

High School Students' Metaphorical Perceptions about the Concept of Soil*

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Abstract

In this study, high school students' perceptions about the concept of soil were tried to be determined through metaphors. The phenomenological design was used in the research. Data from the study was collected from 451 students studying in four different types of high schools in the central district of Kütahya. As part of the study, students were distributed written data collection tools "Soil is like ... because...", and students were asked to write their metaphors and justifications for the concept of soil. The collected data was analyzed by content analysis technique. 133 different metaphors were produced by the students in relation to the concept of soil. This result showed that students perceived the soil as multifaceted. Among the metaphors produced, the most preferred metaphors were *mother* (48), *human* (47), *life* (40), *heart* (29), *water* (22) and *homeland* (16). It has been observed that students are influenced by mythological, cultural and religious factors in their choice and justification of metaphors. Metaphors have been studied under 10 different categories. Considering these categories, it was concluded that students' perceptions about the concept of soil were positive and that they were aware of the importance of soil in living life. In addition, it was understood that soil, which is a geographical concept, cannot be considered separately from its mythological, cultural and religious contexts. As a result of research, the versatility of the soil appears in curriculum units for Geography and Social Studies, in textbooks as a living being and the source of life; and the importance of soil as a resource will transfer to the student from presentation of the content of the course. The geographical, mythological, cultural and religious aspects of soil are to be included in activities that will allow us to detect soil as a whole have been proposed.

Keywords

Soil Perception, Student Perception, Geographical Education, Social Studies Education, Phenomenological Research, Metaphor

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The soil, which is considered one of the elements that form the basis of existence in classical philosophy and Islamic terminology, is a natural resource that allows humanity to transition into settled life with the beginning of processing for the purpose of growing crops and thus initiates the first great revolution in human history. As a geographical concept, soil is one of the main elements of the lithosphere, which is one of the spheres that make up the natural environment together with the atmosphere, hydrosphere, and biosphere. Soil is a loose and dispersed substance, full of plant and animal life, derived from the physical and chemical dispersion of rocks and the degradation and decay of biological beings, covering bedrock and part of the soil as a layer when it remains (Sanır, 2000, p. 257).

It consists of decomposition products of soil, bedrock and organic matter. The formation of these inorganic and organic soil substances, mixing with each other and taking their place in the structure of the soil occurs at the end of a series of events called *pedogenetic processes* (Çepel, 1988, p. 15). It takes quite a long time for these events to happen. In general, 1 cm of soil formation functions occur over a period of 80 to 400 years (Lutgens, Tarbuck, & Tasa, 2014, p. 135). According to Ergene (1997) cool, arid climates and hard rocks means soil formation needs thousands of years, while loess, alluvial material or glacial deposits, rainfall are abundant in temperate climates and 10 cm of upper soil layer can occur in a comparatively short time such as a hundred years (p. 76).

Soil is a source of life for plants, animals and people living on land; and wraps the Earth in the form of a cover with an average thickness of 15 cm (Efe, 2010, p. 42). Archaeological research has shown that the use of soil by humans for plant cultivation occurred in at least 8000 B.C. (Ergene, 1997, p. 1) and evidence shows that it started in Anatolia (Günaydın, 2015, p. 66).

As the world's population increases, the need for nutrients increases. Nutrients used in nutrition, vegetable and animal fats, fibers and skins used in the production of clothing come either directly or indirectly from the soil (Süzer et al., 2005, p. 2). For this reason, it is essential to use soil for the continuation of human life. First-class agricultural land on soil is limited. For this reason, the soil needs to be well protected (Ergene, 1997, p. 339).

From the moment humans began to live on soil they constantly changed its nature. It has led to the deterioration of natural balances and accelerated the usual rate of soil erosion (Güney, 2011, p. 93). Accelerated erosion caused by human activities such as destruction of natural vegetation, degradation of natural slope profiles, and misuse of land causes millions of tons of agricultural land to be transported by external forces to lakes, seas, and oceans every year (Doğanay & Sever, 2011, p. 329). Erosion leads to the loss of soil, as well as the loss of all living things that live in the soil and feed on the soil (Atalay, 2002, p. 179).

