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Comparison of Turkish Science Curricula and British Science Curriculum in Terms of Environmental Education

Süleyman Akçay [1]

Abstract

A common and important problem that threatens all humanity today is environmental problems. A comprehensive effort is indispensable for the permanent solution of environmental problems. Again, in this process, it is important for all countries and societies to work simultaneously and collaboratively. However, perhaps qualified environmental education is a must in this process. In this context, all curricula around the world, especially science curricula, are rapidly being enriched in terms of environmental education. The purpose of this study is to compare Turkish and British science curricula in terms of environmental education. In this context, the science curricula of the two countries at primary and secondary school levels (3rd-8th grades) were compared in the context of environmental education. Turkey's 2018 and 2024 curricula were used in the study. The study generally falls into the document analysis method. In particular, it falls into the category of content analysis. In this research, British and Turkish science curricula were compared in three categories. First, the frequency of use of environmentally related keywords in the curriculum was examined. Secondly, the numbers and contents of environmentally related acquisitions were compared. Finally, it was examined whether there were independent courses on environmental education. As a result, Turkish science curriculum stands out in terms of the frequency of use of environmental concepts. Again, in terms of the number of environmental acquisitions, the 2018 Turkish science curriculum includes more acquisitions. However, in terms of the distribution and content of the acquisitions, the English science curriculum is more harmonious, meaningful and effective. In addition, the Turkish 2024 curriculum mentions the course "environmental education and climate change". However, there is no information about the content of the course. Within the framework of the research findings, it would be beneficial to enrich the Turkish science curriculum in terms of effective acquisitions for environmental education. Finally, it can be suggested that the Turkish science curriculum be enriched in terms of the protection of natural resources.

Keywords: Environment, Education, Science Education, Curriculum, Turkish, British.

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Türk Fen Bilimleri Öğretim Programları ile İngiliz Fen Bilimleri Öğretim Programının Çevre Eğitimi Açısından Karşılaştırılması

Süleyman Akçay [1]

Öz

Günümüzde tüm insanlığı tehdit eden ortak ve önemli bir sorun çevre sorunlarıdır. Çevre sorunlarının kalıcı olarak çözülmesi için ise kapsamlı bir gayret vazgeçilmezdir. Yine bu süreçte tüm ülke ve toplumların eş zamanlı ve işbirliği içerisinde çalışması önem taşımaktadır. Ancak belki de bu süreçte nitelikli çevre eğitimi olmazsa olmazların en başındadır. Bu bağlamda dünya çapındaki tüm öğretim programları, özellikle fen bilimleri öğretim programları, çevre eğitimi açısından hızla zenginleştirilmektedir. Bu çalışmanın amacı ise Türk ve İngiliz fen bilimleri öğretim programlarını çevre eğitimi açısından karşılaştırmaktır. Bu bağlamda iki ülkenin ilkokul ve ortaokul düzeyindeki (3-8. sınıflar) fen bilimleri öğretim programları çevre eğitimi bağlamında karşılaştırılmıştır. Çalışmada Türkiye'nin 2018 ve 2024 öğretim programları kullanılmıştır. Çalışma yöntem açısından içerik analizi sınıfındadır. Bu araştırmada İngiliz ve Türk fen bilimleri öğretim programları üç kategoride karşılaştırılmıştır. İlk olarak çevreyle ilgili olan anahtar kelimelerin öğretim programlarındaki kullanım sıklığına bakılmıştır. İkinci olarak çevre ile ilgili kazanımların sayıları ve içerikleri kıyaslanmıştır. Son olarak ise çevre eğitimine dair bağımsız derslerin olup olmadığına bakılmıştır. Sonuç olarak Türk fen öğretim programları çevre ile ilgili kavramların kullanım sıklığı açısından öne çıkmaktadır. Yine çevre ile ilgili kazanım sayısı açısından 2018 Türk fen bilimleri öğretim programında daha fazla kazanım yer almaktadır. Ancak kazanımların dağılımı ve içeriği açısından İngiliz fen bilimleri öğretim programı daha uyumlu, anlamlı ve etkili bir nitelik taşımaktadır. Ayrıca Türk 2024 öğretim programında "çevre eğitimi ve iklim değişikliği" dersinden bahsedilmektedir. Ancak dersin içeriği hakkında bilgi yoktur. Araştırma bulguları çerçevesinde Türk fen bilimleri öğretim programının çevre eğitimine yönelik etkili kazanımlar açısından zenginleştirilmesi faydalı olacaktır. Son olarak Türk fen bilimleri öğretim programının doğal kaynakların korunması açısından zenginleştirilmesi önerilebilir.

