoors as an umbrella (Priest, 1986) (Figure 2.1).

First point is that outdoor education was a method of learning. Smith (1995) described the OE as a "learning strategy for things that learned best outdoors." Second, the process of learning was experiential and learning directly came from native materials in the outdoors (Priest, 1986). Third, learning primarily occurred in outdoor settings. Some preparation materials and basic descriptions might be learned indoors. Fourth, Lewis (1975) stated that experiential learning requires the use of six senses (sight, sound, taste, touch, smell, and intuition) and three major domains (cognitive, affective, and psychomotor). In addition, subject matter directly linked with tangible concepts (Lewis, 1975). Fifth, OE was an interdisciplinary concept and involved interactions of different concepts.

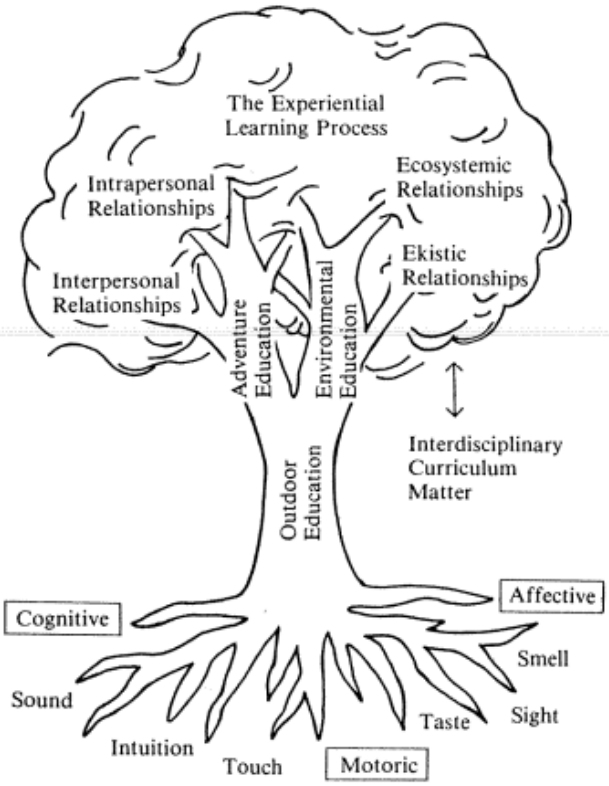

Figure 1 Outdoor Education Tree

Note: Adapted by Priest, S. (1986). Redefining Outdoor Education: A matter of many relationships. *The Journal of Environmental Education*, *17*(3), 13–15. https://doi.org/10.1080/00958964.1986.9941413

Sixth one was considered as the most important one by Priest (1986) emphasized that OE included various relationships such as interpersonal, intrapersonal, ecosystemic, and ekistics. Interpersonal refers to the relationship between people and how they interact with each other. Intrapersonal refers to the individual's personal relationship with himself/herself. Ecosystemic refers to all of the dynamic parts of the ecosystem. Ekistic refers to interactions between people and their surroundings. To sum up, within this context, Priests (1986) described the OE as a method (experiential), topic (relationship) and process (sensory) of learning that included a place (natural environments), a subject (ecological dynamics) and a reason (nature use).

In the 21st century, OE has gained a holistic form. Rickinson et al. (2004) indicated that the concept of OE includes a wide range of complex things, which covers various educational activities in different settings, such as environmental education, adventure education, agricultural education, nature studies, and outdoor play. Therefore, overlaps occurred between outdoor education, outdoor learning, and outdoor studies (Humberstone, 2016, p.7). In addition, outdoor education was considered as a young and emerging part of outdoor studies (Humberstone et al., 2015). In time OE was redefined in its current final form as an educational concept of learning that takes place outdoors, which aims to increase people's academic, physical, emotional, social, and overall well-being (Harun & Salamuddin, 2014).

OE was characterized as cooperative, learner-centered, and influenced significantly by both environmental and social contexts that used the natural environment to promote learning and develop knowledge about the environment. (Waite et al., 2015; Harun & Salamuddin, 2014). In addition, OE provides opportunities to increase the interaction between society and the environment (Lugg, 1998). As a learning process OE was directly shaped by first-hand observation and related to actual "doing" (Priests,1986). Learning was seen as directly linked with outdoor experiences and they were used to help students understand the relationship between nature, culture, and society (Dahlgren & Szczepanski, 2005). Thus, OE was gained as the interdisciplinary and holistic form that allow to promotes students' development in different set of skills such as cognitive, affective and psychomotor (Ratinen et al., 2021).

According to Woodhouse and Knapp (2000), outdoor experiences in the OE had significant effects on the students' development in various fields. Similarly, Lien's study (2007) supports this research and has significant effects on OE in the four main areas: personal development, social skills, academic achievements, and environmental awareness. Driessnack (2009) and Dillon et al. (2019) indicated that OE increases students' level of retentions, which promote the strength of permanent learning and helps to use prior knowledge of students. In addition, outdoor activities were helped to develop students' research skills and increases level of achievement

related to biology and nature concepts (Fančovičová & Prokop, 2011; Joyce & Farenga, 1999). Prokop et al. (2007) indicated that OE improves students' attitudes about nature and positively affects their views of nature (Mullenbach et al.,2018). OE reduces the level of stress and promotes individuals' self-efficacy (Chang et al., 2018; Yıldız et al., 2016). Furthermore, OE encourages individual communication and interaction skills (Farmer et al., 2007). To sum up, OE includes multidisciplinary perspectives, problem-solving activities, inquiry learning, and real-world environments in teaching and learning practices, which ease learning and organize learning as active learning (Banchi & Bell, 2008).

In generally, teachers and preservice teachers were considered as OE has an important role in teaching and learning (James & Williams, 2017; Blatt & Patrick, 2014). The nature related life experiences of OE such as outdoor play and nature content were important point for development of positive view regarding OE among teachers and preservice teachers (Waite, 2011; Blatt & Patrick, 2014). The preservice teachers' nature related actions, environmental behaviors, and stewardship for nature view might also be related to their OE experiences (Blatt & Patrick, 2014). In addition, researchers found that preservice teachers and inservice teachers' experiences in the outdoor during their lives were affected their intention the use of OE (Barrable & Lakin, 2019; Blatt & Patrick, 2014; Sjöblom et al., 2023).

In generally, positive experiences in outdoor settings were positively related to teachers' intention to use OE for their students (Blatt & Patrick, 2014). Blat and Patrick's (2014) study showed that teachers and preservice teachers think that implementing OE plays a significant role in students' learning thus, they take responsibility for having their students to involve with nature related experiences. Barrable and Lakin (2019) study indicated that nature relatedness might be indicator for individuals' competence and willingness to teach outdoors. The high nature relatedness, which indicates a strong individual's connection with nature, reflected the greater environmental concern and environmental happiness (Corazon et al., 2019). Additionally, individuals who strong connection with nature, feel a desire to protect nature (Zelenski & Nisbet, 2014). In this regard, examining an individual's

connection with nature might be an indicator of how the individual interacts with the environment (Sahin & Alıci, 2019).

2.2 Nature Relatedness and Its' Theoretical Framework

In general, many people are aware of the environmental problems and care about the environment. However, this might not be reflected the individuals' behaviors (Kaplan, 2000; Kortenkamp & Moore, 2001; Nisbet et al., 2009). Psychologist examined this situation in terms of different aspects such as motivation, belief and values (Kaiser et al., 1999; Kaplan, 2000; Pelletier et al., 1999). Also, Hines et al. (1987) meta-analysis study showed that environmental related behaviors might be predicted from personality and attitudes as well as knowledge and skills about environment. In this regard, Nisbet et al. (2009) defined the new term that name is Nature-Relatedness (NR) and created the Nature-Relatedness (NR) scale to understand individual's differences in environmentally responsible behaviors (ERB).

According to Nisbet et al. (2009), NR mainly related with *biophilia hypothesis* and *ecopsychology* approach. The *biophilia hypothesis* explained the desire of humanity relationship with the nature (Kellert & Wilson, 1993). Thanks to *biophilia*, humans make emotional connection with nature unconsciously and leads to respect for nature that create interest and love about the nature (Perkins, 2010). Therefore, humanity easily learn interact with nature (Gullone, 2000). This process was learned by the experientially and was expressed in the various concept such as art, ethics and cognitions (Kahn, 1997; Simaika & Samways, 2010). Although humanity has begun to far from the nature, humanity protected the desire of being in nature (Nisbet et al., 2009). Popularity of outdoor activities, botanical gardens, safari parks, zoos, positive attribute the natural scenery are the evidence for this (Ernst & Tornabene, 2012; Milton, 2002).

Despite an existing connection between human and nature, people level of connectedness' with nature were varied differently (Nisbet et al., 2009). Many research investigated this variation and why some people feels positively about nature in terms of emotion, interest, experiences related to nature and environmental knowledge (Allan & Ferrand, 1999; Kals et al., 1999; Pooley & O'Connor, 2000). Also, some research suggested that when the degree of connectedness with nature increases, people feel as they are the part of nature, have more concern about nature, and want to protect the nature (Hovardas, 1997; Shultz, 2000). In this regard, Nisbet et al. (2009) defined this new construct *Nature Relatedness* (NR) as an individual's level of connectedness with natural world.

The concept of interconnectedness with the earth and sense of being in nature are related to individuals ecological identify and the term created by Arne Naess in 1973 that is ecological self that describe relationship among self, human, non-human community, and planet. Therefore, giving a damage in the part of this relationship is seen as damage given to the self (Conn, 1998). The term of environmental self-concepts, environmental self-definition, and environmental attitudes were investigated by Clayton (2003). It was found that individuals' identification of natural environment was seen as significant aspect for human-nature relationship. Nisbet et al. (2009) argued that along with identity, role of emotions, experiences, and interaction of these factors need to be investigated to understand individuals' differences about nature and NR concept. In this regard, NR Scale was develop by Nisbet et al. (2009) to understand how people related to nature reflects individual differences in their cognitive, affective, and physical connections with the nature.

2.3 Nature Relatedness and Outdoor Education Relation

Zykstra et al.'s (2014) review study indicated that there are two main types of experiences that increase the NR; one is direct experience and contact with nature, the other one is gaining information about the nature. In addition, many study indicated that there are strong associations between NR and being in nature

(Arbuthnot et al., 2014; Hinds & Sparks, 2008; Kals et al., 1999). According to Mayer et al.'s (2009) study, even the short exposure to nature (short walk) increased connection with nature significantly rather than virtual or urban walk. In parallel, many studies suggested that outdoor experiences had the most important influence in developing nature sensitivity (Kaplan, 2000; Nisbet et al., 2009).

Tanner (1980) study indicated that interaction with nature, frequent habitat contact, outdoor activities (fishing/hunting and sports), role models, family, and teachers identified as variables that influenced individuals' nature-related actions and their sensitivity about the nature. In addition to this research, training or educated about the nature were significantly affect individuals' connection to the nature (Arbuthnot et al., 2014; Ernst & Theimer, 2011). In this sense, OE might be seen to improve the relationship between individuals and nature (Barrable & Arvanitis, 2019). Characteristics of OE such as exposure of nature , relation of the nature, identification of the nature and knowledge-based curriculum realted to nature increases spent time in the nature and connection of the nature.Also, this increased the participants feeling significantly regarding connection to the nature (Ernst & Theimer, 2011; Ernst & Tornabene,2012;Lumber et al. ,2017; Nisbet et al., 2009 ;Quay ,2013). In this regard, NR was considered as important part and one of central aim of OE (Barrable & Arvanitis, 2019; Mayer & Frantz, 2014).

In summary, the characteristics of OE increased individuals' connectedness to the nature and affected individual' behaviors and sensitivity about nature positively (Ernst & Theimer, 2011). Therefore, experience in the nature, nature related activities, and curriculum content related to nature in the OE provide opportunities for learning and practice about nature and foster the connectedness of nature and frequencies of experiences related to nature. In this regard, NR was investigated differently within scope OE.

Şahin and Alıcı (2019) investigated 402 preservice early childhood teachers' nature relatedness in terms of differeny grade level in Turkey by using Nature Relatedness (NR) Scale. The results indicated that preservice teachers had positive nature related

worldview. However, preservice teachers did not prefer to be in nature. Also, although preservice teachers were seen human as part of the nature, they had little idea about role of human in the nature or connection of human with the other component of the nature. In another research, 49 preservice elementary school teachers' nature relatedness and perceived competence and willingness to teach outdoors were examined by Barrable and Lakin (2019) by using Nature Relatedness (NR) Scale. The study found that positive correlation exist among nature relatedness, perceived competence, and willingness to teach outdoors. In addition, the result showed that outdoor experience were significantly affected the individuals' willingness to teach outdoors.

In a different study, 177 preservice science education and 186 elementary schools teachers nature relatedness in term of gender, grade level, education department and nature related activities were investigated by using Nature Relatedness (NR) Scale (Karakaya et al.,2017). The result showed that while the NR score of participants were statistically significant in terms of gender, education department, and grade level, there was no statistically significant difference in nature activities regarding these variables.

Yılmaz (2016) study investigated 300 preservice early childhood teachers' nature relatedness and its relationship with their landscape preferences by using Nature Relatedness (NR) Scale and set of images. The result showed that preservice teachers' personal landscape preferences were impacted by their level of nature relatedness. Similarly, Ernst (2012) investigated same concept with 110 preservice early childhood teachers. In contrasts the Yılmaz (2016) study, individuals' level of nature relatedness did not influence the participants landscape preferences in the study.

2.4 Theoretical Framework & Teachers Landscapes Preferences

People affective evaluation about the landscape is linked with individuals' environmental value orientation (Kaltenborn & Bjerke, 2002). In parallel, Buijs et al.(2009), Kaltenborn and Berke (2009) suggested that individuals' environmental value directly affect their landscape preferences. For example, while anthropocentric values were preferred for the maintained landscapes, ecocentiric values were preferred for the wild or natural landscapes. Although environmental value orientation played significant role on landscape preferences, individuals' landscapes preferences might change with sociodemographic and cultural values such as age, gender, education level, and race (Kaltenborn & Bjerke, 2002). Similarly, Stern's (2000) value-belief-norm theory indicates that individuals' educational and cultural backgrounds significantly affect the individuals' value orientation.

In the environmental psychology, individuals' preferences about the outdoor are generally related to their beliefs, attitudes, and values, social and personal experiences about the nature (Kaplan & Kaplan, 1989; Ruiz & Bernaldez, 1983). In addition, individuals' values and attitudes about the nature are highly linked with individuals' level of nature connectedness and directly affected by the individuals' nature-related actions (Ernst & Tornabene, 2012). Maller et al.'s (2005) research supported this idea and the researchers stated that a person, who shows little connectedness with nature, does not feel part of nature and is not willing show an action related to nature.

Theoretical grounding of this current study mainly related to the role of belief and affective influences such as opinion, motivation, limitation, and barriers of inservice and preservice science teachers on the teaching practices about OE. Magnusson et al. (1999) and Richardson (1994) indicated that teachers' beliefs have a significant role in their actions and guide their classroom practices. Teachers' ethical values and educational philosophies directly influence how they organize their teaching and their practices about the nature (Sandell et al., 2005). Research showed that instructional settings are perceived by teachers differently from the point of different

sets of barriers, benefits, and educational affordances (Davies, 1996; Simmons, 1993; Skamp & Bergman, 2001). In this regard, in this research the researcher believed that understanding the teachers' practices with outdoor settings as an instructional learning environment and their outdoor setting preferences are critical to understand their NR and beliefs about OE (Ernst & Tornabene, 2012; Munoz, 2009).

2.5 Teachers Perception about OE

According to Christie et al. (2014) study, OE can be implemented successfully and effectively, when only methodology of OE was known and was guided students into active leaning process by teachers. For this reason, well-prepared, self-confident, and creative teachers are needed to implement and maintain OE (Borsos et al., 2022).). In parallel to this idea, the recent studies showed that teacher' beliefs, attitudes, willingness, and opinions about outdoor education were considered as critical aspects for implementation of OE (Borsos et al.,2022; Borsos et al.,2018; Blatt & Patrick,2014;Barfod,2017;Cengelci,2013; Henriksson,2018; Karasslan-Semiz,2020; Skarstein & Skarstein, 2020; Sjöblom et al.,2021;Palmberg et al., 2018; Ratinen et al., 2021).

In addition to above mentioned aspects, many studies have found that integration of OE and nature experiences into teacher training programs was considered as important since the lack of opportunities with OEs experience and benefits of OE during teacher training makes them unlikely to implement OE in their future teaching carrier (Blatt & Patrick, 2014; Borsos et al., 2022; Henriksson, 2018; Palmberg et al., 2018). Similarly, between the teachers' levels of confidence in implementing OE and effective training about OE during their training were found positively correlated (O'Donnel et al., 2006). According Gray and Colucci-Gray (2019) research, nature experiences and nature related content of OE during the teachers training increased the preservice teacher's connectedness of nature and promote level of implementation of OE in their future carrier.

In this regard, preservice teachers' perceptions about OE were seen as key factors on implementing of OE in terms of planning and teaching and should be investigated deeply.

Borsos et al. (2022) investigated the 511 senior preservice teachers from different field perceptions' about OE from five different countries. In this study, the survey showed that participants believed that OE is an important and effective teaching method. In addition, most of the participants had the intention to use OE in their future careers. However, they did not have enough knowledge about OE, and they were afraid of using it. In another study, Sjöblom et al. (2021) examined 51 preservice teachers' perceptions of OE in terms of survey and open-ended questions in Finland and Norway. The result of data showed that participants have more positive perception about teaching indoors than teaching outdoors. While participants had positive perceptions of OE in terms of health-related aspects of OE, active learning, hands-on experience, and experiential base, they had a negative perception of OE in terms of time consumption, complex planning, and preparation.

In a different research, Borsos et al. (2018) investigated 340 elementary school teachers' opinions and experiences about OE. The survey questionnaire was used in the study. The result of the study indicated that participants believe it to be important to hold outdoor classes and effective. Also, they thought OE motivated students to about nature and become familiar the nature for them However, they indicated that teaching units are indoors in the classroom. In another study, Henriksson (2018) examined that 15 elementary school teachers' perception about OE within science education. Data were collected by interview. According result of the study, elementary school teachers suggested that OE influence students positively in terms of content knowledge about nature, problem solving skills, and attitudes toward environment. Also, teachers indicated that OE realizes the nature and has increased interest in it. Although teachers have positive perception on OE, result revealed that teachers have little knowledge about learning aims of OE and they do not know how to prepare lesson plan and tasks about the OE.

In another study, 186 Norwegian early childhood preservice teachers' views on environment and species identification in the scope of OE were investigated by Skarstein and Skarstein (2020). The experimental study methodology and pre-posttest were used. In this research, after implementation of the OE, participants' attitudes and knowledge about nature increased positively and became nature more familiar. Similarly, 426 elementary school preservice teachers' views on environment and species identification in the scope of OE were investigated by Palmberg et al. (2018). Participant's attitudes and knowledge about nature increased positively and became more familiar with nature. In both study, participants indicated that they want to use this methodology in the future carriers.

Blatt and Patrick (2014) examined 148 preservice elementary teachers' perception about experiences in outdoor and their belief about OE. The data collected by qualitative with the essay. The result showed that participant, who have higher experience in the outdoor, have positive views on environment and have higher intention the use outdoor as educational setting. In addition, participants identified OE as positive methodology to increase connection the nature, creativity and learning about the nature. In another study, 52 preservice elementary school teachers' perception related to OE was investigated by Semiz (2013). The data collected by qualitative with the essay. The preservice elementary school teachers indicated that OE might improve students' creativity and attention the nature. In addition, they agreed on the importance of OE for children.

In the different study, 51 elementary teachers that pursuing a master's degree in Sustainability and Outdoor Education views' on OE was investigated by Ratinen et al (2021). Data were collected by open-ended question and analyzed qualitative. Participants believed that the nature base design of OE affect students positively in terms of environmental attitudes and familiarization of the nature. In addition, participants had positive perception about OE in terms of active learning, participatory learning and hand on learning. Another study, 15 social science teachers' views on OE was investigated by Cengelci (2013). Interview was used. Result of study revealed that participants thought that OE increase the students'

level of interaction and communicants. Also, they indicated that OE help the educators to connect subject and real life.

2.6 Barriers to Use of OE

Although the recognized advantages and potential positive effects of outdoor education (OE) in the students' development in cognitively and affectively, human-nature relationship and individual's nature view (Chang et al., 2018; Fančovičová & Prokop, 2011; Joyce &Farenga, 1999; Merewether, 2015; Mullenbach et al.,2018;Yıldız et al., 2016; Tuncer et al.,2007) , barriers for teachers to use OE such lack of knowledge, time , administrative problems , management problems, curriculum content economic constraint ,lack of parental support and safety concern were listed in the literature (Borsos et al., 2022; Borsos et al., 2018; Blatt & Patrick, 2014;Barfod,2017;Cengelci,2013;Henriksson,2018;Semiz,2020;Skarstein&Skarstein, 2020; Sjöblom et al.,2021; Palmberg et al., 2018; Ratinen et al., 2021).

Shume and Blatt (2019) investigated the 95 preservice elementary teachers' obstacles on OE. Qualitative essay methodology was used. Qualitative essay methodology was used. Result showed participants have three main themes of perceived barriers to implement OE. First, one was difficulty in the organizing outdoor activities such safety concern, limited access to natural area, transportation problem, time and effort in the plaining phase. Another one was administrative and parental problem. Last one was the curricular context such as time, crowded curriculum, insufficient context into subject and national exam pressure. In parallel this study, Wait (2011) worked with British elementary school teachers and found similar findings.

In different research, Yılmaz et al. (2016) investigated 300 preservice early childhood teachers' barriers on OE in terms of using outdoor setting as educationally. The result indicated that lack of parental and administrative supports, safety concern, transportation and lack of access. Similarly, Ernst (2013) investigated same concept

with 110 preservice early childhood teachers. In contrasts the Yılmaz et al. (2016) study, teachers' lack of confidence in teaching and the need for guide/expert also existed as barriers.

2.7 Summary of the Literature

Based on the literature review, teachers and preservice perception on outdoor education(OE) was investigated in different culture and context (Barfod, 2017;Borsos et al., 2022;Borsos et al., 2018; Blatt & Patrick, 2014; Henriksson, 2018; Karasslan-Semiz,2020; Palmberg et al., 2018; Ratinen et al., 2021;Sjöblom et al.,2021). Nature relatedness was considered as significant part of OE and one of the basic goals of (Barrable and Lakin, 2020; Sahin & Alıci, 2019). The overall result showed that OE is considered as effective and important methodology to increase sensitivity of environment ,become more familiar the nature and improve relationship human-nature relationship both preservice and inservice teachers. However, outdoor education was investigated limitedly within scope of science education. In this regard, the purpose of the present study was to examine inservice science teachers and preservice science teachers' perceptions about OE in order to get detailed information.

CHAPTER 3

METHODOLOGY

In this chapter, the research design of the study was explained. First, participants, instrumentation, data collection and data analysis were presented. Then, possible threats for internal validity and external validity and limitations were discussed.

3.1 Research Design

This study investigated the perception and experiences of preservice and inservice science teachers about outdoor education (OE) in terms of different aspects. Survey and correlational research designs were used in this study. As one of the quantitative research designs, a correlational research design was used. Correlational research can be described as the research design to investigate "the relationship between two or more variables''(Fraenkel et al. (2012, p.331). This research design was used in this study to explore the relationship between nature-relatedness and landscape preferences of the participants. Also, survey research is used by researchers to "describe the characteristics of a population" (Fraenkel et al. (2012, p.419) was used. In this study, a survey research design was used to describe the participants' perceptions of outdoor education in terms of opinion, barriers, and motivation.

To investigate the perception and experiences of preservice and inservice science teachers about OE, qualitative data were collected via open-ended questions and survey questions. Survey questions include participants' demographic variables, opinion about OE and preferences about the outdoor settings.

Open-ended responses were coded for data reduction and interpretation (Patton, 2022). Loftand and Loftand (1995) suggested that initial coding allows to eliminate less useful ones. Also, initial coding allows combining and dividing categories from

larger to smaller. Mixed data analysis was used to analyze qualitative and quantitative data.

3.2 Research Question

The purpose of the present study was to investigate the perception and experiences of preservice and inservice science teachers about outdoor education (OE) in terms of different concepts, such as barriers, motivations, and educational opportunities. In this regard, the following research questions addressed the present study;

1. Do the preservice and inservice science teachers consider outdoor education important and effective?
2. What are the preservice and inservice science teachers' perceptions of outdoor education?
3. What are the differences between preservice and inservice science teachers' perceptions of outdoor education?
4. Is there a difference in inservice science teachers' and preservice science teachers' nature-relatedness?

3.3 Participants

In-service and preservice science teachers were constituted the participants of this study. A convenient sampling methodology was used to reach participants, considering easy access and its available nature (Fraenkel et al., 2012). Demographic characteristics of the participants were presented in Table 3.1.

For the inservice science teachers, the target population of the study was in-service science teachers from the public schools in Ankara. The accessible population was all the science teachers in the public schools of the Çankaya district. There are 258 inservice science teachers in the public schools of the Çankaya district (ANDE,

2023). A total of 95 inservice science teachers participated in the study, thus 36% of the accessible population was reached.

For the preservice science teachers, the target population of the study was preservice science teachers in Ankara, whereas the accessible population was selected from the two public universities in Ankara. There are 502 preservice science teachers in the public universities in Ankara (YÖKAtlas, 2023). A total of 181 preservice science teachers participated in the study, thus 36% of the accessible population was reached.

Table 3.1 Demographic Characteristics of the Sample

	Demographic Variable		**(f)**	**(%)**
Preservice Science Teacher	**Gender**	Male	32	17.7
		Female	149	82.3
	Grade	1	15	8.3
		2	55	30.4
		3	75	41.4
		4	36	19.9
	GPA	0-1.99	15	8.3
		2.00-2.49	55	30.4
		2.50-2.99	75	41.4
		3.00-3.49	36	19.9
		3.50-4.00	15	8.3
Inservice Science Teacher	**Gender**	Male	16	16.8
		Female	73	76.8
	Work Experience	0-5	3	3.3
		6-10	8	8.8
		11-15	10	11.0
		16+	70	73.7
	Education Level	Associate Degree	1	1
		Bachelor	70	77.8
		Master	17	18.9
		PhD	2	2.2

3.4 Instrument

The instrument used in this study was the ‘‘Outdoor Education Perception Survey’’ (see Appendix-A), which includes five main parts: Demographic Information Form, Outdoor Education Opinion Questionnaire, Outdoor Setting Questionnaire, and Nature Relatedness Scale. All questionnaires and scale were used with the authors’ permission (Appendix-L). In the following section, each of the instrument was presented in detail.

3.4.1 Demographic Information Form

The Demographic Information Form was used to collect information about both preservice and inservice science teachers’ demographic characteristics. This part of the instrument was formed differently for each teacher group. The preservice version was constituted of three items that aimed to collect data about gender (female or male), grade level (1st to 4th), and GPA (5 different sections as “0.00-1.99”, “2.00-2.49”, “2.50-2.99”, “3.00-3.49” and “3.50-4.00”). The inservice version included three items that aim to address gender (female or male), education level (Associate Degree to PhD), and work experience (4 different sections as “0-5 years”, “6-10 years”, “11-15 years”, “16+ years”).

3.4.2 Outdoor Education Opinion Questionnaire (QEOQ)

Outdoor Education Questionnaire Form was used to collect information about preservice and inservice science teachers’ opinions and knowledge that connected the OE, which was developed by Borsos et al. (2022). The questionnaire consisted of eight questions that linked with OE. The questions are multiple-choice questions in the form of a five-point Likert type and open-ended.

Table 3.2 represented the distributions of the questionnaire. In this instrument, only question 4 is an open-ended question, which aimed to obtain in depth information about OE. Other questions are multiple-choice type.

Table 3.2 Outdoor Education Opinion Questionnaire

Statements	Related Content	Example
2,4,6,8	Opinion	8. Do you think there are teaching units that can be taught outdoors more effectively than inside the classroom?
1,3,5,7	Knowledge	7. Do you think you have received enough knowledge during your studies to hold outdoor classes?

Also, Cronbach's alpha coefficient was reported as 0.75 by Borsos and colleagues (2022). Moreover, Borsos and colleagues translated the Questionnaire from their mother language to English through gathering expert opinion. The pilot study was conducted to check clarity and comprehensibility by Borsos and colleagues (2022). The remarks were fixed. Thus, it is considered as valid and reliable (Fraenkel et al., 2012).

