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THE PLACE OF TREES IN THE CONCEPT OF ENVIRONMENTAL EDUCATION AND BIODIVERSITY IN THE SECONDARY EDUCATION BIOLOGY CURRICULUM

ÇEVRE EĞİTİMİ VE BİYOÇEŞİTLİLİK KAVRAMI İÇİNDE YER ALAN AĞAÇLAR KONUSUNUN ORTAÖĞRETİM BİYOLOJİ DERSİ ÖĞRETİM PROGRAMINDAKİ YERİ

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ABSTRACT: Within seconds of writing this sentence, the human population continues to grow, and hundreds of species worldwide face extinction due to human actions towards the environment. Individuals must change their behavior toward the environment to solve environmental issues. Successful educational programs achieve desired thoughts, behaviors, value judgments, knowledge, and skills in people. Biology education is becoming increasingly important as it affects human life, nature, the environment, and sustainable resources. This study's goal is to examine trees' place in the MNE's secondary school biology curriculum, which includes environmental education and biodiversity. This study used document analysis as a qualitative research method. The research uses the MEB Secondary Education Biology Course (9th,10th,11th, and 12th Grades) curriculum. The data were analyzed descriptively. According to the research, there are 3 acquisitions in 9th grade, 5 in 10th grade, and 4 in 11th grade regarding trees in Secondary Education Biology Curriculum. Thus, trees are included in the Secondary Education Biology Curriculum up to the 10th grade.

Keywords: Environmental education, biodiversity, tree, secondary education biology curriculum

ÖZ: Bu cümleyi yazdığımız birkaç saniye içinde bile insan nüfusu artmaya devam etmekte ve insanların çevreye yönelik davranışlarıyla dünya üzerindeki yüzlerce türün neslinin tükenmesine ve binlercesinin de yok olma tehlikesiyle karşı karşıya kalmaktadır. Oluşan çevre sorunlarının çözümü için, bireylerin çevreye yönelik davranışlarını değiştirmeleri gerekmektedir. Tam da bu noktada bireylerde istendik düşünce, davranış, değer yargısı, bilgi ve beceri kazandırma süreci olarak çevre eğitimine ve çevre eğitiminin amaçlarının etkili öğretim programları ile gerçekleşmektedir. Fen ve matematik disiplinleri içerisinde yer alan biyoloji eğitimi; insan yaşamı, doğa, çevre ve sürdürülebilir kaynaklar arasındaki ilişkileri etkilemesi nedeniyle önemi gün geçtikçe artmaktadır. Bu bağlamdan yola çıkılarak araştırmanın amacı, çevre eğitimi ve biyoçeşitlilik kavramı içinde yer alan ağaçlar konusunun MEB'te uygulanmakta olan ortaöğretim biyoloji dersi öğretim programındaki yerinin incelenmesidir. Araştırmanın modeli nitel araştırma yöntemlerinden doküman incelemesidir. Araştırmanın çalışma dokümanı ise MEB Ortaöğretim Biyoloji Dersi (9.,10.,11. ve 12. Sınıflar) öğretim programıdır. Elde edilen verilerin çözümlenmesinde betimsel analiz tekniği kullanılmıştır. Araştırmanın sonuçlarına göre; Ortaöğretim Biyoloji Dersi Öğretim Programı'nda ağaçlar konusunun yeri ile ilgili; 9. Sınıf düzeyinde 3 kazanım, 10. Sınıf düzeyinde 5 kazanım ve 11. Sınıf düzeyinde ise 4 kazanım olduğu saptanmıştır. Buna göre Ortaöğretim Biyoloji Dersi Öğretim Programı'nda en fazla 10. Sınıf düzeyinde ağaçlar konusunun yer aldığı söylenebilir.

Anahtar sözcükler: Çevre eğitim, biyoçeşitlilik, ağaç, ortaöğretim biyoloji dersi öğretim programı

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GENİŞLETİLMİŞ ÖZET

Giriş

21. yüzyılda hızla artan dünya nüfusunun beslenmesi, temel ihtiyaçlarının karşılanması esnasında su, hava, toprak gibi temel kaynakların hızlı ve bilinçsiz tüketimi sonucu çevre sorunları, sadece bir ve birkaç ülkenin değil tüm dünyayı ilgilendiren küresel bir sorun haline gelmesine neden olmuştur, özellikle içinde bulunduğumuz son yüzyılda doğal çevrede meydana gelen tahribat önceki dönemlerle kıyaslanamayacak kadar büyümüş ve var olan dengenin de bozulmasına neden olmuş sadece insanı değil yaşayan diğer canlıları da tehdit eder bir hale gelmiştir. Politik ve bilimsel çevreler yaşanan sorunlar üzerinde düşünmeye başlamış, çevre kirleticilerine karşı önlem almak için, ulusal ya da uluslararası arenada ortak çalışmalar, konferanslar, araştırmalar yapmaya, projeler geliştirmeye ve çevreyi korumaya odaklanmışlardır. Günümüz tüketim toplumunun artan ihtiyaçları karşısında, çevreye verilen zararın kümülatif olarak artması gelecek neslin çevre ve çevre sorunları konusunda eğitimini son derece önemli kılmaktadır (Gülersoy vd., 2020). İklim değişikliğinin yanı sıra kirliliğe ve habitatlarda değişikliklere neden olan insan faaliyetleri, türler ve ekosistemler üzerinde baskı oluşturmaktadır. Bilim adamları şu anda dünya çapında bir milyon bitki, böcek, kuş ve memeli türünün neslinin tükenme tehdidi altında olduğunu tahmin etmektedirler. Her gün 200'e kadar türün nesli tükenmektedir. Bu bağlamdan yola çıkılarak araştırmanın amacı, çevre eğitimi ve biyoçeşitlilik kavramı içinde yer alan ağaçlar konusunun MEB'te uygulanmakta olan ortaöğretim biyoloji dersi öğretim programındaki yerinin incelenmesidir. Bu çalışma, MEB'te uygulanmakta olan ortaöğretim biyoloji dersi öğretim programında ağaçların yerini ortaya koymayı ve alandaki boşluğu açığa çıkarmayı amaçlamaktadır. Bu amaç doğrultusunda aşağıdaki araştırma sorusuna cevap aranmıştır:

MEB'te uygulanmakta olan ortaöğretim biyoloji dersi öğretim programındaki çevre eğitimi ve biyoçeşitlilik kavramı açısından ağaçlar konusunun kapsamı nasıldır?