According to United Nations data, it is estimated that more than a third of the world's agricultural land has been lost to erosion since 1950 (Lutgens et al., 2014, p. 141). About 500 million tons of clay and miles of material are transported to reservoirs, lakes and seas by streams every year in Turkey. On average, the amount of material transported from 1 km² per year is over 600 tons, which is six times more than it should be in normal erosion areas (Atalay, 2002, p. 178). Turkey does not

have erosion problems in only 6.64% of its total area (Akpınar, 2011, p. 157). Most of the remaining areas (79%) are under the influence of erosion at a level that will lead to loss of soil and crop. Soils in Turkey are eroded 12 times more than in Europe, and 17 times more than in Africa (Süzer et al., 2005, p. 8). As a result, problems arise such as low yield in agriculture, economic and social problems, migration from rural to urban, and shortening of the economic life of reservoirs.

Considering the functions of the soil, there is a need to implement sustainable soil policies globally. Sustainable soil management has been proven to contribute to increasing food production, increasing the nutritional content of foods, and reducing the effects of climate change (FAO, 2017). Stopping soil degradation, rehabilitation of degraded soils, preventing non-purposeful soil use, spreading nature-friendly agricultural practices, effective solid waste disposal and establishment of treatment systems stand out as steps to be taken for sustainable soil management (TEMA, 2019).

On the other hand, soil has been one of the main subjects of art and literature throughout history. In particular, an important part of the classical works was the relationship between soil and human. Many writers, such as Hesiodos, Tolstoy, Gogol, Sholohov, have brought the reader face to face with the human reality that the soil forms (Güner, 2019). Famous Kyrgyz writer Cengiz Aytmatov published his first novel, *Soil Mother*, in 1963; Tolgonay, who lost his wife and three sons in World War II, became the subject of his friendship with the land and his concern with it.

As in all cultures, Anatolian culture was shaped by the soil, and soil took place in all aspects of life. In the casserole on the stove, in the wish in *Hıdırellez*, in the picture on the wall, in the played saz, the so-called soil has always existed (TEMA, 2019). Soil in Yunus Emre poems, delineated with images of creation, death, humility and worthlessness (Bars & Irmak, 2019). Mevlâna said, "Be like soil in humility!" by his advice, he praised the humility that he symbolized with the soil, showing as an example that many blessings, such as various fruits and grains, come out of the soil (Yaran, 2007). According to Karakuş and Keçe (2012), there are 74 proverbs related to the concept of soil in Turkish culture. In these proverbs, the soil is considered the reason for human existence and the importance of protecting and maintaining the soil is emphasized.

The folk bard Aşık Veysel described the soil as "Loyal Lover" in his poem "Black Soil". This poem of the bard is one of the most beautiful poems written on the generosity, purification and fertility of the land (Sezer & Yiğitoğlu, 2019). In his poems on soil, the bard touched on the maternity function of the soil, the healing aspect, the return of human to the soil, and the importance of winning *halal* (Şenocak, 2017).

The soil also has an important place in Turkish cinema. Many films have been made with the theme of soil ownership from the past to the present, novels have been adapted for cinema; in these films, village life, farming, windlass have been processed. Fifteen of the 403 films shot in Turkish cinema with a village theme are named after the concept of soil (Pösteki, 2012).

