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The Analysis of Middle School Science Course Contents of Out-of-School Learning Environment Guidebooks

Ümmü Gülsüm DURUKAN [a], Demet BATMAN [b], Ayşegül ASLAN [c*]

a Res. Asst. Dr., Giresun University, (https://orcid.org/0000-0002-9279-2812)

b Dr., Trabzon University, (https://orcid.org/0000-0001-6209-7045)

c* Asst. Prof. Dr., Trabzon University, (https://orcid.org/0000-0003-2363-0091) *aysegulaslan@trabzon.edu.tr

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ABSTRACT

This study aimed to analyze and compare the science contents of "Out of School Learning Environments Guidebooks (OSLEGs)" developed by the Ministry of National Education (MoNE) in the 2018-2019 academic year. The research was carried out by the document analysis method, one of the qualitative designs. Science content in the OSLEGs, selected randomly from seven provinces (Trabzon, Bursa, Denizli, Osmaniye, Erzurum, Sivas, and Diyarbakır), were analyzed in terms of units/subjects, learning outcomes, and learning environments. The findings indicated that the most qualified guidebook regarding relations between unit/subject - learning outcome and learning outcome - learning environment is Denizli's OSLEG. In addition, it has been determined that the science contents in many OSLEGs do not contain sufficient relations of unit/subject, learning outcome, and learning environment. Based on the results, it is recommended that the OSLEGs be reorganized at all grades to address more unit/subjects and learning outcomes.

Keywords: Document analysis, Out-of-school learning environment guidebook, Science course.

Okul Dışı Öğrenme Ortamları Kılavuzlarının Ortaokul Fen Bilimleri Dersi İçeriklerinin Analizi

ÖZ

Bu araştırmada, 2018-2019 eğitim öğretim yılında Milli Eğitim Bakanlığı (MEB) tarafından geliştirilen okul dışı öğrenme ortamları kılavuzlarının fen bilimleri dersi içeriklerinin incelenmesi ve illere göre karşılaştırılması amaçlanmıştır. Araştırma nitel desenlerden doküman analizi yöntemi ile yürütülmüştür. Türkiye'nin yedi bölgesinden rastgele seçilen yedi ilde (Trabzon, Bursa, Denizli, Osmaniye, Erzurum, Sivas ve Diyarbakır) hazırlanmış olan "Okul Dışı Öğrenme Ortamları Kılavuzları"nın (ODÖOK) fen bilimleri dersi içeriği ünite/konu, kazanım ve mekân yönünden analiz edilmiştir. Elde edilen bulgular; ünite/konu ve kazanım ilişkisi ile kazanım ve mekân ilişkisi açısından en zengin kılavuzun Denizli iline ait olduğunu göstermektedir. Ayrıca, birçok kılavuzdaki fen bilimleri ders içeriklerinin yeterli düzeyde ünite/konu, kazanım ve mekân ilişkileri içermediği tespit edilmiştir. Ulaşılan sonuçlara dayalı olarak; kılavuzların, tüm sınıf düzeylerinde daha fazla sayıda konu ve kazanıma değinerek kurulan kazanım-mekân ilişkilerinin artırılması ile öğretmenlerimize daha fazla seçenek sunularak bu öğrenme ortamlarından öğretim sürecinde daha fazla yararlanması ve öğrencilerimizin fen dersine olan ilgilerinin ve akademik başarılarının ülke çapında arttırılmasına katkıda bulunacağı düşünülmektedir.

Anahtar kelimeler: Doküman analizi, Okul dışı öğrenme ortamı kılavuzu, Fen bilimleri dersi.

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1 | INTRODUCTION

The change in student profiles (vis-à-vis learning styles, attention spans, etc.) resulting from the developments in the modern age requires adaptations in curricula, teaching methods, materials, and learning environments. The traditional approach to teaching, carried out only in classrooms, between four walls, and using only a blackboard, is now far from meeting the needs and expectations of students today. Focusing entirely on the time students spend in the school and classroom and preparing the instructional planning solely for the classroom environment results in neglect for other alternative spaces that can be used during instruction (Bransford, Brown, & Cocking, 2000). Out-of-school learning, which is one way of addressing this problem, is defined as the curriculum-based activities carried out outside the school to support formal education (Bozdoğan & Kavcı, 2016). While Öztürk (2009) defines *out-of-school learning* as learning processes that include educational activities in the nature and the living environment, Çiçek and Saraç (2017) define out-of-school learning environments as a less structured and more spontaneous educational environment than the classroom, which allows unexpected elements to emerge. Out-of-school learning environments may include "authentic" learning environments such as science centers, museums, public institutions, industrial organizations, nature camps, zoos, planetariums, or "virtual" learning environments such as web 2.0 tools, educational websites, and social media (Karademir, 2018). These environments offer students hands-on interaction opportunities with real objects or phenomena and allow them to learn by doing and experiencing (Bakioğlu & Karamustafaoğlu, 2020).

Studies have shown that students remember the information learned in out-of-school learning environments even after a long time, that is, learning retention is achieved in these environments (Anderson & Pisticelli, 2002; Bakioğlu & Karamustafaoğlu, 2020; Falk & Dierking, 1997; Sarıoğlan & Küçüközer, 2017; Türkmen, 2010). Conducting a study with 6th-grade students, Bozdoğan and Kavcı (2016) found that teaching activities outside the classroom significantly increased academic achievement in science courses. Furthermore, various studies conducted especially for the subject of science (Efe, 2019; Kaya, 2019; Kılıç, 2020; Metin, 2020) have concluded that out-of-school learning environments complement the textbook, students learn with fun, and environments such as science centers make a positive contribution to students' perceptions on the nature of science. The relevant literature on out-of-school learning environments includes studies conducted with students and pre-service/in-service science teachers. A study by Balkan Kıyıcı and Atabek Yiğit (2010) found that teacher candidates reported meaningful and permanent learning about wind power after their technical trip to a power plant as part of the "wind energy" subject in their "Energy and Environment" course. Mertoğlu (2019) also found that as a result of their out-of-school activities, teacher candidates achieved new and permanent learning in many subjects related to science, especially physics. Ocak and Korkmaz (2018) examined the opinions of science and pre-school teachers about out-of-school learning environments. The teachers in their study stated that out-of-school learning environments offer students the opportunity to learn by doing, concretize abstract information, and have positive contributions to their development. Similarly, in the study conducted by Batman (2020) in which physics teachers' views on out-of-school learning environments were examined, physics teachers reported that activities carried out in informal environments would positively affect students' attitudes and academic achievement and would be effective in facilitating and making learning permanent. According to Aslan and Demircioğlu (2019), chemistry teachers thought that out-of-school learning environments were suitable for chemistry teaching and stated that these environments helped students learn by doing, seeing the relationship of chemistry with daily life, and encouraging permanent learning. On the other hand, the related research literature shows that teachers find out-of-school learning environments effective in learning, but they do not prefer to conduct these activities for various reasons (Moseley, Reinke, & Bookout, 2002; Simmons, 1998; Tatar & Bağrıyanık, 2012). In this context, some studies (Bozdoğan, 2015; Güler, 2009; Thomas, 2010) emphasized that teachers do not have sufficient knowledge and experience about out-of-school learning environments. In addition, transportation difficulties, time constraints, crowded classrooms, difficult student control, and the presence of some official procedures make it difficult for teachers to prefer such activities (Dillon ve diğerleri, 2006; Erten & Taşçı, 2016; Karademir, 2013).