Anahtar Kelimeler: Çevre, Eğitim, Fen Eğitimi, Öğretim Programı, Türk, İngiliz.

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Introduction

Humanity has faced many adverse environmental conditions throughout history. However, with industrialization and urbanization caused by humans, environmental problems have become more dominant and noticeable. As a result, various environmental protection laws have been on the agenda in many western countries since the late 1960s (Bozkurt, 2017). Greenhouse gas emissions released into the atmosphere since the industrial revolution have surpassed all emissions before the industrial revolution. Due to this incomparable increase in greenhouse gas emissions, environmental problems such as global warming and climate changes have emerged (Adebayo, Pata and Akadiri, 2024). The environmental problem threatens the entire world as a whole. However, perhaps only global warming and climate changes are more visible now (Świąder et al., 2020). It is known that a recyclable, active and balanced life process prevails in ecosystems where there is no human intervention. However, human intervention without taking into account the integrity of the ecosystem and its recycling balance harms this process. The disturbed balance in ecosystems has reached serious levels such as global warming and waste problems and has become a threat to the whole world (Ruggerio, 2021). The basis of many environmental problems, especially climate change, lies in unsustainable industrialization and the rapid increase in greenhouse gas emissions that it brings (Aksakal, 2013). To overcome these problems, 28 OECD countries decided to reduce carbon dioxide emissions at least on a local scale and rapidly increase their renewable energy production (Cerqueira, SoBritishiasis and Proença, 2021).

It is of great importance that all countries and societies work in coordination in order to significantly reduce and permanently solve environmental problems. In this process, the need for qualified environmental education seems inevitable. In this regard, all curricula around the world, especially science curricula, are rapidly being enriched in terms of environmental education (Wilson, 2000; Reid, 2019). The purpose of environmental education is to convey information about the environment we live in, to protect nature, to teach how to benefit from the environment in a healthy way and to live in interaction with the environment (Çelik, 2011). Another aim of environmental education is to improve people's attitudes towards the environment and to raise individuals who are more conscious about the place they live in (Başer, 2019). Education of this age group becomes even more important, especially since it is seen that the habits and attitudes acquired at a young age are more permanent (Alım, 2006). In order for people to know and fulfill their responsibilities towards the environment, they need to gain a positive attitude towards the environment (Karatekin, 2013). Teaching program and the teachers who implement it are of great importance in the process of developing positive attitudes towards the environment in students and therefore in society. Many developed countries are updating their curricula in order to provide more qualified environmental education to their citizens and are making efforts to make them more qualified in terms of environmental education (Reid, 2019; Turan and Koç, 2021).

In Turkey, environmental education is mainly given within the scope of the science program (Akınoğlu and Sarı, 2013). It can be said that science curriculum updates made in Turkey in recent years have shown progress in terms of environmental education (Akınoğlu and Sarı, 2013; Alım, 2006). However, comparing the Turkey science curriculum with other developed countries will give us more meaningful data. In this context, in this research, British and Turkish science curricula were compared in terms of

environmental education. It is thought that this research will contribute to future curriculum updates.

Balkan Kıyıcı and Atabek-Yiğit (2023) compared Turkish and Brazilian science curriculum in terms of environmental education. Derman and Gürbüz (2020) compared the primary school science curriculum of Australia, Singapore, Ireland, Canada and Turkey in terms of environmental education. Erten, Köseoğlu and Gök (2022) similarly compared Turkey, Canada and America. Tasar and Karaçam (2008) compared the Turkish science curriculum with the US state program of Massachusetts. Özata-Yücel (2010) compared the 1999 TIMSS (Trends in International Mathematics and Science Study) exam data among the countries taking this exam. Güven and Gürdal (2011) broadly compared science education in Turkish and Canada. However, when looking at the above studies, no comparative study was found specific to England and Turkey. In addition, the studies were mostly conducted with pre-2018 programs. In this sense, it is believed that this study will fill an important gap in terms of environmental education and science education. The problem statements of the research are as follows:

In British and Turkish science curricula:

- How often are concepts related to the environment included?
- How often are environmental acquisitions included?
- How does it include courses related to the environment?