Yöntem

Bu araştırmanın modeli, nitel araştırma yöntemlerinden doküman incelemesidir. Bu bağlamda, MEB Ortaöğretim Biyoloji Dersi (9.,10.,11. ve 12. Sınıflar) öğretim programı araştırmanın çalışma dokümanı olarak seçilmiştir.

Bulgular

Araştırmanın amacı kapsamında Ortaöğretim Biyoloji Dersi Öğretim Programı'nda çevre eğitimi ve biyoçeşitlilik kavramı konusunun yeri ile ilgili kazanımlar: 9.sınıf düzeyinde "Canlılar Dünyası" ünitesinde 5 kazanım, 10. Sınıf düzeyinde "Ekosistem Ekolojisi ve Güncel Çevre Sorunları" ünitesinde 10 kazanım, 11. Sınıf düzeyinde "Komünite ve Popülasyon Ekolojisi" ünitesinde 5 kazanım, 12. Sınıf düzeyinde ise "Genden Proteine" ünitesinde 2 kazanım ve "Canlılar ve Çevre" ünitesinde 2 kazanım olmak üzere toplam 4 kazanım yer almaktadır.

Araştırmanın amacı kapsamında Ortaöğretim Biyoloji Dersi Öğretim Programı'nda ağaçlar konusunun yeri ile ilgili kazanımlar ise; 9. Sınıf düzeyinde 3 kazanım, 10. Sınıf düzeyinde 5 kazanım ve 11. Sınıf düzeyinde ise 4 kazanım olduğu saptanmıştır. Buna göre Ortaöğretim Biyoloji Dersi Öğretim Programı'nda en fazla 10. Sınıf düzeyinde ağaçlar konusunun yer aldığı söylenebilir. Bu kazanımların da 9'u bilişsel ve 2'si ise duyuşsal alan basamağına yönelik olduğu saptanmıştır. Ancak psikomotor alan basamağına yönelik herhangi bir kazanıma rastlanmamıştır.

Tartışma ve Sonuç

Orman alanları dünyada yaşayan her canlı açısından hayati öneme sahiptir. Orman ekosistemleri, ekonomi ve insan açısından gıda, yakıt, barınma ve temiz hava gibi ihtiyaçların her dönemde karşılamıştır. Orman kaynaklarının azalması iklim, klimatik dengenin değişmesi, sıcaklık artışı ve toprak kaybına neden olarak enerji döngüsünün sağlanamaması, biyoçeşitliliğin azalması ve yenilenebilir kaynakların azalmasına yol açmaktadır (Ke ve Quackenbush, 2011).

Türkiye'deki ortaöğretim biyoloji dersi programında duyuşsal ve motor beceriler yeteri kadar yer verilmediği gözlenmektedir. Tutum, değer ve beceri eğitimine daha fazla yer verilmesi ile çevre sorunlarına duyarlı nesillerin geliştirilmesi sağlanabilir. Kazanımlarda üst düzey davranışların sayısı artırılarak okul-aile-toplum işbirliğine dayalı proje çalışmaları ile çevre sorunlarına yönelim gösterilebilir.

Araştırma sonuçlarına göre çevre eğitimi ve biyoçeşitlilik kavramı içerisinde önemli bir kapsamı oluşturan ağaçların yeryüzünde yaşam için büyük bir öneme sahip olmasına rağmen Ortaöğretim Biyoloji Dersi Öğretim Programı'nda gereken önemin verilmediği görülmektedir. Bunun sonucu olarak da bireylerin genellikle göz ardı ettiği bilinmektedir. Bu göz ardı edilme olgusu; bireylerin çevrelerindeki ağaç türlerini görmezden gelme eğilimine yol açmaktadır. Dijital yerliler olarak da adlandırılan günümüz bireylerinin dinlendikleri zamanları doğa yerine mobil cihazlarla geçirmeyi tercih ettiklerinden kaynaklı olduğu bilinmektedir (Hartman ve diğerleri, 2019). Türkiye'de ağaç ve ağaç eğitimi adı altında ayrı bir ders bulunmaması ve biyoloji dersi içerisinde ele alınması programların bütüncül bir anlayışla ve öğretim teknolojileriyle bağlantılı olarak hazırlanması gerekliliğini doğurmaktadır. Çevre eğitimi ve biyoçeşitlilik konularının içerisinde yer alan ağaçlar konusunun ele alınmasında programların eşgüdüm ve ortak bir komisyonun işbirliği ile hazırlanması gerekliliğini doğurmaktadır. Bu amaçla Çevre ve Şehircilik Bakanlığı, Tarım ve Orman Bakanlığı, sivil toplum Örgütleri, AFAD vb. kurum ve kuruluşlardan oluşan komisyonların programların hazırlanmasında aktif görev alması faydalı olacaktır. Ayrıca fen ve matematik eğitiminin bir disiplini olan biyoloji eğitiminde ağaçlar konusunda teknolojik yaklaşımların da ele alınmasının önemli olacağı düşünülmektedir.