The Questionnaire is originally written in English. For the purpose of this study, it was translated into Turkish by considering experts' opinions. Experts included four academic members who work in Mathematics and Science Education, one preservice science teacher and one experienced inservice science teacher. Additionally, the grammar and punctuation of the instrument were checked by an assistant professor from the Department of Turkish Language. Based on experts' opinions, feedback and remarks were addressed and made necessary revisions. The sentence organization of statements and language were restructured in line with these opinions.

After the revisions were finalized, the pilot study was conducted with 12 in-service science teachers who did not attend the real study's sample. The purpose of the pilot study was to test the content validity of the Outdoor Education Opinion Questionnaire. Based on the data obtained from the pilot study, it was ensured that the questionnaire was understood clearly and did not need to be modified.

3.4.3 Outdoor Setting Questionnaire (QSQ)

The Outdoor Setting Questionnaire was developed by Ernst and Tornabene (2012). The questionnaire included questions and 16 photographs (see Appendix A). The Questionnaire uses a preference-rating approach identified by Kaplan (1985), which is based on photograph usage to understand participants' outdoor settings preferences. All photographs were selected from the same natural environments (forest and mountain) and none of them contained striking stimuli (animals or people) that might cause potential preference selection. Photographs represent mainly four major outdoor setting types; water, forest, open field/grassy area, and park, which find four photographs in two types with respect to human influence (natural or maintained) in each setting. All photographs were described in detail in Table 3.3.

Table 3.3 Description of Outdoor Setting Photographs

Outdoor Setting Type	Setting Label	Photograph Description	Human Influence Attribute
Water	13	Stream dotted with small rocks; water appears still; wooded/brushy vegetation on edge; narrow footpath leading down to water's edge	Natural
	14	Stream cutting through large rock outcropping, forming small waterfalls; dense forest/vegetation along rock outcropping	Natural
	15	Small lake with calm water; trail alongside edge of lake; small dock and shelter with canoes; forested backdrop	Maintained
	16	Shore of a larger lake (likely recognizable as Lake Superior from its distinct pebbly beach), with forested shoreline	Natural

Table 3.3 (cont'd)

Forest	9	Dense forest with a wide paved trail winding through; visually 'open' due to the wideness of trail, allowing enough sun to create shadows on pavement	Maintained
	10	Dense forest; narrow footpath winding through; very little light appears to be shining through forest cover	Natural
	11	Open forest with a mix of grasses/vegetation on forest floor; crushed gravel path lined by wooden fencing	Maintained
	12	Open forest, with vegetation, underbrush, and fallen trees on forest floor; no path	Natural
Open field/ grassy area	6	Open natural area, with tall grasses, wildflowers, and a small wet area visible; several trees in the background	Natural
	5	Open natural area, with tall grasses, wildflowers, and a small area visible; several trees and a building in the background; gravel road leading to and alongside grassy area	Maintained
	8	Open area of grass and wildflowers, with a single tree near the foreground; no paths	Natural
	7	Open area of grass and wildflowers, with a single tree near the foreground; a gravel path with a wooden bridge midway	Maintained
Park	4	Open area with a mix of tall grass and wildflowers, with a forested background; park bench that seems almost hidden by long grass	Natural
	3	Open grassy area, with several park benches scattered about; grass is very short and appears mowed	Maintained
	2	Open area, with several large trees dotting foreground; pavilion with picnic tables; forested background; grass appears mowed	Maintained
	1	Playground on a raised woodchip-filled area, with mowed grass and trees in background	Maintained

Note: Adapted from ''Pre-service Early Childhood Educators' Perceptions of Outdoor Settings as Learning Environments'' by J.Ernst and L.Tornabene, 2012, *Environmental Education Research, 18:5,* p.643-664

Before the adaptation of the initial instrument into the Turkish context, the researcher of the current study communicated with the original authors of the instrument, Ernst and Tornabene (2012). Then, all photographs were faithfully adapted into the Turkish context by considering experts' and the original authors' opinions. During

the adaption of the photographs, the original study and the aim of the current study were considered and the new photographs were adapted into the current study in line with the original descriptions given in Table 3.3 (see Appendix A) . All photo are taken by the researcher of the current study. Based on the original description, all photo adapted into the Turkish context by considering local geography of the Turkey and common biodiversity in Turkey.

The Questionnaire is originally written in English. For the purpose of this study, it was translated into Turkish by considering experts' opinions. Experts included four academic members who work in Mathematics and Science Education, one preservice science teacher and one experienced in-service science teacher. Additionally, the grammar and punctuation of the instrument were checked by an assistant professor from the Department of Turkish Language. Based on experts' opinions, feedback and remarks were addressed and made necessary revisions. The sentence organization of statements and language were restructured in line with these opinions.

After the revisions were finalized, the pilot study was conducted with 12 in-service science teachers who did not attend the real study's sample. The purpose of the pilot study was to test the content validity of the Outdoor Setting Questionnaire. Based on the data obtained from the pilot study, the changes were applied to the Outdoor Setting Questionnaire.

The change was related to the expression of the fifth question. The pilot study revealed that participants could not express their responses in detail because of the missing part. When participants selected the "Likely" or "Very Likely" answers, there is an additional part to explain why. If participants selected the "Very Unlikely" or "Unlikely" answers, there was no additional part to explain why. Therefore, only motivations or positive outcomes could be collected. When the participants wanted to express negative outcomes (such as barriers or limitations), the answers could not be collected. Additionally, barriers or limitations are important as positive outcomes (such as motivations) to understand the perception about natural settings (Simmons,

1998). Therefore, an additional section was added for “Very Unlikely” or “Unlikely” answers to express their reasons to the question stated as “why”. Based on these revisions the final version of the questionnaire was formed.

In the first section of the questionnaire, participants selected three photographs of places to be the most likely to visit and participants selected three photographs of places to be the least likely to visit. Then, participants explained the reasons why they selected these places. In the following section, participants expressed their opinions and feelings by selecting three photographs of places that are the most conducive to achieving educational goals and outcomes for their students in outdoor settings. Then, participants responded to the same procedure for the least conducive ones. In addition, the participants were asked why they selected the most conductive settings, what they did or will do in these settings, and what they needed materials in them for the part of the most conducive places. Kaplan (1985) described this methodology as a preference-rating approach, while the top three photograph selections are based on it. Therefore, time was saved, and it allowed asking detailed questions about most and least one by preventing equal score ratings (Kaplan, 1985)

In the third section, participants responded to questions about how likely and why they used both maintained and natural outdoor settings by indicating barriers and motivating them. Except for how often questions, all questions are open-ended. Thus, answers for the open-ended questions were coded and transformed into numeric data.

In the final section of the questionnaire, participants responded to 5 points Likert-type questions (totally disagree to totally agree) about the relationship between the nature experiences of children and educational goals. Educational goals cover the importance of the children's development in cognitive, socioemotional, physical, health and wellness, environmental appreciation and environmental experiences (Ernst & Tornabene, 2012).

3.4.4 Nature Relatedness Scale (NR-Scale)

The nature relatedness scale was originally developed by Nisbet et al. (2009) and adapted by Çakır et al. (2010) into Turkish. Nature relatedness (NR) was defined as individuals' level of connectedness with nature. The scale assessed the affective, cognitive and experiential relationship of individuals' connections with nature (Nisbet et al., 2009). The scale has three dimensions that called as "NR-self," "NR-perspective" and "NR-experience" and 21 Likert type items reflected them ranging from 1(strongly disagree) to 5 (strongly agree) (Nisbet et al., 2009). The dimension "NR-self" represents the internal identification with nature and is related to feelings and personal thoughts of individuals' nature connection, which includes eight items (item 1, item 2, item 3, item 4, item 5, item 6, item 8, item 9). The dimension "NR-perspective" includes seven items (item 7, item 10, item 11, item 12, item 13, item 14, item 15) that represent individuals' worldviews about human impact and actions related on nature. The dimension "NR-experience" includes six items (item 16, item 17, item 18, item 19, item 20, item 21) that represent individuals' level of recognition, familiarity with nature and level of desirability out in nature. Cronbach's alpha values for each dimension of NR developed by Nisbet et al. (2009) range from .66 to .87. In the Turkish version, Cronbach's alpha values for each dimension of NR developed by Çakır et al. (2010) range from .73 to .87. Thus, it is considered as valid and reliable (Fraenkel et al., 2012).

The pilot study was conducted with 12 in-service science teachers who did not attend the real study's sample. The purpose of the pilot study was to test the content validity of the NR-Scale. Based on the data obtained from the pilot study, the questionnaire was understood clearly and did not need to be modified. In the current study, the participants' total nature relatedness scores are considered.

3.4.4.1 Factor Structure of Nature Relatedness Scale (NR-Scale)

In this study, to ensure construct validity and examine the factor structure of the "NR-Scale" factor analysis was conducted. *Factor analysis* is described as a statistical method used to identify relationships between variables that determines which variables are consistently related to each other and which are relatively independent (Tabachnick & Fidell,2013). There are two major types of exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The EFA was conducted by Çakır et al.(2010) during the adaptation process of the scale into Turkish and the Kaiser-Meyer-Olkin (KMO) test value was found as 0.9 is considered valid (Büyüköztürk,2010). In this study, EFA factors derived in Çakır et al. (2010) study was used in this study.

To ensure the three-factor structure of NR-scale CFA analysis was conducted. CFA is defined as a statistical technique to determine how measured variables are represented in a smaller set of constructions (Hair et al., 2014). To analyze the data, IBM SPSS 28 (Statistical Package for the Social Sciences) and LISREL 11 Program for Confirmatory Factor Analysis (CFA) was used and the proposed model was tested. Before the CFA analysis, some assumptions must be checked to control the appropriateness of data for factor analysis or not. These assumptions were sample size, normality, outliers, multicollinearity and singularity (Tabachnick & Fidell, 2013);

1. Sample Size: The sample size should be at least 300 cases for the factor analysis (Tabachnick & Fidell, 2013). Hatcher (1994) recommends that at least five subjects per item or 100 subjects are required for cases for the factor analysis. In addition, 20 subjects per factor are required (Arrindel & Van der Ende, 1985).In this study, three factors exist in the scale, and the number of participants is above +60 for each group. This met the criteria and the assumption was not violated

2. Normality: *Normality* is defined as all variables and all linear combinations of variables distributed symmetrically normal and distributed highest and most considerable frequency in the center and comparatively lesser frequencies on either side (Tabachnick & Fidell, 2013). Normality can be checked statistically and graphically. Histograms were examined and disturbed normally. In addition, Normal P-P Plots were examined, and normality was satisfied. These met the criteria and the assumption was not violated.
3. Outliers: *Outliers* are defined as extreme circumstances in which values obtained are significantly different from the other participants' values (Tabachnick &Fidell, 2013). According to Pallant (2011), since the factor analysis is sensitive to outliers, outliers need to be checked before the factor analysis. In this study, the data set was examined and only "Participant 181" in the preservice data was determined outlier since it disturbed the data randomly and was omitted. This met the criteria.
4. Multicollinearity and singularity: *Multicollinearity* is defined as cases when variables are highly correlated; *Singularity* is defined as cases the one of the variables is the combination of other variables two or more (Tabachnick & Fidell, 2013).To check this assumption, collinearity statistics were used. According to Pallant (2011), tolerance values smaller than .10 or the Variance Inflation Factor (VIF) values of more than 10 implied multicollinearity. In this study, all values are smaller than 10 and more than 0.10 (see Table 3.4). This met the criteria and the multicollinearity or singularity was not violated

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Table 3.4 Collinearity statistics of Scale

Item	Collinearity statistics	
	Tolerance	VIF
S2Q1	.345	2.898
S2Q2	.325	3.076
S2Q3	.446	2.242
S2Q4	.548	1.826
S2Q5	.465	2.151
S2Q6	.518	1.932
S2Q7	.578	1.729
S2Q8	.585	1.709
RS2Q9	.678	1.476
RS2Q10	.814	1.228
RS2Q11	.771	1.297
RS2Q12	.713	1.403
RS2Q13	.605	1.652
RS2Q14	.592	1.689
S2Q15	.789	1.268
RS2Q16	.652	1.533
S2Q17	.562	1.778
S2Q18	.892	1.121
RS2Q19	.615	1.626
S2Q20	.656	1.526
S2Q21	.50	2.01

After checking the assumptions, CFA was conducted. One of the most commonly used indicators for internal consistency is Cronbach's Alpha coefficient, which should be above .70 on the scale (Tabachnick & Fidell, 2013). In this data, Cronbach's Alpha coefficient is between the ranges .66 to .80. for the inservices and between the range .42 to .82 for the preservice. According to interpretations of the result, the main problem came from "item 18" and was dedicated to "item 18" omitted by considering the suggestion of an analyzing tool. After the revision of the data, Cronbach's Alpha coefficient was above .70 for each dimension and in the scale for each group. Then, a CFA analysis was conducted for ensuring the factor structure of scale in the sample of current study.

The goodness of fit indices of CFA were interpreted to indicate the validity of the factor structure. These indices indicate validity criteria and recommend values are presented in Table 3.5 (Tabachnick & Fidell, 2013; Brown, 2006; Sumer, 2000; Thompson, 2004; Hooper et al., 2008).

Table 3.5 Fit Indices of CFA

Model Fit Index	Recommended Value for Good Fit	The goodness of fit indices of CFA	
		Inservice	Preservice
χ^2	> .05 (non-significant)		
χ^2 /df	≤ 5 $2 \leq \chi^2/df \leq 3$	1.92	2.06
CFI	≥ .90	0.87	0.93
GFI	≥ .90	0.77	0.86
AGFI	≥ .85	0.70	0.81
RMSEA	≤ .08	.009	0.08
NFI	≥ .90	0.8	0.87
SRMR	≤ .08	0.14	0.08

Note: CFI (Comparative Fit Index), GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit Index), RMSEA (Root Mean Square Error of Approximation), NFI (Normed Fit Index), SRMR (Standardized Root Mean Residual)

CFA analysis was obtained and the results were evaluated for each participant group. CFA results of the NR-Scale show that some items (item 7, item 9, item 15) are problematic in the representing factor for both participant groups and error variance occurred for several items (Inservice; χ^2/df = 2.19, GFI = .72, AGFI = .65, CFI = .83, RMSEA = .11, RMR = .15, NFI= .74; Preservice; χ^2/df = 2.50, GFI = .81, AGFI = .76, CFI = .89, RMSEA = .09, SRMR = .08, NFI = .83). According to the interpretation of the initial result, some suggested modifications were executed to present a good model with a good fit of the data. In line with this purpose, modification indices recommended some suggestions to add error covariance. For this purpose, error covariance between S2Q2 and S2Q1 was added. After adding error covariance, the model did not show a good fit [Inservice; χ^2/df = 1.99, GFI = .74, AGFI = .67, CFI = .85, RMSEA = .10, SRMR = .15, NFI= .76; (Appendix A) Preservice; χ2/df = 2.08, GFI = .84, AGFI = .79, CFI = .92, RMSEA = .08, SRMR

= .08, NFI = .86) (Appendix-B and Appendix-C)]. CFA results of the scale show that similar items are problematic in the representing factor for both participant groups in terms of error variance and T-values. At this point, related literature was reviewed and decided to omit problematic items (item 9 and item 15). According to Nisbet (2009) and Çakır et al. (2010) studies, "item 7" loaded "NR-Self" in both studies. However, "item 7" is determined to be a similar concept to other "NR-perspective" items and analyzed in this way by Nisbet (2010). For this reason, "item 7" is considered in the "NR-Perspective," and the data is interpreted in this line. With the help of this modification, modification indices suggested that the addition of "item 7" into the "NR-Self" factor could be decreased in Chi-Square at 26.0 for preservice and 47.7 for inservice. Although each model fit indices explain the different characteristics of the scale in terms of the structure, the scale structure should be interpreted and determined in the holistic approach (Tabachnick & Fidell, 2013). In other words, it is better to consider all fit indices together to decide the structure of the scale. When the CFA result of the Scale was interpreted, problems in the indices might come from the structure of "item 7". Therefore, the goodness of fit indices of "NR-Scale" was considered admissible in terms of the total interpretation of the index (see table 3.7). In the present study, the CFA model was tested both in-service and preservice and the indices were not determined as a problem. The revised model is presented in Appendix D and Appendix E.

3.5 Ethical Issues in the Study

All required approvals and necessary permissions were taken by the Subjects Ethics Committee of Middle East Technical University (METU HSEC see Appendix-M), Ankara Provincial Directorate of National Education (see Appendix-N), and Universities President Offices (see Appendix-O). All participants were informed about the survey, and a consent form(see Appendix-P) was signed by them. Also, all participants participated in the study voluntarily.

3.6 Data Collection Procedure

A pilot study was conducted to test language checks and content validity before the data collection. The pilot study was conducted in the 2021-2022 Summer period with 12 science teachers in face-to-face. 9 (75%) female and 3 (25%) male participants filled out the study, and the average time was 22.7 minutes.

Data were collected by both face-to-face and online survey**.** Due to the COVID-19 pandemic and the 2023 Turkey–Syria earthquake, access to schools and universities was difficult. Therefore, some participants were invited to the online version of the questionnaire via Google Forms. In the face-to-face data collection phase, 181 preservice science teachers and 68 inservice science teachers responded to the questionnaire. In the online phase, 27 inservice science teachers responded to the questionnaire. A total of 95 in-service science teachers and 181 preservice science teachers participated in the study.

All preservice science teachers completed the instrument individually in face-to-face. During the data collection phase, natural classroom environments were used, and conditions were standardized. All data collected by the researcher to prevent data collector characteristics that are one of the internal validity threats in 20-30 minutes (lesson hour).

A total number of 68 (71.6 %) in-service science teachers completed the instrument in face-to-face. During the face-to-face data collection phase, standardized public school environments were used, and all data was collected by the researcher to prevent data collector characteristics that are one of the internal validity threats in 25-35 minutes. 27 (28.4 %) in-service science teachers completed the instrument online via Google Forms. The web-based survey was sent via an online communication platform or was also delivered by school administrations.

3.7 Data Analysis Procedure

In the present study, data were analyzed by quantitative and qualitative analysis methods. For quantitative data analysis, descriptive statistics and inferential statistics were used. In the initial studies (Ernst &Tornabene, 2013; Borsos et al., 2022), researchers used descriptive statistics, t-test and multiple regression analysis were used. In addition to the initial analysis, two-way ANOVA was used.

Before the analysis procedure, sample t-tests were used to examine where there was a difference between data collected face-to-face and online for in-service science teachers. The data were analyzed and did not show significant differences. Therefore, the data was used as pooled for conducting analysis.

To understand whether participants consider outdoor education to be important and effective, the Outdoor Education Opinion Questionnaire (QEOQ) was used, which is in the form of a 5-point Likert type 1(disagree) to 5 (agree). After the participants' responses to each item were analyzed by IBM SPSS Statistics 28 by using descriptive statistics, the participants' responses were reported as percentages and frequencies. Based on this analysis, participants' answer distribution was determined for each group. To interpret the result, mean scores (M) and standard deviations (SD) were also calculated.

In order to determine participants' preferences, barriers and motivations about outdoor settings and landscapes, the Outdoor Setting Questionnaire (QSQ) was used (Table 3.6). All open-ended responses were analyzed qualitatively first. In the qualitative data analysis, the main point is to identify the participants' responses in terms of common phrases, words and sentences. Therefore, the qualitative data is transformed into quantitative data through a quantitating process by using initial independent codes (Sandelowski et al., 2009).

Table 3.6 Question of the Scale

Content of the questions	Sample questions
Personal landscape preferences	Which three places would you be *most* likely to visit? Why did you select these three photos?
Educational landscape preferences	Which three places do you feel are *most* conducive to meeting educational outcomes for your students? Why did you select these three photos?
Opportunities in most preferred landscapes	For each of the three photos you selected, please indicate what you would do with your students in a place like this.
Resource needs in most preferred landscapes	For each of the three photos you selected, please indicate what you feel you would need in order for an outing to this place to be successful for you and the your students in your class.
Motivations to use natural landscapes in their professional life	What motivates you to want to utilize natural areas within future students' education?
Perceived barriers preventing the use of natural landscapes in their professional life	What do you feel would be the primary obstacle to your use of natural areas for educational opportunities with your students?

Then, the frequencies were calculated for each of them. Coding categories were used based on the original research (Ernst &Tornabene, 2013). To clarify the analysis produce, some coding examples were presented in Table 3.7. During the quantitating process, different researchers coded responses and the researchers make a consensus on similar codes. After the quantitating process, frequencies for the participants' responses were calculated by using descriptive statistics.

Table 3.7 Example of Coding

Reasons why most and least preferred	Example
Educational preferences	
Opportunities for structured learning about nature	“Students can make observations. They can list the living and non-living things they see around them. Grade 5 students can do activities related to biodiversity, species-specific to Turkey and classification of living things within the scope of the unit "Let's get to know living things". Students can prepare a poster by taking photographs.”(InP79) “In this region, I would like to be able to use it as an application garden in terms of growing a new plant and seeing its development. In another region, I think that they can find opportunities to examine nature and living things, not only in the study of nature but also in the field of physics.”(PreP56)
Opportunities for unstructured learning about nature	"It contains many natural elements in terms of soil and green space. There is also a large observation area."(InP5) "It harbors many natural elements in terms of soil and green areas. It also has a large observation area. All of them are quite favorable for the science course objectives."(PreP7)
Safety hazards	“The forest can be dangerous .they can get lost… the rough terrain can injure them and it looks like a swamp.”(InP90) "... It looks like a swamp and it would be dangerous for the students. ... The photo looks like a high place and it would be dangerous for students. ...in the water can be dangerous for students...”(PreP120)
Personal preferences	
Setting was pretty	"I heard the sound of water from the photo and it reminded me of my good memories."(InP36) "I'm amazed by nature's own filter."(PreP45)
Setting seemed relaxing	"I felt that there were places where I could relax and listen to the sound of nature in terms of the elements they contain" (InP87) "The atmosphere created by tall trees. In this region, the color of the trees and the general atmosphere are relaxing. There is also the combination of blue and green." (PreP160)

Table 3.7 (cont'd)

Human Influence	"The natural structure has been damaged, it has turned into a construction site, and drought has begun" (InP2) "There is a human factor, there is a high probability of people coming, individual space is scarce, you have to share nature" (PreP111)
Motivations for and barriers to the use of natural outdoor settings	Example
Motivations	
Nature and natural materials are appropriate for a student's development/health	"When children see some things live on the spot, the retention of knowledge increases."(InP9) "In the open air, the lessons will be more practical and the lessons will be more fun for the students" (PreP172)
Fostering creativity	"Nature is the biggest and most impressive laboratory, and sharing this excitement with my students is my biggest motivation." (InP12) "Surprises in nature make classes more fun and students more motivated" (PreP42)
Barriers	
Lack of school administration support	"In general, school administrations are not very open to outdoor education. Also, outdoor education involves a lot of procedures, e.g. administration."(In82) "School administration permissions and parent permissions....." (InP22)
Economic constraints of the school	"The problem of traveling and meeting the expenses of the necessary eating, drinking and lavatory needs is challenging for me."(InP26) "It may not always be financially possible to access such areas in the school district."(PreP111)
Safety concerns	"I do not prefer to use it much due to the risk areas for both students and teachers. First of all, I have an allergic body. If students have such a body, it becomes difficult to get permission from the family and participation decreases..."(InP95) "Even if a safe area is created, events such as a student staying under the sun for too long or being affected by a food he ate on a trip, etc. may occur."(PreP165)

After the descriptive statistics were analyzed, inferential statistics were conducted. Two-way ANOVA was used to assess whether there was a significant difference in participants' nature relatedness scores in terms of outdoor setting type preferences, human ınfluence attribute and participants' group (preservice and inservice). An independent t-test was used to analyze the NR-Score of the group. In addition, a multiple regression analysis was used. Additionally, multiple regression analyses were conducted to understand which of the following were significant predictors of intention to use natural settings with their students, recognition of benefits of experiences in nature, personal level of nature relatedness, perceived difficulty in using natural settings, and intention to use maintained outdoor settings. A personal level of nature relatedness refers total score of the nature relatedness score that explains the connection of nature.

All tests and analysis methodology were explained in detail in Chapter 4.

3.8 Internal and External Validity of the Study

3.8.1 Internal Validity

According to Fraenkel et al. (2012), internal validity was defined as ‘‘any relationship observed between two or more variables should be unambiguous as to what it means rather than being due to “*something else*.” (p.166). There were some possible threats to internal validity in this study. Subject Characteristics threat was defined as the ‘‘difference of individual (or groups) characteristics that affect variables being studied unintentionally’’. Also, it was defined as "Selection Bias’’ (Fraenkel et al., 2012). Therefore, sample characteristics such as gender, age, and belief might be threats and may affect the study. In this study, participants were selected from the same region (district of Çankaya and public universities in Ankara) to provide common characteristics so that the threat was eliminated. According to Fraenkel et al. (2012), ‘‘location differences between subjects during data collection’’ was defined as location threats. In this study, standardized conditions

were used to eliminate this threat. During the preservice science teachers' data collection phase, all data was collected in their own classrooms. Moreover, during the in-service science teachers' data collection phase, data was collected in the district of Çankaya and the publicschool environment. Instrumentation threat was defined as the ''changing in the instrument or scoring, characteristic of the data collector and/or bias of the data collector'' (Fraenkel et al., 2012). Therefore, the Instrumentation threatens internal validity. In this study, the instrument was not changed during the data collection and was collected in a single session. Also, all data collected by the researcher to prevent characteristics of the data collector. Finally, the data collector used the same procedure during data collection, and repeated analysis was conducted to prevent bias.

3.8.2 External Validity

According to Fraenkel et al. (2012), external validity was defined as ''The extent to which the results of a study can be generalized determines the external validity of the study" (p.103). According to Fraenkel et al. (2012), two types of external validity exist. Population generalizability was defined as the ''degree of representativeness of the sample to the population of interest'' (Fraenkel et al., 2012). Therefore, appropriate sampling methodology and sample size were considered and used in this study. Due to the COVID-19 pandemic and the 2023 Turkey–Syria earthquake, some challenges and difficulties were faced. For the representativeness of the population, convenience sampling was used, so it might be a threat to external validity. In the present study, the accessible population was the district of Çankaya of Ankara. To minimize the threats, different public schools were selected from different regions of the district of Çankaya to generalize the population of Çankaya. Also, three different universities in Ankara were selected to generalize the population of Ankara.

Ecological generalizability was defined as the ''extent degree of results of study to other setting or conditions '' (Fraenkel et al., 2012). The generalized nature of the study, such as the environment (inservice and preservice science teachers in public

schools/universities) and district (Çankaya), might be threats to external validity. To minimize the threats, conditions and nature of the study are defined in detail.

3.9 Assumptions

In the present study, the following assumptions were considered valid;

1. Instrument of the study is a self-reported base. The researcher assumed that all participants completed the instrument honestly and sincerely.
2. During the data collection procedure, all participants completed the instrument on their own. The researcher assumed that there were no interactions and/or cheating between the participants in the online part.
3. During the data collection procedure, the researcher assumed that all participants understood in a similar way of the descriptions given for the photographs.
4. During the data collection procedure, the researcher assumed that all participants completed the instrument under standard conditions in the online part.
5. During the data analysis procedure, the researcher assumed that the data analysis tools and software worked properly without any technical errors.

3.10 Limitations

In the present study, the following limitations are valid,

1. Convenience sampling methodology might be limited to generalizability.
2. Due to the limited location (district of Çankaya and Ankara Public Universities), the sample of the study might be limited.
3. The sample is limited to public universities. Private universities might have different results and findings.
4. Self-reported base characteristic of the instrument might be misleading for the present study.

5. The photographs part of the instrument might not represent all types of outdoor settings. Therefore, participants might not reflect their responses properly.
6. The frameworks, methodology, sample, and nature of the present study are unique to the present study. Different selections of them might reflect different results and findings.

CHAPTER 4

RESULTS

In this chapter, a descriptive statistic about participants' consideration of the importance and effectiveness of outdoor education (OE), as well as participants' preferences, barriers, and motivations about outdoor settings and landscapes are presented. In addition to the descriptive data, nature relatedness scores of groups are presented. Inferential t-tests statistics were used to explain the difference between the groups in terms of nature-relatedness. Two-way ANOVA was conducted to determine both whether there were significant differences or not in participants' nature relatedness scores by outdoor setting types and human influence attributes and between groups. Also, multiple regression analyses were conducted to understand how well recognition of benefits of experiences in nature, personal level of nature relatedness, perceived difficulty in using natural settings and intention to use maintained outdoor settings predict intention to use natural settings with their students.

4.1 Descriptive Statistics

Descriptive statistics were used to address the first three research questions of this study. For this purpose, frequency, mean and standard deviation were used to identify participants' consideration of the importance and effectiveness of outdoor education (OE) and their preferences, barriers and motivations about outdoor settings and landscapes.