Considering the findings of the studies mentioned above, it is evident that besides the experiments and observations carried out in laboratories, activities performed in out-of-school learning environments are critical, especially in a course intertwined with daily life, such as science. Teachers' conducting science lessons in out-of-school learning environments increases student interest and success (Bozdoğan & Yalçın, 2006; Dori & Tall, 2000; Metin, 2020; Tatar & Bağrıyanık, 2012; Türkmen, 2018). In addition, it is known that teaching activities

implemented in out-of-school learning environments are known to be more effective in increasing student motivation towards science learning and developing their creativity compared to the applications carried out in the classroom environment (Bozdoğan & Yalçın, 2006; Kulalıgil, 2016; Metin, 2020). Rapp (2005) also states that as a result of associating the activities carried out in out-of-school learning environments with the acquisitions related to the subject, students achieve deep learning and socio-cognitive growth. However, the Science Curriculum approved in 2018 states that students should benefit from out-of-school learning environments, whose positive effects are summarized above (Ministry of National Education, 2018). For this context, "Out-of-School Learning Environments Guidebooks (OSLEGs)" were developed in 2019 by the Ministry of National Education (MoNE) for each province of Turkey, and their piloting was initiated. The guidebooks developed by the commissions formed by the Provincial Directorates of National Education aimed to associate subjects, learning outcomes, and learning environments to cover all levels from pre-school to high school. OSLEGs were created to associate out-of-school learning environments (OOSLEs) with primary and secondary education programs, allowing students to utilize better and understand these environments while also contributing to their learning by doing and experiencing the learning outcomes in the curriculum. A relationship should be established between the characteristics of the learning environments and the outcomes for the subjects that are more beneficial for students to be taught in an OOSLE than the classroom environment, and the number of outcomes should be included in a way that will offer teachers alternatives. In addition, characteristics like measurability and applicability should be considered when relating curriculum outcomes to OOSLEs in the OSLEGs (MoNE, 2019).

Considering that out-of-school activities require more labor and time than traditional teaching practices (Karademir, 2013), the OSLEGs should be designed to make teachers' work as easy as possible. Therefore, Batman (2020) recommends that curricula be arranged according to out-of-school learning environments, with curriculum-based activities planned before and after such learning. These activities should be made available for teachers' use. Despite the positive results, the related research literature has found that one of the reasons why teachers do not use out-of-school learning environments in teaching science is the difficulty of the planning involved (Carrier, Tugurian, & Thomson, 2013). However, the level of content in the developed OSLEGs (whether they are sufficient or not) and whether they are qualified to meet the needs of teachers, especially at the planning stage, is not yet known. Therefore, the current study aims to analyze the secondary school science course contents of OSLEGs by provinces and grades.

RESEARCH QUESTIONS

Answering the following research question was the aim of this study: "How do science course contents of OSLEGs differ by provinces in terms of unit/subject, learning outcome and learning environment?" As part of the main problem of the study, the answers to the following questions were sought:

1. How do the contents of OSLEGs for the 5th grade science course differ in terms of unit/subject, outcome and learning environment by province?
2. How do the contents of OSLEGs for the 6th grade science course differ in terms of unit/subject, outcome and learning environment by province?
3. How do the contents of OSLEGs for the 7th grade science course differ in terms of unit/subject, outcome and learning environment by province?
4. How do the contents of OSLEGs for the 8th grade science course differ in terms of unit/subject, outcome and learning environment by province?

This research is a study in which teachers and researchers can have an idea about the use of the content of the science course in the OSLEGs and the choice of different OOSLEs according to the subject or achievement. On the other hand, when the studies on OOSLEs are examined, it has been found that the results of the teaching activities carried out in the OOSLE(s) that are deemed appropriate within the scope of a determined unit or subject are examined from different perspectives. Based on these determinations, it is also important to determine the extent to which OOSLEs, which have been determined to have positive effects on the learning process, are included in the prepared OSLEGs, and especially in the studies conducted in the literature. In this context, with the results to be reached within the scope of the research; it is thought that the deficiencies in the OSLEGs can be determined before they are put into practice and suggestions can be made to quickly eliminate them. This is also

important in terms of supporting the data to be obtained during the implementation of the OSLEGs in the pilot schools.

2 | METHOD

The research part of the study was conducted by applying the document analysis method, which is one of the qualitative research methods. Document analysis can be defined as the systematic examination of printed or web-based documents and the information contained in these documents (Bowen, 2009). In other words, document analysis involves a close analysis of the written materials containing information or facts about the phenomenon to be investigated (Yıldırım & Şimşek, 2011).

RESEARCH SAMPLE

The OSLEGs, which can be accessed online until 1st September 2019 (deadline to post) of the middle school science course developed by the provincial education directorates in Turkey and also had science contents, were determined as the sample of the study and seven randomly chosen provinces (Trabzon, Bursa, Denizli, Osmaniye, Erzurum, Sivas and Diyarbakır) from each geographical region of Turkey were included in the analysis.

The OSLEGs were accessed from the websites of the provincial directorates of national education between May 1-30, 2020. The content of the science courses of these OSLEGs, which were developed in 2019, has remained unchanged. Therefore, the reviewed versions are still accessible on the websites of the relevant provincial directorates of national education (Appendix-1).

DATA COLLECTION AND ANALYSIS

The descriptive analysis technique was used in analyzing the data. This kind of analysis aims to present the findings to the reader in an organized and interpreted form. For this purpose, the data obtained are first described systematically. Then, these descriptions are explained, interpreted, cause-effect relationships are examined, and some results are reached (Yıldırım & Şimşek, 2011).

The middle school science course OSLEGs' contents of seven provinces included in the research sample and randomly selected from each region were subjected to descriptive analysis in terms of unit/subject, outcome, and learning environment. While the OSLEGs were analyzed descriptively, the number of outcomes included within the scope of units and subjects and the types of learning environments proposed in the context of these outcomes were determined. The learning outcomes are coded as 'O', and learning environments are coded as 'LE' on the tables. While presenting the findings related to the analysis of the outcomes, the outcomes in the OSLEGs are shown with 'x' and used together with the number of different outcomes mentioned (For example, 'x3' indicates three different outcomes for the subject). In addition, in the tables where the outcomes analysis is shown, the total number of the outcomes mentioned as related to the subject in the OSLEGs are also stated.