INTRODUCTION

The rapid and uneven growth of the global population, the gradual widening of the income and living standards gap between the rich and the poor, malnutrition, unplanned settlement, incorrect land use, hazardous waste, the rapid loss of green space and plant and animal species, heavy traffic, noise, and unconsciousness are all factors contributing to the global population explosion. Environment-damaging events, such as increased energy production and consumption, global warming, and an increase in natural disasters, are the most significant economic, technological (including climate change), ecological (including natural disasters), and sociological (including social inequality) environmental problems, or the primary causes of environmental problems (Yldz et al., 2008). Rapid population growth, urbanization, industrialization, and unsustainable production and consumption habits have all contributed to unprecedented levels of natural resource depletion throughout the world. The pollution of resources, desertification, climate change, endangered species, habitat destruction, erosion, floods, avalanches, and landslides, in combination with natural disasters accelerated by human factors, rapidly destroy life, that is biodiversity, of which humans are a part, and humans are a part of this destruction of life (Otto & Pensini, 2017). The resolution of concerns can be accomplished through one of two methods (Atabek-Yiit, Balkan-Kyci, and Yavuz-Topalolu, 2019). One solution is the development of new materials or technologies. This route, on the other hand, is difficult and time-consuming. Alternatively, it is possible to prevent environmental problems from occurring in the first place. More than ever, environmental education is becoming increasingly important. Because environmental education is both more cost-effective and has a greater impact in a shorter period of time, it is becoming increasingly popular. Because of this, environmental education that increases individual awareness of the environment is essential for the achievement of sustainable development in society (Anufrieva et al., 2020).

Changing scientific and technological developments, shifting individual and societal requirements, as well as new learning-teaching theories and methodologies, have all had a direct impact on how individuals perform their jobs. Individuals are expected to be equipped with qualities such as producing information, using information functionally, solving problems, thinking critically, being entrepreneurial, determined, having communication skills, empathizing, contributing to society and culture, having values, and so on in the face of these changes and developments today. When developing curriculums to raise individuals with this quality texture, a simple and understandable structure should be used that takes into account individual differences and emphasizes the acquisition of values and skills rather than the transmission of information. It is essential for the long-term viability of a democratic society that citizens are educated about the environment. Therefore, environmental education encompasses a broader range of topics than just environmental concerns. When it comes to environmental education, people are at the forefront. It is all about the overall quality of life in the area where we live. Environmental education is centered on the natural world and its interconnected systems. Energy efficiency is concerned with the complex interaction between people and the natural resources in which we place our faith and hope to see them preserved. It all comes down to participation in civic life and long-term sustainability. Environmental education is about understanding and participating in the world as it is, as well as the world we want for our children's children and their children's children. Environmental education helps people develop the knowledge, skills, and attitudes that they will need to succeed in the twenty-first century and motivate them to take action. Ecological and sociopolitical knowledge, as well as the identification and understanding of environmental issues, are required for environmental literacy (NEEAC, 2015). Individuals' attitudes toward the environment are formed and transformed into actions through environmental education. On the one hand, environmental education conveys ecological information; on the other, it fosters the development of attitudes toward the environment in individuals. Students' cognitive, affective, and psychomotor learning areas are all addressed through environmental education. When it comes to environmental education, it is the process of cultivating environmental protection attitudes, value judgments, knowledge, and skills, as well as demonstrating environmentally friendly behaviors and observing the outcomes of these behaviors. Environmental education is a multifaceted process that includes a variety of activities (Erten, 2004).

A major goal of biodiversity education, which is a component of environmental education, is to raise public awareness of the importance of biological diversity while also equipping people with the knowledge and skills necessary to safeguard it. However, because Turkish environmental education

consists primarily of biology classes that students must complete until they graduate from high school, these courses are insufficient for providing effective environmental education to the Turkish population. Because students memorize the information presented in the lectures in preparation for the exam, the information presented will not result in the intended behavioral change in the individual (Zcan et al. 2003). The result is that by participating in biodiversity education, children can gain knowledge about local species by directly observing plants and animals, i.e., by participating in an effective educational process. Educating students in natural settings and allowing them to examine living organisms and interactions between organisms through their own observations is possible through educational environments that allow them to interact with nature (Lindemann-Matthies, 2002). Therefore, environmental education should be a lifelong endeavor for individuals who wish to make positive contributions to the present and future of the environment. When we talk about environmental education, we are referring to the process of providing students with knowledge, skills, attitudes, and values about the environment and the problems that it faces (Pandey & Wright, 2006; Esteban -Ibanez et al., 2020).

It is critical to raise public awareness about biodiversity conservation in order to protect it. In order to develop this awareness, students should be taught several different approaches and methods at each stage of their education. A society that has developed current environmental awareness will be able to deal with the difficulties it faces and work to find solutions to those difficulties. This consciousness, which is first learned in the family, develops over time as the individual's life progresses. It is a lifelong process. Turküm (1998) argues that the family, teachers, and the media all have important roles to play in the development process. Biodiversity education is essential for the conservation of biodiversity and the transmission of that biodiversity to future generations. It is possible that in-class activities will help students understand the significance of the subject of biodiversity while also ensuring that students understand the subject's value in extracurricular activities outside of the classroom. Visiting botanic gardens, plant greenhouses, and seed banks, which take place outside of the classroom, are extremely beneficial in raising environmental awareness among students and teaching biodiversity in Europe, according to the European Commission (Demir, 2009). Students in biology, science, and technology courses will benefit the most from an understanding of biodiversity because of its content. Science and mathematics education, which includes biology education, contributes to this issue by addressing issues such as how children and young people learn about biodiversity, how to motivate them, how to develop individual responsibilities, and how to raise awareness of social biodiversity, among other things (Erten, 2004; Pandey & Wright, 2006).