4.1.1 Preservice and Inservice Science Teachers' Opinion about the Importance and Effectiveness of Outdoor Education

Research Question 1: Do the preservice and inservice science teachers consider outdoor education important and effective?

The purpose of the first research question was to investigate whether preservice and inservice science teachers consider outdoor education important and effective. In this way, a five-point Likert Outdoor Education Opinion Questionnaire (QEOQ), which has eight items, was implemented. The answers of participants were analyzed by descriptive statistics.

The data obtained with QEOQ indicated that the majority of preservice teachers (59%) and inservice teachers (69%) were aware of outdoor education. Although participants had different opinions about the effectiveness of outdoor education, most of them were considered OE as "effective" (preservice; *M*=3.73, SD=.86, inservice; *M*=3.90, SD=.91).

While participants considered the OE effective, participants indicated that the school has a huge role in making nature familiar to the students (preservice 27%, inservice; 27%). Moreover, most participants in both groups believed that parents and schools had to work together in this process (preservice; 64%, *M*=3.18, SD=.59, inservice; 60%, *M*=3.14, SD=.62). In addition, the majority of the participants in both groups thought that holding classes in outdoors considered as "important" (preservice; 54%, *M*=4.08, SD=.82, inservice; 66%, *M*=4.05, SD=.83) and "very important" (preservice; 31%, inservice; 24%).

In parallel, almost all participants agreed (preservice; 43%, *M*=4.07, SD=.1.01, inservice; 60%, *M*=4.19, SD=.82) and "agree completely" (preservice; 39%, inservice; 34%) that there were teaching units that could be taught more efficiently outdoors than inside the classroom.

Although participants considered as OE effective and important, participants had insufficient knowledge to hold outdoor classes (preservice; 60%, *M*=1.77, SD=.1.10, inservice; 65%, *M*=1.59, SD=.97). Also, the majority of participants did not take a course/classes related to outdoor education (preservice; 74%, inservice; 82%)

4.1.2 Preservice and Inservice Science Teachers' Perceptions about Outdoor Education

Research Question 2: What are the preservice and inservice science teachers' perceptions of outdoor education?

Research Question 3: What are the differences between preservice and inservice science teachers' perceptions of outdoor education?

The purpose of the second research question was to investigate participants' preferences, barriers and motivations about outdoor settings and landscapes. In that vein, the Outdoor Setting Questionnaire (QSQ) was used. The answers of participants were analyzed by descriptive statistics.

4.1.2.1 Outdoor Settings Most and Least Preferred Both Educationally and Personally

According to participants' responses, the three most and least preferred setting frequencies both educationally and personally were obtained for both groups. The three settings with the highest and lowest frequencies were listed by considering educational and personal preferences in Table 4. 1. The three settings as personally *most* preferred were Setting 2 (Pavilion in open woods), Setting 13 (stream in a wooded area with narrow footpath), Setting 14 (stream cutting through rocky outcropping forming small waterfalls) and Setting 15 (small lake with dock and shelter). The three settings as personally *least* preferred were Setting 1 (playground), Setting 5 (open natural area edge of gravel road) and Setting 8 (open unmoved grassy area with no path).

Moreover, the three settings as educationally *most* conducive were Setting 2 (Pavilion in open woods), Setting 3 (open grassy area with several park benches), Setting 6 (open natural area near the forest into the edge of wet area), Setting 13 (stream in a wooded area with narrow footpath), Setting 14 (stream cutting through rocky outcropping forming small waterfalls) and Setting 15 (small lake with dock and shelter). The three settings as educationally *least* conducive were Setting 1 (playground), Setting 3 (open grassy area with several park benches), Setting 5 (open natural area edge of gravel road), Setting 7 (open area with gravel pathway and bridge) and Setting 8 (open unmoved grassy area with no path).

Table 4.1 Distribution of Most and Least Preferred Setting

Participant Group	**Most Preferred**		**Least Preferred**	
Inservice Science Teacher	Setting (#)	(*f*)	Setting (#)	(*f*)
	Personal Preferences		Personal Preferences	
	2	29	1	30
	14	33	5	30
	15	39	8	39
	Educationally Conducive		Educationally Conducive	
	1	26	5	26
	13	28	7	21
	15	37	8	29
Preservice Science Teacher	Personal Preferences		Personal Preferences	
	2	61	1	67
	10	94	5	103
	15	96	8	131
	Educationally Conducive		Educationally Conducive	
	3 & 6	47	3	54
	13	50	5	55
	15	72	8	85

** Each participant could give more than one suggestion

4.1.2.2 Characteristics of Educationally Conducive Outdoor Settings

In order to understand why the participants preferred particular outdoor settings and what makes these settings the most and the least preferred,participants' written comments were analyzed by coding (see Table 4. 2). The results showed that the most frequent reason for selecting Setting 15 was related to having a sense of calmness and peace sense for the preservice science teacher and having green space scenery including trees for the inservice science teachers. Setting 8 was personally the least preferred setting as being not attractive for the preservice science teacher and lack of trees and green space scenery for inservice science teachers. Moreover, the preference of Setting 15 as educationally the most conducive was related to having opportunities for structured learning about nature for both groups. Lastly, the most frequent reason for selecting Setting 8 as educationally the least conducive was related to as being not attractive settings for the preservice science teachers and as having insufficient stimulus in the environment for inservice science teachers.

To explore the participants' ideas about the characteristics of educationally conducive outdoor settings in depth, participants' open-ended responses were analyzed and their frequencies were compared in terms of outdoor setting type and human influence attribute (see Table 4. 3). According to the result, most participants selected "water" as the most frequent outdoor setting type both educational preferences and personal preferences in both groups. Moreover, maintained (human influence attribute) was selected as the most frequent one for personal preferences for both groups and was the most conducive for educational outcomes in preservice teachers. In contrast, "natural" was the most conducive for educational outcomes for the inservice teachers. "Open field/grassy area" was the least preferred outdoor setting type for both educational preferences and personal preferences in both groups.

These preferences included "green space with trees", "presence of water" and "give a sense of calmness and peace" characteristics that were consistent with the personal preferences of the participants. These were also consistent with the educational preferences of participants identified as "opportunities for structured learning about nature" and "natural area/s contain rich biodiversity and intersection area".

Table 4.2 Characteristics of Participants' Most and Least Preferred Educational and Personal Outdoor Setting

Participant Group		Reason for most preferred		Reason for least Preferred	
Inservice Teacher	**Science**		**(*f*)**		**(*f*)**
		Personal Preferences		**Personal Preferences**	
		Give a sense of calmness and peace	55	Not attractive	32
		The presence of water	60	Too quiet/Safety	55
		Green space including trees	86	Lack of trees	60
		The beauty of the scenery	26	Not appropriate to relax	6
		Appropriate for engaging in different kinds of activities	9	Lack of things to do	2
		The presence of shelter	6	Too much human influence/Not Natural	55
		Educational Preferences		**Educational Preferences**	
		Opportunities to move freely	8	Safety	39
		Enjoyable for student	16	Lack of things for children to do	7
		Opportunities for unstructured learning in nature	42	Difficult to use	3
		Opportunities for structured learning about nature	70	Insufficient stimulus in the environment	71
		Familiar	2	Not attractive	43
		Safe	1	Human influence/not natural	27
		Opportunities for science activities related with physics and chemistry	11		
		Natural area/s contain rich biodiversity and intersection area	56		
		Nature-based related activities(hiking ,trekking)	1		
		Technology	3		

Table 4.2 (cont'd)

Preservice Science Teacher	**Personal Preferences**		**Personal Preferences**	
	Give a sense of calmness and peace	178	Not attractive	209
	The presence of water	96	Too quiet/Safety	34
	Green space including trees	126	Lack of trees	136
	The beauty of the scenery	88	Not appropriate to relax	28
	Appropriate for engaging in different kinds of activities	38	Lack of things to do	115
	The presence of shelter	21	Too much human influence/Not Natural	89
	Educational Preferences		**Educational Preferences**	
	Opportunities to move freely	28	Safety	93
	Enjoyable for student	43	Lack of things for children to do	30
	Opportunities for unstructured learning in nature	71	Difficult to use	35
	Opportunities for structured learning about nature	208	Insufficient stimulus in the environment	119
	Familiar	1	Not attractive	144
	Safe	18	Human influence/not natural	4
	Opportunities for science activities related with physics and chemistry	8		
	Natural area/s contain rich biodiversity and intersection area	116		
	Nature-based related activities(hiking ,trekking)	6		
	Technology	1		

** Each participant could give more than one suggestion

Table 4.3 Preferences by Outdoor Setting Type and Human Influence Attribute

Inservice Science Teacher		Participants Selecting the setting as an *Educational* preference (*f*)	Participants Selecting the setting as *Personal* preference (*f*)
	Outdoor Setting Type		
	Park	55	56
	Forest	50	67
	Water	98	112
	Open field/grassy area	45	39
	Human influence attribute		
	Maintained	118	140
	Natural	130	134
Preservice Science Teacher	**Outdoor Setting Type**		
	Park	122	86
	Forest	126	161
	Water	181	233
	Open field/grassy area	86	52
	Human influence attribute		
	Maintained	266	267
	Natural	249	265

** Each participant could give more than one suggestion

4.1.2.3 Educational Affordances and Activities of Educationally Conducive Outdoor Settings

To investigate what activities are selected by participants to prefer as educational most conducive, open-ended responses related to the three educationally most preferred settings were analyzed and frequencies of activities were presented in Table 4.4. The most frequent activities were “structured learning about nature” and “physical health benefits activities” for preservice teachers, “structured learning about nature” and “environmental issues related” for the inservice teachers.

Table 4.4 Educational Affordances and Activities of Outdoor Setting

Activities	Inservice Science Teacher (*f*)	Preservice Science Teacher (*f*)
Structured learning about nature(biology, ecology)	138	281
Unstructured learning about nature	3	49
Physical health benefits activities	11	70
Art activities	1	23
Picnic	2	3
All activities	2	6
Camping	2	4
Science activities related to physics and chemistry	16	1
environmental issues related (climate change, pollution)	39	13

** Each participant could give more than one suggestion for activities.

4.1.2.4 Motivations for and Barriers to the Use of Natural Outdoor Settings

To investigate participants' motivations and barriers of using natural outdoor settings, the open-ended responses were coded to calculate frequencies. The related results were presented in Table 4.5. According to the result, the most frequent motivations were opportunities for hands-on learning and rich natural materials for preservice science teachers. For inservice science teachers, physical/health benefits on students and student enjoyment were the other most frequent motivations. However, while parent support and transportation were the most frequent barriers for inservice teachers, safety concerns, transportation and curriculum-related problems were the other most frequent barriers for preservice teachers.

Table 4.5 Motivations and Barriers of Participants towards the Use of Natural Outdoor Settings

Motivations	Inservice Science Teacher (*f*)	Preservice Science Teacher (*f*)
Nature and natural materials are appropriate for a student's development/health	12	17
Hands-on learning	2	58
Appropriate for activities	1	1
Fostering creativity	1	6
Increasing sensitivity to protect nature	2	6
Humans are a part of nature	3	15
Desire to be a teacher in natural settings	1	1
Rich natural materials	3	20
Enjoyable settings for student	7	8

Table 4.5 (cont'd)

Barriers		
Parent support/Problems	3	14
Administration support/Problems	29	24
Safety concerns	13	29
Scarcity of natural areas around us	1	1
Difficulty of drawing children's attention to the subject in	6	11
Economic constraints	6	8
Prior knowledge is given to teachers about settings	5	4
Transportation/lack of access	25	27
Lack of material	6	7
Time	14	9
Student Number	2	1
Curriculum Problem/Content	22	8
Classroom Management	13	25
Planning	2	1

** Each participant could give more than one suggestion

4.1.2.5 Recognition of Benefits of Experiences in Nature and Intentions Regarding Use of Natural Setting

Participants' responses about the potential benefits of experiences in nature for students were analyzed. Descriptive statistics of these statements were used to describe participants' recognition of the benefits of experiences in nature. The related results were presented in Table 4.6. The result revealed that participants were in the strongest agreement with fostering students' environmental appreciation of experiences in nature in both groups. Although participants generally agreed on the benefit of experiences in nature, both groups were in the lowest agreement on the benefits of experiences in nature associated with formal school settings. This indicates that participants generally agree on the benefits of nature experiences, but some participants might have attitudinal barriers to using natural settings in formal education.

Table 4.6 Recognition of Benefits of Experiences in Nature

Statements	**Inservice Science Teacher**		**Preservice Science Teacher**	
	(*M*)	**(SD)**	**(*M*)**	**(SD)**
Cognitive development	4.30	.99	4.29	.66
Socioemotional development	4.41	.86	4.26	.68
Physical development	4.33	1.01	4.29	.74
Health and wellness	4.38	.92	4.49	.63
Development of an environmental appreciation	4.63	.88	4.66	.60
Nature experiences belong within the formal school setting	4.30	.98	4.24	.83
Overall	4.16	1.28	4.38	.53

To investigate the participants' intention about using outdoor settings, data was interpreted (see Table 4. 7). Participants' responses indicated that using the natural setting with their students was perceived as "difficult" for both groups. Although preservice science teachers were "likely" to use both maintained outdoor settings and natural settings with their students, inservice teachers were "unlikely" to use maintained outdoor settings and natural settings with their students.

Table 4.7 Intention of Using Outdoor Setting

Statements	Inservice Science Teacher		Preservice Science Teacher	
	(*M*)	(SD)	(*M*)	(SD)
Perceived difficulty in using natural settings	2.34	1.09	2.57	.93
Personal level of nature relatedness,	4.21	.40	4.04	.45
Recognition of benefits of experiences in nature	4.16	1.28	4.38	1.53
Intention to use maintained outdoor settings with their students	2.17	1.39	3.57	1.19
Intention to use natural settings with their students	2.18	1.31	3.39	1.15

4.1.3 Preservice Science Teachers and Inservice Science Teachers Nature Relatedness Scores

In the present study, participants' descriptive analysis of nature-relatedness scores were presented in Table 4.8. The higher mean score indicates a stronger level of connection with nature. The both groups had (Inservice; *M*=4.23, SD=.40, Preservice; *M*=4.04, SD=.46) a stronger level of connection with nature. However, inservice science teachers had slightly higher scores than preservice teachers.

Table 4.8 Descriptive Statistics of Participants' Nature Relatedness Scores

Participant Groups	Mean	SD	Min.	Max.
Inservice Science Teacher	4.21	.40	3,22	5.00
Preservice Science Teacher	4.04	.46	2.83	5.00

4.2 Inferential Statistics

4.2.1 Preservice Science Teachers and Inservice Science Teachers Nature Relatedness Scores

Research Question 4: Is there a difference in in-service science teachers' and pre-service science teachers' nature-relatedness scores?

The purpose of the third research question was to investigate whether preservice science teachers' and inservice science teachers' nature nature-relatedness scores differ significantly. In that vein, the independent sample test was implemented. Before conducting an independent t-test, the assumptions of an independent t-test were checked.

According to Pallant (2011), independent sample t-tests have five assumptions that were the level of measurement, random sampling, independence of observation, normality, and homogeneity of variances;

1. Level of measurement: Nature-relatedness scores, which is the dependent variable, were continuous; the first assumption was not violated.
2. Random sampling: In this study, a convenient sampling methodology was used to reach participants, considering easy access and its available nature (Fraenkel et al., 2012). Therefore, the assumption of random sampling was violated. However, Pallant (2011) indicated that the random sampling technique might not be used in real-life searches. Therefore, convenience sampling might be acceptable.
3. Independence of observation: In this study, the data was collected by the researcher of the study. During the collection, the researcher ensured that participants did not influence each other. Also, during the online data collection phase, the researcher assumed that participants did not influence each other. Therefore, the assumption was not violated.
4. Normality: To ensure the normality, skewness and kurtosis values and histograms were checked. While Skewness and kurtosis values were between -2 and +2 for a preservice science teacher, inservice teachers' values were not acceptable. When the boxplots and values were checked. "Participant 95" was problematic for the inservice teacher and was decided to omit. Then, the values observed as acceptable.

In addition, the histogram shapes were normal distributions (See Appendix F). . Therefore, the assumption was not violated. “

5. Homogenes of variances: Levene’s test was conducted as part of the test and the significance values were greater than .05 in both groups. Therefore, the assumption was not violated.

After checking assumptions, an independent t-test was conducted to compare the NR scores of preservice and inservice science teachers. According to the test result (see Table 4. 9), there was significant differences in scores for inservice (*M*=4.23, SD=.40) and preservice (*M*=4.04, SD=.46; *t*(272)=3.31 *p*=.001,two-tailed). The magnitude of the differences in the means was small (eta squared = .04). These results suggested a practical significant difference between inservice and preservice science teachers in terms of nature-relatedness score.

4.2.2 Intentions Regarding and Predictors of the Use of Natural Settings

To explore how well recognition of benefits of experiences in nature, personal level of nature relatedness, perceived difficulty in using natural settings and intention to use maintained outdoor settings predicts intention to use natural settings with their students, multiple regression analysis was used.

Before conducting multiple regression, the assumption of multiple regression was checked. These are random sampling, independence of observation, sample size, Multicollinearity and singularity, outliers, normality, linearity, homoscedascity of residuals and Independent of residual.

1. Sample Size: According to (Tabachnick & Fidell (2013), the sample size formula should be higher than N>50+8m (m=number of IVs). In this study, four independent variables exist and the minimum participant number is 95. Therefore, this met the criteria and the assumption was not violated

Table 4.9 Independent Sample t-test Results for Preservice and Inservice Science Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p*	Mean Difference	Std. Error Difference	Lower	Upper
NR-Score	Equal variances assumed	1.55	.21	3.31	272	<.001	.001	.18	.060	.07	.30
	Equal variances not assumed			3.45	212.59	<.001	<.001	.18	.053	.08	.29

*p<0.05

2. Multicollinearity and singularity: *Multicollinearity* is defined as cases when variables are highly correlated; *Singularity* is defined as cases the one of the variables is the combination of other variables two or more (Tabachnick & Fidell, 2013). To check this assumption, collinearity statistics were used. According to Pallant (2011), tolerance values smaller than .10 or the Variance Inflation Factor (VIF) values of more than 10. This met the criteria and the multicollinearity or singularity was not violated.
3. Outliers: *Outliers* are defined as extreme circumstances in which values obtained are significantly different from the other participants' values (Tabachnick & Fidell, 2013). According to Pallant (2011), since the analysis is sensitive to outliers, outliers need to be checked before analysis. In this study, the data set was examined and only "Participant 181" in the pre-service data was determined outlier since it disturbed the data randomly and was omitted. This met the criteria.
4. Normality, Linearity, and Homoscedasticity of Residual: *Normality* is defined as all variables and all linear combinations of variables distributed symmetrically normal and distributed highest and most considerable frequency in the center and comparatively lesser frequencies on either side (Tabachnick & Fidell, 2013). Normality can be checked statistically and graphically. Histograms were examined and disturbed normally (see Appendix G). In addition, Normal P-P Plots were examined, and normality was satisfied. Moreover, the straight line in the scatterplots indicated the linear relationship between residuals and predicted DV scores. Therefore, the linearity assumption was also met. Residual scatterplots disturbed rectangular, hence homoscedasticity of residual was also met. These met the criteria and the assumptions were not violated.
5. Independence of Residuals: For multiple regression analyses, the residuals should be independent of each other. Durbin-Watson values

were examined for each multiple-regression analysis. Since all the Durbin-Watson values were between the values 1.5 and 2.5, this assumption was also met.

The multiple regression analysis was conducted to evaluate how well recognition of benefits of experiences in nature, personal level of nature relatedness, perceived difficulty in using natural settings and intention to use maintained outdoor settings predicts intention to use natural settings with their students. The independent variables were recognition of benefits of experiences in nature, personal level of nature relatedness, perceived difficulty in using natural settings and intention to use maintained outdoor settings while the dependent variable was an intention to use natural settings with their students for both groups. Multiple regression analysis indicated that the combination of predictor variables was significantly related to the dependent variable for both groups (inservice; $F(4,90)=5.29, p<.05$, preservice; $F(4,175)=14.49$, $p<.05$). The sample multiple correlation coefficients were .50 in preservice and .43 for inservice, indicating that approximately 25% of the variance of the dependent variable in preservice and 19% of the variance of the dependent variable in inservice can be explained by the combination of independent variables. There were two significant predictors for both groups; perceived difficulty in using natural settings (inservice; b = .23, SE = .09, p = .02 preservice; b = .22, SE = .08, p <.05) and intention to use maintained outdoor settings (inservice; b = .28, SE = .012 p = .02; preservice; b = .40, SE = .07, p <.05) with medium effect size for both groups (inservice; $f^2 = 0.33$; preservice; $f^2 = 0.18$).

Based on the results, it is tempting to conclude that intention to use maintained outdoor settings makes the strongest unique contribution to the intention to use natural settings with their students *(*inservice*; beta*=-.28, *sr2*= .07, *p*<.05, preservice*; beta*=-.40, *sr2*= .13, *p*<.05*)* explaining 7% and 13% of variance uniquely .Perceived difficulty in using natural settings was also found to make a statistically significant contribution to the prediction of the dependent variable

*(*inservice*; beta=-.23, sr2= .05, p<.05,* preservice*; beta=-.22, sr2= .05, p<.05))* uniquely accounting for 5% and 5% of the variance .

The regression equation for predicting intention to use natural settings with their students;

Preservice

$\hat{Y} = 0.272\ X_1 + 0.384\ X_2 + 0.663$

Inservice

$\hat{Y} = 0.279\ X_1 + 0.262\ X_2 - 0.156$

4.2.3 Preservice Science Teachers and Inservice Science Teachers' Nature Relatedness Score and Their Outdoor Setting Preferences

To investigate whether participants' preferences were related to nature relatedness score and their preferences in terms of outdoor setting types and human influence attributes, Analyses of variances were conducted. Participants' most frequent outdoor setting type and human influence attribute responses were recorded both educationally and personally. Then, two-way ANOVA was conducted to determine both whether there were significant differences or not in participants' nature relatedness scores by outdoor setting types and human influence attributes and between groups.

4.2.3.1 Nature Relatedness Score of Preservice Science Teachers and Inservice Science Teachers in terms of Personally Preferred Outdoor Settings Types

To explore whether participants' personal outdoor setting type preferences were related to nature relatedness scores or not, two-way ANOVA was conducted. Before

conducting a two-way ANOVA, the assumptions of two-way ANOVA were checked. These were;

1. Random sampling: In this study, a convenient sampling methodology was used to reach participants, considering easy access and its available nature (Fraenkel et al., 2012). Therefore, the assumption of random sampling was violated. However, Pallant (2011) indicated that the random sampling technique might not be used in real-life searches. Therefore, convenience sampling might be acceptable.
2. Independence of observation: In this study, the data was collected by the researcher of the study. During the collection, the researcher ensured that participants did not influence each other. Also, during the online data collection phase, the researcher assumed that participants did not influence each other. Therefore, the assumption was not violated.
3. Normality: To ensure the normality, skewness and kurtosis values and histograms were checked. While Skewness and kurtosis values were between -2 and +2 for a preservice science teacher, inservice teachers' values were not acceptable. When the boxplots and values were checked. “Participant 95” was problematic for the inservice teacher and was decided to omit. Then, the values observed as acceptable. In addition, the histogram shapes were normal distributions (See Appendix H). . Therefore, the assumption was not violated.
4. Homogenes of variances: Levene’s test was conducted as part of the test and the significance values were greater than .05 in both groups. Therefore, the assumption was not violated.

A two-way between-groups analysis of variance was conducted on the impact of a group of participants (inservice and preservice) and outdoor setting types (park, grassy area, forest and water) on a personal level of nature relatedness as measured by the Nature Relatedness Scale(NR-Scale). Participants were divided into four groups according to outdoor setting types (Group 1: Park; Group 2: Open

Field/Grassy area, Group 3: Forest, Group 4; Water). Table 4.10 presents descriptive statistics for a personal level of nature relatedness by personal outdoor setting type preferences and group of participants.

Table 4.10 Descriptive Statistics for a Personal Level of Nature Relatedness by Personal Outdoor Setting Type Preferences and Group of Participants

Outdoor Setting Types	Mean	SD	n
Park			
Inservice Science Teacher	4.23	.39	14
Preservice Science Teacher	3.96	.48	30
Open Field/Grassy area			
Inservice Science Teacher	4.40	.43	12
Preservice Science Teacher	3.99	.56	19
Forest			
Inservice Science Teacher	4.11	.47	17
Preservice Science Teacher	4.05	.45	45
Water			
Inservice Science Teacher	4.23	.41	43
Preservice Science Teacher	4.03	.42	81

According to the two-way between-groups analysis of variance results, the interaction effect between personal outdoor setting type preferences and groups of participants was not statistically significant, F (3,253)=1.10, p=.35 . The main effect for outdoor setting type preferences, F (3,253) =.48, p= .70, was not statistically significant. There was a statistically significant main effect only for groups of participants, F (1,253)=12.80, p<.05; however, the effect size large (partial eta squared= .04).

Cell means for the level of nature relatedness for each combination of personal outdoor setting types and groups of participants was plotted in Figure 2.

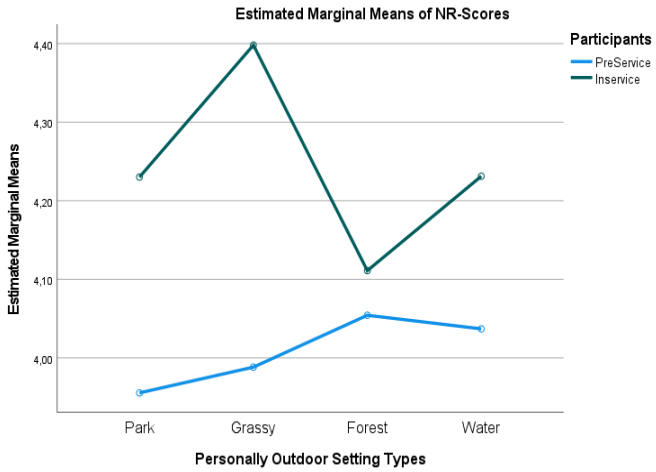

Figure 2 Line graph for the interaction effect of Personally Outdoor Setting Types

4.2.3.2 Nature Relatedness Score of Preservice Science Teachers and Inservice Science Teachers in terms of Educationally Preferred Outdoor Settings Types

To explore whether participants' educational outdoor setting type preferences were related to nature relatedness scores or not, two-way ANOVA was conducted. Before conducting a two-way ANOVA, the assumptions of two-way ANOVA were checked. These were;

1. Random sampling: In this study, a convenient sampling methodology was used to reach participants, considering easy access and its available nature (Fraenkel et al., 2012). Therefore, the assumption of random sampling was violated. However, Pallant (2011) indicated that the random sampling technique might not be used in real-life searches. Therefore, convenience sampling might be acceptable.
2. Independence of observation: In this study, the data was collected by the researcher of the study. During the collection, the researcher ensured that participants did not influence each other. Also, during the online data

collection phase, the researcher assumed that participants did not influence each other. Therefore, the assumption was not violated.

3. Normality: To ensure the normality, skewness and kurtosis values and histograms were checked. While Skewness and kurtosis values were between -2 and +2 for a preservice science teacher, inservice teachers' values were not acceptable. When the boxplots and values were checked. “Participant 95” was problematic for the inservice teacher and was decided to omit. Then, the values observed as acceptable. In addition, the histogram shapes were normal distributions (See Appendix I).Therefore, the assumption was not violated.
4. Homogenes of variances: Levene’s test was conducted as part of the test and the significance values were greater than .05 in both groups. Therefore, the assumption was not violated.

A two-way between-groups analysis of variance was conducted on the impact of a group of participants (inservice and preservice) and outdoor setting types (park, grassy area, forest and water) on a personal level of nature relatedness as measured by the Nature Relatedness Scale (NR-Scale). Participants were divided into four groups according to outdoor setting types (Group 1: Park; Group 2: Open Field/Grassy area, Group 3: Forest, Group 4; Water). Table 4.11 presents descriptive statistics for level of nature relatedness by educational outdoor setting type preferences and a group of participants.

According to the two-way between-groups analysis of variance results, the interaction effect between educational outdoor setting type preferences and groups of participants was not statistically significant, $F(3,248)=.55$, $p=.65$. The main effect for outdoor setting type preferences, $F(3,248)=.33$, $p= .33$, was not statistically significant.