The learning environments in OSLEGs are grouped under 15 headings in Figure 1 by examining the learning environment classifications included in the guidebooks. In presenting the findings related to the analysis of the learning environments, the numbers for the classified groups were used (Figure 1).

Learning environments	1. Museums
	2. Science and Research Centers
	3. Art Centers
	4. Technoparks
	5. Historical and Cultural Places
	6. Libraries
	7. Natural Protected Area and Archaeological Sites
	8. Industrial Organizations
	9. Universities
	10. National, Thematic Parks and Gardens
	11. Various Institutions and Organizations (Governorship, Airport etc.)
	12. Healthcare Organizations
	13. HEPP and Power Plants
	14. Sports Areas
	15. Various Educational Organizations

Figure 1. *Categories of learning environments*

The OSLEGs were first analyzed by the researchers independently. Then, the accuracy of the classifications was confirmed by comparing the data obtained. Finally, the percentage of agreement between the researchers was calculated using Miles and Huberman (1994)'s intercoder reliability formula, and it was determined that the rate of agreement between the researchers was 0.96.

Grades were taken into consideration in displaying the data. It would be convenient to present the unit/subject, outcome, and learning environment information together for each grade to help readers understand and interpret the findings easily.

3 | FINDINGS

In this section, the findings obtained from the examination of middle school science course OSLEGs' contents categorized by unit/subject, outcome and learning environment relations are presented by grades. The findings showing the distribution of unit/subject, outcome, and recommended learning environment for the fifth-grade science course are summarized in Table 1.

Table 1. Units / Subjects, Outcome and Learning Environments Distribution for the Fifth-Grade Science Course in OSLEGs

Units / Subjects	Provinces	Bursa		Denizli		Erzurum		Osmaniye		Sivas		Diyarbakır		Trabzon		Number of provinces referring to the subject
		O	LE	O	LE	O	LE	O	LE	O	LE	O	LE	O	LE	
1. Sun, Earth, and Moon	1. Structure and Properties of the Sun			x2	10			x	1, 10	x	3					3
	2. Structure and Properties of the Moon			x2	10					x2	3					2
	3. Movements and Phases of the Moon	x	2,	x2	10			x	1, 10							3
	4. Sun, Earth, and Moon			x	10			x	1, 10							2
2. World of Living	1. Getting to Know the Living Beings	x	1,9, 10	x	7,9,10	x	9	x	1,7, 10	x	2,11	x	1, 10	x	1	7
3. Measurement of Force and Friction	1. Measurement of Force			-	-			x	2	x	2					2
	2. Frictional Force	x3	2	x3	9,15			x	2	x	2					4
4. Matter and Change	1. State Change of Matter			x	11											1
	2. Distinctive Properties of Matter			x	11											1
	3. Heat and Temperature			x	11			x	9					x	11	3
	4. Heat Affects Matters			x2	11			x2	9							2
5. Spread of Light/ Physical Events	1. Spread of Light			x	1,3,11											1
	2. Reflection of Light			x2	1,3,11			x	10							2
	3. Interaction of Light with Matter	x	1	x	1,3,11			x	10							3
	4. Umbra	x2	1, 2	x2	1,3,11			x	10							3
6. Human and Environment	1. Biodiversity	x2	1, 10	x2	7,8,9, 11	x	9	x2	1, 7	x2	10,11	x2	1, 9	x	10	7
	2. Human-Environment Relationship	x4	8	x4	7,8,9, 11	x	10	x2	10, 7					x2	9, 11	5

	3. Catastrophic Natural Phenomena	x2	2, 11	x2	7,8,9, 11			x2	11		x	9, 10	4	
7. Electrical Circuit Elements	1. Representation of Circuit Elements with Symbols and Circuit Diagrams	x	2	x2	15		x2	2			x	9	4	
	2. Variables Affecting Bulb Brightness in a Simple Electrical Circuit			x	15		x	2					2	
Number of outcomes referred to on the basis of provinces		17		33		3	19		10	3	7		92	61

*O: Number of outcomes referred to, LE: Recommended type of learning environment.

There are seven units in the curriculum for the fifth-grade science course and 20 subjects within these units. When the frequency of these subjects is examined on the basis of provinces, it can be seen that the subjects of "Getting to Know the Living Beings" in the "World of Living" unit and "Biodiversity" in the "Human and Environment" unit are also mentioned in the OSLEGs of the seven provinces examined in the study (Table 1). On the other hand, it found that the subjects of "State Change of Matter" and "Distinctive Properties of Matter" in the unit "Matter and Change," besides the "Spread of Light" in the unit "Spread of Light" are the least-frequent subjects, mentioned in the OSLEG of only one province. These issues are followed by the subject of "Human-Environment Relationship" in the "Humans and Environment" unit, which is mentioned in the OSLEGs of five provinces. As for the number of outcomes mentioned on the basis of provinces, 33 outcomes were listed under 19 subjects were found to have been mentioned in the Denizli province's OSLEG. On the other hand, the analysis showed that the OSLEG of Erzurum province mentions three outcomes within the scope of three subjects, and the Diyarbakır province's OSLEG outlines three outcomes under two subjects.

The recommended learning environments for seven units and 20 subjects in the fifth-grade science course curriculum are given in Table 1. When the proposed learning environments were examined in the context of the unit, the units that were offered the most suggestions with six different types of learning environment suggestions were found to be "World of Living" and "Humans and Environment." When the distribution of the unit/subject and learning environment suggestion in the OSLEGs was examined on the basis of provinces, the analysis showed that nine different types of learning environment suggestions were included in the OSLEG of Denizli province, and five different types of learning environment suggestions were included in the OSLEGs of Bursa and Osmaniye provinces. It was observed that there are two different learning environment suggestions in the OSLEG of Erzurum province.

The curriculum for the sixth-grade science course includes seven units and 20 subjects within these units (Table 2). When the frequency of the subjects by the seven provinces is examined, the subjects of "Circulation System" in the "Systems in Our Body" unit, "Fuels" in the "Matter and Heat" unit, and "Interaction of Sound with Matter" in the "Properties of Sound" unit were found to be included in the OSLEGs of five provinces. It was further determined that the least-often mentioned subject in the OSLEGs for the sixth-grade science course was the subject of "Density" in the "Matter and Heat" unit, as referred by only one province. It was determined that the subjects of "Regulation and Control Systems" in the "Systems in Our Body and Health" unit and "Conductive and Insulating Materials" in the "Transmission of Electricity" unit and the "Solar and Lunar Eclipses" in the unit titled "Solar System and Eclipses"; and the "Support and Movement System", "Digestive System", "Respiratory System" and "Excretion System" in the "Systems in Our Body" unit; and "Resultant Force" and "Movement with Constant Velocity" in the unit titled "Force and Motion"; along with the "Particulate Structure of Matter" in the "Matter and Heat" unit; as well as the "Speed of Sound" in the "Properties of Sound" unit were included in the OSLEGs of two provinces. Furthermore, 59 outcomes for 20 subjects were included in the curriculum of the Denizli province's OSLEG, while the OSLEG of Erzurum province only touched on three outcomes in two subjects.