The purpose of this study is to investigate the place of trees in the secondary school biology curriculum used by the Ministry of National Education (MNE), which is included in the concept of environmental education and biodiversity. The MNE uses a curriculum that includes trees in the concept of environmental education and biodiversity. The purpose of this study is to determine the role of trees in the secondary biology curriculum of the Ministry of National Education and to identify a gap in the field. For this purpose, it was necessary to find an answer to the following research question:

- What is the scope of trees in terms of environmental education and biodiversity concept in the secondary education biology curriculum applied in the MNE?

Biodiversity, Environmental Awareness and Environmental Education

Biodiversity is described as "genetic, taxonomic, and ecosystem diversity of living organisms in a certain area, environment, ecosystem, or all over the world" (Kocataş, 2012: 22). The stages of biodiversity range from genes to species-containing ecosystems. Genes, which are the most basic components of organisms, form the basis of this field. Species, genes, ecosystem diversity, and ecological processes all contribute to biological diversity (Zeydanlı & Tuğ, 2008). Biological diversity, or simply "biodiversity," is the sum of a region's genes, species, ecosystems, and ecological events. Biodiversity consists of three main parts from the big part to the smaller part and a fourth part that connects these three parts (Işık, 1998):

Ecosystem diversity is the first element of biodiversity. Since this diversity changes by location and time, numerous ecosystem types can be found on the planet (Işık, 2014). An ecosystem is a system that is made up of both living and non-living elements. It forms the most important thing of nature. With the diversification of the living species, it contains, the ecosystem evolves. Abiotic factors required by different living species differ, resulting in the formation of various ecosystems. Higher species diversity

indicates more ecosystem diversity in a specific area (Eren, 2015). Species diversity is the second aspect of biodiversity. Changes in the environment can cause species to change. It gets endangered and eventually disappears if there is no ecosystem identical to the one it is in. The extinction of living beings can occur spontaneously through time or as a result of human influence. The rate of extinction caused by human behavior is substantially faster than the rate of extinction caused by natural causes. Resources are gradually depleting as living species become extinct. Ecosystem balances are degrading, and critically important gene resources are disappearing (Işık, 2014). The protection of endangered species is critical. The extinction of living organisms means great damage to the biodiversity of the habitats (Çakmak & Gürbüz, 2012). The third element of biodiversity is gene diversity. Genetic diversity is the diversity of genes within a species, the wealth of hereditary information in a species' gene pool. There is considerable genetic variation between populations of the same species and between individuals of the population. Genetic diversity provides information about the extent of a population's gene pool. The genetic diversity of a population increases its chances of survival and adaptation to new environments (Görür, 2011). Ecological events (process) diversity is a functional element of biodiversity. They are ecological events that connect living and non-living elements and provide the balance and order between the substances that form biological diversity. The diversity of ecological events is changing very rapidly. When the elements that make up biological diversity are examined, it is found that the fastest change is in the diversity of ecological events (Işık, 2014).

It is widely acknowledged that biodiversity makes a significant contribution to the well-being of humanity. Biodiversity, which serves as a safeguard against the occurrence of extraordinary events in the future, is a strategically important asset that humanity possesses, but whose significance has not yet been fully appreciated. Any portion of these vital resources that is lost will result in global impoverishment for all of the world's countries. Darçin and Güçlü (2007; Darçin and Güçlü, 2007) argue that biodiversity is a particularly valuable component of the world heritage. Given the importance of biodiversity in decomposition, the structure of the atmosphere, and the global climate for the long-term sustainability of an ecosystem, the need to conserve the world's biological diversity becomes apparent (Başkent et al., 2005). The importance of biodiversity in decomposition, the structure of the atmosphere, and the global climate for the long-term sustainability of an ecosystem It is necessary to establish an environment-centered biopolitics that is shaped within the framework of bioethics in order to protect biodiversity. By utilizing bioeducation, it is possible to raise awareness of biodiversity while also exhibiting behaviors such as protecting and utilizing it appropriately (Alpagut & Karataş, 2014).

In terms of biodiversity, Turkey is a very rich country, owing to factors such as its intercontinental geographic location between Asia and Europe, topography structure, regional climate influences, and a high proportion of endemic species. A result of the research, nearly 3,000 plant species have been identified as endemic in Turkey's flora, out of approximately 12,000 plant species found in the country's flora. Furthermore, it is predicted that the Turkish flora will contain over 80,000 animal species, and Turkey is home to three of the world's 34 high diversity points, which are located in the country (Mediterranean, Caucasus, and Iran-Anatolia). Despite Turkey's 10000-year history of intensive natural resource exploitation and human land use, the country has a rich biodiversity heritage as it is a center of genetic diversity, which is reflected in its biodiversity heritage. For the approximately 20 million rural people in Turkey who derive significant cultural and commercial value from biodiversity, the preservation of this heritage is an important social and environmental responsibility (Ekerciolu et al., 2011; Enel, 2015).

Turkish biodiversity-rich woods will decline as a result of widespread commercial forestry activities and human intervention, according to the OECD Environment Forecast Report for 2050. The report states that (Kram & Stehfest, 2012). In spite of the fact that humans are responsible for biodiversity and its protection, the next generation's direct engagement with the environment is insufficient, and biodiversity loss is not among their future concerns (Bergseng & Van der Vatn, 2009; nel, 2015).

To effectively manage and protect a region's biodiversity, it is necessary to work in close collaboration with the local people living there. Teachers who work in the region play an important role in the conservation of the region's natural resources and the education of students about environmental conservation issues. To protect rich natural resources, it is critical for teachers working in rural communities who are familiar with biological diversity to be able to recognize, examine, and maintain it as a part of their teaching. A critical component of achieving the goals set out in targeted development

plans (Erten, 2004; enel, 2015; cited in Mercan & Köseolu, 2019) is providing individuals with biodiversity information through well-planned environmental education.