Table 4.11 Descriptive Statistics for Level of Nature Relatedness by Educational Outdoor Setting Type Preferences and Group Of Participants

Outdoor Setting Types	Mean	SD	n
Park			
Inservice Science Teacher	4.29	.44	20
Preservice Science Teacher	3.97	.50	44
Open Field/Grassy area			
Inservice Science Teacher	4.36	.36	11
Preservice Science Teacher	4.02	.47	30
Forest			
Inservice Science Teacher	4.27	.47	14
Preservice Science Teacher	4.12	.46	39
Water			
Inservice Science Teacher	4.22	.35	38
Preservice Science Teacher	4.04	.40	60

There was a statistically significant main effect only for groups of participants, F (1,248) =14.97, p<.05; however, the effect size was medium (partial eta squared= .06).Cell means for level of nature relatedness for each combination of educational outdoor setting types and groups of participants was plotted in Figure 3.

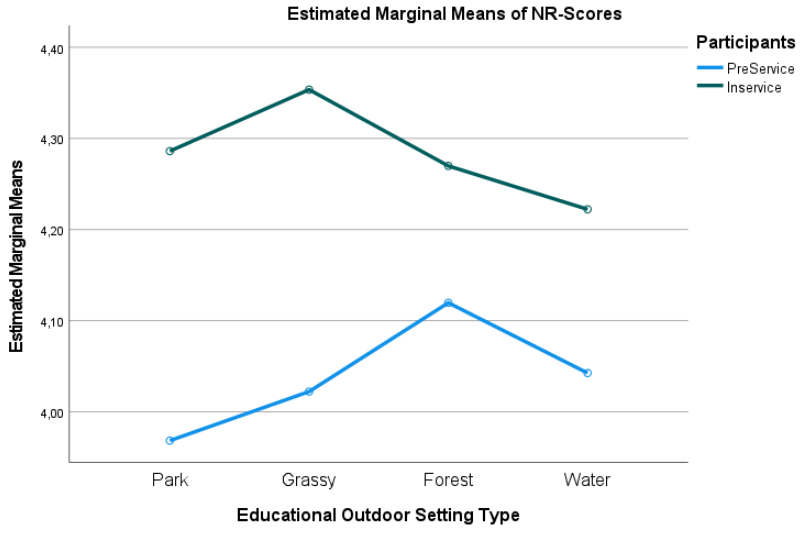

Figure 3 Line graph for the interaction effect of Educational Outdoor Setting Type

4.2.3.3 Nature Relatedness Score of Preservice Science Teachers and Inservice Science Teachers in Terms of Personally Preferred Human Influence Attribute

To explore whether participants' personal human influence attribute preferences were related to nature relatedness scores or not, two-way ANOVA was conducted. Before conducting a two-way ANOVA, the assumptions of two-way ANOVA were checked. These were;

1. Random sampling: In this study, a convenient sampling methodology was used to reach participants, considering easy access and its available nature (Fraenkel et al., 2012). Therefore, the assumption of random sampling was violated. However, Pallant (2011) indicated that the random sampling technique might not be used in real-life searches. Therefore, convenience sampling might be acceptable.
2. Independence of observation: In this study, the data was collected by the researcher of the study. During the collection, the researcher ensured that participants did not influence each other. Also, during the online data collection phase, the researcher assumed that participants did not influence each other. Therefore, the assumption was not violated.
3. Normality: To ensure the normality, skewness and kurtosis values and histograms were checked. While Skewness and kurtosis values were between -2 and +2 for a preservice science teacher, inservice teachers' values were not acceptable. When the boxplots and values were checked. “Participant 95” was problematic for the inservice teacher and was decided to omit. Then, the values observed as acceptable. In addition, the histogram shapes were normal distributions (See Appendix-J) .Therefore, the assumption was not violated.
4. Homogenes of variances: Levene’s test was conducted as part of the test and the significance values were greater than .05 in both groups. Therefore, the assumption was not violated.

A two-way between-groups analysis of variance was conducted on the impact of a group of participants (inservice and preservice) and human influence attribute (maintained and natural) on a personal level of nature relatedness as measured by the Nature Relatedness Scale (NR-Scale). Participants were divided into 2 groups according to human influence attribute (Group 1: Maintained; Group 2: Natural). Table 4.12 presents descriptive statistics for the level of nature relatedness by personal human influence attribute and a group of participants.

Table 4.12 Descriptive Statistics for an Educational Level of Nature Relatedness by Personal Human Influence Attribute Preferences and Group of Participants

Human Influence Attribute	Mean	SD	n
Maintained			
Inservice Science Teacher	4.23	.44	48
Preservice Science Teacher	4.04	.49	99
Natural			
Inservice Science Teacher	4.21	.36	42
Preservice Science Teacher	4.03	.42	79

According to the two-way between-groups analysis of variance results, the interaction effect between personal human influence attribute preferences and groups of participants was not statistically significant, $F(1,264)=.00$, $p=.93$. The main effect for personal human influence attribute preferences, $F(1,264)=.06$, $p= .81$, was not statistically significant. There was a statistically significant main effect only for groups of participants, $F\ (1,264) =10.06$, $p<.05$; however, the effect size was small (partial eta squared= .04).

Cell means for level of nature relatedness for each combination of personal human influence attribute and groups of participants was plotted in Figure 4.

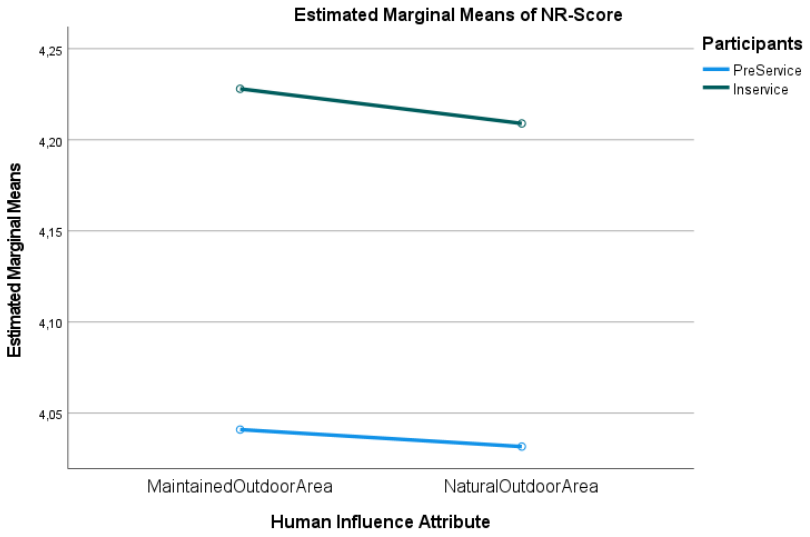

Figure 4 Line graph for the interaction effect of Personally Human Influence Attribute

4.2.3.4 Nature Relatedness Score of Preservice Science Teachers and Inservice Science Teachers in Terms of Educationally Preferred Human Influence Attribute

To explore whether participants' educational human influence attribute preferences were related to nature relatedness scores or not, two-way ANOVA was conducted. Before conducting a two-way ANOVA, the assumptions of two-way ANOVA were checked. These were;

1. Random sampling: In this study, a convenient sampling methodology was used to reach participants, considering easy access and its available nature (Fraenkel et al., 2012). Therefore, the assumption of random sampling was violated. However, Pallant (2011) indicated that the random sampling technique might not be used in real-life searches. Therefore, convenience sampling might be acceptable.
2. Independence of observation: In this study, the data was collected by the researcher of the study. During the collection, the researcher ensured that

participants did not influence each other. Also, during the online data collection phase, the researcher assumed that participants did not influence each other. Therefore, the assumption was not violated.

3. Normality: To ensure the normality, skewness and kurtosis values and histograms were checked. While Skewness and kurtosis values were between -2 and +2 for a preservice science teacher, inservice teachers' values were not acceptable. When the boxplots and values were checked. "Participant 95" was problematic for the inservice teacher and was decided to omit. Then, the values observed as acceptable. In addition, the histogram shapes were normal distributions (See Appendix-K). Therefore, the assumption was not violated.
4. Homogenes of variances: Levene's test was conducted as part of the test and the significance values were greater than .05 in both groups. Therefore, the assumption was not violated.

A two-way between-groups analysis of variance was conducted on the impact of a group of participants (inservice and preservice) and human influence attribute (maintained and natural) on a personal level of nature relatedness as measured by the Nature Relatedness Scale (NR-Scale). Participants were divided into 2 groups according to human influence attribute (Group 1: Maintained; Group 2: Natural). Table 4.13 presents descriptive statistics for the level of nature relatedness by educational human influence attribute and a group of participants.

Table 4.13 Descriptive Statistics for an Educational Level of Nature Relatedness by Educational Human Influence Attribute Preferences and Group of Participants

Human Influence Attribute	Mean	SD	n
Maintained			
Inservice Science Teacher	4.21	.50	41
Preservice Science Teacher	3.97	.48	89
Natural			
Inservice Science Teacher	4.27	.50	45
Preservice Science Teacher	4.10	.43	83

According to the two-way between-groups analysis of variance results, the interaction effect between educational human influence attribute preferences and groups of participants was not statistically significant, $F(1,254)=.042$, $p=.52$. The main effect for educational human influence attribute preferences, $F(1,254)=2.69$, $p= .10$, was not statistically significant. There was a statistically significant main effect only for groups of participants, $F (1,264) =12.66$, $p<.05$; however, the effect size was small (partial eta squared= .05).

Cell means for the level of nature relatedness for each combination of educational human ınfluence attributes and groups of participants were plotted in Figure 5.

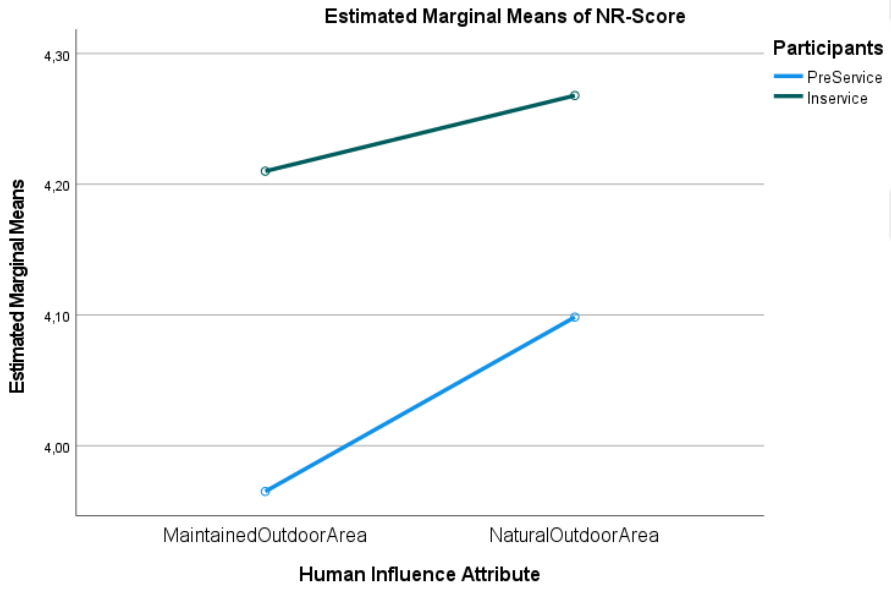

Figure 5 Line graph for the interaction effect of Educationally Human Influence Attribute

CHAPTER 5

DISCUSSION

In this chapter, initially, the results of the current study is discussed. After that, implications for the research and practice are mentioned. Finally, recommendations for future research are specified.

5.1 Summary of Study

The purpose of the present study was to investigate the perception and experiences of preservice and inservice science teachers about outdoor education (OE) in terms of different concepts, such as barriers, motivations, and educational opportunities. In the present study, survey and correlational research designs were used and total of 95 inservice science teachers the public schools of the Çankaya district and A total of 181 preservice science teachers participated in the study from the two public universities in Ankara. The data were collected with face-to-face for preservice and both face-to-face and online survey for inservice science teachers by using the ‘‘Outdoor Education Perception Survey’’ (see Appendix-A), which includes five main parts: Demographic Information Form, Outdoor Education Opinion Questionnaire developed by Borsos et al, (2022), Outdoor Setting Questionnaire developed by Ernst and Tornabene, (2012) and Nature Relatedness Scale (Nisbet et. al,2009) adapted into Turkish by Çakır et. al, ,(2010).

In the present study, data were analyzed by quantitative and qualitative analysis methods. All open-ended responses were analyzed qualitatively first and the qualitative data is transformed into quantitative data through a quantitating process by using initial independent codes (Sandelowski et al., 2009). After the quantitating process, frequencies for the participants’ responses were calculated by using descriptive statistics. After the descriptive statistics were analyzed, Two-way ANOVA was used to assess whether there was a significant difference in participants’ nature relatedness scores in terms of outdoor setting type preferences,

human ınfluence attribute and participants' group (preservice and inservice). An independent t-test was used to analyze the NR-Score of the group. Additionally, multiple regression analyses were conducted to understand which of the following were significant predictors of intention to use natural settings with their students, recognition of benefits of experiences in nature, personal level of nature relatedness, perceived difficulty in using natural settings, and intention to use maintained outdoor settings.

5.2 Discussion of Finding

In this section, the findings regarding each research question are discussed respectively.

5.2.1 The Relationship between Outdoor Education and Teachers' Opinions

First, most of the participants in both groups were aware of outdoor education (OE) and considered an effective teaching method for holding classes outdoors. However, the majority of participants had insufficient knowledge of holding outdoor classes (preservice; 60%, inservice; 65%) and they took few courses related to OE (preservice; 74%, inservice; 82% did not take any courses related to OE). For that reason, the meaning of OE might not be known by participants clearly or they want to select the correct choice. Borsos et al. (2018) and Borsos et al. (2022) studies were showed the similar results and researchers indicated that insufficient information about teachers training or lack of confidence on implementation of OE might be related to this result. This might be the limitation of the present study and needs to be investigated more deeply by using other tools, such as interviewing or open-ended responses.

Moreover, most of the participants thought that holding outdoor classes as important and considered the OE as effective. The finding of current research showed similarities with previous studies. For example, Borsos et al. (2022) found that outdoor education is considered highly effective by preservice teachers in five different countries. In addition, Henriksson (2018) indicated that elementary school teachers consider OE as influencing student' positively science content knowledge , problem solving skills and attitudes toward environment. Moreover, Ratinen et al (2021) proposed that OE affect students positively in terms of environmental attitudes and connectedness of nature. However, Henriksson (2018) also indicated that despite positive perception of teachers on OE, teachers have little knowledge about learning aims of OE and they do not know how prepare plan and task about the OE as similarly in the current study. Henriksson (2018) explained the possible reason of inadequate knowledge is insufficient training of teachers during their teacher training . In this regard, researchers suggest that outdoor-related classrooms/courses should integrated into both education systems and university since teachers knowledge on and familiarity about OE affect positively to implementation of OE and teachers intention to use in their future work. (Borsos et al., 2021; Gray and Gray, 2019: Henriksson, 2018).

Lastly, participants agreed that the school had a huge role in the familiarization of nature but the majority of participants believed that parents and schools had to work together in this process. According to Jewell (2022), for easy and effective familiarization of nature, schools and parents need to cooperate with each other and should collaborate. In addition, Blatt and Patrick (2014) indicated that school hierarchy and parents are major barriers to implementing of OE. These barriers and limitations have described in detail in the following sections. In that vein, researcher suggested that school and parent involvement is an important part of implementing OE and should be integrated into training programs (Blatt & Patrick, 2014; Borsos et al., 2022; Shume & Blatt, 2019).

5.2.2 Outdoor Education and Teachers' Landscape Preferences

According to the result of the current study, participants selected the "water" outdoor setting type as the most educationally conducive and personally preferred. However, participants were different selections for human influence attribute While inservice teachers preferred as "natural", preservice teachers were preferred the "maintained" one for educational conducive preference. In addition, both inservice and preservice teachers concentrated their preferences of "water" outdoor setting type related to green space with trees and calmness and peace feeling of scenery. In this regard, Kaplan(1989) indicated that people prefer water because water has a direct or, indirect relationship with sustaining life and also has a relaxation effect that reduces the stress level of people (Ulrich,1991).While Ernst and Tornebene (2012) found similar result, Yılmaz et al. (2016) found "water" as least preferred educational and personal outdoor setting. Park et al,(2010) indicated that people incline to prefer familiar environment with their surroundings. In this regard, lack of personal experience with outdoor setting might affected preference of both inservice and preservice teachers.

Moreover, the current study showed consistent with Ernst and Tornebene (2012). These studies found that preservice teachers have insufficient knowledge on what do with students in natural landscapes so they prefer maintained area in educational contex(Ernst,2014), Skamp &Bergmann ,2001) .Additionally, Yılmaz et al. (2016) study indicated similar result with previous studies but argued different explanation. Park was the most preferred educational landscapes in the Yılmaz et al. (2016) study. . Yılmaz et al. (2016) and Fjørtoft, (2001) indicated that park have limited boundary to ease the classroom management and allow the student to develop physical activity. In the current study, classroom management is one of most frequent barriers to use of natural setting. In that vein, preservice science teacher's preference might have related with these explanations. In addition, Simmons (1993) indicated that elementary teachers had a strong preference for using natural outdoor settings rather than maintained settings in their implementation. In addition, Ernst and Tornebene

(2012), the preferences of outdoor settings is directly related to what teachers perceive and what teachers do in there.

Although water is the most frequent setting type for both educationally and personally, “grassy area /open field” was the least frequent setting type for both educationally and personally for both groups. In addition, the most frequent reason for the least preferred both educationally and personally was the lack of trees and insufficient stimulus in the environment. Moreover, the least preferred both educationally and personally, setting 8 contained gravel road and lack of green space and tree .According to Gerstenberg (2015), trees and green spaces were linked with a high level of visual attractiveness and tolerance of stress, and the lack of existence of trees in the scenery was also linked with negative feelings.

In the current study, level of nature relatedness of both inservice and preservice science teachers were not influenced their influence their educational and personal outdoor setting preferences and human influence attribute similarly Ernst and Tornebene (2012). In contrast, nature relatedness was affected educational preference of preservice earltchilhood education teachers (Yılmaz et. al., 2016). Yılmaz et. al. (2016) interpreted this result within the scope of spending time in the nature.

5.2.3 Educational Affordances

Based on the both inservice and preservice science teacher’s selection, educationally the most preferred activities were structured learning about the nature and environmental related activities as part of structured learning about nature. Similar result were highlighted by and Ernst et. al. (2013) as observing animals and plant, plant characteristics and the classification of living things. In addition, Davies (1996) found that outdoor setting mainly affected physical and social development.According to Yılmaz et al. (2016), these might be related to field trip activities. According to Athman and Monroe (2002) and Steven and Andrews

(2006), field trips can be an effective way for both teachers and students to gain first-hand experience and knowledge about science and the environment. By organizing effective field trips to natural places, pre-service teachers can learn how to encourage children to observe natural environments closely in the context of science and environmental education. Researchers highlight the importance of teachers using age-appropriate structured learning activities that align with the objectives of their programs, similar to the value of environmental learning activities (Gregg, 2009; Rickinson et al., 2004).

5.2.4 Motivations for and Barriers to the Use of Natural Outdoor Settings

In the current study, while most frequent barriers are administration support/problems, curriculum problem/content and transportation/lack of access to nature for inservice science teachers, administration support/problems, safety concerns, transportation/lack of access to nature and classroom management are the most frequent barriers for preservice science teachers. Differently from the Ernst and Tornabene (2012) and Yılmaz et al. (2016) studies, current study found that transportation/lack of access to nature was seen as large barriers as administration support/problems. In addition, administration support/problems is consistency participant's belief about parents and schools role on in this OE as mentioned about previous section. Also, role of administrative problems were defined as barriers in different studies (Blatt & Patrick,2014;Shume & Blatt, 2019).In addition, barriers in the current study were defined in the different context and sample such as time (Ernst, 2014; Rickinson et al., 2004) , lack of confidence(Sjöblom et al.,2021; Henriksson, 2018) and financial problems (Blatt & Patrick,2014,Shume & Blatt, 2019).

In the both inservice and preservice science, teachers have motivated from the hand-on learning, rich natural materials and well-being effect of OE. Sjöblom et al.,(2021) found that similar findings .Similarly, Norðdahl and Jóhannesson (2014) found that

teachers preferred to undertake teaching activities in natural outdoor settings (e.g. forest, grassy area, seacoast, or tree garden) beyond the school ground. The inconclusive results of some research suggest that teachers may have different preferences depending on the opportunities that different places can offer them. For example, some teachers may prefer places where they can teach a variety of subjects such as math, language, or cooking (Norðdahl & Jóhannesson, 2014). Others may prefer places where it is easier to control children within limited boundaries (Ernst & Tornabene, 2012), while some may prefer places where children can play in a natural environment (Norðdahl & Jóhannesson, 2014).

5.3 Conclusion

Considering the findings of the present study, the following conclusions can be drawn:

1. In the current study, both inservice and preservice science teachers were aware of outdoor education (OE) and considered an effective teaching method for holding classes' outdoors both inservice and preservice science teachers. In addition, both inservice and preservice science teachers considered OE as important and affective. However, both inservice and preservice science teachers have insufficient knowledge of holding outdoor classes.

2. In the current study, both inservice and preservice science teachers believed that t the school had a huge role in the familiarization of nature. In addition, they believed that parents and schools had to work together in this process. Although both inservice and preservice science teachers emphasized that parent and school play critical role on the familiarization of nature, they have barriers and limitation about it.

3. In the current study, , both inservice and preservice science teachers preferred "water" as the most preferred outdoor setting both

educationally and personally. In contrary, “grassy area /open field” was preferred at the least one both educationally and personally by both inservice and preservice science teachers. While Both inservice and preservice science teachers “water” preferences related with positive feeling such as relax, calm and peace, Both inservice and preservice science teachers ““grassy area /open field” preferences related to their negative feeling on absence of green space and tree.

4. In the current study, both inservice and preservice science teachers have barriers to use outdoor setting . Admistrarive support and problems was considered as the most frequent one . Also, barriers in the current study were defined in the different context and sample such as time (Ernst, 2014; Rickinson et al., 2004), lack of confidence (Sjöblom et al., 2021; Henriksson, 2018) and financial problems (Blatt & Patrick, 2014; Shume & Blatt, 2019). Also, inservice and preservice science, teachers have motivated from the hand-on learning, rich natural materials and well-being effect of OE. In the literature, this aspect allow the teachers offer chance for being able to teach in variety of learning domains.

5.4 Implications for Research and Practice

In the current study, both inservice and preservice science teachers considered the outdoor education and effective and important. However, they have lack of knowledge about OE. For that reason; OE should integrate into more intensively to teacher training programs and educational curriculum. For example, curriculum activates might include field trip, short walk around schools ground.

In addition, both inservice and preservice science teacher’s barriers and motivations about OE was identified. Considering the findings of present study, main problems related with implementing OE are administrative problems and lack of access to nature. In this regard, professional development programs can consider some

regulation about observed problems or policy maker might organize curriculum to eliminate these barriers.

5.5 Recommendations for Further Research

Initially, data in the present study were limited Ankara. In addition, all data collected from both public universities and publics schools. In generally, these schools' opportunities and location are limited. In the private schools, teachers have more opportunists and have little bit flexible curricula. Therefore, It is also strongly recommended for future research that comparing public and private school contexts may add value in order to understand science teachers perception about the OE.

In other limitations, data was collected by only district of Çankaya from similar sociocultural background. Perception about the outdoor education mainly related the individuals' belief, values and opinion about the nature. Different sample and different sociocultural background might reflect different result.

In other aspects, data instrument mainly collected data with short answer, survey and multiple choice. Due to this, some points in the were missing. For example, participant's insufficient knowledge about OE could not investigate deeply. In the further research, interview or open-ended questions can enrich literature and can collect data more deeply.

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APPENDICES

A. Outdoor Education Perception Survey

AÇIK HAVA EĞİTİMİ GÖRÜŞ ÖLÇEĞİ

Öğretmen

Cinsiyet: □ Erkek □ Kadın
Hizmet Yılınız: □ 0-5 □ 6-10 □ 11-15 □ 16 ve üzeri
Öğrenim Durumunuz(En son bitirdiğiniz öğrenim durumunu işaretleyiniz):
□Ön-Lisans □Lisans □Yüksek Lisans □Doktora
Branşınız:_____

Öğretmen Adayı

Cinsiyet: □ Erkek □Kadın
Sınıf Düzeyi : □1 □2 □ 3 □ 4
GNO'nız nedir? □ 0-1.99 □2.00-2.49 □ 2.50-2.99 □ 3.00-3.49 □3.50-4.00
Hâlihazırda Öğrenim Gördüğünüz Kurum:_____

Yönerge: Lütfen, aşağıda yer alan sorulara seçmeniz gerektiğini düşündüğünüze veya başkalarının nasıl tepki verebileceğine göre değil, sizin için doğru olduğuna inandığınız yanıtı verin. Doğru ya da yanlış cevap yoktur.

1. Açık hava eğitimi daha önce hiç duydunuz mu?
□evet □hayır

2. Açık hava eğitimi sizce etkili midir?
1 Hiç etkili değil
2 Biraz etkilidir
3 Kararsızım
4 Etkilidir
5 Oldukça etkilidir

3. Açık hava eğitimi hakkında kaç ders aldınız?
□0 □1 □2 □3 □ 3+

4. Açık hava eğitimi hangi derslerde kullanılabilir (Birden fazla cevap işaretleyebilirsiniz)

□Fen Bilimleri
□Sosyal Bilimler
□ Matematik
□Müzik
Diğer_____ (Lütfen belirtiniz)

5. Sizin görüşünüze göre, okul, öğrencilerin doğayla tanışma/aşina olma sürecinde nasıl bir rol oynuyor?

1 Okulun bu süreçte rolü yoktur, bu süreç ebeveynlerin görevidir
2 Okul bu süreçte oldukça az bir role sahiptir
3 Okul ve ebeveynler bu süreçte beraber çalışmalıdır
4 Okul bu süreçte büyük bir role sahiptir
5 Ebeveynlerin bu süreçte rolü yoktur, bu süreç okulun görevidir

6. Açık hava eğitimi kapsamı çerçevesinde sınıf dışı ortamlarda gerçekleştirilen derslerin önemli olduğunu düşünüyor musunuz?

1 Önemli olduğunu düşünmüyorum
2 Biraz önemli olduğunu düşünüyorum
3 Kararsızım
4 Önemli olduğunu düşünüyorum
5 Çok önemli olduğunu düşünüyorum

7. Üniversite öğreniminiz sırasında açık hava eğitimi kapsamında dersleri vermek için yeterince bilgi edindiğinizi düşünüyor musunuz?

1 Hayır, yeterince bilgi edindiğimi düşünmüyorum
2 Bu konuda biraz bilgi edindiğimi düşünüyorum
3 Kararsızım
4 Yeterli bilgi edindiğimi düşünüyorum
5 Bu alanda kesinlikle yeterli bilgi edindiğimi düşünüyorum

8. Fen bilimleri dersi öğretim programında sınıf içinde olduğundan daha etkili bir şekilde açık havada öğretilebilecek ünitelerin olduğunu düşünüyor musunuz?

1 Açık havada öğretilecek üniteler olduğunu düşünmüyorum
2 Öğretilecek bazı üniteler olabilir, emin değilim
3 Kararsızım
4 Öğretilecek üniteler olduğunu düşünüyorum
5 Kesinlikle açık havada öğretilecek üniteler var

- ***Ekte verilen / Çalışmanın son sayfasında bulunan*** **fotoğraf setini kullanarak aşağıdaki soruları cevaplayınız. Bunu yaparken her fotoğraf karesinin sağ alt köşelerinde bulunan numarayı, fotoğraf etiketi olarak kullanabilirsiniz. Ayrıca diğer katılımcılar aynı seti kullanacağından lütfen fotoğrafların üzerine yazı yazmayınız. Teşekkürler…**

1. Kişisel olarak en çok hangi üç yeri ziyaret etmek isterdiniz? (Fotoğrafların altındaki numarayı yazınız)

   Fotoğraf# _____, Fotoğraf# _____, Fotoğraf #_____

   Neden bu üç fotoğrafı seçtiniz? (Lütfen, bu fotoğraflardaki yerlerin hangi özelliklerinin sizin buraları **ziyaret etmeyi isteme nedeninizi** oluşturduğunu belirtiniz.)

Fotoğraf # __- Fotoğraf # __- Fotoğraf # __-

2. Kişisel olarak en az hangi üç yeri ziyaret etmek isterdiniz? (Fotoğrafların altındaki numarayı yazınız)

   Fotoğraf# _____, Fotoğraf# _____, Fotoğraf #_____

   Neden bu üç fotoğrafı seçtiniz? (Lütfen, bu fotoğraflardaki yerlerin hangi özelliklerinin sizin buraları **ziyaret etmeme** nedeninizi oluşturduğunu belirtiniz.)