The recommended learning environments for the seven units and 20 subjects in the sixth-grade science course curriculum are shown in Table 2. Examination of the proposed learning environments revealed that that the unit titled "Properties of Sound" is the unit that has the most diverse suggestions, with seven different learning environments. This unit is followed by the "Systems in Our Body" unit, with six different learning environment recommendations. When the distribution of the unit/subject and learning environment suggestions in the OSLEGs were examined on the basis of provinces, it was found that the Denizli province's OSLEG, with 10 different types of learning environment suggestions, and the Osmaniye province's OSLEG, with seven different suggestions, contained the highest number and variety of learning environment suggestions. On the other hand, only two different types of learning environments were suggested in the OSLEGs of Erzurum and Sivas provinces.

Table 2. Units / Subjects, Outcome and Learning Environments Distribution for the Sixth-Grade Science Course in OSLEGs

Units/Subjects	Provinces	Bursa		Denizli		Erzurum		Osmaniye		Sivas		Diyarbakır		Trabzon		Number of provinces referring to the subject
		O	LE	O	LE	O	LE	O	LE	O	LE	O	LE	O	LE	
1. Solar System and Eclipses	1. Solar System			x2	10			x2	1, 10	x2	2					3
	2. Solar and Lunar Eclipses			x3	10			x	1, 10							2
2. Systems in Our Body	1. Support and Movement System	x	1,2	x	15											2
	2. Digestive System	x	1	x3	9											2
	3. Circulation System	x	1	x5	12					x	2	x	11	x	11	5
	4. Respiratory System	x	1	x	9											2
	5. Excretion System	x	1	x	9											2
3. Force and Motion	1. Resultant Force			x3	7,14					x	2					2
	2. Movement with Constant Velocity			x2	9					x	2					2
4. Matter and Heat	1. Particulate Structure of Matter	x	2	x2	2											2
	2. Density			x4	9,11											1
	3. Matter and Heat			x4	15			x4	9					x	9	3
	4. Fuels	x3	1,2	x3	11	x	11	x	9					x2	9, 12	5
5. Properties of Sound	1. Spread of Sound	x	2	x	3,5,10, 11,15					x	2					3
	2. Hearing The Sound Differently in Different Environments	x	2	x2	3,5,10, 11,15					x	2	x	9			4
	3. Speed of Sound	x	2	x	3,5,10, 11,15											2
	4. Interaction of Sound with Matter			x5	3,5,10, 11,15	x2	3, 11	x3	3,5,7	x2	2,5	x	11			5

6. Systems and Health in Our Body	1. Regulation and Control Systems			x5	9									x	12	2	
	2. Sense Organs	x	1	x4	9,11			x2	2							3	
	3. The Health of Systems	x	1,11	x2	11,12							x2	11,12	x2	12	4	
7. Transmission of Electricity	1. Conductive and Insulating Materials			x2	15			x	9							2	
	2. Electrical Resistance and Related Factors			x3	15			x	9	x	2			x	8	4	
Number of outcomes referred to on the basis of provinces		14		59		3		15		10		5		8		62 / 104	

*O: Number of outcomes referred to, LE: Recommended type of learning environment.

Table 3. Units / Subjects, Outcome and Learning Environments Distribution for the Seventh-Grade Science Course in OSLEGs

Units / Subjects	Provinces	Bursa		Denizli		Erzurum		Osmaniye		Sivas		Diyarbakır		Trabzon		Number of provinces referring to the subject
		O	LE	O	LE	O	LE	O	LE	O	LE	O	LE	O	LE	
1. Solar System and Beyond	1. Space Researches			x6	10,15			x2	1, 10	x2	2			x	4, 9	4
	2. Beyond Solar System: Celestial Bodies			x4	10,15			x4	1, 10							2
2. Cell and Divisions	1. Cell			x3	2,9			x2	2	x2	2					3
	2. Mitosis			x2	2,9	x	9									2
	3. Meiosis			x3	2,9											1
3. Force and Energy	1. Force and Weight Relationship	x	2													1
	2. Force, Work and Energy Relationship	x2	2													1
	3. Energy Conversions	x2	2	x2	9,11			x3	9							3
4. Pure Substances and Mixtures	1. Particulate Structure of Matter			x4	9											1
	2. Pure Substances	x2	1, 2	x3	9									x	8	3

	3. Mixtures	x2	2													1
	4. Separation of Mixtures															---
	5. Domestic Waste and Recycling	x3	1, 8	x5	8,11	x	8	x4	8	x3	8	x	8	x2	8, 9,	7
5. Interaction of Light with Matter	1. Absorption of Light	x2	1, 2	x2	13,15			x2	9			x	10	x	11	5
	2. Mirrors	x2	2							x2	2					2
	3. Refraction of Light and Lenses			x4	11,15	x	10			x	2			x	7, 10	4
6. Reproduction, Growth and Development in Living Beings	1. Reproduction, Growth and Development in Humans			x3	9											1
	2. Reproduction, Growth and Development in Plants and Animals	x	8	x4	7,10,11					x2	10,11	x	2, 9	x	9, 10	5
7. Electric Circuits	1. Connecting Types of Bulbs	x2	2	x6	11,15			x4	13, 9					x	8	4
Number of outcomes referred to on the basis of provinces		19		51		3		21		12		3		8		50 / 117

*O: Number of outcomes referred to, LE: Recommended type of learning environment.

The curriculum for the seventh-grade science course includes seven units and 19 subjects comprised of these units (Table 3). When the frequency of subjects by province was examined, it was found that the subject of "Domestic Waste and Recycling" in the unit labeled "Pure Substances and Mixtures" is mentioned in the guidebooks of all the provinces examined. Following this, the subjects of "Absorption of Light" in the unit titled "Interaction of Light with Matter" and "Reproduction, Growth, and Development in Plants and Animals" in the unit titled "Reproduction, Growth and Development in Living Beings" were mentioned in the OSLEGs of five provinces. On the other hand, no province mentioned the "Separation of Mixtures" in the unit titled "Pure Substances and Mixtures" in the OSLEGs. In addition, the "Meiosis" subject in the "Cell and Divisions" unit, the "Force and Weight Relationship" subject in the "Force and Energy" unit, the "Force, Work and Energy Relationship", "Particulate Structure of Matter", and "Mixtures" subjects in the "Pure Matter and Mixtures" unit, and the subject of "Reproduction, Growth and Development in Humans" in the unit titled "Reproduction, Growth and Development in Living Beings" were mentioned only by one province. Considering the number of outcomes mentioned on the basis of provinces, it was found that 51 outcomes outlined under 14 subjects within the seven units in the curriculum are included in the Denizli province's OSLEG. In contrast, Erzurum and Diyarbakır's OSLEGs have only three outcomes for three subjects.