In addition, the soil has been considered a sacred being in many cultures. According to Ortaş (2017), the value that humanity to the soil is that it is clean and

not polluted. In ancient Anatolian Turks, the soil is the last blessed ring of activities, in Arab culture and Islamic tradition, when there is no water, the tayammum, which means preparation before worship for Muslims, performing with soil the hand of the person who is polluted among the people, cleaning the hand with the soil, the use of the soil (clay) in cleaning hair and washing clothes, shows this value that is appraised the soil (Ortaş, 2017). A study conducted by Solmaz (2017) found that the soil called “white soil” due to its color in Konya/Ereğli was used in home insulation, molasses production, baby swaddling; it was consumed as food, especially by pregnant women. It is popularly believed that pregnant women get rid of miscarriage by eating land. A soil-eating habit called geophagy is common, especially in sub-Saharan African country societies. In Kenya, for example, women associate geophagy with fertility and reproduction (Geissler et al., 1999).

Soils are of great importance for living life and are quite limited assets. Expanding, increasing or replacing existing soil on earth is a process that takes a very long time. For humanity, soil is an irreplaceable resource. For this reason, it is necessary to maintain the existing soils well. Many of the human factors that cause the destruction of the soil are situations that can be eliminated by consciousness. Situations that cause irreversible destruction of the soil, such as stubble burning, destruction of woodlands, fires, the opening of agricultural lands to settlement, can only be overcome by the correct perception of the soil. The role of teaching Geography and Social Studies is great in helping students to understand the increasing value of soil because these curriculums aim to equip students with geographical skills to help them gain a geographical awareness and perspective (Artvinli, 2010a).

Curriculums in Turkey were updated according to a constructivist approach and have been implemented since 2005. Artvinli (2012) evaluated the new curriculum's design as being skill-based and student-centered, the best curriculums Turkey ever had. In the Social Studies course curriculum in force in Turkey (Republic of Turkey Ministry of National Education, 2018), soil-related topics and achievements are included in two areas of learning. In the field of learning "Production, Distribution and Consumption", there are issues about using soil in economic activities, and about the importance of soil in production and management from the past to the present. In the "People, Places and Environments" learning area, erosion and landslides are treated as natural disasters associated with soil, and soil pollution is treated as an environmental problem. In the Geography curriculum (Republic of Turkey Ministry of National Education, 2018), direct achievements associated with soil is located within the "Natural Systems" unit in the 10th Grade curriculum. In the unit, soil formation processes, soil diversity on soil and factors affecting the distribution of soils in Turkey, soil types, soil use are given. In addition, the subject of soil is mentioned within the natural factors affecting settlement, biodiversity, distribution of population, economic activities, and formation of historical trade routes. Topics such as landslides, erosion, drought, soil pollution, desertification in natural disasters are also associated with the concept of soil and presented in textbooks. With these subjects and acquisitions, it is aimed to provide students with geographical skills such as working in the field, geographical observation, perception of change and continuity, map skills and using evidence.

Determining how students perceive soil will make an important contribution to the development of the curriculum related to soil and the organization of activities. In the literature, there are various studies on the concept of soil and the perception of soil. Some of these works are included below.

In studies aimed at determining students' perceptions of soil through metaphors, primary school students related to the concept of soil produced 44 metaphors (Albayrak & Hakverdi-Can, 2012). Secondary school students produced 93 metaphors (Güllü & Dönel-Akgül, 2020), and university students produced 13 metaphors (Gürten & Köseoğlu, 2019). In his study Yıldırım (2014), he concluded that in national and universal religions, starting with primitive tribal societies, the soil was always considered sacred and that human was perceived as the cause of existence because of his role in creation. Another study aimed at determining the connotations of the concept of soil based on texts in Turkish Sufi literature found that soil represents qualities such as loyalty, humility, vitality, submission, confidence; it revives death along with symbols of faith, fertility and mercy in minds (Harmancı, 2014). Azerbaijani proverbs also in literature (Buyukokutan-Töret, 2019), in Ottoman poetry (Batislam, 2019; Turan, 2019), in the poetry of Yunus Emre (Bars & Irmak, 2019), Aşık Veysel poems (Şenocak, 2017), Mahtumkulu poems (Sağlam, 2018), Fuzuli poems (Samancı, 2017) and Ceyhun Atuf Kansu poems (Şahbaz, 2012) located studies on the perception of soil.