Fotoğraf # __- Fotoğraf # __- Fotoğraf # __-

3. Öğrencileriniz için fen bilimleri dersi öğretim programının kazanımlarını karşılamaya en elverişli (en uygun) üç yerin hangileri olduğunu düşünüyorsunuz? (Fotoğrafların altındaki numarayı yazınız)

   Neden bu üç fotoğrafı seçtiniz? (Lütfen, bu fotoğraflardaki hangi özelliklerin bu yerleri öğretim programının kazanımlarını karşılamaya **<u>en elverişli</u>** olduğunu düşündüğünüz yerler yaptığını belirtiniz)

   Fotoğraf# _____, Fotoğraf# _____, Fotoğraf #_____

Fotoğraf # __- Fotoğraf # __- Fotoğraf # __-

Seçtiğiniz bu üç fotoğrafın her biri için öğrencilerinizle buralara gittiğinizde ne tür etkinlikler yapabileceğinizi belirtiniz.

Fotoğraf#___:

Fotoğraf# ___:

Fotoğraf# ___:

Seçtiğiniz bu üç fotoğrafın her birinde sizin öğrencilerinizle birlikte etkili bir açık hava eğitimi verebilmek için neye ihtiyaç(ders materyali, çeşitli araç-gereç, rehber/uzman vb.) duyacağınızı lütfen belirtiniz.

Fotoğraf# ___:

Fotoğraf# ___:

Fotoğraf# ___:

4. Öğrencileriniz için fen bilimleri dersi öğretim programının kazanımlarını karşılamaya **en elverişsiz** üç yerin hangileri olduğunu düşünüyorsunuz? (Fotoğrafların altındaki numarayı yazınız)

   Fotoğraf# ___ Fotoğraf# ___ Fotoğraf# ___

   Neden bu üç fotoğrafı seçtiniz? (Lütfen, bu fotoğraflardaki hangi özelliklerin bu yerleri öğretim programının kazanımlarını karşılamaya **<u>en elverişsiz</u>** olduğunu düşündüğünüz yerler yaptığını belirtiniz)

Fotoğraf # __-

Fotoğraf # __-

Fotoğraf # __-

5. Doğal alanlar olarak kast edilen yerler; çimenlik alanlar, peyzajlı parklar gibi suni olarak oluşturmuş/geliştirilmiş alanların aksine, nispeten doğal, yabani olarak oluşmuş ya da oluşturulmuş göl, orman, milli park gibi açık hava ortamlarıdır.
   Yukarıda verilen açıklamaya göre öğrencilerinizle eğitim fırsatları için doğal alanları ne kadar kullandığınızı belirtiniz.

□ Hiç Kullanmam □ Nadiren Kullanırım □ Kararsızım □ Kullanırım

□ Oldukça Sık Kullanırım

Cevabınız kullarım veya oldukça sık kullanırım ise, sizi neyin motive ettiğini açıklayınız.

Cevabınız kullarım veya oldukça sık kullanırım **değil ise**, bu alanları kullanmama nedenlerinizi belirtiniz.

6. Öğrencileriniz için doğal alanları eğitim fırsatları için kullanmanın ne kadar zor olacağını düşünüyorsunuz?

□ Çok Zor □ Zor □ Ne zor ne de kolay □ Kolay

□ Çok Kolay

Cevabınız zor ya da çok zor ise, öğrencileriniz ile doğal alanları eğitim fırsatları için kullanmanızın önündeki başlıca engelin ne olacağını düşünüyorsunuz?

7. Lütfen, öğrencilerinizle eğitim fırsatları için **yapılandırılmış dış ortamları** (okul bahçeleri, çimenlik alanlar, park ortamları, oyun alanları vb.) kullanma sıklığınızı belirtiniz.

□ Hiç Kullanmam □ Nadiren Kullanırım □ Kararsızım □ Kullanırım

□ Oldukça Sık Kullanırım

Yönerge: Lütfen aşağıdaki ifadelerin her birine ne ölçüde katıldığınızı/katılmadığınızı belirtiniz. Doğru veya yanlış yanıt yoktur. Lütfen başkalarının nasıl yanıt vereceğine göre değil, sizin için doğru olduğuna inandığınız yanıtı verin. Her bir madde için bir seçenek işaretleyiniz.

Doğadaki deneyimler çocukların ‘‘…….’’ için önemlidir;	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
Bilişsel Gelişim	O	O	O	O	O
Sosyo-duygusal Gelişim	O	O	O	O	O
Fiziksel Gelişim	O	O	O	O	O
Genel sağlık ve zindelik (zihinsel ve fiziksel)	O	O	O	O	O
Çevre için bilinç geliştirme	O	O	O	O	O
Doğa deneyimlerinin okul ortamına aitliği	O	O	O	O	O

Yönerge: Lütfen, seçmeniz gerektiğini düşündüğünüze veya başkalarının nasıl tepki verebileceğine göre değil, sizin için doğru olduğuna inandığınız yanıtı verin. Doğru ya da yanlış cevap yoktur. Her bir madde için <u>bir seçenek işaretleyiniz.</u>					
	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1. Doğaya ve çevreye bağlılığım ruhumun bir parçasıdır	O	O	O	O	O
2. Doğa ile ilişkim benliğimin önemli bir parçasıdır	O	O	O	O	O
3. Dünyaya ve canlıların tümüne oldukça bağlıyım	O	O	O	O	O
4. Kendimi doğanın bir parçası olarak görüyorum	O	O	O	O	O
5. Davranışlarımın çevreyi nasıl etkilediğini düşünürüm	O	O	O	O	O
6. Çevre sorunlarının farkındayım	O	O	O	O	O
7. Hayvanların çektiği acıları umursarım	O	O	O	O	O
8. Şehrin ortasında bile etrafımdaki doğayı fark ederim	O	O	O	O	O

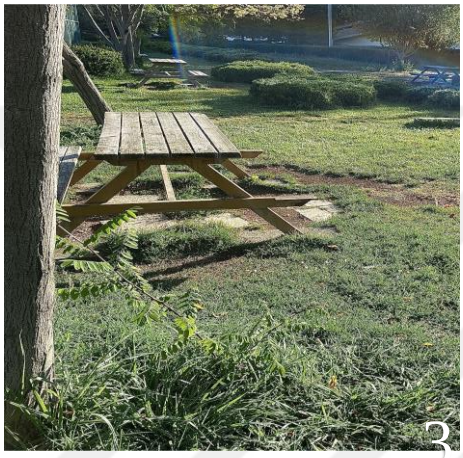
9. Doğa ile ilgili hislerim yaşam tarzımı etkilemez	O	O	O	O	O
10. İnsanların doğal kaynakları istedikleri gibi kullanma hakları vardır	O	O	O	O	O
11. Doğayım koruma çalışmaları gereksizdir, çünkü doğa insanların yol açtığı sorunlara karşı kendini yenileyecek kadar güçlüdür	O	O	O	O	O
12. Hayvanlar ve bitkiler insanlardan daha az haklara sahip olmalıdır	O	O	O	O	O
13. Bazı türlerin nesli devam etmese de olur	O	O	O	O	O
14. Çevre konusunda ne yaparsam yapayım dünyanın öteki yerlerindeki problemlere çözüm olmayacaktır	O	O	O	O	O
15. İnsan dışındaki canlıların durumu, insanoğlunun geleceğinin bir göstergesidir	O	O	O	O	O
16. Medeniyetten uzak, ormanın derinliklerinde olma düşüncesi beni korkutur	O	O	O	O	O
17. İdeal tatil yerim uzak, el değmemiş bir doğa alanıdır	O	O	O	O	O

18. Kötü havada bile dışarıda olmayı severim	O	O	O	O	O
19. Doğal alanlara sık gitmem	O	O	O	O	O
20. Toprakla uğraşmaktan ve ellerimi kirletmekten hoşlanırım	O	O	O	O	O
21. Nerede olursam olayım yabani hayat ilgimi çeker	O	O	O	O	O

Araştırmaya ayırdığınız zaman, emek ve katkınız için çok teşekkür ederiz!!!


1


2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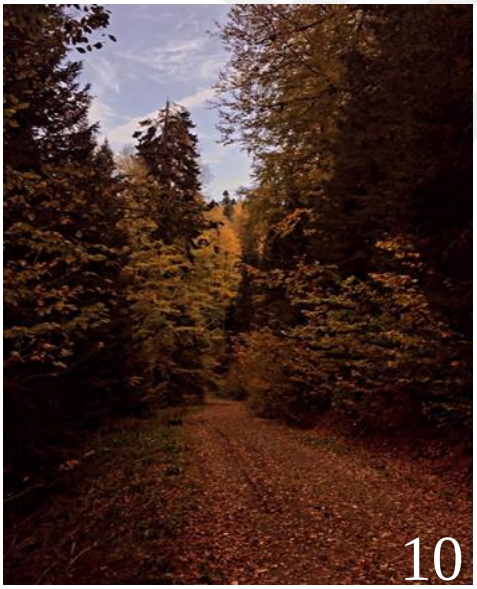
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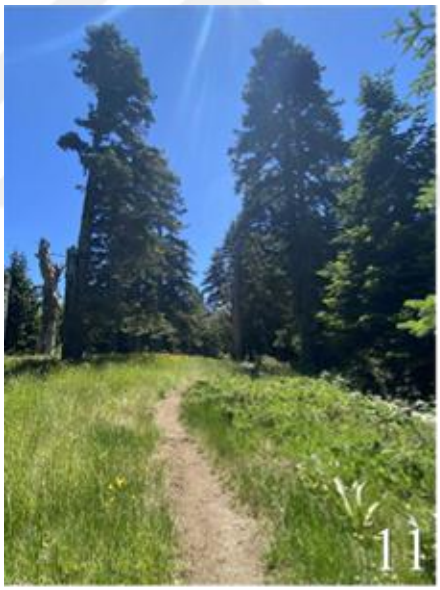
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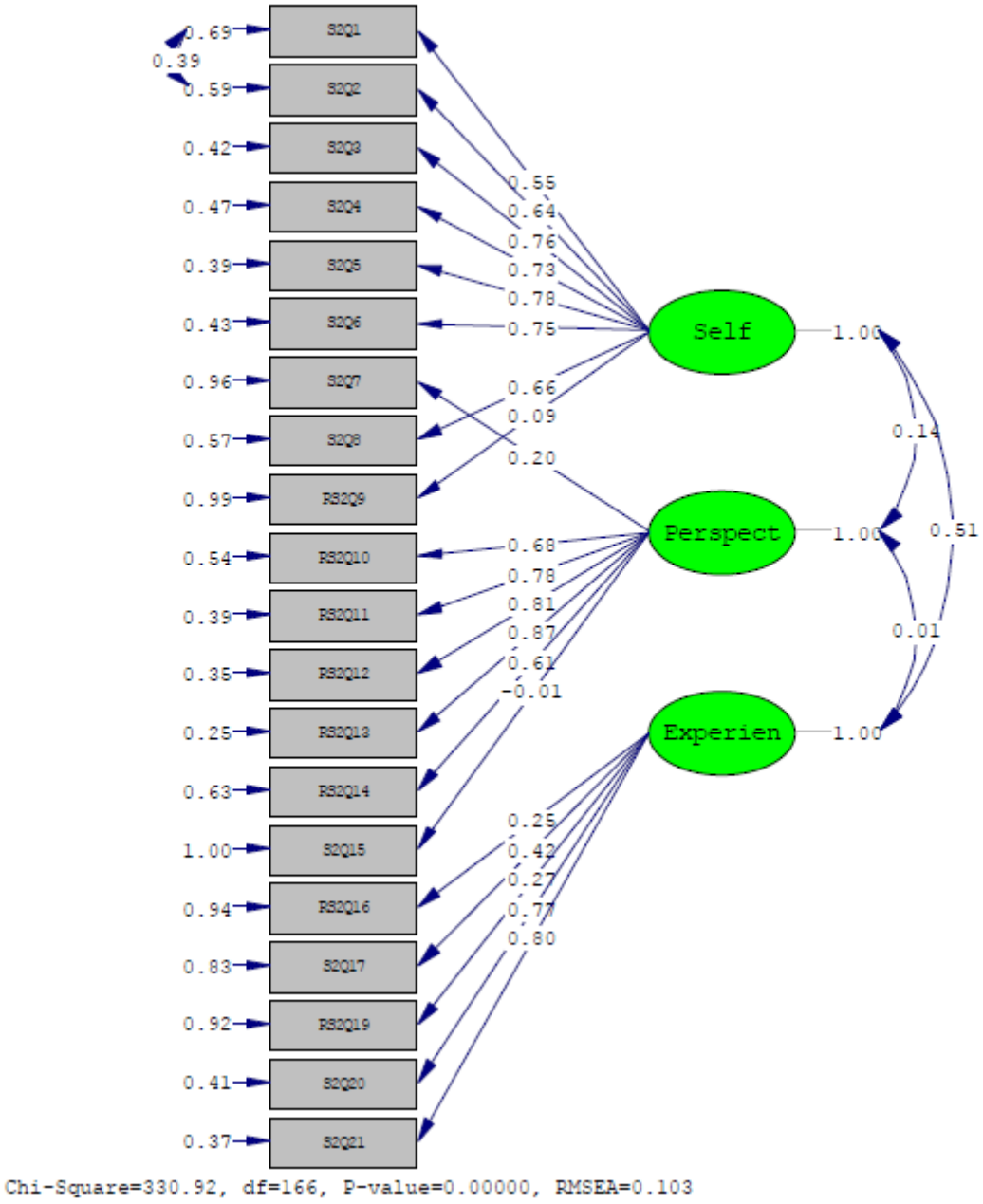
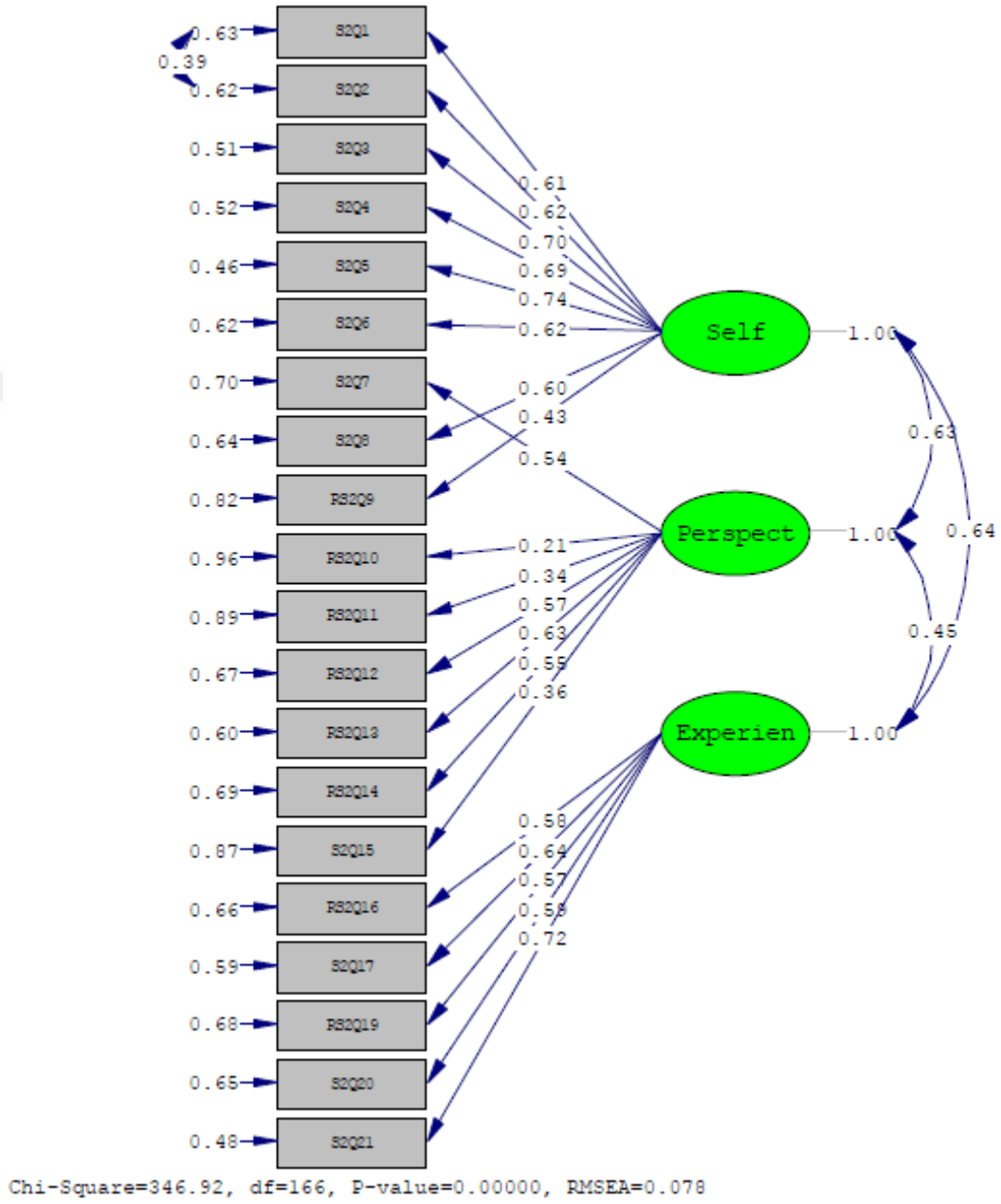
16

B. Initial CFA Model for Nature Relatedness Scale for Inservice Teachers

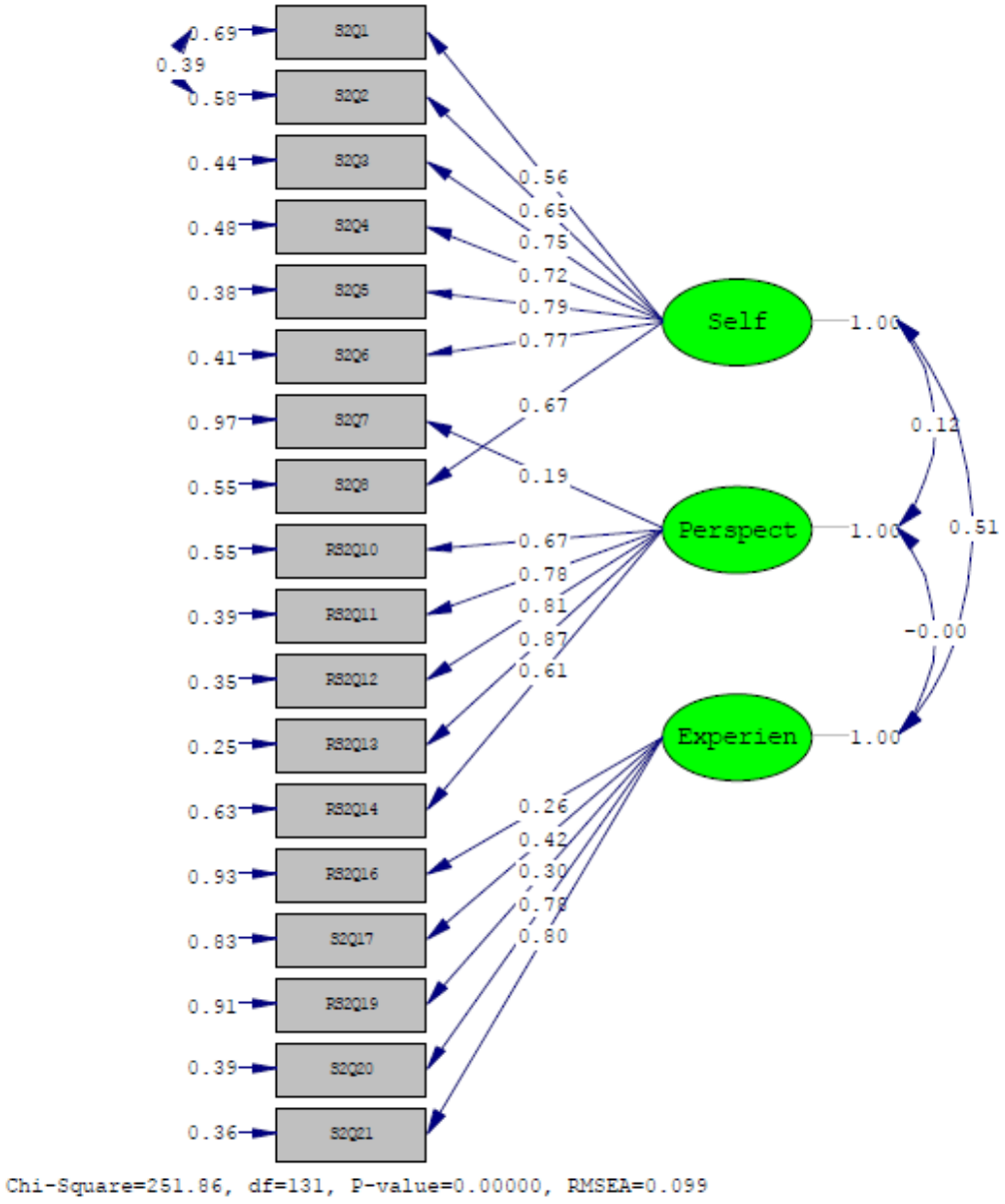


Chi-Square=330.92, df=166, P-value=0.00000, RMSEA=0.103

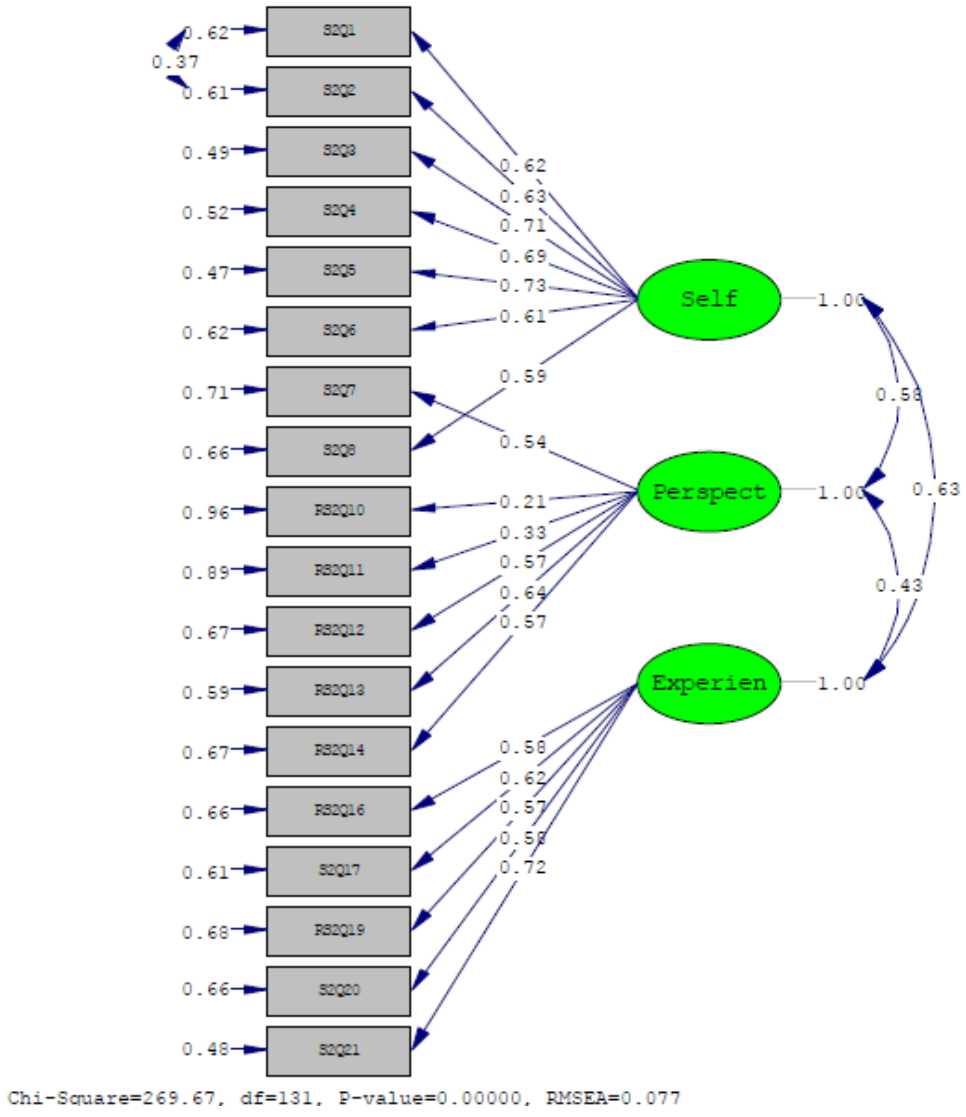
C. Initial CFA Model for Nature Relatedness Scale for Preservice Teachers



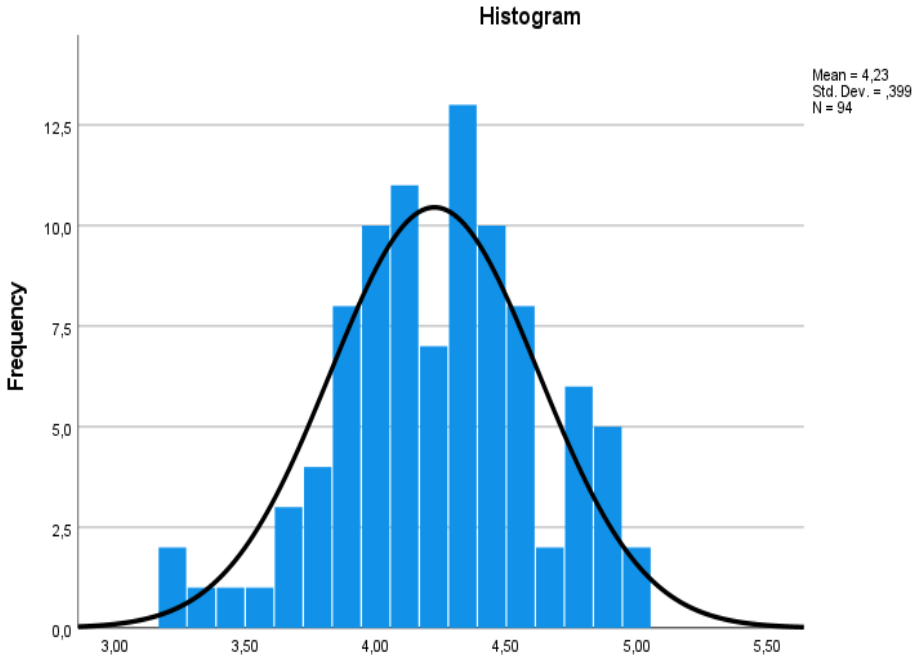
D. Revised CFA Model for Nature Relatedness Scale for Inservice Science Teachers