The Place of Environmental Education in the Secondary Education Biology Curriculum

The Biology Lesson Curriculum, which was developed in accordance with the General Objectives of the Turkish National Education and the Fundamental Principles of the Turkish National Education, as stated in Article 2 of the Basic Law of National Education No. 1739, is intended to ensure that students achieve the following outcomes in biology (MEB, 2018):

- Be familiar with biology's laws, theories, processes, concepts, hypotheses, and experiments.
- Learn how to apply biological knowledge and applications in everyday life,
- Know some of the scientists who have contributed to the study of biology throughout history,
- Be able to actively participate in arguments concerning biology and science, as well as to evaluate these debates,
- Develop new and innovative ideas and conduct original research using the biology course's knowledge, skills, and competences,
- Be able to make functional projects, comprehensive and original designs and inventions,
- Be aware of technologies inspired by organisms and being willing to make similar innovations,
- Be able to evaluate the effects of science and technology on the lives of humans and other organisms,
- Recognize the necessity and significance of having ethical values in scientific studies and social life, as well as the importance of acting in accordance with these values
- Be able to make informed evaluations about socioscientific issues (controversial social issues related to science),
- Be individuals who research, think critically, cooperate, have effective communication skills, solve problems, inquire, produce, and want to learn science for life.

METHOD

Model of the Research

This study employs the qualitative research methodology of document analysis, which is one of the methodologies used in this study. "Document analysis is the examination of written documents that contain information about the facts and events that are being investigated," according to Yldrm and Imşek (2018). According to Corbin and Strauss (2008), document analysis, like other qualitative research methods, necessitates the examination and interpretation of data in order to make sense of it, gain understanding of it, and gain empirical knowledge in order to make sense of it, gain understanding of it, and gain empirical knowledge (Cited in Bowen, 2009). When applied in this context, document analysis can be used as a stand-alone qualitative research method (Yıldrm & Şimşek, 2018).

One of the reasons for selecting document analysis as the model for this research is that the MEB Secondary Education Biology Course (9th through 12th Grades) curriculum is physically a document, and the subject matter to be investigated is appropriate for document analysis. Since "document review includes the analysis of written materials containing information about the phenomenon or phenomena that are intended to be researched" (Yıldrm & Şimşek, 2018). It is important to understand how to conduct a document review.

Working Document

In research-based document analysis, it is possible that not all document data will be able to be analyzed as a whole due to time constraints. As a result, it is attempted to create a sample from the data that has been obtained (Yecke, 2005). Taking this into consideration, the MEB Secondary Education Biology Course curriculum (for grades 9 through 12) was selected as the research's working document.

Table 1 provides detailed information about the MNE Secondary Education Biology Course (9th, 10th, 11th, and 12th Grades) curriculum, which falls within the scope of the study.

Table 1.
Information about the MNE Secondary Education Biology Course (9th, 10th, 11th, and 12th Grades) curriculum

Grade Level	Unit Name	Program Year	Number of Outcomes	Duration/Class Hour
9. Grade	1. Life Science Biology	2018	3	26
	2. Cell		3	22
	3. World of Organisms		3	24
Total			9	72
10. Grade	1. Cell Divisions	2018	5	18
	2. General Principles of Inheritance		2	30
	3. Ecosystem Ecology and Current Environment Problems		10	24
Total			17	72
11. Grade	1. Human Physiology	2018	29	116
	2. Community and Population Ecology		5	28
Total			34	144
12. Grade	1. From Gene to Protein	2018	8	56
	2. Energy Transformations in Organisms		8	32
	3. Plant Biology		11	44
	4. Organisms and Environment		2	12
Total			29	144

According to Table 1, there are three units at the 9th-grade level: Life Science, Biology, Cell and World of Organisms. The total number of learning outcomes of these units is 9 and the course duration/hour is 72. There are three units at the 10th-grade level: Cell Divisions, General Principles of Heredity, Ecosystem Ecology, and Current Environmental Problems. The total number of achievements of these units is 17 and the duration of the lesson is 72. There are two units at the 11th-grade level: Human Physiology and Community and Population Ecology. The total number of learning outcomes of these units is 34 and the course duration/hour is 144. At the 12th grade level, there are three units: From Gene to Protein, Energy Conversions in Organisms, Plant Biology, and Organisms and Environment. The total number of learning outcomes of these units is 29 and 144 lessons per hour.

Analysis of Data

Descriptive analysis was used to analyze the research data. Descriptive analysis is an approach that provides the explanation and interpretation of the obtained data under the created themes, examining the cause-effect relationships and reaching the result (Yıldırım & Şimşek, 2018).

The descriptive data obtained in the current study are categorized according to the previously determined conceptual framework or themes, with direct quotations included to reflect the ideas of individuals in a striking way (Denzin & Lincoln, 2000; cited in Yıldırım & Şimşek). The data analysis step was conducted from the view of inductive analysis in this direction.

Reliability of Data

For the data obtained in this study, two expert opinions were consulted in order to ensure the credibility of the research. The reliability formula of Miles and Huberman (1994) was used. The formula is given below:

Reliability = (Agreement / [(Agreement + Disagreement)]) x 100

As a result of the reliability formula of Miles and Huberman (1994), it was 98%. According to Miles and Huberman (1994), they claimed that the reliability of the research results of 70% and above is high.

FINDINGS

According to the explanations above, in the "Special Objectives of the Biology Curriculum", it was emphasized that the students' knowledge, skills, competence, and values should be developed in relation to the interactions between science-technology-society-environment.