In the current study, metaphors were used to determine high school students' perceptions about the concept of soil. A metaphor is to substitute a concept with similar characteristics for another concept with a different meaning, to compare an idea with another idea, to form an implicit comparison or analogy (Ritchie, 2013, p.4). According to Arslan and Bayrakçı (2006), a metaphor is an effective tool for teaching unknown things, for keeping learned information in mind. According to Sezer (Eraslan, references from 2003, 2011), the metaphorical thinking process consists of three stages: (1) an abstract/concrete phenomenon to be explained, (2) a concrete phenomenon used to explain this phenomenon, and linguistic expression of this phenomenon, (3) special equivalences established between these two phenomena.

For this purpose, the problem sentence of the research was created as “what are the metaphors that high school students produce about the concept of soil and what categories are these metaphors collected under?”

Methodology

Research Design

This research is qualitative research and is structured according to the phenomenon pattern. According to Yıldırım and Şimşek (2013), people are aware of some phenomena, but do not have a deep and detailed understanding of these phenomena (p. 78). Phenomenology research is an approach in which a researcher tries to understand and explain how an individual or a group of individuals experience a particular phenomenon by looking at it from the perspective of individuals (Kalaian, 2008, p. 730). According to Christensen, Johnson and Turner (2015), Husserl, who is considered the founder of this method of research, claimed that all individuals

experience the same phenomenon in the same way when assumptions and learned emotions are disabled. In contrast to Husserl, many subsequent case studies have made the argument that individuals or groups can experience the same phenomenon in different forms (Christensen, Johnson & Turner, 2015, p. 408). In this study, the phenomenon pattern was used as it was aimed to reveal the perceptions of high school students about the concept of soil and the ways they make sense of soil.

Working Group

The research was carried out with the participation of 468 students studying in four different types of high schools (Social Sciences High School, Anatolian High School, Anatolian Imam Hatip High School, Vocational and Technical Anatolian High School) in Kütahya Central district in the 2017-2018 academic year. There were 468 students who participated in the study. The distribution of these students by class is shown in Table 1.

Table 1
Distribution of Students in the Study Group by Class.

Class	<i>f</i>	Outside the Working Group		
		Group	<i>f</i>	%
9 th grade	129	4	125	27.72
10 th grade	142	6	136	30.15
11 th grade	119	2	117	25.94
12 th grade	78	5	73	16.19
TOTAL	468	17	451	100.0

The working group for the study it consisted of 468 students attending classes in 9th, 10th, 11th and 12th Grades. Research was conducted in a form distributed to students as a result of an examination. If they produce a mismatch between the metaphor and justification or give a blank form, it is considered to be invalid, therefore, seventeen students were to be excluded from the scope of the study and the findings were arranged according to the data obtained from 451 students. In the study group of the students 27.72% were in the 9th Grade, 30.15% were in the 10th Grade, 25.94% were in the 11th Grade, and 16.19% were in the 12th Grade.

Data Collection

In order to determine the students' perceptions about the concept of soil, students were distributed forms written "Soil is like ... because...". According to Saban (2009) in studies which metaphor is used as a research tool, the concept of "like" is used to establish the connection between the subject of the metaphor and its source. with the concept of "because", participants justify their metaphors.

The study was conducted during Geography lessons under the guidance of Geography teachers in school types who were sampled. Before the study was started, students were informed about the purpose of the study and talked about the study of metaphors with various examples. Students were then asked to complete the statement in the forms given. Students were given 20 minutes to study.

Data Analysis

The data of the research was analyzed by content analysis. In content analysis, the goal is to reach relationships and concepts that will help explain the data obtained in the research process. For this purpose, the collected data must first be conceptualized, then logically organized according to the emerging concepts, and finally the themes that describe the data must be identified (Yıldırım & Şimşek, 2013, p. 259). Coding and sorting, creating sample metaphors list, category development, ensuring validity and reliability, converting to quantitative data were used in the analysis and interpretation of metaphors developed by students related to the concept of soil (Saban, Koçbeker & Saban, 2006).