The learning environments recommended for seven units and 19 subjects in the seventh-grade science course curriculum are shown in Table 3. When the recommended learning environments are examined, the study revealed that the unit titled "Interaction of Light with Matter" contained eight different types of learning environment suggestions, and that the units "Solar System and Beyond", "Reproduction, Growth and Development in Living Beings", and "Electric Circuits" included six different learning environment suggestions. When the distribution of the unit/subject and learning environment suggestions in the OSLEGs was examined on the basis of provinces, it was seen that the Denizli province's OSLEG ranked first with 8 different types of learning environment suggestions; the OSLEGs of Osmaniye and Trabzon followed Denizli with six different types of learning environment recommendations (Table 3).

The curriculum for the eighth-grade science course includes seven units and 22 subjects (Table 4). When the frequency of the subjects was examined by province, it was determined that the subject of "Electricity Conversion" of the unit titled "Electric Charges and Electric Energy" was mentioned in the OSLEGs of six provinces, and the "Simple Machines" subject of the "Simple Machines" unit and "Sustainable Development" subject of the "Energy Conversions and Environmental Science" unit were mentioned in the OSLEGs of five provinces. On the other hand, the subjects of the "Periodic System" and "Interaction of Matter with Heat" in the unit of "Matter and Industry" were mentioned in none of the OSLEGs. In addition, the analysis showed that the subjects of "Inheritance," "Mutation and Modification," and "DNA and Genetic Code" in the "DNA and Genetic Code" unit, along with the "Food Chain and Energy Flow" and "Energy Conversions" in the "Energy Conversions and Environmental Science" unit, and the "Electric-Charged Objects" in the unit of "Electric Charges and Electric Energy" were mentioned by only one province. When Table 4 is analyzed according to the number of outcomes mentioned on the basis of provinces, it is clear that 55 outcomes for 20 subjects are mentioned in the Denizli province's OSLEG, and four outcomes for four subjects are mentioned in the Diyarbakır province's OSLEG.

The learning environments suggested in OSLEGs for the seven units and 22 subject titles in the eighth-grade science course curriculum are presented in Table 4. When the learning environments suggested in the OSLEGs were examined by unit, it was determined that the units suggesting the highest number of learning environments was the "Simple Machines" with 10 different types of learning environment, followed by the "Electric Charges and Electric Energy" unit with eight different types of learning environment. When the distribution of the unit/subject and learning environment suggestions in the OSLEGs was examined on the basis of provinces, the Denizli's OSLEG with 10 different types of learning environment suggestions and Trabzon's OSLEG with eight different types of learning environment stood out with the most frequent suggestions.

Table 4. Units / Subjects, Outcome and Learning Environments Distribution for the Eighth-Grade Science Course in OSLEGs

Units/Subjects	Provinces	Bursa		Denizli		Erzurum		Osmaniye		Sivas		Diyarbakır		Trabzon		Number of provinces referring to the subject
		O	LE	O	LE	O	LE	O	LE	O	LE	O	LE	O	LE	
1. Seasons and Climate	1. The Formation of the Seasons	x	2	x	11					x2	11					3
	2. Climate and Air Movements			x2	11	x	11							x	11	3
2. DNA and Genetic Code	1. DNA and Genetic Code			x3	2,7,9											1
	2. Inheritance			x3	2,7,9											1
	3. Mutation and Modification			x3	2,7,9											1
	4. Adaptation	x	1	x	2,7,9											2
	5. Biotechnology	x	11	x3	2,7,9	x	9									3
3. Pressure	1. Pressure			x3	7,11	x	9	x3	9					x	5	4
4. Matter and Industry	1. Periodic System															---
	2. Physical and Chemical Changes	x	2	x	2,7,8, 9,11	x	9									3
	3. Chemical Reactions	x	2	x	2,7,8, 9,11											2
	4. Acids and Bases			x7	2,7,8, 9,11									x	9	2
	5. Interaction of Matter with Heat															---
	6. Chemical Industry in Turkey			x2	9	x	8					x	8	x2	9	4
5. Simple Machines	1. Simple Machines	x	2	x2	1,8,10,15			x2	9			x	1	x	3,7, 10,14	5
6. Energy Conversions and	1. Food Chain and Energy Flow			x	2,7,11											1
	2. Energy Conversions			x3	2,7,11											1

Environmental Science	3. Matter Cycles and Environmental Problems			x3	2,7,11									x	9	2
	4. Sustainable Development			x5	8			x2	8	x2	8	x	8	x	8	5
7. Electric Charges and Electric Energy	1. Electric Charges and Electrification			x3	5,9,11,15					x	2					2
	2. Electric-Charged Objects			x2	5,9,11,15											1
	3. Electricity Conversion	x2	1	x6	10,11,13, 15	x	13	x2	13	x	2	x	13			6
Number of outcomes referred to on the basis of provinces		8		55		6		9		6		4		8		52 / 98

*O: Number of outcomes referred to, LE: Recommended type of learning environment.

Table 5. Distribution of the Number of Subjects and Outcomes mentioned in Different Grades for the Science Course in OSLEGs by Provinces

Units \ Provinces	Bursa		Denizli		Erzurum		Osmaniye		Sivas		Diyarbakır		Trabzon	
	Number of Subjects	Number of Outcomes	Number of Subjects	Number of Outcomes	Number of Subjects	Number of Outcomes	Number of Subjects	Number of Outcomes	Number of Subjects	Number of Outcomes	Number of Subjects	Number of Outcomes	Number of Subjects	Number of Outcomes
5.1. Sun, Earth, and Moon	1	1	4	7			3	3	2	3				
5.2. World of Living	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5.3. Measurement of Force and Friction	1	3	1	3			2	2	2	2				
5.4. Matter and Change			4	5			2	3					1	1
5.5. Spread of Light	2	3	4	6			3	3						
5.6. Human and Environment	3	8	3	8	2	2	2	4	2	4	1	2	3	4
5.7. Electrical Circuit Elements	1	1	2	3			2	3					1	1
6.1. Solar System and Eclipses			2	5			2	3	1	2				
6.2. Systems in Our Body	5	5	5	11					1	1	1	1	1	1
6.3. Force and Motion			2	5					2	2				
6.4. Matter and Heat	2	4	4	13	1	1	2	5					2	3
6.5. Properties of Sound	3	3	4	9	1	2	1	3	3	4	2	2		