There are a total of 91 learning outcomes in the biology course. 24 of these outcomes are related to the environment, and their ratio in total is 27.37%. The biology course's "World of Organisms," "Ecosystem Ecology and Current Environmental Problems," "Community and Population Ecology," "From Gene to Protein," and "Organisms and Environment" units all focused on environmental issues. The place of the concept of environmental education and biodiversity in the secondary education biology curriculum is given in Table 2.

Table 2.
The place of the concept of environmental education and biodiversity in the secondary education biology curriculum

Class	Unit name	Achievement in Environmental Education	The Step To Which The Achievement Is Associated
9. Grade	World of Organisms	In order to understand the diversity of organisms, explain the significance of classification systems.	Cognitive Domain-Comprehension
		With the help of examples, this section explains the categories used in the classification of organisms, as well as the hierarchy between these categories.	Cognitive Domain-Comprehension
		The kingdoms used in the classification of organisms, as well as the general characteristics of each kingdom, are discussed in detail.	Cognitive Domain-Comprehension
		This chapter provides illustrations of the contributions of organisms to biological processes, the economy, and technology.	Cognitive Domain-Comprehension
		Describe the general characteristics of viruses in general terms.	Cognitive Domain-Comprehension
10. Grade	Ecosystem Ecology and Current Environmental Issues	Give an explanation of how the ecosystem's living and non-living components interact with one another.	Cognitive Domain-Comprehension
		With the help of illustrations, explains the process of nutrition in organisms.	Cognitive Domain-Comprehension
		Examine the movement of matter and energy through the ecosystem.	Cognitive Domain-Analysis Assessment
		Demonstrates a connection between substance cycles and the long-term viability of life.	Cognitive Domain-Analysis Comprehension
		Examines the causes of current problems as well as their potential consequences.	Cognitive Domain-Assessment
		He or she should reflect on his or her own personal contribution to the emergence of environmental problems.	Cognitive Domain-Assessment
		Provides solutions for the prevention of environmental pollution on a local and international scale.	Cognitive Domain-Creation application
		Explain the significance of ensuring the long-term vability of natural resources.	Cognitive Domain-Comprehension
		The significance of biodiversity for life is called into question.	Cognitive Domain-Assessment
		Make recommendations for solutions to the problem of biological diversity preservation.	Cognitive Domain-Creation application
11. Grade	Community and Population Ecology	Explain the factors that have an impact on the community's organizational structure.	Cognitive Domain-Comprehension
		With the help of examples, this paper explains how competition occurs within and between species in a community.	Cognitive Domain-Comprehension
		Examples are used to explain the symbiotic relationships that exist between species in a community.	Cognitive Domain-Comprehension
		Give an example of how succession occurs in a community.	Cognitive Domain-Comprehension
		Analyze the factors that influence the dynamics of the population.	Cognitive Domain-Analysis
12. Grade	From Gene to Protein	Disseminate your knowledge of genetic engineering and biotechnology concepts.	Cognitive Domain-Comprehension
		The impact of genetic engineering and biotechnology applications on human life is examined in this study.	Cognitive Domain-Assessment
	Organisms and the environment	Provide an explanation for the influence of environmental conditions on the continuity of genetic changes	Cognitive Domain-Comprehension
		In this section, you will learn about artificial selection in agriculture and livestock applications.	Cognitive Domain-Comprehension

Table 2 shows that all of the environmental advantages occur in the cognitive domain, with no gains in the affective or psychomotor domains. According to the steps, the acquisitions in the cognitive domain are at the levels of understanding (15), analysis (3), evaluation (4), and creation (2).

The place of trees in the secondary education biology curriculum is explained according to Table 2.

In the three units of the 9th Grade Biology Curriculum, there are 3 learning outcomes related to trees:

- **Biology and Common Characteristics Unit of Organisms:** "Examines the characteristics that are shared by all organisms."
- **Unit of Diversity and Classification of Organisms:** "The importance of classification in understanding the diversity of organisms is explained, as are the categories used in the classification of organisms and the hierarchy between these categories, through the use of illustrations."
- **The Living Kingdom and Characteristics Unit:** "It explains the kingdoms used in the classification of organisms and the general characteristics of these kingdoms, as well as the contributions of organisms to biological processes, economy, and technology, through the use of illustrations."
- **There are 5 learning outcomes related to trees in three units in the 10th Grade Biology Curriculum:**
- **Heredity and Biodiversity Unit:** "Debates whether genetic variations are responsible for explaining biodiversity."
- **Ecosystem Ecology:** "Explanations of the relationship between the living and non-living components of an ecosystem are provided. With the help of illustrations, this book explains the nutrition patterns of an organism. The flow of matter and energy in the ecosystem is investigated. In this study, the relationship between matter cycles and life's long-term viability is established."
- **Current Environmental Problems and Human Unit:** "Considers the causes and potential consequences of current environmental problems; inquires into his or her own role as an individual in the emergence of environmental problems; and provides solutions for the prevention of environmental pollution on a regional, national, and international scale; Explain the significance of environmental sustainability in relation to natural resources. Offers suggestions for the preservation of biological diversity."

In the two units of the 11th Grade Biology Curriculum, there are 4 learning outcomes related to trees:

- **Community Ecology Unit:** "Explains the factors that influence the structure of a community; explains competition within and between species in a community using examples; and explains succession in communities using examples."
- **Population Ecology Unit:** "It investigates the factors that influence the dynamics of the population."

In a unit in the 12th Grade Biology Curriculum, there is 1 learning outcome related to trees:

- **Organisms and Environment Unit:** "It explains the influence of environmental conditions on the persistence of genetic mutations."