In the first phase of the analysis, the metaphors produced by the students were sorted alphabetically, and the metaphors and their justifications were examined. After the examination, 17 forms were extracted and excluded from the analysis, in which no metaphor related to the concept of soil was included, the metaphor was not justified, or the connection between the metaphor and the justification could not be logically established. Following this weeding out of responses, the metaphors produced by students were simply coded. A sample metaphor expression representing each metaphor was then selected from among the valid metaphors obtained. Finally, metaphors have been interpreted by dividing them into 10 different categories according to their rationale.

The validity of the research was provided by explaining how the results of the research were achieved and reporting the data in detail (Yıldırım & Şimşek, 2013, p. 291). In order to ensure its reliability, expert opinion was taken to determine whether the metaphors contained in the categories created in the research represent the categories created. Lists of metaphors and categories created by the researcher were examined by an expert. The categories created by the researcher and the matches made by the expert were compared. The reliability of research, by Miles and Huberman (1994) was calculated using a formula that it created based on the number of consensus and differences of opinion (p. 64). There was 79% reliability obtained in the study. After ensuring validity and reliability, the data was converted into quantitative data. Tables were created showing the frequency and percentage values for each category, and the data were interpreted in accordance with these tables.

Findings

In this section, tables and explanations showing the distribution of valid metaphors and these metaphors by categories obtained in the research are given. The frequency and percentile values of valid metaphors obtained in the study are given in Table 2.

Table 2
Frequency and Percentage Values of Metaphors Developed By High School Students about the Concept of Soil.

Row	Metaphor	f	Row	Metaphor	f	Row	Metaphor	f	Row	Metaphor	f
1	Mother	48	36	Brain	2	71	Crop	1	106	Cotton	1
2	Human	47	37	Wheat	2	72	Electroscope	1	107	Money	1
3	Life	40	38	Chocolate	2	73	Partner	1	108	Perfume	1
4	Heart	29	39	Vein	2	74	Universe	1	109	Battery	1
5	Water	22	40	Foundation of the state	2	75	Clothing	1	110	Protein	1
6	Homeland	16	41	World	2	76	Beautiful Thing	1	111	Mercy	1
7	Spirit	10	42	Electric Receiver	2	77	Raw Material	1	112	Soap	1
8	Life Source	9	43	Medicine	2	78	Hospital	1	113	Art	1
9	Home	9	44	Book	2	79	Treasury	1	114	War	1
10	Tree	7	45	Fruit	2	80	Light	1	115	Greenhouse	1
11	Friend	7	46	Shoulder	2	81	Human Body	1	116	Fortune	1
12	Child	7	47	Sponge	2	82	Part of Human	1	117	Shelter	1
13	Gold	6	48	Field	2	83	Wrought Iron	1	118	Mystery	1
14	Factory	6	49	Quilt	2	84	Paper	1	119	Cigarette	1
15	Love	6	50	Nest	2	85	Blood Cells	1	120	Digestive System	1
16	Market	5	51	Forgiving Presence	1	86	Sibling	1	121	Infinity	1
17	My Father	4	52	Family	1	87	Spoon	1	122	Stress Ball	1
18	Food Source	4	53	Lung	1	88	Gain	1	123	Water and Sun	1
19	Air	4	54	Anatolia	1	89	Shroud	1	124	Sufi	1
20	Greengrocer	4	55	Shoe	1	90	Big plane tree	1	125	Seed	1
21	Breath	4	56	Baby	1	91	Slave	1	126	Vase	1
22	Blessing	4	57	Food of Plants	1	92	Furrier's Shop	1	127	Virus	1
23	Lifetime	4	58	Refrigerator	1	93	Hometown	1	128	Skeleton of the Body	1
24	Mother and Father	4	59	Whole	1	94	Housing	1	129	Rain	1
25	Darling	4	60	Heaven	1	95	Grave	1	130	Creation	1
26	Plant	3	61	Wallet	1	96	Happiness	1	131	Life Provider	1
27	Living	3	62	Garbage	1	97	Coy Bride	1	132	Bed	1
28	Flower	3	63	Precious Stone	1	98	Oxygen	1	133	Emerald	1
29	Woman	3	64	DNA	1	99	School	1		Total	451
30	Stomach	3	65	Nature	1	100	Organ	1			
31	Cover	3	66	Natural Gas	1	101	Foundation of Forest	1			
32	Body	3	67	Source of Nature	1	102	Play Dough	1			
33	Food	3	68	Birth and Death	1	103	Toy	1			
34	Soup Kitchen	2	69	Wardrobe	1	104	Fear of Death	1			
35	Flag	2	70	Wall	1	105	Essence	1			