6.6. Systems in Our Body and Health	2	2	3	11			1	2			1	2	2	3
6.7. Transmission of Electricity			2	5			2	2	1	1			1	1
7.1. Solar System and Beyond			2	10			2	6	1	2			1	1
7.2. Cell and Divisions			3	8	1	1	1	2	1	2				
7.3. Force and Energy	3	5	1	2			1	3						
7.4. Pure Substances and Mixtures	3	7	3	12	1	1	1	4	1	3	1	1	2	3
7.5. Interaction of Light with Matter	2	4	2	6	1	1	1	2	2	3	1	1	2	2
7.6. Reproduction, Growth and Development in Living Beings	1	1	2	7					1	2	1	1	1	1
7.7. Electric Circuits	1	2	1	6			1	4					1	1
8.1. Seasons and Climate	1	1	2	3	1	1			1	2			1	1
8.2. DNA and Genetic Code	2	2	5	13	1	1								
8.3. Pressure			1	3	1	1	1	3					1	1
8.4. Matter and Industry	2	2	4	11	2	2					1	1	2	3
8.5. Simple Machines	1	1	1	2			1	2			1	1	1	1
8.6. Energy Conversions and Environmental Science			4	12			1	2	1	2	1	1	2	2
8.7. Electric Charges and Electric Energy	1	2	3	11	1	1	1	2	2	2	1	1		

The number of subjects and outcomes mentioned for the units in all grades within the science course were determined on the basis of provinces and presented in Table 5. Denizli is the city that touches on the highest number of subjects and outcomes, followed by Osmaniye, Bursa, and Trabzon, respectively. However, Erzurum and Diyarbakır include the least number of subjects and outcomes related to the science course. As for the fifth-grade science course content, it can be seen that the OSLEGs with the highest number of subjects and outcomes belong to Denizli and Osmaniye provinces, while the least number of subjects and outcomes are mentioned in the OSLEGs of the provinces of Erzurum and Diyarbakır. The current study showed that for the content of the sixth-grade science course, the most subjects and outcomes were mentioned in the OSLEG of Denizli province, and the least number of subjects and outcomes were mentioned in the OSLEG of Erzurum province. Concerning the seventh-grade science course content, it was found that the OSLEG that mentioned the highest number of subjects and outcomes belonged to Denizli province and the OSLEGs mentioned the least number of subjects and outcomes belonged to Erzurum and Diyarbakır provinces. Regarding the content of the eighth-grade science course, the highest number of subjects and outcomes are mentioned in the Denizli province's OSLEG and the least in the Sivas province's OSLEG (Table 5). Table 6 shows the distribution of the learning environments recommended in the OSLEGs for the subjects and outcomes included in the science course curriculum by grade and province.

Examining Table 6, showing the distribution of learning environment recommendations for the science course by grade and province, it is clear that the highest number of learning environment suggestions are made in the OSLEGs content of Denizli, Bursa, and Osmaniye for the fifth-grade science course; Denizli and Osmaniye for the content of the sixth-grade science course; Denizli, Trabzon, and Osmaniye for the content of the seventh-grade science course; and Denizli and Trabzon for the content of the eighth-grade science course.

When the same data are examined in terms of learning environment diversity, it is observed that museums, science and research centers, industrial organizations, national, thematic parks and gardens, universities, and various institutions and organizations are frequently recommended. Museums, universities, and national, thematic parks and gardens were mainly recommended as the learning environments to visit in the content of the fifth-grade science course. The most frequently recommended learning environments for the sixth-grade science course were science and research centers, universities, and various institutions and organizations. For the seventh-grade science course, the most recommended science and research centers, industry organizations, universities, and national, thematic parks and gardens content. In the content of the eighth-grade science course, industrial organizations, universities, various institutions and organizations, and HEPPs and power plants emerged as the most highlighted.

Table 6. Distribution of the Learning Environments Recommended in Different Grades for the Science Course in OSLEGs by Provinces

	5th Grade							6th Grade							7th Grade							8th Grade						
Learning Environments	Bursa	Denizli	Erzurum	Osmaniye	Sivas	Diyarbakır	Trabzon	Bursa	Denizli	Erzurum	Osmaniye	Sivas	Diyarbakır	Trabzon	Bursa	Denizli	Erzurum	Osmaniye	Sivas	Diyarbakır	Trabzon	Bursa	Denizli	Erzurum	Osmaniye	Sivas	Diyarbakır	Trabzon
1. Museums	4	4		5		2	1	8			2				3			2				2	1				1	
2. Science and Research Centers	5			4	3			6	1		1	8			8	3		1	4	1		4	11			2		
3. Art Centers		4			2				4	1	1																	1
4. Technoparks																					1							
5. Historical and Cultural Places									4		1	1											2					1
6. Libraries																												
7. Natural Protected Area and Archaeological Sites		4		3					1		1					1					1		12					1
8. Industrial Organizations	1	3												1	2	1	1	1	1	1	3		5	1	1	1	2	1
9. Universities	1	5	2	2		1	3		7		4		1	2		7	1	3		1	3		11	3	2			3
10. National, Thematic Parks and Gardens	2	5	1	8	1	1	2		6		2					3	1	2	1	1	2		2					1
11. Various Institutions and Organizations	1	11			3		2	1	8	2			3	1		5			1		1	1	12	1		1		1
12. Healthcare Organizations									2				1	3														
13. HEPPs and Power Plants																1		1					1	1	1		1	
14. Sports Areas									1																			1
15. Various Educational Organizations		3							8							5							4					

4 | DISCUSSION & CONCLUSION

The purpose of this study was to analyze the middle school science course content in OSLEGs of randomly selected seven provinces from each geographic region of Turkey by comparatively analyzing unit/subject, outcome, and learning environment variables. In this section, the findings regarding the research problems are interpreted in light of the related literature, and the results are presented.

When the contents of the science course in OSLEGs were examined holistically depending on the frequency of subject mentions in provinces (for instance, "number of provinces referring to the subject" in Table 1-4), it was observed that biology in the fifth grade, biology, chemistry, and physics in the sixth grade, chemistry in the seventh grade, and physics in the eighth grade were highlighted. When analyzed on the basis of grades, it was found striking that although physics-based subjects (10 subjects) were higher in number in the fifth grade, biology-based subjects (4 subjects) were given a higher coverage in the OSLEGs. However, in the sixth grade, while physics subjects were found to be predominant (10 subjects), it was observed that a chemistry-based unit containing four subjects had the same weight as physics units in the OSLEGs. Similarly, in the seventh grade, physics-based subjects (9 subjects) were more frequent than biology and chemistry (5 subjects). Considering all these findings, the study presented that the frequency of mentioning physics and biology-based subjects lagged behind the frequency of addressing chemistry-based subjects. However, Mertoğlu (2019) found that teacher candidates prefer the subjects and outcomes related to physics and biology from among the units in the science curriculum while practicing extracurricular activities. Köseoğlu and Türkmen (2020) claimed that science teachers mostly use out-of-school learning environments on biology-based subjects. Still, they want to use these environments for all subjects included in the curriculum. Considering these results, it can be suggested that the contents of the OSLEGs should be developed to support the studies of teachers and teacher candidates in this scope, especially in terms of the diversity of outcome-learning environment relations in the context of physics and biology-based subjects. If teachers are presented with as many outcomes and learning environment suggestions as possible in terms of applying out-of-school learning activities with the OSLEGs, the process of preparing out-of-school learning activities can be facilitated, and teachers' interest and motivation to carry out these activities can be increased.