DISCUSSION, CONCLUSION and RECOMMENDATIONS

Forest habitats are critical for the survival of all organisms on the planet. Forest ecosystems have always been able to meet the needs of the economy and the people by providing food, fuel, shelter, and clean air. As a result of the reduction in forest resources, there has been a shift in the climate balance, temperature increase, and soil loss, all of which have resulted in an inability to produce energy, a decrease in biodiversity and a decrease in renewable resources (Ke & Quackenbush, 2011).

When it comes to environmental education, students must learn by doing—by living and experiencing the world around them. In order to be effective, environmental education must include a process that contributes to the development of an individual's motor skills as well as cognitive fields, attitudes, and values toward the environment, as well as inventive learning methods that are intertwined

with nature, such as the way of invention and discovery (Gülersoy et al., 2020). Although it has been observed that affective and motor abilities are undervalued in Turkey's secondary biology curriculum, this has not been confirmed. It is possible to raise generations of people who are concerned about environmental issues by emphasizing the importance of attitude, value, and skill education more. Environmental problems can be addressed through project studies that are based on collaboration between schools, families, and communities by increasing the number of high-level behaviors in achievements.

According to the research objectives, the following achievements have been made in relation to the role of environmental education and the concept of biodiversity in the Secondary Education Biology Curriculum: At the 9th grade level, there are 5 achievements in the "World of Organisms" unit, 10 achievements in the "Ecosystem Ecology and Current Environmental Problems" unit at the 10th grade level, 5 achievements in the "Community and Population Ecology" unit at the 11th grade level, 2 achievements in the "From Gene to Protein" unit, and 2 achievements in the "Organisms and Environment" unit at the 12th grade level, for a total of 4 achievements.

Specifically, it was discovered that the acquisitions related to the place of trees in the Secondary Education Biology Curriculum were three achievements at the 9th-grade level, five achievements at the 10th-grade level, and four achievements at the 11th-grade level. The findings of the research were published in the journal Environmental Education. As a result, the subject of trees is included in the Secondary Education Biology Curriculum up to the 10th grade level at the very least. Nine of these accomplishments are in the cognitive domain, with the remaining two being in the affective realm. However, there was no evidence of achievement for the psychomotor domain step.

According to the findings of the study, despite the fact that trees, which play a critical role in environmental education and biodiversity, are essential to the survival of all life on Earth, they do not receive the attention they deserve in the Secondary Education Biology Curriculum, despite the fact that they are essential to the survival of all life. As a result, it is well known that the vast majority of people do not pay attention to it. As a result of this phenomenon of being ignored, individuals prefer to disregard the tree species in their immediate vicinity. Most people know that today's people, referred to as "digital natives," prefer to spend their free time on their mobile devices rather than in the outdoors, which is a sad reality (Hartman et al., 2019). There is no separate course in Turkey for trees and tree education, so the subject is taught as an integrated part of the biology curriculum. This requires development of programs that are holistic in nature and that work in conjunction with educational technology. Prepare programs in collaboration and cooperation with a joint commission in order to address the issue of trees, which is a component of environmental education and biodiversity, as well as other related issues. It would be beneficial for commissions comprised of institutions and organizations such as the Ministry of Environment and Urbanization, the Ministry of Agriculture and Forestry, non-governmental organizations, the AFAD and others to play an active role in the preparation of the programs in order to achieve this objective. Aside from that, it is believed that it will be important to consider technological approaches to trees in biology education, which is a discipline within the fields of science and mathematics instruction.

REFERENCES

Alpagut, B. & Karataş, A. (2014). İçerik ve tarihsel gelişimi açısından çevre eğitimi. İçinde H. Reyhan, A. Mutlu, H. H. Doğan & A. S. Reyhan (Ed.), *Sosyal Çevre Bilimleri* (ss.405-428). Ankara: Siyasal Kitabevi.

Anufrieva, N. I., Volkov, L. V., Aralova, E. V., Kolomyts, O. G., & Myagkova, E. V. (2020). Environmental education: Nurturing of the humanistic orientation of a personality. *Universal Journal of Educational Research, 8*(11), 5529-5535.

Atabek-Yiğit, E., Balkan-Kıyıcı, F., & Yavuz-Topaloğlu, M. (2019). İlkokul öğrencilerinin çevre sorunları ile ilgili kavramlara yönelik algılarının belirlenmesi. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 19*(3), 732-744.

Başkent, E.Z., Köse, S., Terzioğlu, S., Başkaya, Ş., & Altun, L. (2005). Biyolojik çeşitliliğin orman amenajman planlarıyla bütünleştirilmesi: GEF projesi yansımaları – I (Tasarım). *Orman Mühendisliği, 42*(6), 31-37.

Bergseng, E., Vatn, A. (2009). Why protection of biodiversity creates conflict–Some evidence from the Nordic countries. *Journal of Forest Economics*, *15*(3), 147–165.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, *9*(2), 27-40.

Çakmak, M., & Gürbüz, H. (2012). Biyoloji Eğitimi Bölümü Öğrencilerinin Çevreye Yönelik Tutumlarinin İncelenmesi. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, (19), 162-173.

Çakmak, N. M. (2008). Biyolojik çeşitliliğin hukuken korunması ve kamu yararı. *Ankara Üniversitesi Hukuk Fakültesi Dergisi*, *57*(1), 133-166.

Darçın, E. S. & Güçlü, Y. (2007). Biyolojik çeşitlilik ve Türkiye'deki durumu. İçinde. M. Aydoğdu & K. Gezer (Ed.) *Çevre bilimi* (ss. 145-166). Ankara: Anı Yayıncılık.

Demir, A. (2009). Küresel iklim değişikliğinin biyolojik çeşitlilik ve ekosistem kaynakları üzerine etkisi. *Ankara Üniversitesi Çevrebilimleri Dergisi*, *1*(2), 37-54.