Method

Research Model

In this study, the document analysis method was used. Document analysis is one of the qualitative research methods in which written documents are examined for a purpose. In this context, while the research is generally a qualitative research, it is a document analysis study in particular. Since direct observation or interviews are not performed in document analysis, written sources regarding the problem are needed (Yıldırım and Şimşek, 2016). It involves examining documents and documents sequentially, obtaining information about the subject, making sense of it, and comprehensively interpreting the information obtained (Corbin and Strauss, 2008). Since this type of research does not involve one-on-one observations and interviews, it saves time for the researcher. In this research, the Turkish science curriculum received online was compared with the British science curriculum obtained by the same method.

Data Collection and Analysis

In this study, text analysis method was used. In this method, a framework is created based on the problem statement of the research, and analysis is carried out by determining under which categories and themes the data will be collected in line with this framework (Baltacı, 2019). A three-stage method was followed in this study. First of all, the curricula were compared in terms of environmental concepts. Secondly, it was examined how often and in what way environmental achievements were included in the curricula. Thirdly and finally, it was examined whether science curricula included independent environmental courses. Turkish science curricula (2018 and 2024) cover six grades, including grades 3 and 8 (Ministry of National Education (MoNE, 2018; MoNE, 2024).

Two of the British science curricula were included in the study to be equivalent to this curriculum. These are key stages 1 and 2 and key stage 3. Key stage 1 and 2 cover the 3rd and 6th grades, and key stage 3 covers the 7th, 8th and 9th grades (NCE, 2023).

Reliability and Validity

The science curricula examined were examined in three stages: environmental concepts, environmental achievements and whether they included environmental courses. In the first stage, a 90-minute meeting was held with the participation of two educational programmers and researchers with at least 15 and 20 years of experience. At this meeting, it was decided with a hundred percent consensus that two concepts (environment and ecology) could be used as basic concepts in comparing these two curricula in terms of environmental education. Afterwards, the frequency of these concepts being included in the curriculum was investigated by the researcher. While looking at the frequency of these basic concepts, it was taken into account whether environmental discipline was meant in terms of the context of the sentence. Finally, the suitability of the study for its purpose was discussed by the same three experts, including the researcher. As a result, it was accepted with 100% consensus that comparison of concepts, achievements and course contents would be sufficient to compare curricula.

Findings

In this section, the data obtained according to the problem sentences are listed. In the study, the findings of the three problem sentences are presented in tables, respectively. In the following, the comparisons in each table are explained separately.

How often are environmental concepts included in British and Turkish science curricula?

Table 1. Frequency of Environmental Concepts in The Science Curricula of Both Countries.

Curriculum	Number of pages of curricula	Concepts	Frequency of use
Turkish 2018	58	Environment	73
		Ecosystem	1
Turkish 2024	234	Environment	151
		Ecosystem	4
British	47	Environment	22
		Ecosystem	2

As seen in Table 1, the existence of two environmental concepts in science curricula has been examined. Turkish 2018 and 2024 science curricula 3-8. It is a single file covering the classes and consists of 58 and 234 pages respectively. In contrast, the British science curriculum is prepared in the form of basic stages. When we look at the curricula in terms of the frequency of use of the mentioned concepts, the concept of environment is included more frequently (73, 151 times) in Turkish curricula. The concept of ecosystem was included four times in the 2024 Turkish science curriculum. The concept of ecosystem is included twice in the British science curriculum. However, the page numbers of the 2024 Turkish science curriculum and the British science curriculum are quite different from

each other. In this sense, the 2024 Turkish science curriculum has almost 5 times more pages than the British science curriculum. With this logic, it can be said that the British science curriculum includes the concept of ecology to a significant extent.

How often are environmental acquisitions included in British and Turkish science curricula?

Table 2. The status of environmental acquisitions in the science curricula of both countries.