The current study showed that all provinces established an outcome-learning environment relationship for the "World of Living and Human and Environment" units in the fifth-grade science course in their OSLEGs (Table 1). For these units, the analysis revealed that learning environments in the categories of museums, science and research centers, natural sites and archaeological sites, universities, national, thematic parks and gardens, and various institutions and organizations were generally preferred. Kaya (2019) also found that after the field trip carried out within the scope of the "World of Living" unit, students see the zoos included in the thematic park classification as an educational environment, that they learn while having fun in zoos, and that they think that subjects for science lesson can be learned outside the classroom environment. In the study conducted by Özata Yücel and Kanyılmaz (2018), teachers stated that they found the units of "Living and Life and Phenomenon" suitable for the students to acquire life skills that are not specified as separate outcomes in the science curriculum and are implicitly given in other outcomes. They explained that the reason for this is that the subjects included in these units are more intertwined with life, arouse curiosity in students, and are suitable for learning by living. In this context, it can be said that an environment where students can learn life skills with fun can be provided in all provinces by conducting fifth-grade science lessons in the learning environments recommended in the OSLEGs. Ural Keleş (2018) also obtained findings that support this result in his study, and based on these findings, he concluded that the science and engineering activities included in the curriculum would make a significant contribution to the students' learning by experiencing. Still, it is important to provide the necessary environments for these contributions to be made.

When the contents of the sixth-grade science course in Table 2 and the relation between the subject/outcome and the learning environment were examined, the subjects of "Support and Movement System, Digestive System", "Respiratory System", and "Excretory System" were mentioned only in the OSLEGs of two provinces (Bursa and Denizli). However, it is very thought-provoking that in the OSLEGs of Erzurum and Osmaniye provinces, no outcome and learning environment relation was made on any subject within the scope of this unit. Focusing on student views regarding the use of OOSLEs, Bakioğlu and Karamustafaoğlu (2020) found that these environments had a positive effect on students' learning due to the attractiveness of the materials used during the teaching process of the Human Body subject, and they determined that they help students attain knowledge and skills. Similarly,

Yavuz Topaloğlu (2016) concluded that after the activity carried out in a dialysis center to teach the unit of "Systems in Our Body", students improved their conceptual understanding of organ donation, which is one of the socio-scientific topics. Despite such positive findings, it is pretty surprising that a unit based on biology, which every person should learn very well to acquire basic knowledge of life, is given very little attention in the OSLEGs. This is because the basic life knowledge taught concretely in the preschool period is actually based on abstract and complex structures (Bilaloğlu, 2005; Gümüş, Demir, Koçak, Kaya, & Kırıcı, 2008). For this reason, it is vital to learning environment biology-based topics in the middle school OSLEGs in more detail to both put information based on individual health issues on a more solid basis in the minds of students at the secondary school level and to prevent them from having problems with prior knowledge during high school. However, the unit of "Force and Motion" in the sixth-grade science course was only mentioned in the OSLEGs of two cities (Denizli and Sivas) (Table 2). In addition, it can be said that there is not a lot of diversity when the units in Table 2, in which the relationship of the outcome-learning environment is frequently established, were examined. However, Bozdoğan and Kavcı (2016) revealed that paying due attention to out-of-school activities in science courses with out-of-school lesson plans developed as part of the "Force and Motion" unit improves students' academic success. Therefore, a higher number of out-of-school activities should be included in the teaching process to increase students' academic success and spread and develop the learning culture outside of school.

It was also found that an outcome-learning environment relationship is frequently established for the subject of "Domestic Wastes and Recycling," which is included in the chemistry-based "Pure Substances and Mixtures" unit in the content of the seventh-grade science course in the OSLEGs (Table 3). It was found that Recycling Facilities, which generally fall into the industrial organization category, are preferred as a learning environment. Katırcıoğlu (2019) studied the effect out-of-school learning activities (trips to a solid waste sorting facility, liquid waste oil storage unit and electronic waste collection-storage area) carried out as part of the subject of "Domestic Waste and Recycling" on the level of student awareness and perception of nature and revealed that out of school learning environments have a supportive effect on classroom learning. Furthermore, the activities carried out in the recycling facilities can be expected to have a positive effect on the development of students' environmental awareness. In his study, Aydın (2019) concluded that, following the workshop activities held in the Izmit Seka Paper Museum, which was visited as an out-of-school learning environment, the experimental group students' attitudes towards the environment became more positive than the other students.

When the content of the eighth-grade science course was examined province by province, it was obvious that the outcome-learning environment relationship is mainly established for the unit of "Electric Charges and Electric Energy" (Table 4). In the OSLEGs, HEPPs and power plants are generally suggested as the locations for the outcomes in this unit. A study conducted by Bozdoğan and Yalçın (2006) on the subject of energy determined that the equipment found in an Energy Park and the activities carried out here significantly affect the interest and academic outcome of secondary school students in science. In addition, based on their study conducted in a wind power plant, Balkan Kıyıcı and Atabek Yiğit (2010) concluded that the opportunities to obtain first-hand information, to make observations, and to support permanent and meaningful learning, and enabling social interactions with entertainment are the salient characteristics of the teaching activities organized in OOSLEs. Thus, if subject-related activities are carried out in the recommended learning environments, they can be expected to contribute to increasing student interest and success in science lessons. In addition, by associating simple machines that make our daily life easier with OOSLEs (for example, a seesaw in a playground), the working mechanisms of such machines can be taught in an easy and fun way. Another striking finding is that Erzurum and Sivas's OSLEGs do not refer to the "Simple Machines" unit. However, access to OOSLEs such as playgrounds is relatively easy in these cities (Table 4). When these findings are considered, it can be concluded that units such as "Seasons and Climate" and "Simple Machines" that can be easily associated with daily life are not adequately addressed in the OSLEGs. This conclusion can be interpreted as either indicating that the teachers in the commission are not aware of the OOSLEs around or do not know how to use such environments around them as an OOSLE.