Eren, Y. (2015). *Çevre ve enerji- biyolojik çeşitlilik ve Türkiye'deki durumu*. Ankara: Nobel Akademik Yayıncılık.

Erten, S. (2004). Uluslararası düzeyde yükselen bir değer olarak biyolojik çeşitlilik. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *27*(27). 98-105.

Esteban-Ibanez, M., Musitu Ferrer, D., Amador Munoz, L. V., Claros, F. M., & Olmedo Ruiz, F. J. (2020). University as change manager of attitudes towards environment (The importance of environmental education). *Sustainability*, *12*(11), 4568.

Görür, G. (2011). Temel ekolojik kavramlar. İçinde. S. Gökmen (Ed.), *Genel ekoloji* (s.120). Ankara: Nobel Yayıncılık.

Gülersoy, A. E., Dülger, İ., Dursun, E., Ay, D., & Duyal, D. (2020). Nasıl bir çevre eğitimi? çağdaş yaklaşımlar çerçevesinde bazı öneriler. *Turkish Studies*, *15*(5), 2357-2398.

Hartman, T., Lydon, S. J., & Rasmussen, A. (2019). Hunting for answers: Linking lectures with the real world using a mobile treasure hunt app. *Plants, People, Planet*, *1*(3), 233-247.

Işık, K. (1998). Biyolojik çeşitlilik. İçinde, M. Kıvanç & E. Yücel (Ed.), *Çevre ve insan* (ss. 13-39). Eskişehir: Anadolu Üniversitesi Açıköğretim Fakültesi İlköğretim Öğretmenliği Lisans Tamamlama Programı.

Işık, K. (2014). Biyoçeşitlilik. İçinde. *Erozyonla mücadele* (ss. 38-51). Ankara: TEMA Vakfı Yayınları.

Ke, Y., & Quackenbush, L. J. (2011). A review of methods for automatic individual tree-crown detection and delineation from passive remote sensing. *International Journal of Remote Sensing*, *32*(17), 4725-4747.

Kocataş, A. (2012). *Ekoloji, çevre biyolojisi*. Bursa: Dora.

Kram, T., & Stehfest, E. (2012). The IMAGE model suite used for the OECD Environmental Outlook to 2050. https://www.pbl.nl/sites/default/files/downloads/pbl-2012-the-image-model-suite-used-for-oecd-environmental-outlook-2050.pdf (Retrieved from: 06/02/2022)

Mam Eğitim Bakanlığı [MEB]. (2018). *Ortaöğretim biyoloji dersi öğretim programı (9,10,11,12. sınıflar).* Ankara: Talim ve Terbiye Kurulu Başkanlığı. https://mufredat.meb.gov.tr/Dosyalar/20182215535566-Biyoloji%20d%C3%B6p.pdf (Erişim Tarihi: 06/02/2022)

Mercan, G., Köseoğlu, P. (2019). Biyoloji öğretmen adaylarının yakın çevrelerindeki ağaçları tanıma düzeyleri: Ankara ili örneği. *YYÜ Eğitim Fakültesi Dergisi*, *16*(1), 538-560.

NEEAC (The National Environmental Education Advisory Council). (2015). 2015 Report to the U.S. Environmental Protection Agency Administrator, https://www.epa.gov/sites/production/files/2015-10/documents/final2015neeacreport-08_7_2015_2.pdf, Retrieved from: 06/02/2022

Otto, S., & Pensini, P. (2017). Nature-based environmental education of children: Environmental knowledge and connectedness to nature, together, are related to ecological behaviour. *Global Environmental Change*, *47*, 88-94.

Özcan, N., (2003). A group of students' and teachers' perceptions with respect to biology education at high school level (Unpublished Ph.D.Thesis). Middle East Technical Universty Instute of Education Science, Ankara.

Pandey, S. K., & Wright, B. E. (2006). Connecting the dots in public management: Political environment, organizational goal ambiguity, and the public manager's role ambiguity. *Journal of Public Administration Research and Theory*, *16*(4), 511-532.

Şekercioğlu, Ç. H., Anderson, S., Akçay, E., Bilgin, R., Can, Ö. E., Semiz, G., Tavşanoğlu, Ç., Yokeş, M., B., Soyumert, A., İpekdal, K., Sağlam, İ. K., Yücel, M., Dalfes, N. (2011). Turkey's globally important biodiversity in crisis. *Biological Conservation, 144*(12), 2752-2769.

Şenel, T. (2015). Analysis of university students' perception of and attitudes towards biodiversity (Unpublished Master Thesis). Istanbul Technical University Eurasia Institute Of Earth Sciences, İstanbul.

Türküm, A., S. (1998). Çağdaş toplumda çevre sorunları ve çevre bilinci. G. Can (Ed.). *Çağdaş Yaşam Çağdaş İnsan* (ss. 165-181). Eskişehir: Anadolu Ü. A.Ö.F. İlköğretim Öğretmenliği Lisans Tamamlama Programı.

Yecke, C.,P. (2005). *Mayhem in the middle: How middle schools have failed America--and how to make them work*. Thomas B. Fordham Foundation.

Yıldırım, A., & Şimşek, H. (2018). *Sosyal bilimlerde nitel araştırma yöntemleri*. Ankara: Seçkin Yayıncılık.

Yıldız, K., Sipahioğlu, Ş. & Yılmaz, M. (2008). *Çevre bilimi ve eğitimi*. Ankara: Gündüz Eğitim.

Zeydanlı, U. & Tuğ, S., (2008). *Biyolojik çeşitlilik ve orman ekosistemlerindeki önemi*. Ankara: Orman ve Biyolojik Çeşitlilik, Doğa Koruma Merkezi.