	Acquisitions	Classes
Turkish 2018	F.3.6.1.1. Classifies entities as living and non-living using examples around him.	3rd grade
	F.3.6.2.1. He knows the environment he lives in.	
	F.3.6.2.2. He takes an active role in cleaning the environment he lives in.	
	F.3.6.2.3. Explains the differences between natural and artificial environments.	
	F.3.6.2.4. Designs an artificial environment.	
	F.3.6.2.5. Recognizes the importance of the natural environment for living things.	
	F.3.6.2.6. It conducts research and suggests solutions to protect the natural environment.	
	F.3.7.2.2. Discusses the damage that battery waste will cause to the environment and what needs to be done about it.	
	F.4.5.5.2. Explain the negative effects of sound pollution on human health and the environment.	4th grade
	F.5.6.2.1. It expresses the importance of the interaction between humans and the environment.	5th grade
	F.5.6.2.2. It offers suggestions for solving an environmental problem in its immediate surroundings or in our country.	
	F.5.6.2.3. It makes inferences about environmental problems that may occur in the future as a result of human activities.	
	F.5.6.2.4. Discusses the benefits and harms in human-environment interaction using examples.	
	F.6.4.4.2. Discusses the effects of using different types of fuels for heating purposes on humans and the environment.	6th grade
	F.7.4.5.4. It pays attention to waste control in its immediate surroundings.	7th grade
	F.8.6.3.3. Discusses the causes and possible consequences of global climate changes.	8th grade
	F.8.6.4.1. Takes care to be economical in the use of resources.	

	F.8.6.4.2. Designs projects for economical use of resources.	
	F.8.6.4.3. Explains the importance of separating solid waste for recycling.	
	F.8.6.4.4. It offers solution suggestions using research data on the contribution of recycling to the country's economy.	
	F.8.6.4.5. It indicates the problems that may be encountered in the future if resources are not used economically and offers solutions.	
Total: 21 Acquisitions		
Turkish 2024	FB.3.4.3. Ability to solve problems regarding waste separation	3rd grade
	FB.3.8.1. Ability to use evidence to determine the characteristics of living things' habitats	
	FB.3.8.2. Ability to operationally define the diversity of living things in the habitat	
	FB.3.8.3. Ability to question what to do to protect living spaces	
	FB.4.7.3. Ability to evaluate solution suggestions for the problem of the effects of light pollution on living things	4th grade
	FB.4.8.1. Ability to make scientific inquiries about establishing a sustainable living space	
	FB.5.7.1.1. Ability to classify recyclable and non-recyclable materials in household waste	5th grade
	FB.5.7.1.2. Ability to make scientific inferences about the importance of recycling in the effective use of resources	
	FB.5.7.1.3. Ability to reflect on experiences regarding the applicability of waste management in the immediate environment	
	FB.6.7.1.1. Ability to question the importance of biodiversity for natural life	6th grade
	FB.6.7.1.2. Ability to predict factors that threaten biodiversity based on research data	
	FB.6.7.2.1. Ability to discuss the effects of using fuel for heating on humans and the environment	
	FB.6.7.2.2. Ability to produce solutions to an environmental problem in the immediate surroundings or in our country	
	FB.7.7.2.1. Ability to question the importance of economical use of resources	7th grade
	FB.8.4.2.3. Ability to make scientific inquiries to prevent sound pollution	8th grade
	FB.8.7.2.3. Ability to discuss the causes and possible consequences of global climate changes	
Total: 16 Acquisitions		
	Notes and guidance	**Class**

British	Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Where possible, they should observe the growth of flowers and vegetables that they have planted.	
	Pupils should use the local environment throughout the year to explore and answer questions about animals in their habitat. They should understand how to take care of animals taken from their local environment and the need to return them safely after study. Pupils should become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets.	3rd grade
	Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy. They should raise and answer questions that help them to become familiar with the life processes that are common to all living things. Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter). They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example, plants serving as a source of food and shelter for animals. Pupils should compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest.	4th grade
	Pupils should use the local environment throughout the year to observe how different plants grow. Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants.	
	Linked with work in geography, pupils should explore different kinds of rocks and soils, including those in the local environment.	5th grade
	Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment	
	Recognise that environments can change and that this can sometimes pose dangers to living things.	
	Pupils should use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. They should identify how the habitat changes throughout the year. Pupils should explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants. Pupils could begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects.	6th grade
	Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.	

They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment.	
Pupils might work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.	7th grade
Pupils might work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.	
Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	
How organisms affect, and are affected by, their environment, including the accumulation of toxic materials.	
The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops	8th grade
Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction	
Total: 16 Acquisition	

In the Turkish 2018 science curriculum, a total of 21 environmental acquisitions were determined between the 3rd and 8th grades. Eight of them are at the 3rd grade level, one at the 4th grade level, four at the 5th grade level, one at the 6th grade level, one at the 7th grade level and finally six at the 8th grade level.