When the findings (Table 6) were examined, the analysis revealed that museums, science centers, industrial organizations, universities, parks and gardens, and various other institutions and organizations were frequently recommended in the OSLEGs in terms of OOSLEs. It can be said that these environments are often recommended because of their high number and easy accessibility, as well as their positive effects on the academic achievement of students. Öz (2015) determined that the courses taught using science center activities developed according to the research-based learning approach were more effective in increasing students' academic success compared to the courses taught using the current curriculum. Further, Efe (2019) found that science centers cause a positive

change in student perceptions of the nature of science, and students defined science centers as very interesting, fun and useful. Cebeci (2019) also reported that science teachers thought that museums should be expanded with their rational function more emphasized, and museum environments should be developed to create interactive learning environments. On the other hand, it was found that the art center, technopark, historical and cultural sites, natural sites and archaeological sites, health institutions, HEPP and power plants, sports fields and various educational institutions are, used in the OSLEGs to a lesser degree. However, studies have shown that taking secondary school students to such learning environments as part of science courses provides benefits in many ways. For example, Yavuz Topaloğlu and Balkan Kıyıcı (2017) found that activities carried out in out-of-school learning environments enable students to learn new, unknown and different aspects of HEPPs, which is one of the socio-scientific issues. However, it was further determined that while thematic parks and gardens such as botanical parks were included as site suggestions in the OSLEGs, the planetariums, which are also classified under National, Thematic Parks and Gardens, were not. However, in the studies of Sontay, Tutar and Karamustafaoğlu (2016), Yılmaz (2018), and Başakçı (2018), it was stated that planetarium trips are effective in making the information more permanent and increasing student awareness of the professions related to space. Furthermore, these studies emphasized that such out-of-school learning environments should be included in the teaching process, as it is effective and fun to use in science teaching. The results obtained in similar studies support the conclusion that more diverse OOSLEs need to be included in the OSLEGs. When the findings in Table 6 are examined in terms of the recommended learning environments, libraries turn out to be not included as a learning environment to visit. As stated in the studies of Balcı, Uyar, and Büyükikiz (2012) and Sevmez (2009), students generally prefer to use the internet for research and especially the low rate of using publ, especially be the reason public use addition, the reason for this result can be attributed to the nature of the course, as is not very compatible with the library environment. It has been determined that in the subjects in which an outcome-learning environment relationship is established, a relationship is established between each outcome and a single learning environment (science center, museum, etc.), and an alternative learning environment cannot be presented. This situation may create the perception in teachers that if this learning environment cannot be visited, other environments cannot be evaluated. On the other hand, it is quite remarkable that the OSLEGs do not include school gardens. However, it is not necessary to choose a place physically outside out-of-school when it comes to out-of-school learning. If school gardens are designed for this purpose, it is thought that they can be both easily accessible and useful places for out-of-school learning. Similarly, school gardens are environments that encourage students to develop positive psycho-physical characteristics and acquire new knowledge in a healthy environment (Geušić, 2020). Many studies examining the effects of the school garden on the educational process show that the use of school gardens in the learning process provides many benefits to students, one of which is experiential learning (Başar, 2020; Papadopoulou, Kazana & Armakolas, 2020). School gardens, especially designed under a certain theme, enable to be intertwined with nature, to learn by doing and by living, and thus increase students' interest in science lessons (Riggs, 2020). Gülen and Bozdoğan (2021), in their study in which determined the use of school gardens by science teachers in their lessons, emphasized that almost half of the teachers use the school garden in their lessons, while the majority of the teachers, who use the school garden, use it at irregular intervals and to teach the lesson. In addition, when the middle school classroom levels were examined in terms of learning areas, it was determined that the teachers mostly used the school gardens in the "Physical Events" learning area.

When Table 5 and Table 6 were examined together, it can be concluded that while the OSLEG of Denizli province stands out in terms of both the mentioned unit/subject and the number of outcomes and the variety of learning environment suggestions, Erzurum, Diyarbakır and Sivas provinces' OSLEGs were found to be quite weak in these aspects. This may be due to the fact that the commissions that prepared the OSLEGs, which were relatively weak in terms of the variables examined, did not have enough knowledge, experience, and equipment regarding the theme of "OOSLEs". Considering the findings indicating that teachers do not have sufficient knowledge and experience about out-of-school learning environments (Bozdoğan, 2015; Güler, 2009; Thomas, 2010), the teachers in OSLEG preparation commissions may be suggested to request support from experienced academic staff about OOSLEs, with an eye towards improving the OSLEGs. MoNE (2019) suggested that in the well-designed OSLEGs a relationship should be established between the characteristics of the learning environments and the outcomes for the subjects that are thought to be more beneficial for students to be taught in an out-of-school learning environment than the classroom environment. The number of outcomes should be included in a way that will offer teachers alternatives.

Considering the findings obtained in the current study, it may be suggested that the OSLEGs be developed at all grades by strengthening the outcome-learning environment connections and thus, offering an adequate number of applicable options to teachers in the provinces they work. In this way, out-of-school learning activities can be used more extensively in the teaching process and can contribute to raising student interest and achievement in science. Since it is important to establish interdisciplinary relations in out-of-school learning activities (Bunting, 2006), information on interdisciplinary relations is added to OSLEGs (for example, supporting an outcome in a science course or a chosen out-of-school learning environment with other disciplines such as mathematics, geography, and visual arts) so that an effective learning activity in terms of time, integrity, and efficiency can be prepared.

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STATEMENTS OF PUBLICATION ETHICS

While preparing this article, the authors certify that research and publication ethics were followed, as well as copyright restrictions for the intellectual and artistic works used. Since this study was carried out with the method of document analysis, no ethics committee approval was required.

RESEARCHERS' CONTRIBUTION RATE

Three authors contributed equally to the article writing. All authors read and approved the final version manuscript.

CONFLICT OF INTEREST

The authors of this article declare that there is no personal conflict of interest within the scope of the study.

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Appendix-1. The links of the OSLEGs.

Bursa:
https://bursa.meb.gov.tr/Dosyalar/Okul%20D%C4%B1%C5%9F%C4%B1%20%C3%96%C4%9Frenme%20Ortamlar%C4%B1%20-%20ORTAOKUL.pdf

Denizli:
https://denizli.meb.gov.tr/meb_iys_dosyalar/2019_09/09133738_OKULUM_DENIZLI_ORTAOKUL_KITAP_.pdf

Diyarbakır: https://diyarbakir.meb.gov.tr/okulum_diyarbakir/ortaokul/ortaokul.pdf

Erzurum: https://erzurum.meb.gov.tr/meb_iys_dosyalar/2019_09/05153158_temelegitim.pdf

Osmaniye:
https://osmaniye.meb.gov.tr/dosya/okulumosmaniye/3_OkulumOsmaniye_Ortaokul_DersDisiOgrenmeOrtamlari.pdf

Sivas: https://sivas.meb.gov.tr/meb_iys_dosyalar/2019_09/09164515_03_ortaokul.pdf

Trabzon: https://trabzon.meb.gov.tr/meb_iys_dosyalar/2019_10/18152108_ortaokul.pdf