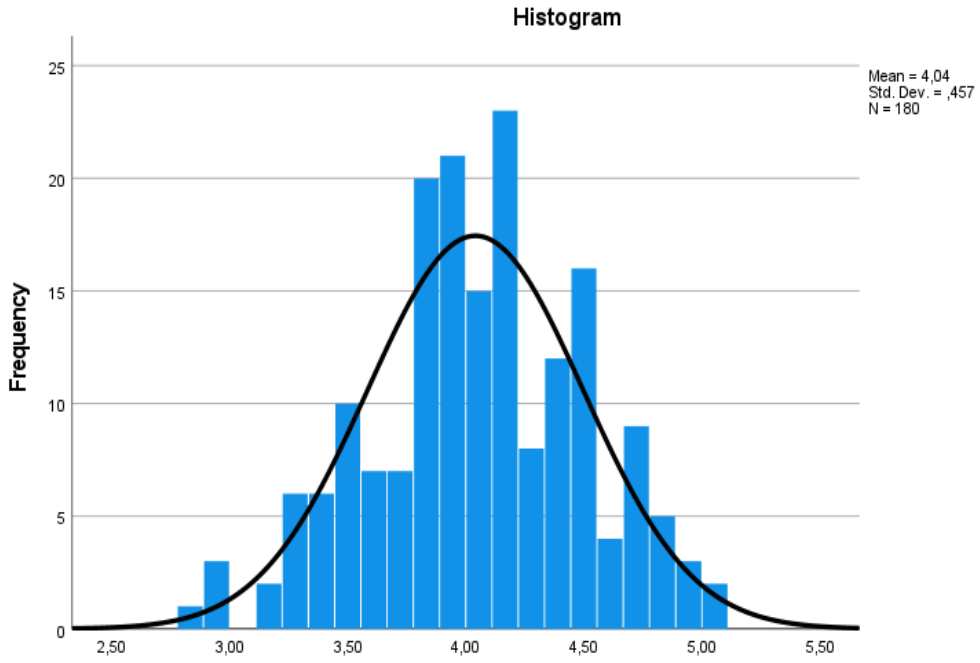


E. Revised CFA Model for Nature Relatedness Scale for Preservice Science Teachers

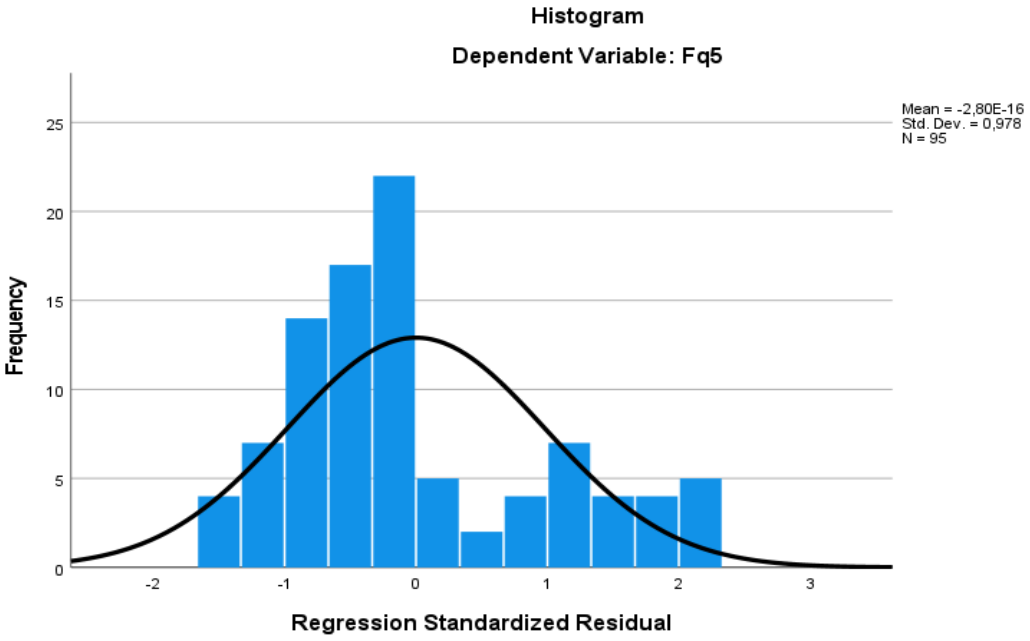


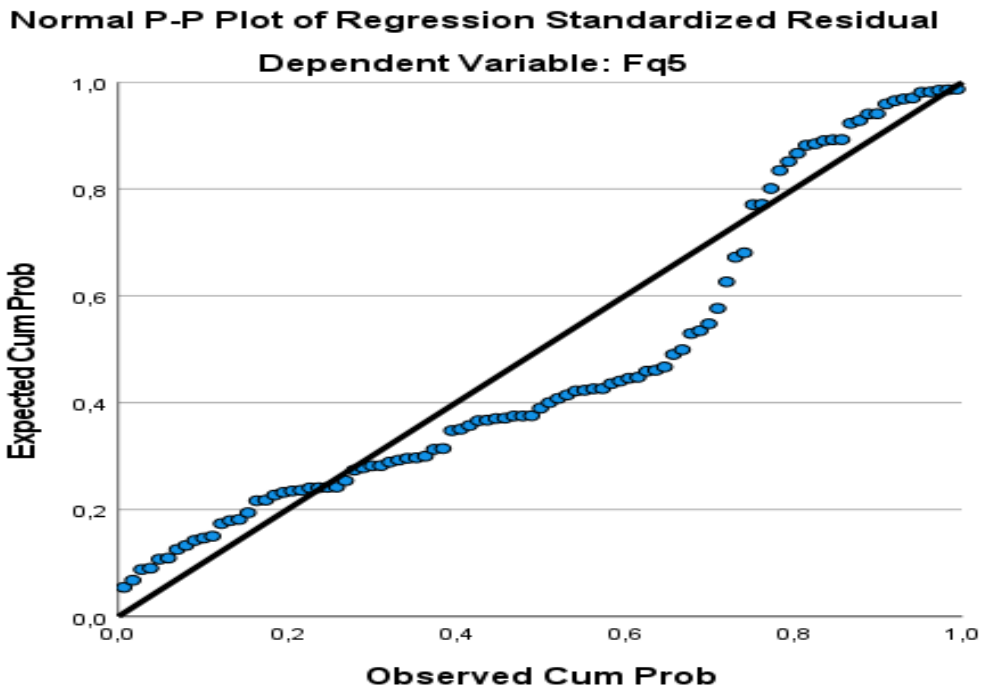
F. Statistical Results of Preservice Science Teachers and Inservice Science Teachers Nature Relatedness Scores

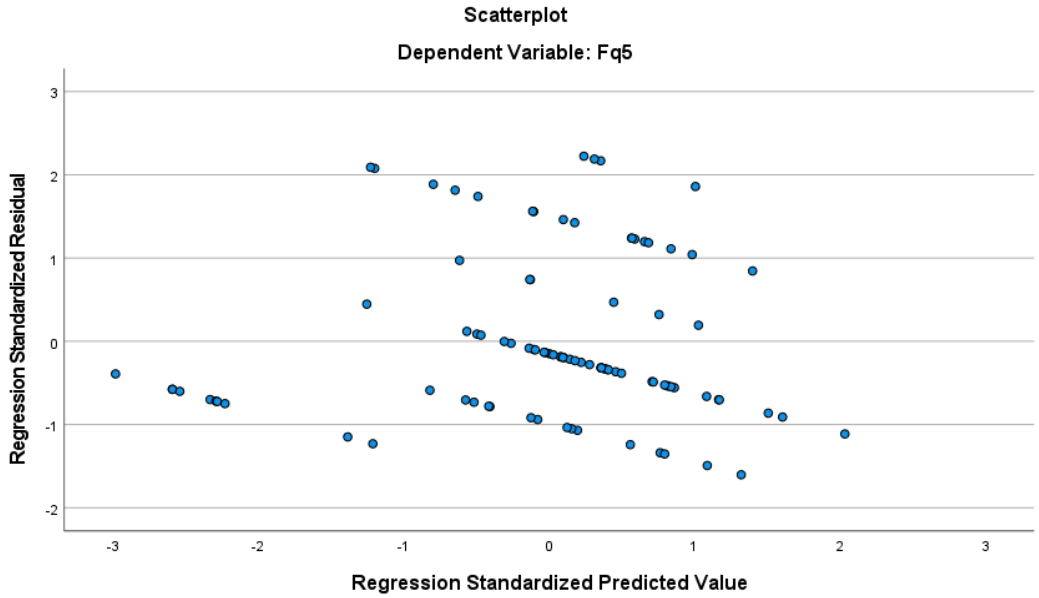


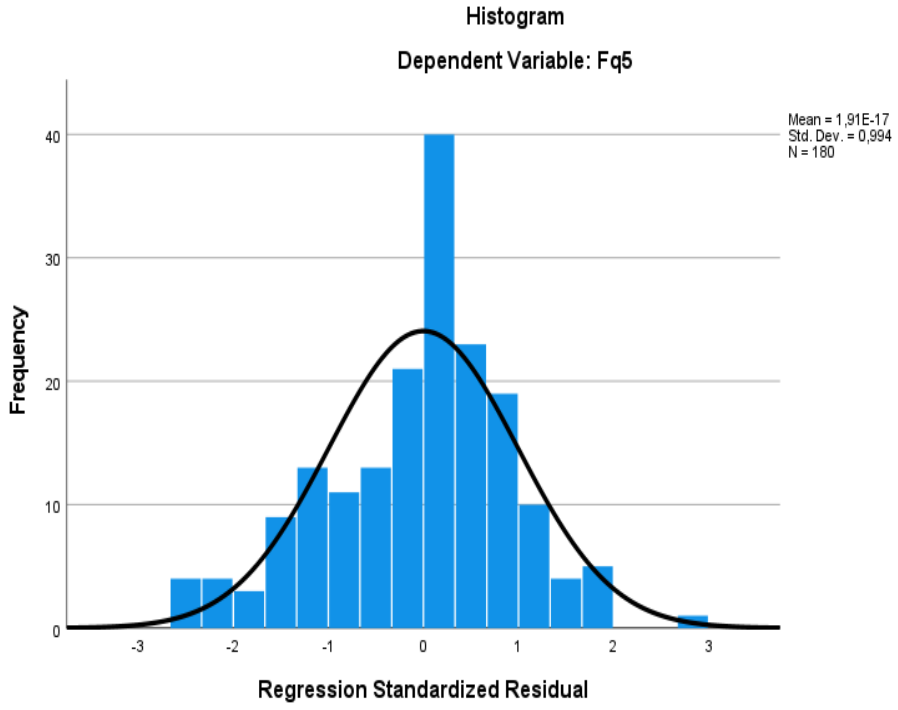


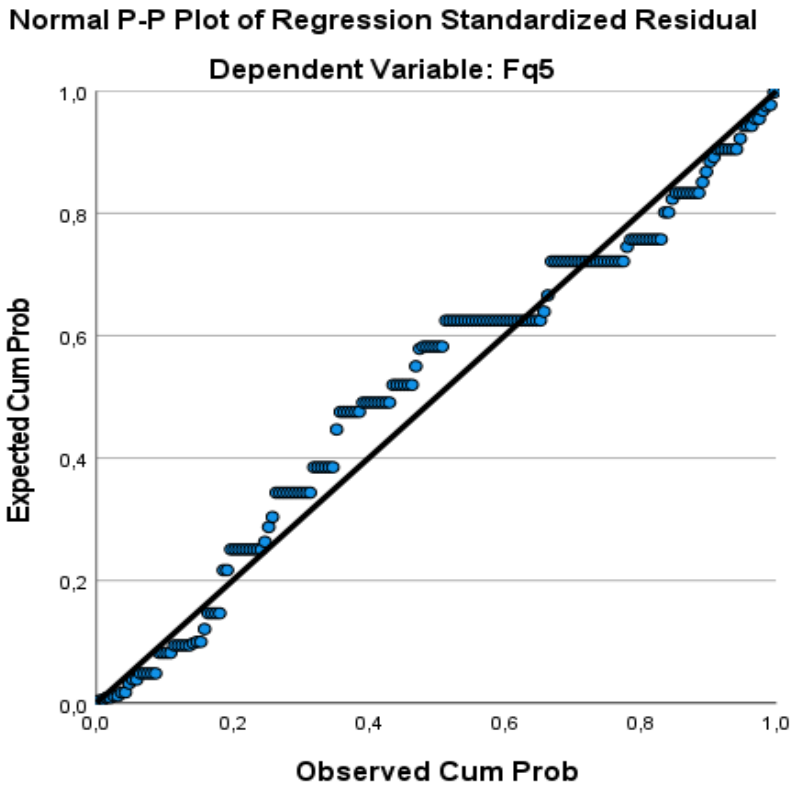
G. Statistical Results of Intentions Regarding and Predictors of the Use of Natural Settings

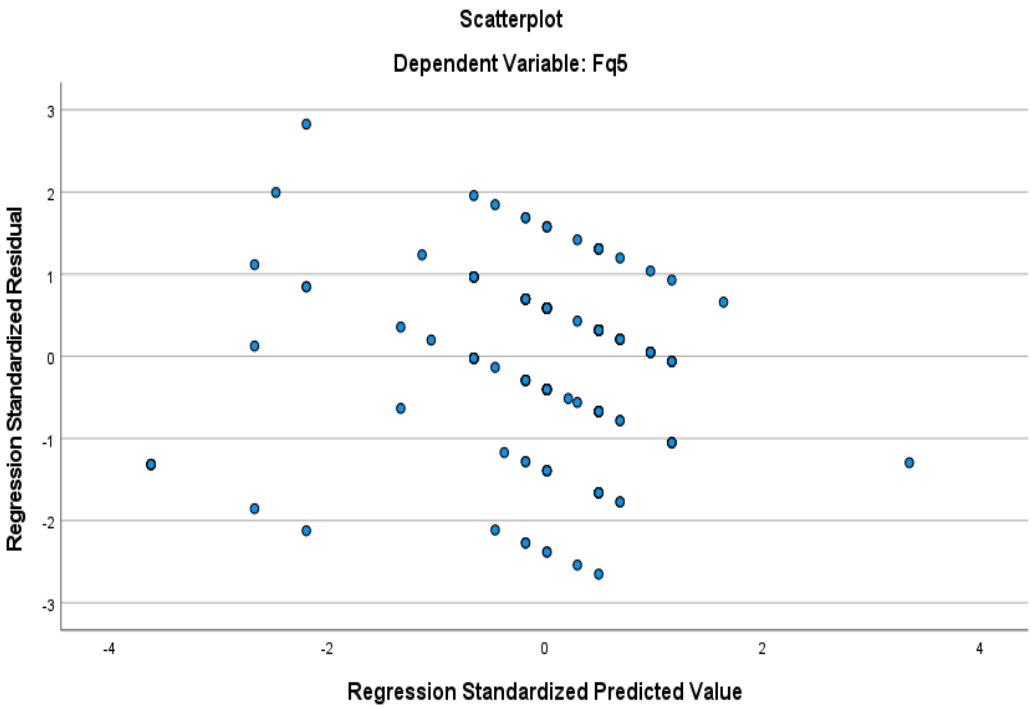





Scatterplot
Dependent Variable: Fq5
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
-3


Histogram
Dependent Variable: Fq5
Mean = 1,91E-17
Std. Dev. = 0,994
N = 180
Frequency
Regression Standardized Residual
40
30
20
10
0
-3
-2
-1
0
1
2
3


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Fq5
Expected Cum Prob
Observed Cum Prob
0,0
0,2
0,4
0,6
0,8
1,0


Scatterplot
Dependent Variable: Fq5
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
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-2
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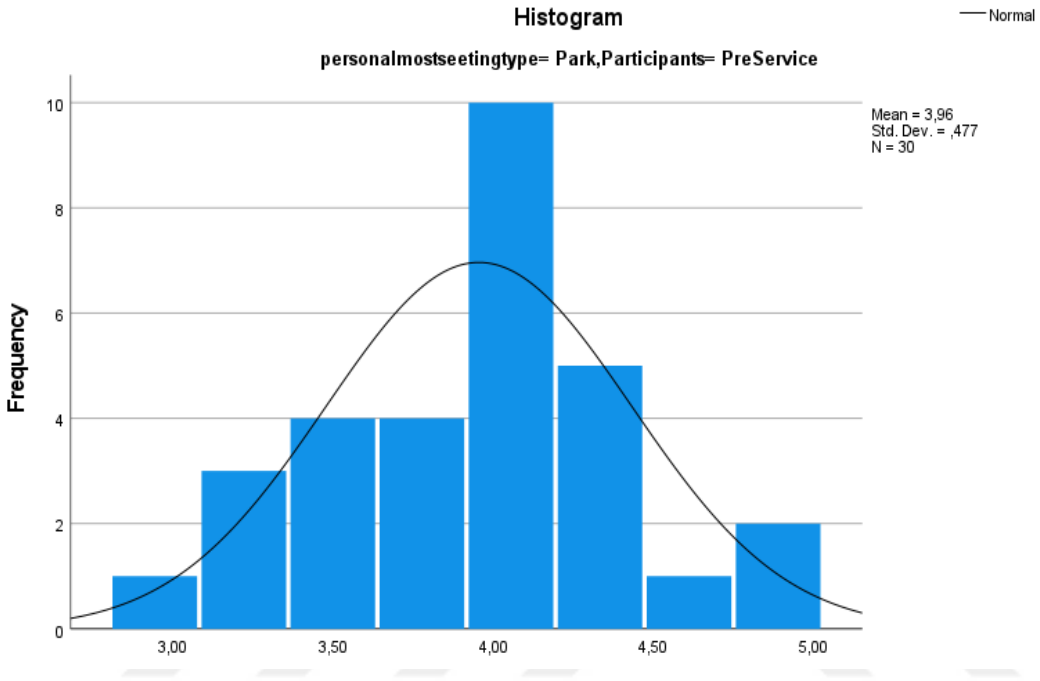
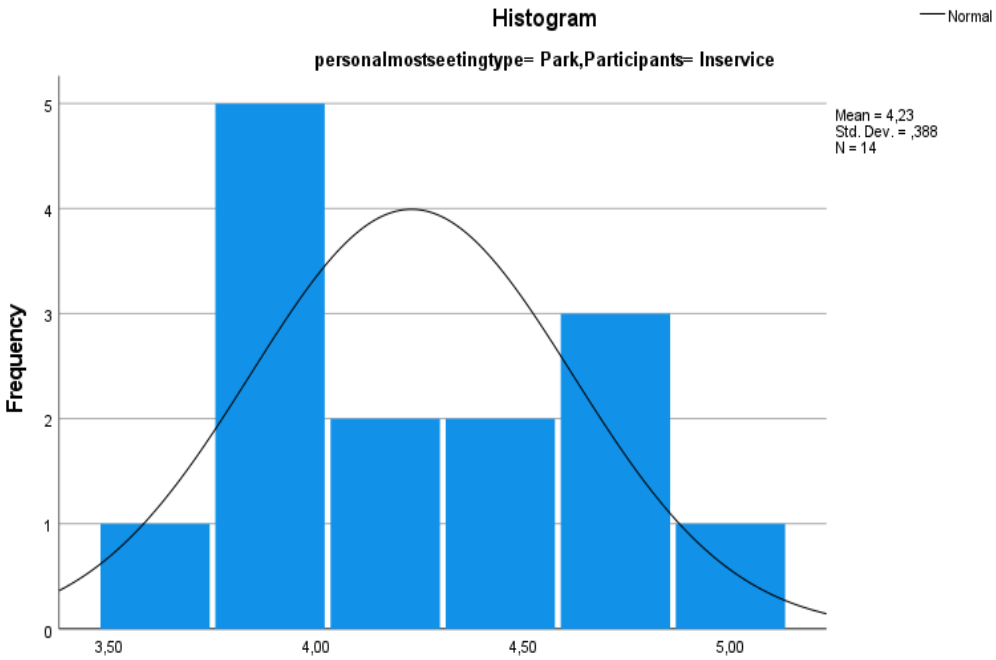
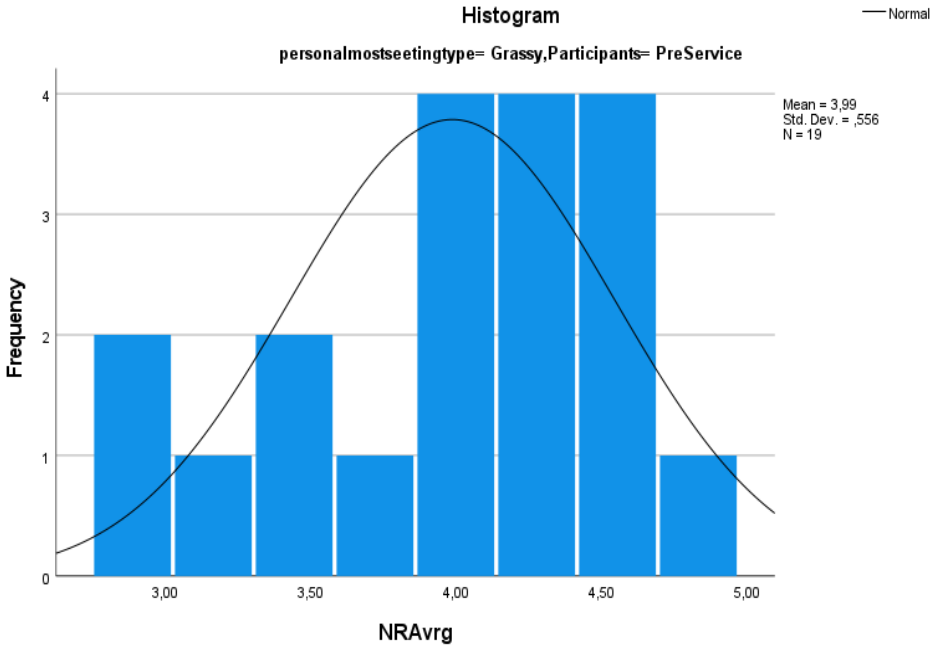
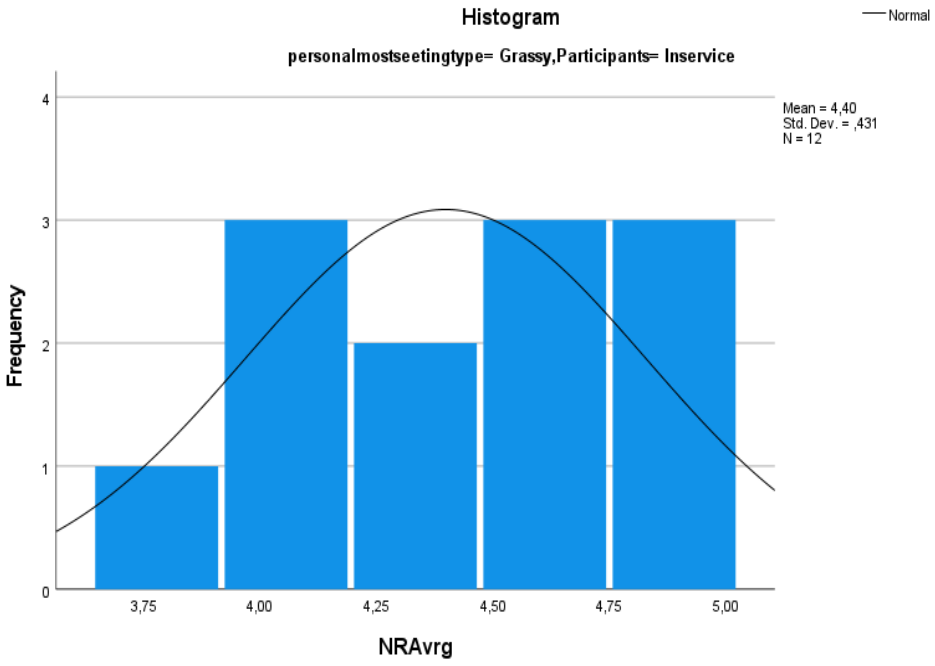
2
4

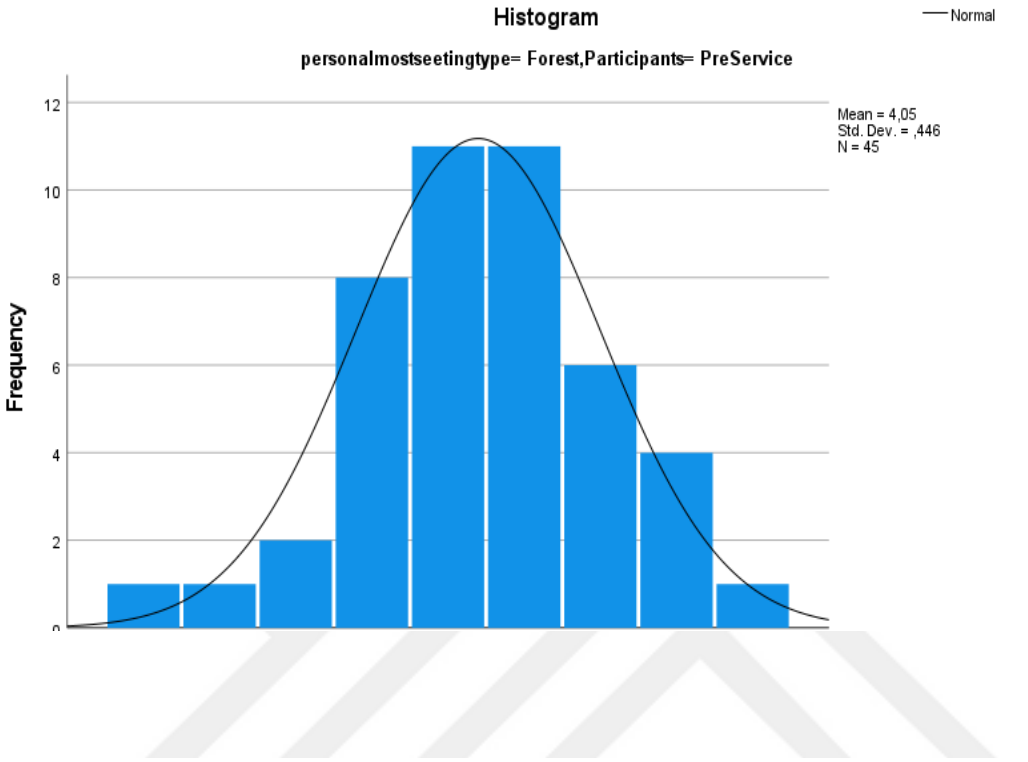
H. Statistical Results of Nature Relatedness Score of Preservice Science Teachers and Inservice Science Teachers in terms of Personally Preferred Outdoor Settings Types

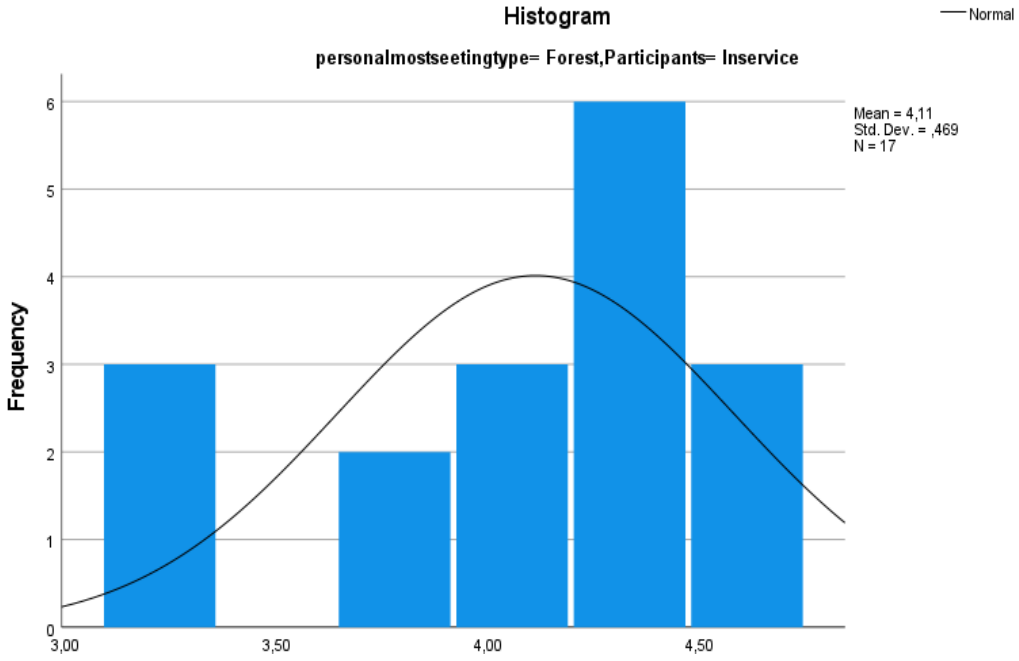


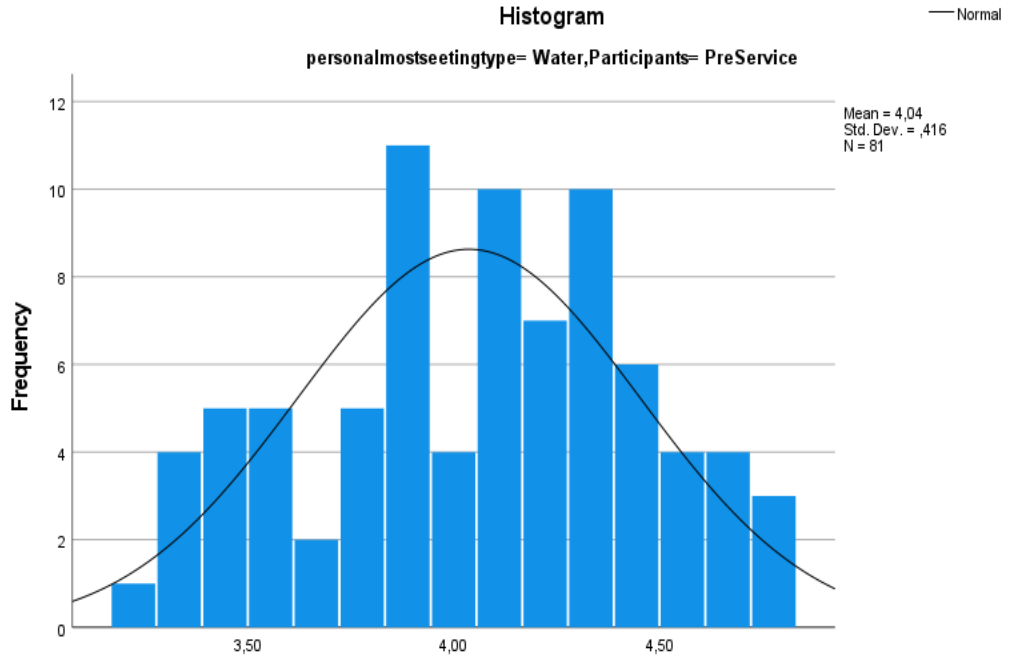


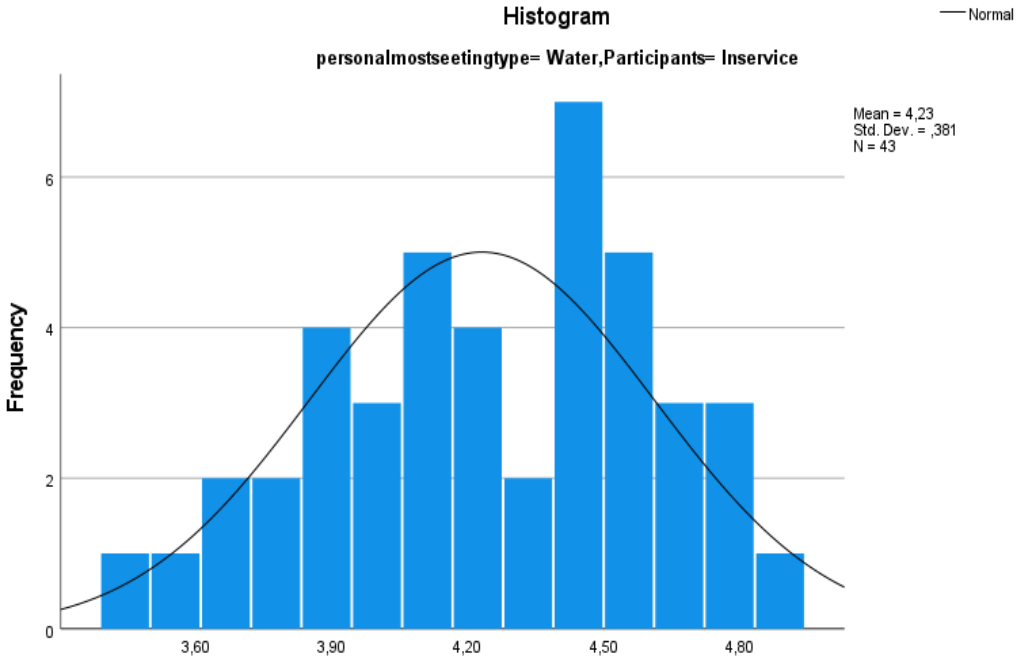

Histogram
Normal
personalmostseetingtype= Grassy,Participants= PreService
Mean = 3,99
Std. Dev. = ,556
N = 19
Frequency
NRAvrg
0
1
2
3
4
3,00
3,50
4,00
4,50
5,00