A total of 16 environmental achievements were identified in the Turkish 2024 science curriculum between the 3rd and 8th grades. Four of them are at the 3rd grade level, two at the 4th grade level, three at the 5th grade level, four at the 6th grade level, one at the 7th grade level and lastly two at the 8th grade level.

A total of 16 environmental acquisitions have been identified in the British science curriculum between 3rd and 8th grades. Two of them are at the 3rd grade level, two at the 4th grade level, one at the 5th grade level, five at the 6th grade level, three at the 7th grade level and the last three at the 8th grade level.

How do the science curricula in British and Turkish include courses related to the environment?

There is no independent environmental course in both the Turkish 2018 and the British science curriculum. The Turkish 2024 curriculum mentions the course "environmental

education and climate change". However, there is no information about the content of the course. In British's key stage 3 science curriculum (covering 7th, 8th and 9th grades), under the subheading "relationships in an ecosystem", the matter and energy cycles in the ecosystem and its relationship with the environment are emphasized at the 8th and 9th grade levels. The British science curriculum has a more general structure. In this context, it is stated in general terms which topics will be emphasized, but does not go into details (NCE, 2023, p. 4).

The concept of environment is included quite frequently in the 2018 and 2024 Turkish science curricula (Table 1). However, when we look at the achievements, the emphasis on ecosystem perception and the interaction of all living things in the ecosystem is not included in the Turkish science curriculum. Despite this, the interdependence of organisms in the ecosystem is emphasized in several acquisitions in the British science curriculum (Table 2).

Conclusion, Discussion and Recommendations

In this section, first the results of the three problem statements will be summarized respectively. Accordingly, two concepts related to the environment stand out in the science curricula of the two countries examined. The first of these is the environment and the other is the ecosystem. While the concept of environment was mentioned 73 times in the Turkish 2018 science curriculum, it was included 151 times in the Turkish 2024 science curriculum. It is mentioned 22 times in the British science curriculum. When compared to the number of pages of science curricula, the 2018 Turkish science curriculum stands out in terms of the concept of environment. The concept of ecosystem is included once in the 2018 Turkish science curriculum, four times in the 2024 Turkish science curriculum, and twice in the British science curriculum. However, it can be seen that in the British science curriculum, a more detailed emphasis is placed on matter and energy cycles with the last two acquisitions at the 8th grade level (Table 2). These acquisitions are included under the heading "interactions and interdependencies" and the subheading "relationships in the ecosystem" (NCE, 2023, p. 7).

Secondly, looking at the frequency of environmental-related achievements in the science curricula of both countries, the Turkish 2018 science curriculum includes a total of 21 environmental-related acquisitions. Turkish 2024 and British science curricula include a total of 16 acquisitions related to the environment (Table 2). It is seen that the frequency of acquisition in the Turkish 2018 science curriculum is highest in the 3rd grade, followed by the 8th grade. In the Turkish 2024 science curriculum, it is seen that the frequency of acquisition is highest in the 3rd and 6th grades, followed by the 5th grade. In this respect, contrary to the expectation that environmental acquisitions will increase as the class level increases, there is a heterogeneous distribution.

A total of 16 environmental acquisitions have been identified in the British science curriculum between grades 3 and 8. Two of them are at the 3rd grade level, two at the 4th grade level, one at the 5th grade level, five at the 6th grade level, three at the 7th grade level and finally three at the 8th grade level (Table 2). As a result, it is seen that the total number of environmental-related acquisitions in the 2018 Turkish science curriculum is higher. However, it can be said that the acquisitions in the British science curriculum are more compatible in terms of distribution and content. Again, it can be said that the

acquisitions in the British science curriculum are more meaningful and effective because they are detailed and descriptive.

In addition, the Turkish 2024 curriculum mentions the course "environmental education and climate change". However, there is no information about the content of the course. The concepts of energy and matter cycles are important concepts for a more meaningful and holistic understanding of environmental education (Boschhuizen and Brinkman, 1995; Johnson and Činčera, 2019). In this sense, the British science curriculum has significant advantages over the Turkish science curriculum in teaching the perception of the ecosystem and the cycles of energy and matter within the ecosystem and its impact on the environment.

Özata-Yücel (2010) similarly reported that Turkish's science program is weaker in terms of environmental issues compared to the programs of Ireland, the USA, Canada and New Zealand. He also stated that the curriculum of these countries includes independent programs and courses related to the environment, which is considered necessary by him. Again, Erten, Köseoğlu, and Gök (2022) compared the 2018 primary school science curriculum of Canada and Turkish in terms of environmental education and determined that Turkish's primary school science curriculum contains significant deficiencies compared to Canada. In this sense, it may be recommended to add more qualified environmental acquisition to the curriculum.

Artvinli and Bayar (2018) find the acquisitions in primary and secondary school curriculum insufficient in terms of recycling, which is considered an important component of environmental education. In order to eliminate this deficiency, it is deemed necessary to first reconsider the curriculum within this framework. Positive changes to be made in the curriculum will also be reflected in the textbooks, since the textbooks are prepared based on the curriculum (MoNE Journal of Announcements, 2023).

Balkan Kıyıcı and Atabek-Yiğit (2023) examined Turkish and Brazilian science curriculum in terms of environmental acquisitions. As a result, it was reported that the science curricula of both countries mainly included cognitive acquisitions in terms of environment and were lacking in terms of effective acquisitions. In this sense, it would be beneficial to enrich the Turkish science curriculum in terms of affective gains regarding environmental education.

A study was conducted comparing the primary school science curricula of Australia, Singapore, Ireland, Canada and Turkey in terms of environmental gains. Here, while Turkish science curriculum ranks second after Canada in terms of environmental achievements, it has been observed that the curricula of all countries do not have any achievements on "protection of soil, water and seas" (Derman and Gürbüz, 2020). In this context, it may be recommended to enrich the Turkish science curriculum in terms of protecting natural resources.

In future studies, the status of more specific concepts such as recycling, global warming, and climate change in curriculum can be investigated. In addition, addressing the environmental acquisitions in the Turkish science curriculum more homogeneously according to grade levels will ensure the permanence and more meaningfulness of environmental education.

In the future, comparing the science curriculum of more countries with Turkish's science curriculum using different methods may provide more detailed information on this subject. If these findings and suggestions are taken into account in the new updates to be made in the curriculum, a more qualified environmental education can be achieved.

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References / Kaynakça

Adebayo, T. S., Pata, U. K., & Akadiri, S. S. (2024). A comparison of CO_2 emissions, load capacity factor, and ecological footprint for Thailand's environmental sustainability. *Environment, Development and Sustainability, 26*(1), 2203-2223, https://doi.org/10.1007/s10668-022-02810-9

Akınoğlu, O., & Sarı, A. (2013). Environmental education in primary school curriculum *Marmara University Atatürk Education Faculty Journal of Educational Sciences, 30*(30), 5-29.

Aksakal, Ş. (2013). *Determination of Science and Technology Teacher Candidates' Sensitivity About Recycling*. [Unpublished master's thesis]. Fırat University, Elazığ, Türkiye.

Alım, M. (2006). Environment and environmental education in primary school in turkey within the process of the membership of European union. *Kastamonu Education Journal, 14*(2), 599-616

Artvinli, E., & Bayar, V. (2018). Recycling as a value in primary and secondary school curriculum. *Osmangazi Journal of Educational Research (OJER), 5*(1),18-33.

Balkan Kıyıcı, F., & Atabek-Yiğit, E. (2023). Examining environmental acquisitions in science curriculum: a comparison of brazil and turkey. *Trakya Journal of Education, 13*(1), 593-605, https://doi.org/10.24315/tred.1067454

Baltacı, A. (2019). The qualitative research process: how to conduct a qualitative research? *Ahi Evran University Institute of Social Sciences Journal, 5*(2), 368-388, https://doi.org/10.31592/aeusbed.598299.

Başer, Ş. (2019). *Perception of high school students about recycling and waste*. [Unpublished master's thesis]. Gazi University, Ankara, Türkiye.

Boschhuizen, R., & Brinkman, F. G. (1995). The concept of cycles for environmental education. *Environmental Education Research*, *1*(2), 147-158, https://doi.org/10.1080/1350462950010202

Bozkurt, O. (2017). *Çevre eğitimi.* Ankara: Pegem Akademi Yayıncılık.

Çelik, Z. (2011). *The place of packaging waste recycling education in the primary education curriculum and investigation of recycling practices in primary education institutions (Istanbul provincial example).* [Unpublished master's thesis]. Yıldız Tecnical University, İstanbul, Türkiye.