Histogram
Normal
personalmostseetingtype= Grassy,Participants= Inservice
Mean = 4,40
Std. Dev. = ,431
N = 12
Frequency
NRAvrg
0
1
2
3
4
3,75
4,00
4,25
4,50
4,75
5,00

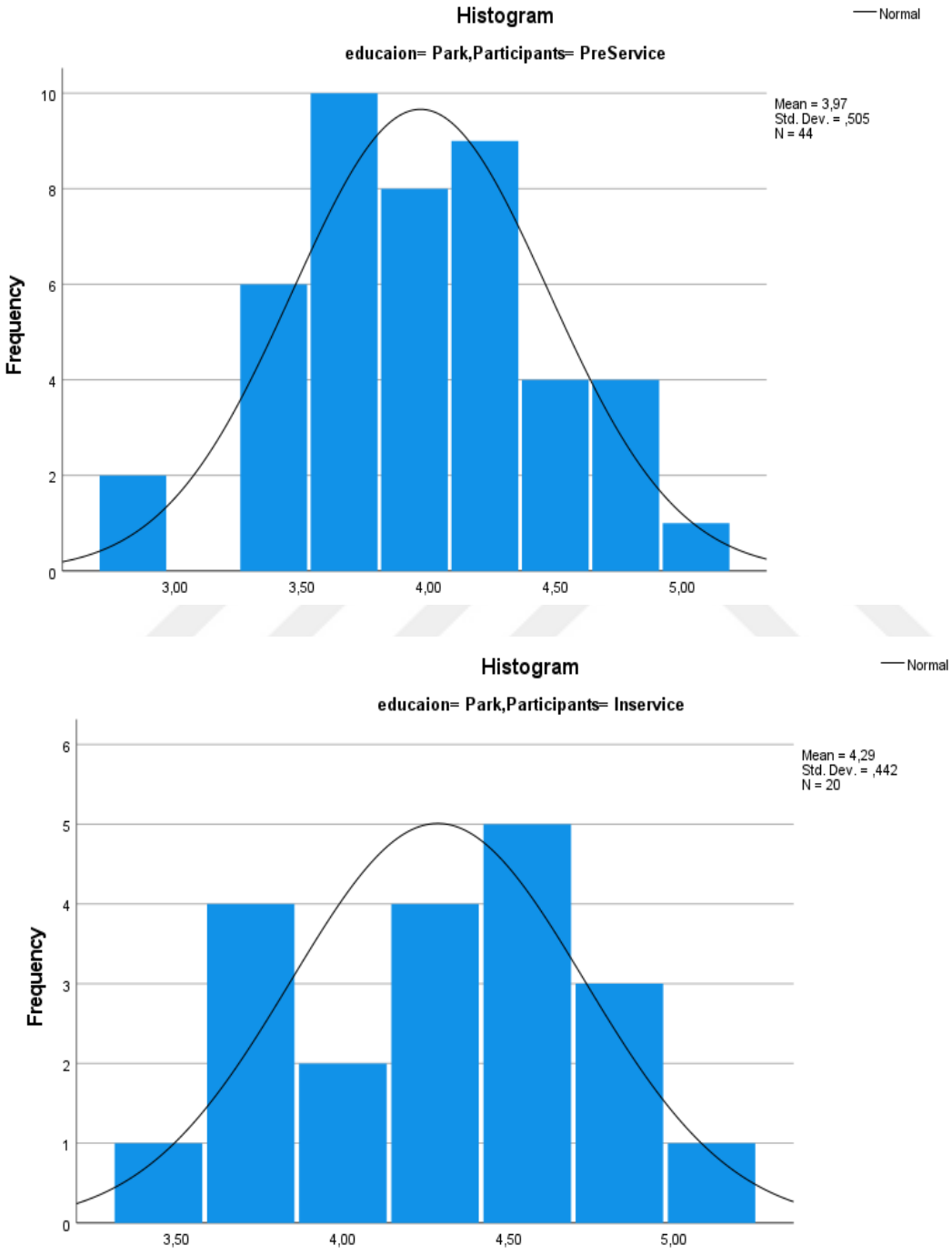

Histogram
Normal
personalmostseetingtype= Forest,Participants= PreService
Mean = 4,05
Std. Dev. = ,446
N = 45
Frequency
12
10
8
6
4
2
0

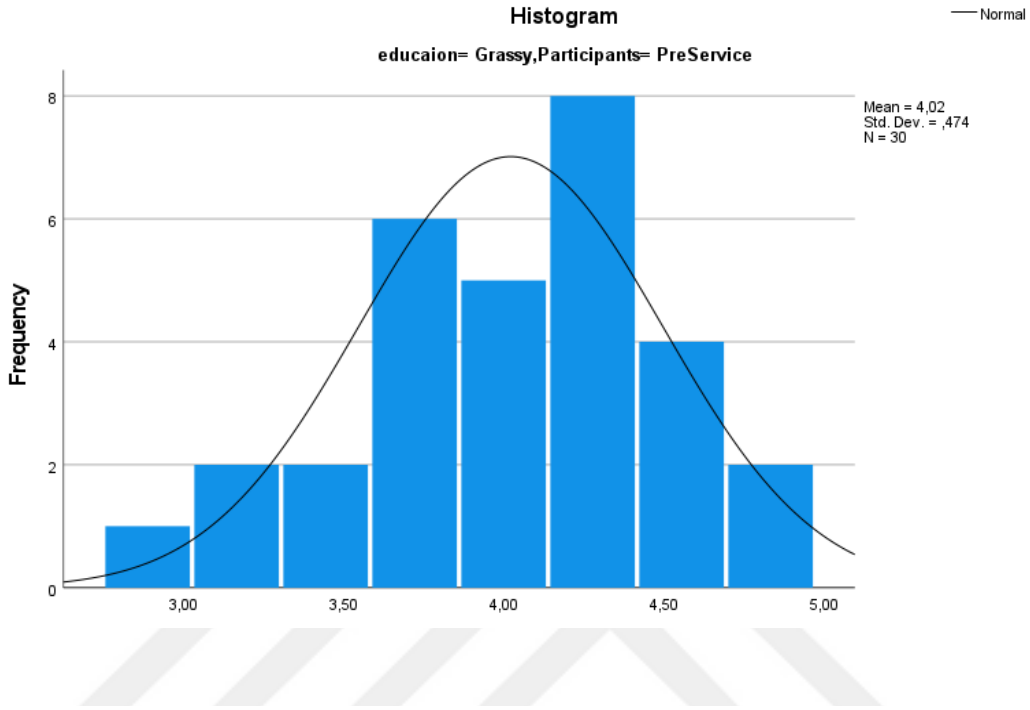

Histogram
Normal
personalmostseetingtype= Forest,Participants= Inservice
Mean = 4,11
Std. Dev. = ,469
N = 17
Frequency
6
5
4
3
2
1
0
3,00
3,50
4,00
4,50

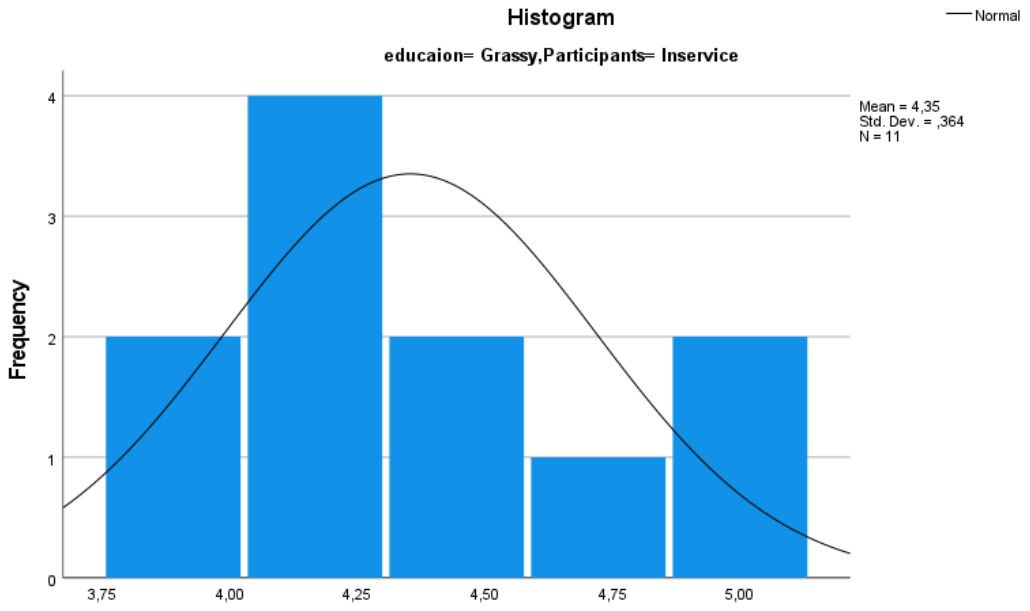

Histogram
Normal
personalmostseetingtype= Water,Participants= PreService
Mean = 4,04
Std. Dev. = ,416
N = 81
Frequency
12
10
8
6
4
2
0
3,50
4,00
4,50

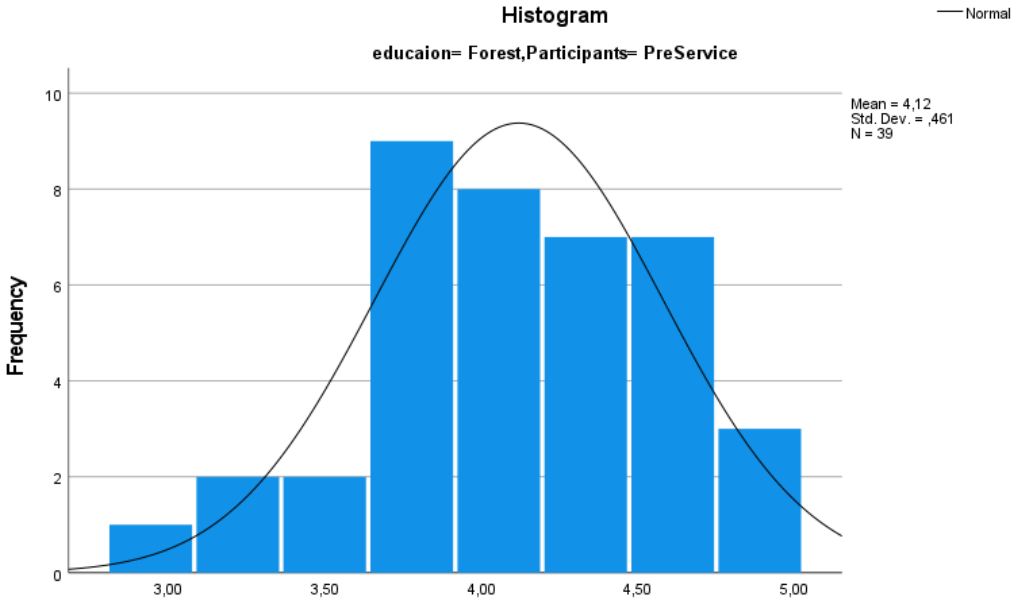

Histogram
Normal
personalmostseetingtype= Water,Participants= Inservice
Mean = 4,23
Std. Dev. = ,381
N = 43
Frequency
6
4
2
0
3,60
3,90
4,20
4,50
4,80

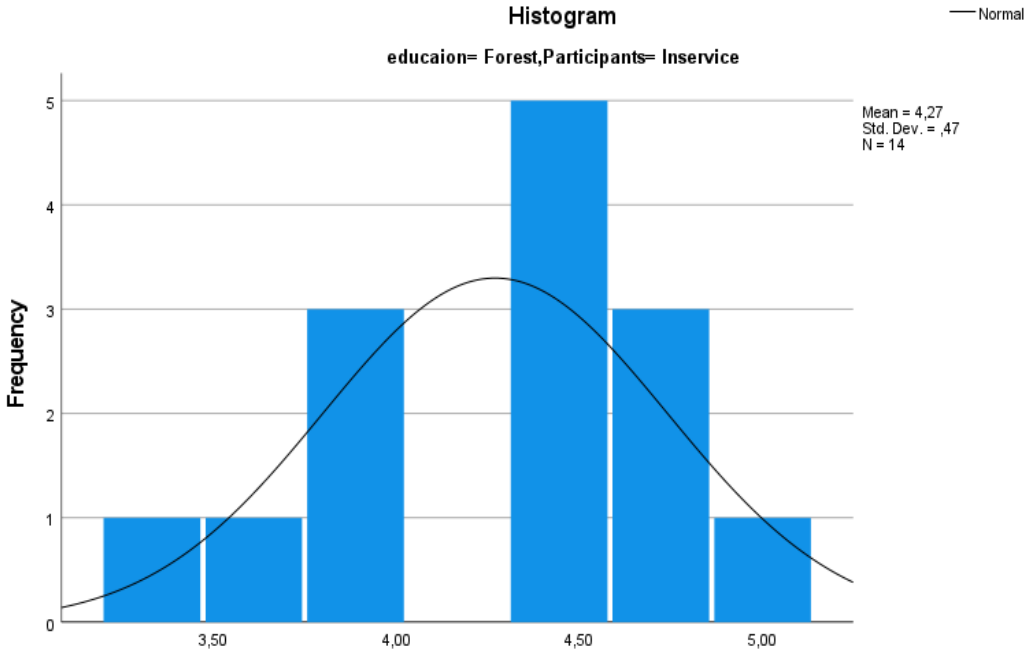
I. Statistical Results of Nature Relatedness Score of Preservice Science Teachers and Inservice Science Teachers in terms of Educationally Preferred Outdoor Settings Types

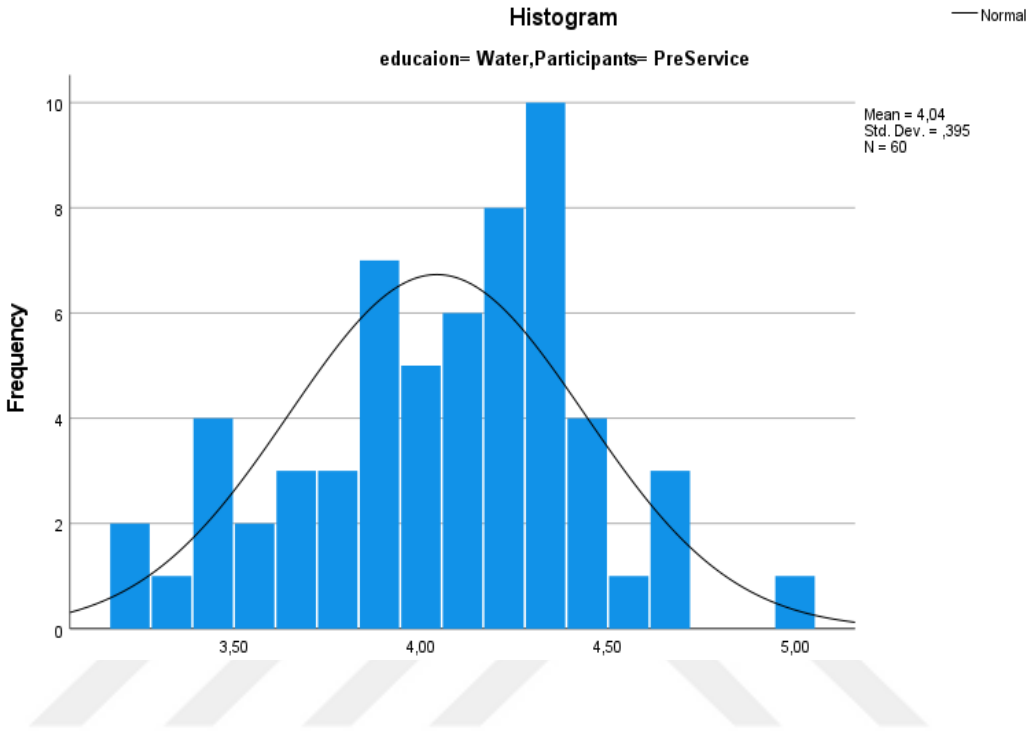


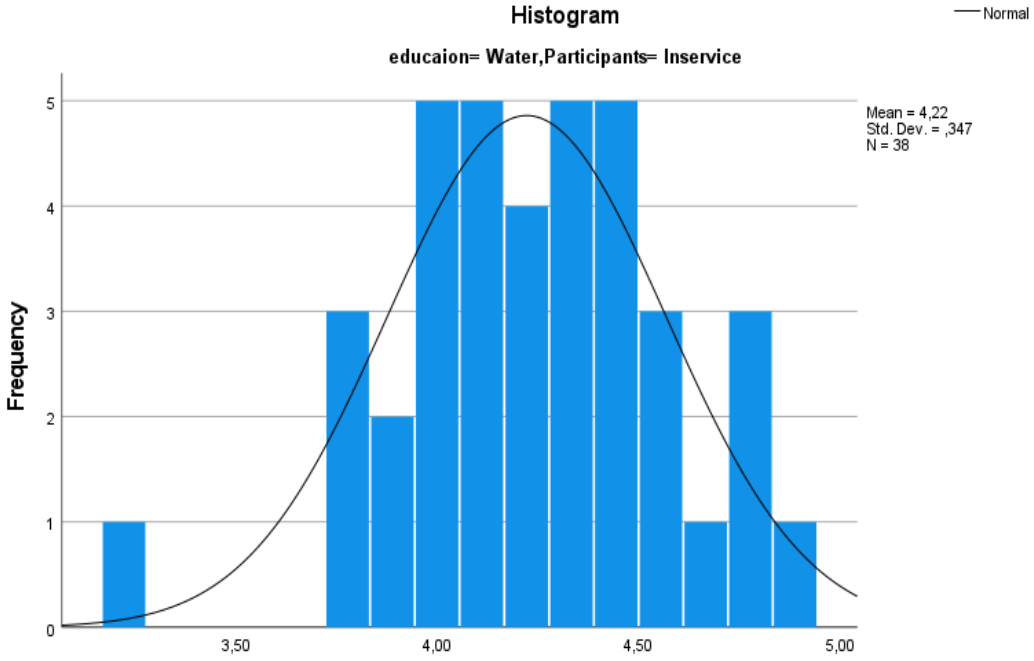

Histogram
Normal
educaion= Grassy,Participants= PreService
Mean = 4,02
Std. Dev. = ,474
N = 30
Frequency
0
2
4
6
8
3,00
3,50
4,00
4,50
5,00


Histogram
Normal
educaion= Grassy,Participants= Inservice
Mean = 4,35
Std. Dev. = ,364
N = 11
Frequency
0
1
2
3
4
3,75
4,00
4,25
4,50
4,75
5,00

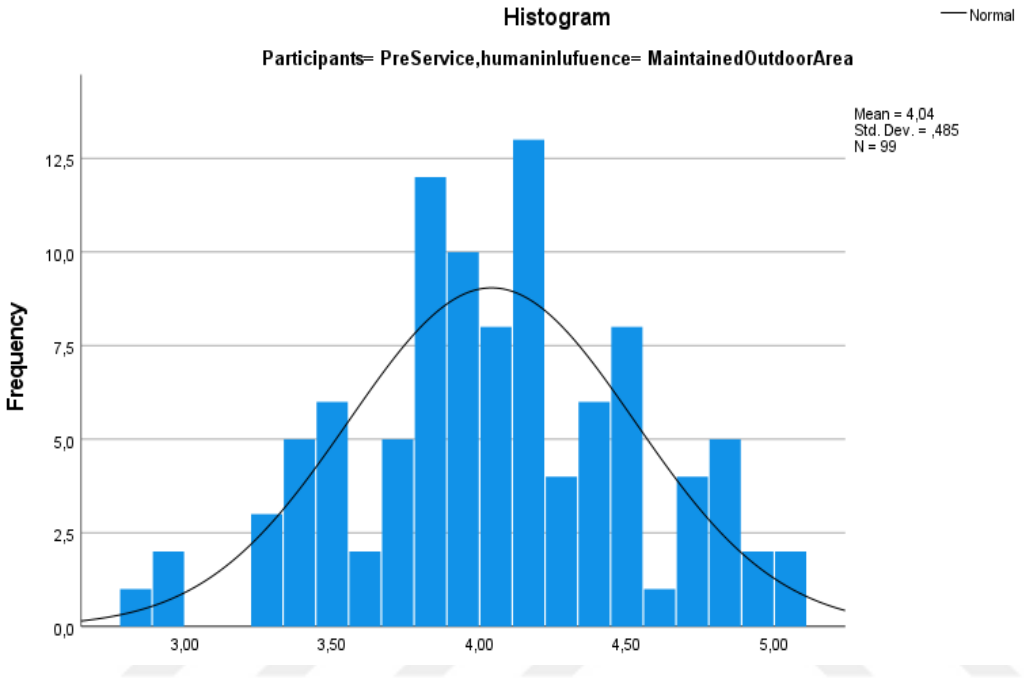

Histogram
Normal
educaion= Forest,Participants= PreService
Mean = 4,12
Std. Dev. = ,461
N = 39
Frequency
10
8
6
4
2
0
3,00
3,50
4,00
4,50
5,00

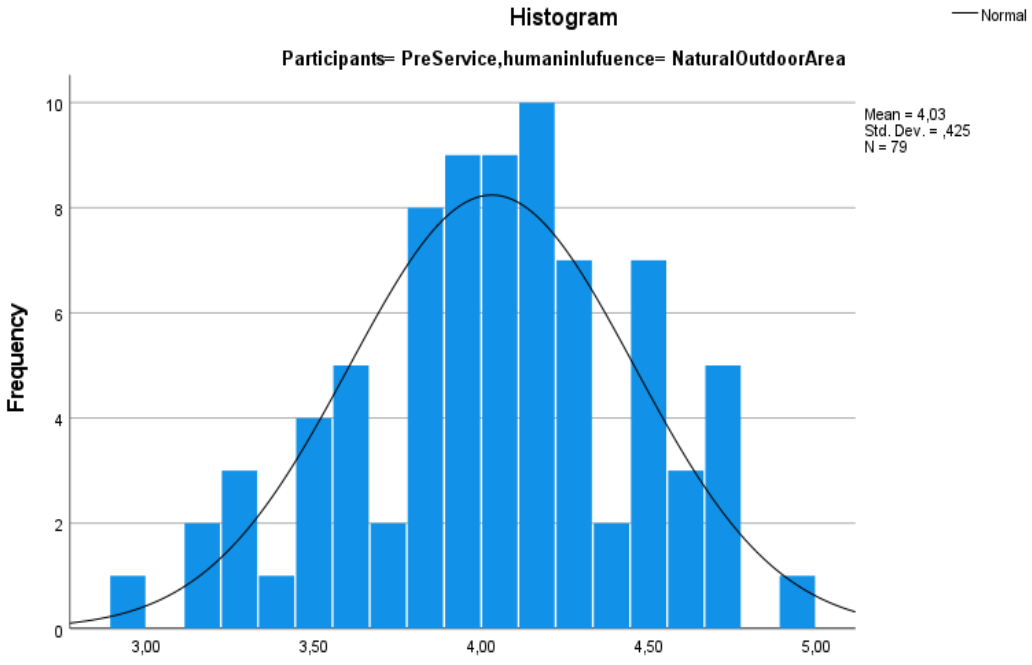

Histogram
Normal
educaion= Forest,Participants= Inservice
Mean = 4,27
Std. Dev. = ,47
N = 14
Frequency
5
4
3
2
1
0
3,50
4,00
4,50
5,00

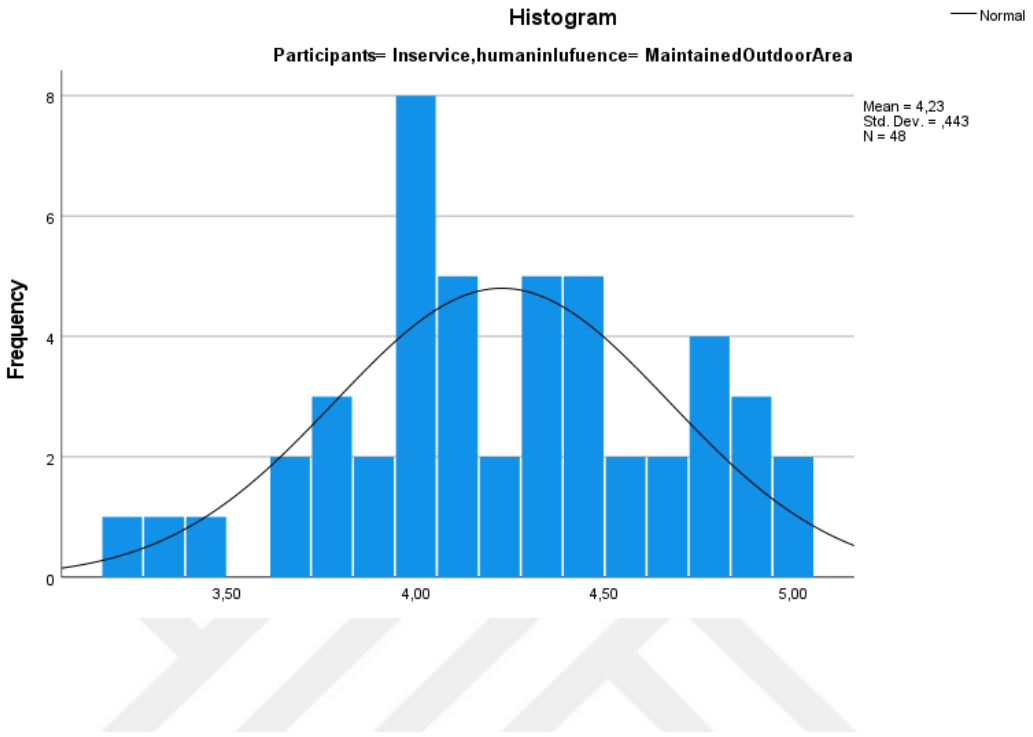

Histogram
Normal
educaion= Water,Participants= PreService
Mean = 4,04
Std. Dev. = ,395
N = 60
Frequency
10
8
6
4
2
0
3,50
4,00
4,50
5,00