Cerqueira, P. A., SoBritishiazis, E., & Proença, S. (2021). Assessing the linkages between recycling, renewable energy and sustainable development: Evidence from the OECD countries. *Environment, Development and Sustainability*, *23*, 9766-9791, https://doi.org/10.1007/s10668-020-00780-4

Corbin, J. & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. London: Sage Publication.

Derman, M., & Gürbüz, H. (2020). Investigation of primary science subjects in term of environmental attainments in Australia, Singapore, Ireland, Canada and Turkey. *The Journal of Academic Social Science*, *9*(9), 411-426, https://doi.org/ 10.16992/ASOS.482

Erten, S., Köseoğlu, P., & Gök, B. (2022). Environmental education in science teaching programs: the case of Turkey, Canada, America. *Mehmet Akif Ersoy University Journal of Education Faculty*, (*63*), 220-246, https://doi.org/10.21764/maeuefd.1019038

Güven, İ., & Gürdal, A. (2011). Comparative analysis of science education systems of Turkish and Canada. *Journal of Turkish Science Education*, *8*(4), 89-110.

Johnson, B., & Činčera, J. (2019). Development of the ecological concepts of energy flow and materials cycling in middle school students participating in earth education programs. *Studies in Educational Evaluation*, *63*, 94-101.

Karatekin, K. (2013). Developing a scale to measure pre-service teachers' attitudes towards solid waste and recycling: a validity and reliability study. *International Journal of Eurasia Social Sciences*, (10), 71-90.

MoNE Journal of Announcements (2023). *2023-2024 Eğitim öğretim yılı ders kitapları (Ocak-2023) [2023-2024 academic year textbooks (January-2023)].,* Retrieved January 25, 2024, from http://dhgm. meb. gov. tr/tebligler-dergisi/2023/2783_Ocak_2023. pdf

MoNE, (2018). *Fen bilimleri dersi öğretim programı (İlkokul ve Ortaokul 3, 4, 5, 6, 7 ve 8. Sınıflar) [Science course curriculum (grades 3-8)*]. Retrieved January 20, 2024, from https://mufredat.meb.gov.tr/Dosyalar/201812312311937-FEN%20B%C4%B0L%C4%B0MLER%C4%B0%20%C3%96%C4%9ERET%C4%B0M%20PROGRAMI2018.pdf

MoNE, (2024). *Fen bilimleri dersi öğretim programı (3, 4, 5, 6, 7 ve 8. sınıflar) [Science course curriculum (grades 3-8)].* Retrieved May 23, 2024, from https://cdn.eba.gov.tr/icerik/GorusOneri/2024Programlar/2024programfen345678.pdf

NCE (2023). *National curriculum in British: Secondary curriculum*, Retrieved February 20, 2023 https://www.gov.British/government/publications/national-curriculum-in-British-secondary-curriculum

Özata-Yücel, E. (2010). Comparison of 2005 primary science and technology curriculum in terms of goals and content with curriculum of different countries. *Uludag University Faculty of Education*, *23*(1), 293-310.

Reid, A. (Ed.). (2019). *Curriculum and environmental education: Perspectives, priorities and challenges*. London: Routledge.

Ruggerio, C. A. (2021). Sustainability and sustainable development: A review of principles and definitions. *Science of the Total Environment*, *786*, 147481, https://doi.org/10.1016/j.scitotenv.2021.147481

Świąder, M., Lin, D., Szewrański, S., Kazak, J. K., Iha, K., van Hoof, J., ... & Altiok, S. (2020). The application of ecological footprint and biocapacity for environmental carrying capacity assessment: A new approach for European cities. *Environmental Science & Policy*, *105*, 56-74, https://doi.org/10.1016/j.envsci.2019.12.010

Taşar, M., & Karaçam, S. (2008). Comparison of 6-8 grade science and technology curriculum framework of the Turkish republic and science and technology/engineering curriculum framework of Massachusetts. *The Journal of National Education, 37*(179).

Turan, S., & Koç, A. (2021). Evaluation of science education and social sciences curriculums in terms of environmental education. *Gazi Journal of Education Sciences, 7*(2), 178-195. https://doi.org/10.30855/gjes.2021.07.02.004

Wilson, T. L. (2000). Environmental education in the 21st century: Theory, practice, progress and promise. *The Journal of Environmental Education*, *31*(3), 40.

Yıldırım, A. & Şimşek, H. (2016). *Sosyal bilimlerde nitel araştırma yöntemleri* [*Qualitative research methods in the social sciences*], Ankara: Seçkin Yayıncılık.