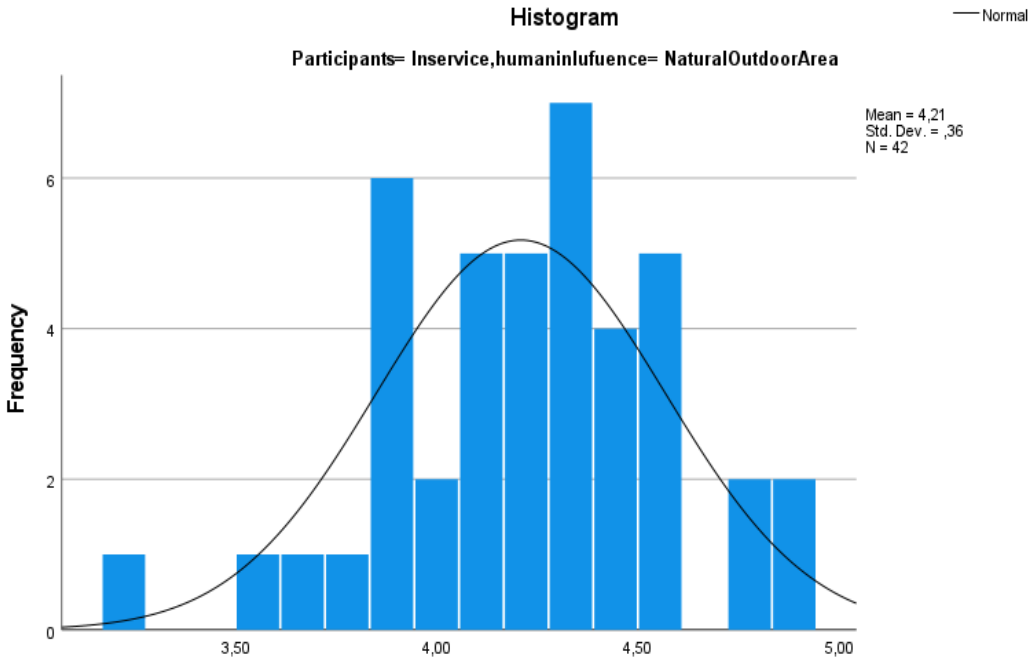

Histogram
Normal
educaion= Water,Participants= Inservice
Mean = 4,22
Std. Dev. = ,347
N = 38
Frequency
5
4
3
2
1
0
3,50
4,00
4,50
5,00

J. Statistical Results of Nature Relatedness Score of Preservice Science Teachers and Inservice Science Teachers in Terms of Personally Preferred Human Influence Attribute

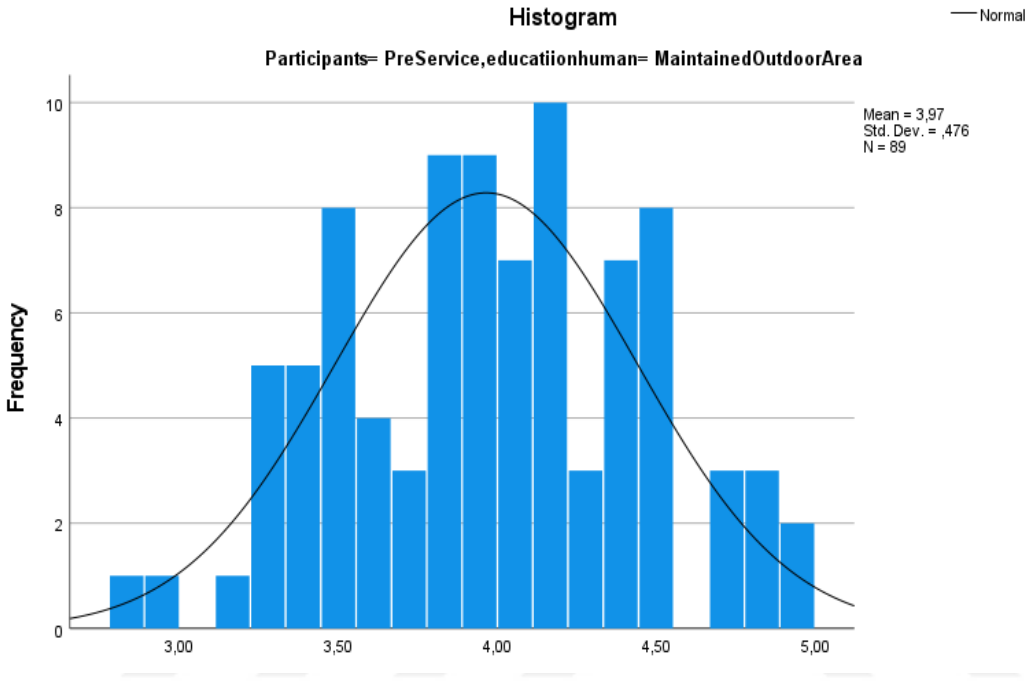


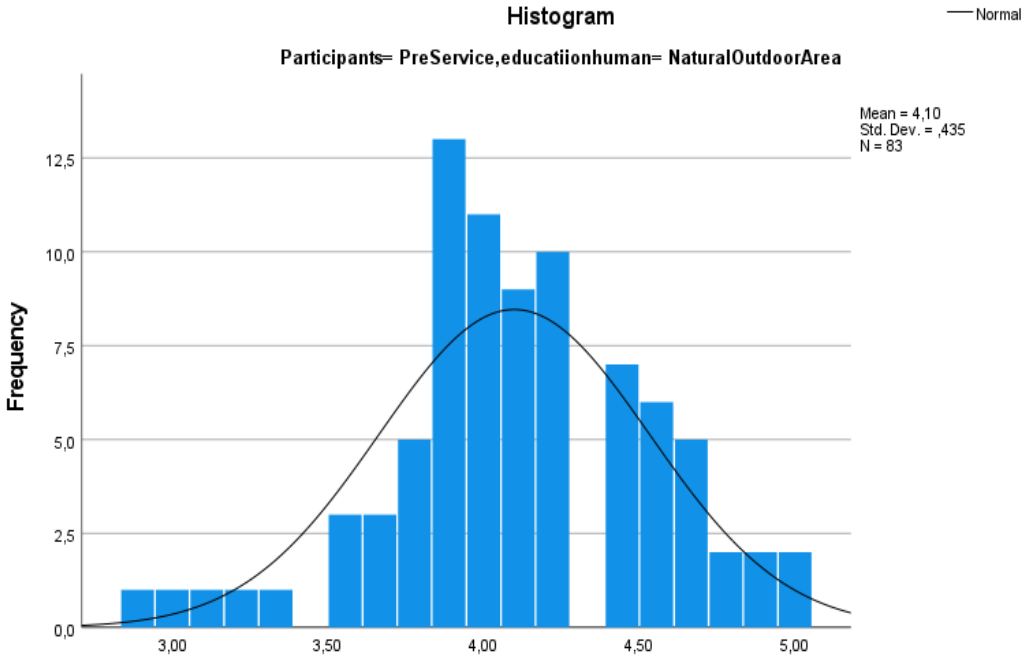


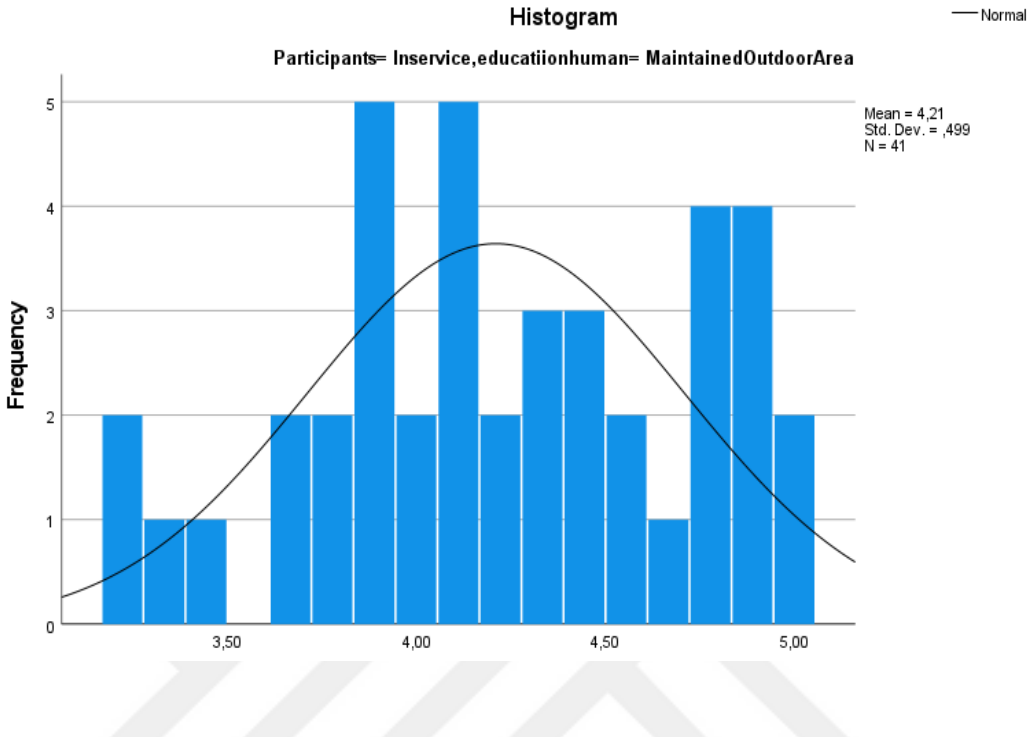

Histogram
Normal
Participants= Inservice,humaninlufuence= MaintainedOutdoorArea
Mean = 4,23
Std. Dev. = ,443
N = 48
Frequency
8
6
4
2
0
3,50
4,00
4,50
5,00

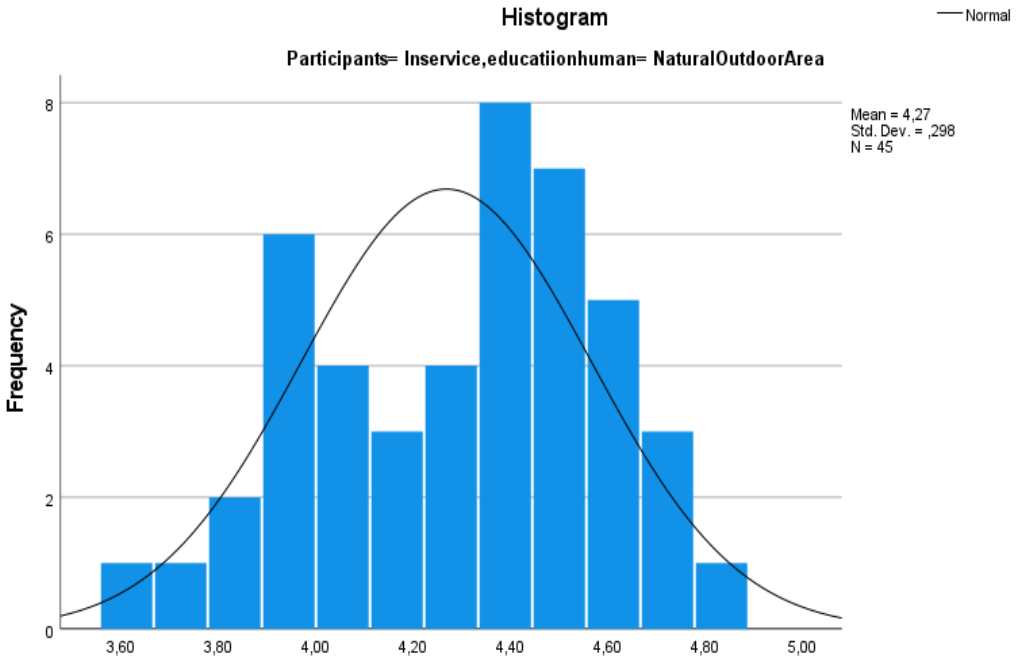

Histogram
Normal
Participants= Inservice,humaninlufuence= NaturalOutdoorArea
Mean = 4,21
Std. Dev. = ,36
N = 42
Frequency
6
4
2
0
3,50
4,00
4,50
5,00

K. Statistical Results of Nature Relatedness Score of Preservice Science Teachers and Inservice Science Teachers in Terms of Educationally Preferred Human Influence Attribute

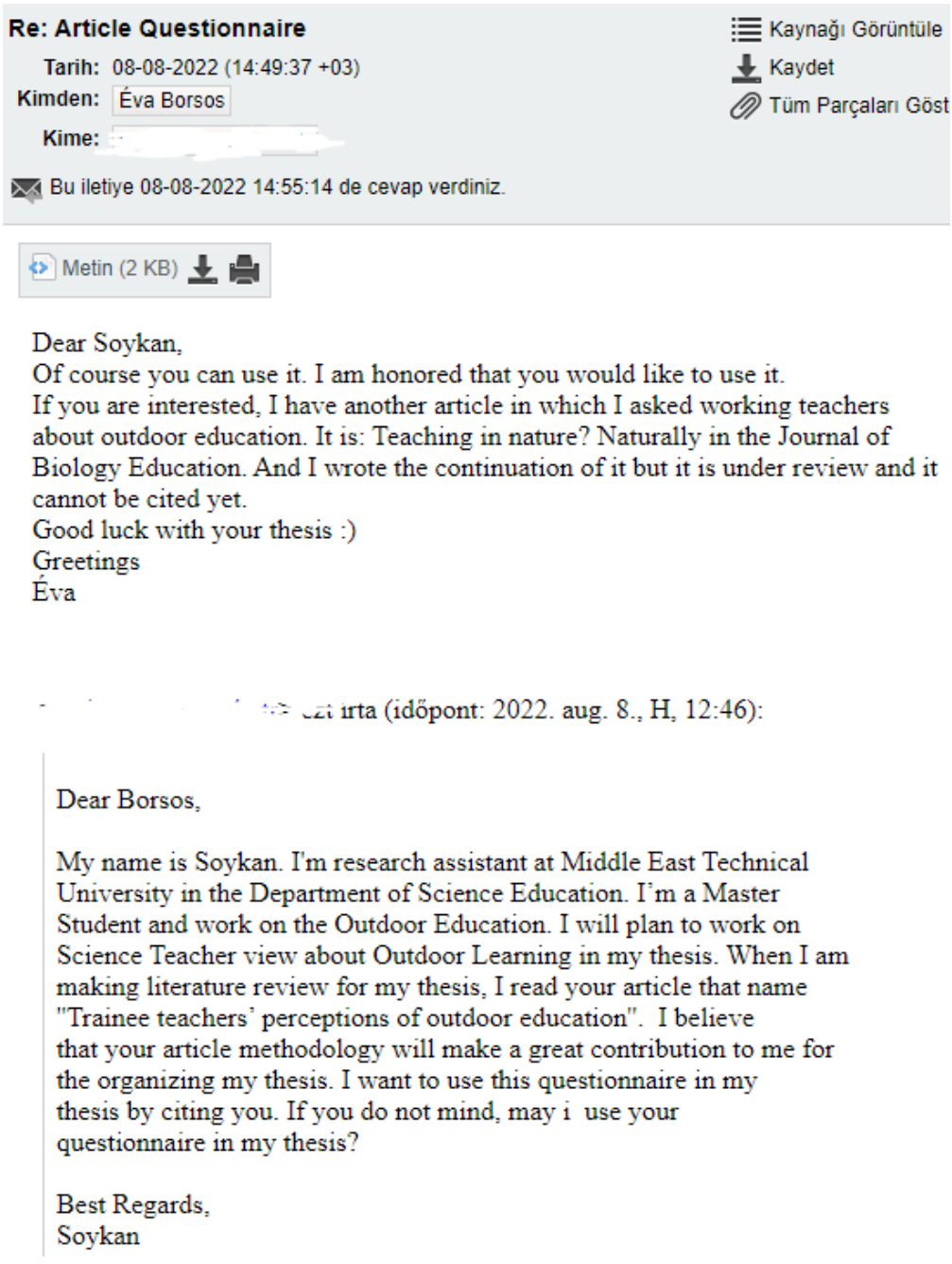





Histogram
Normal
Participants= Inservice,educatiionhuman= MaintainedOutdoorArea
Mean = 4,21
Std. Dev. = ,499
N = 41
Frequency
0
1
2
3
4
5
3,50
4,00
4,50
5,00


Histogram
Normal
Participants= Inservice,educatiionhuman= NaturalOutdoorArea
Mean = 4,27
Std. Dev. = ,298
N = 45
Frequency
0
2
4
6
8
3,60
3,80
4,00
4,20
4,40
4,60
4,80
5,00

L. Permissions for the Instrument



Re: Article Questionnaire

Kaynağı Görüntüle
Kaydet
Tüm Parçaları Göst

Tarih: 08-08-2022 (14:49:37 +03)
Kimden: Éva Borsos
Kime:

Bu iletiye 08-08-2022 14:55:14 de cevap verdiniz.

Metin (2 KB)

Dear Soykan,
Of course you can use it. I am honored that you would like to use it.
If you are interested, I have another article in which I asked working teachers about outdoor education. It is: Teaching in nature? Naturally in the Journal of Biology Education. And I wrote the continuation of it but it is under review and it cannot be cited yet.
Good luck with your thesis :)
Greetings
Éva

[illegible] irta (időpont: 2022. aug. 8., H, 12:46):

> Dear Borsos,
>
> My name is Soykan. I'm research assistant at Middle East Technical University in the Department of Science Education. I'm a Master Student and work on the Outdoor Education. I will plan to work on Science Teacher view about Outdoor Learning in my thesis. When I am making literature review for my thesis, I read your article that name "Trainee teachers' perceptions of outdoor education". I believe that your article methodology will make a great contribution to me for the organizing my thesis. I want to use this questionnaire in my thesis by citing you. If you do not mind, may i use your questionnaire in my thesis?
>
> Best Regards,
> Soykan

Re: Article Questionnaire

Kaynağı Görünt
Kaydet
Tüm Parçaları

Tarih: 10-08-2022 (14:03:52 +03)
Kimden: Julie Ernst
Kime: [redacted]
Ekler: final preservice ech teachers instrument.docx (21 KB)

Bu iletiye 10-08-2022 14:15:01 de cevap verdiniz.

Metin (4 KB)

Greetings, I would be happy to share it. It is attached (although you will need to use new photos, perhaps guided by the table in the article, so that it resembles different natural spaces in your home environment).

Best wishes on your upcoming study,
Julie

On Wed, Aug 10, 2022 at 4:48 AM [redacted] wrote:

> Dear Ernst,
>
> My name is Soykan. I'm research assistant at Middle East Technical University in the Department of Science Education. I'm a Master Student and work on the Outdoor Education. I will plan to work on Science Teacher view about Outdoor Learning in my thesis. When I am making literature review for my thesis, I read your article that name "Preservice early childhood educators' perceptions of outdoor settings as learning environments". I believe that your article methodology will make a great contribution to me for the organizing my thesis. I want to use this questionnaire and open ended questions in my thesis by citing you. If you do not mind, can you share your questionnaire questionnaire and open enden questions with me?
>
> Best Regards,
> Soykan

Re: Doğayla İlişki Ölçeğinin Türkçe'ye Adaptasyonu Ölçek Talebi

Kaynağı Görüntü
Kaydet

Tarih: 16-09-2022 (12:06:15 +03)
Kimden: [redacted]
Kime: [redacted]

Metin (1 KB)

Soykan Hocam merhaba,
Doğayla İlişki Ölçeğini akademik çalışmalarınızda kullanabilirsiniz.
Kolayliklar dilerim.
İyi calismalar,
Prof.Dr. Elvan Şahin

Quoting [redacted]

> Hocam Merhaba ,
>
> İsmim Soykan SANDIKÇIOĞLU. Orta Doğu Teknik Üniversitesi'nde Fen Bilimleri Eğitimden Yüksek Lisans Öğrencisiyim.''Doğayla İlişki Ölçeğinin Türkçe'ye Adaptasyonu'' adlı makalenizde kullanılan Doğaya İlişki Ölçeğinin Türkçe versiyonunu kendi yüksek lisans tezimde sizlere de atıfta bulunarak kullanmak istiyorum. Ölçeği tez çalışmam için kullanabilir miyim?
>
> Saygılarımla,
>
> Soykan SANDIKÇIOĞLU

M. Approval of the Ethics Committee

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTES
MIDDLE EAST TECHNICAL UNIVER

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T: +90 312 210 22 91
F: +90 312 210 79 59
ueam@metu.edu.tr
www.ueam.metu.edu.tr

21 EKİM 2022

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof. Dr. Özgül Yılmaz TÜZÜN

Danışmanlığını yürüttüğünüz Soykan SANDIKÇIOĞLU'nun **"Fen Bilgisi Öğretmenlerinin ve Fen Bilgisi Öğretmen Adaylarının Açık Hava Eğitimi Hakkındaki Görüşleri"** başlıklı araştırmanız İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay **0541-ODTUİAEK-2022** protokol numarası ile onaylanmıştır.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Sibel KAZAK BERUMENT
Başkan

Doç. Dr. I.Semih AKÇOMAK
Üye

Dr. Öğretim Üyesi Müge GÜNDÜZ
Üye

Dr. Öğretim Uyesi Şerife SEVİNÇ
Üye

Dr. Öğretim Üyesi Murat Perit ÇAKIR
Üye

Dr. Öğretim Üyesi Süreyya ÖZCAN KABASAKAL
Üye

Dr. Öğretim Üyesi A. Emre TURGUT
Üye

N. Approval of MoNE

T.C.
ANKARA VALİLİĞİ
Milli Eğitim Müdürlüğü

Sayı : E-14588481-605.99-65517448 09.12.2022
Konu : Araştırma İzni

ORTA DOĞU TEKNİK ÜNİVERSİTESİ REKTÖRLÜĞÜNE
(Öğrenci İşleri Daire Başkanlığı)

İlgi: a) MEB Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 2020/2 sayılı Genelgesi.
b) 01.12.2022 tarihli ve 327 sayılı yazınız.

Üniversiteniz Matematik ve Fen Bilimleri Eğitimi Anabilim Dalı Fen Bilimleri Eğitimi yüksek lisans programı öğrencisi Soykan SANDIKÇIOĞLU'nun "**Fen Bilgisi Öğretmenlerinin ve Fen Bilgisi Öğretmen Adaylarının Açık Hava Eğitimi Hakkındaki Görüşleri**" konulu çalışması kapsamında merkez ilçelerimize bağlı okullarda uygulama yapma talebi ilgi (a) Genelge çerçevesinde incelenmiştir.

Yapılan inceleme sonucunda, söz konusu araştırmanın Müdürlüğümüzde muhafaza edilen ölçme araçlarının; Türkiye Cumhuriyeti Anayasası, Milli Eğitim Temel Kanunu ile Türk Milli Eğitiminin genel amaçlarına uygun olarak, ilgili yasal düzenlemelerde belirtilen ilke, esas ve amaçlara aykırılık teşkil etmeyecek, eğitim-öğretim faaliyetlerini aksatmayacak şekilde okul ve kurum yöneticilerinin sorumluluğunda, gönüllülük esasına göre uygulanması Müdürlüğümüzce uygun görülmüştür.

Bilgilerinizi ve gereğini rica ederim.

Harun FATSA
Vali a.
Milli Eğitim Müdürü

Ek: Uygulama Araçları (8 Sayfa)

Dağıtım:
Gereği:
ODTÜ Üniversitesi

Bilgi:
9 Merkez İlçe

Bu belge güvenli elektronik imza ile imzalanmıştır.
Adres : Emniyet mah.Alparslan Türkeş cad. no:4 (Ek Hizmet Binası AR-GE) Yenimahalle
Telefon No : 0 (312) 306 89 07
E-Posta: istatistik06@meb.gov.tr
Kep Adresi : meb@hs01.kep.tr
Belge Doğrulama Adresi : https://www.turkiye.gov.tr/meb-ebys
Bilgi için: Aysun AKDEMİR
Unvan : Memur
İnternet Adresi: Faks:_____
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T.C.
ANKARA VALİLİĞİ
Milli Eğitim Müdürlüğü

Sayı : E-14588481-605.99-69446153 27.01.2023
Konu : Araştırma İzni

ORTA DOĞU TEKNİK ÜNİVERSİTESİ REKTÖRLÜĞÜNE
(Öğrenci İşleri Daire Başkanlığı)

İlgi: a) MEB Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 2020/2 sayılı Genelgesi.
b) 12.01.2023 tarihli ve 346 sayılı yazınız.

Üniversiteniz Fen Bilimleri Enstitüsü Yüksek Lisans Öğrencisi Soykan SANDIKÇIOĞLU'nun **"Fen Bilgisi Öğretmenlerinin ve Fen Bilgisi Öğretmen Adaylarının Açık Hava Eğitimi Hakkındaki Görüşleri"** konulu tezi kapsamında Çankaya ilçesine bağlı okullarda https//docsgooglecom/forms/d/e/1FAIpQLSeaaNeIuacMOy7vx7Y014W4QJuECBblYe_h64PvzlK0uOH-Q/viewform?usp=sharing linki üzerinden anket uygulaması yapma talebi ilgi (a) Genelge çerçevesinde incelenmiştir.

Yapılan inceleme sonucunda, söz konusu araştırmanın Müdürlüğümüzde muhafaza edilen ölçme araçlarının; Türkiye Cumhuriyeti Anayasası, Milli Eğitim Temel Kanunu ile Türk Milli Eğitiminin genel amaçlarına uygun olarak, ilgili yasal düzenlemelerde belirtilen ilke, esas ve amaçlara aykırılık teşkil etmeyecek, eğitim-öğretim faaliyetlerini aksatmayacak şekilde okul ve kurum yöneticilerinin sorumluluğunda, gönüllülük esasına göre uygulanması Müdürlüğümüzce uygun görülmüştür.

Bilgilerinizi ve gereğini rica ederim.

Harun FATSA
Vali a.
Milli Eğitim Müdürü

Ek: Uygulama Araçları (8 sayfa)

Dağıtım:
Gereği:
ODTÜ

Bilgi:
Çankaya İlçe MEM

Bu belge güvenli elektronik imza ile imzalanmıştır.
Adres : Emniyet Mah. Alparslan Türkeş Cad. 4/A Yenimahalle
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GAZİ EĞİTİM FAKÜLTESİ
Matematik ve Fen Bilimleri Eğitimi Bölüm Başkanlığı

Sayı : E-57618914-044-551867 03.01.2023
Konu : Anketler (Soykan SANDIKÇIOĞLU)

GAZİ EĞİTİM FAKÜLTESİ DEKANLIĞINA

İlgi : 20.12.2022 tarihli ve 89377925-044- 539044 sayılı yazı.

Orta Doğu Teknik Üniversitesi, Fen Bilimleri Eğitimi yüksek lisans programı öğrencisi Soykan SANDIKÇIOĞLU'nun, Prof. Dr. Özgül YILMAZ TÜZÜN danışmanlığında yürüttüğü "Fen Bilgisi Öğretmenlerinin ve Fen Bilgisi Öğretmen Adaylarının Açık Hava Eğitimi Hakkındaki Görüşleri" konulu tez çalışması kapsamında uygulama yapma talebi tüm iş ve işlemlerin araştırmacı tarafından yapılması ve Bölümümüz öğretim elemanlarından izin almak kaydıyla Anabilim Dallarımız ve Bölüm Başkanlığımızca uygun görülmüştür.

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Araştırmaya Gönüllü Katılım Formu

Bu araştırma, ODTÜ Fen Bilgisi Bölümü Yüksek Lisans öğrencisi Soykan Sandıkçıoğlu tarafından Prof.Dr. Özgül Yılmaz-Tüzün danışmanlığındaki yüksek lisans tezi kapsamında yürütülmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır.

Çalışmanın Amacı Nedir?

Araştırmanın amacı açık hava eğitimi hakkındaki görüşlerinizin toplanmasıdır. Araştırmaya katılmayı kabul ederseniz, sizden beklenen, çalışma kapsamında oluşturulan ölçeği doldurmanızdır. Bu çalışmaya katılım ortalama olarak 20 dakika sürmektedir.

Bize Nasıl Yardımcı Olmanızı İsteyeceğiz?

Çalışma kapasında oluşturulan ölçeği bireysel olarak doldurmanız beklenmektedir. Tamamlanması ortalama 20 dk süren ölçekte açık hava eğitimi hakkında çoktan seçmeli ve açık uçlu sorular bulunmaktadır. Açık uçlu sorular için size verilen fotoğrafları kullanarak cevaplar vermeniz gerekmektedir. Çalışma sonunda cevaplarınız ilgili ölçek sizden toplanacak ve analiz edilecektir.

Sizden Topladığımız Bilgileri Nasıl Kullanacağız?

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Yukarıdaki bilgileri okudum ve bu çalışmaya tamamen gönüllü olarak katılıyorum.

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