In this study, 133 different metaphors were produced by 451 students related to the concept of soil. Among them, the *mother* metaphor produced by 48 students is the most preferred metaphor. This metaphor was followed by the metaphors of *human* produced 47 times, *life* produced 40 times, *heart* produced 29 times, *water* produced 22 times and *homeland* produced 16 times (Table 2).

The distribution of metaphors developed by students for the concept of soil by category, the number of metaphors produced in each category, the number of students (f) and the proportions (%) are shown in Table 3.

Table 3

Categories of Metaphors Developed by High School Students about the Concept of Soil.

Categories	Metaphors	Metaphor numbers	f	%
Soil as a Source of Life	Heart (22), Life (22), Water (20), Human (7), Spirit (7), Life Source (6), Mother (6), Breath (4), Homeland (3), Food (2), Tree (2), Lung (1), Brain (1), Food of Plants (1), Wheat (1), Chocolate (1), DNA (1), Friend (1), Wall (1), World (1), Universe (1), Hospital (1), Air (1), Light (1), Part of Human (1), Blood Cells (1), Gain (1), Book (1), Oxygen (1), Organ (1), Foundation of Forest (1), Lifetime (1), Cover (1), Love (1), Water and Sun (1), Sponge (1), Body (1), Life Provider (1), Nest (1)	39	129	28.60
Soil as a Food Supplier	Mother (20), Factory (6), Human (5), Market (5), Food Source (4), Greengrocer (4), Blessing (4), Life (3), Life Source (3), Tree (2), Soup Kitchen (2), Plant (2), Heart (2), Fruit (2), Mother and Father (1), My Father (1), Cover (1), Brain (1), Wheat (1), Refrigerator (1), Spirit (1), Living (1), Source of Nature (1), Raw Material (1), Air (1), Spoon (1), Stomach (1), Protein (1), Greenhouse (1), Fortune (1), Darling (1), Digestive System (1), Water (1), Field (1), Food (1)	35	85	18.85
Soil as a Formatted Entity	Human (19), Child (6), Love (4), Flower (3), Spirit (2), Living (2), Life (2), Woman (2), Lifetime (2), Tree (1), Mother (1), Baby (1), Plant (1), Heaven (1), Vein (1), Crop (1), Wrought Iron (1), Heart (1), Happiness (1), Coy Bride (1), Play Dough (1), Friend (1), Darling (1), Water (1), Sufi (1), Field (1), Virus (1), Body (1)	28	61	13.53
Soil as a Valuable Asset	Homeland (11), Gold (6), Mother (2), Flag (2), Foundation of the State (2), Heart (2), Air (2), Love (1), Whole (1), Wallet (1), Child (1), Precious Stone (1), Nature (1), Natural Gas (1), Friend (1), Partner (1), Beautiful Thing (1), Treasury (1), Sibling (1), Essence (1), Money (1), Soap (1), War (1), Darling (1), Cigarette (1), Seed (1), Vein (1), Life (1), Emerald (1)	28	49	10.86
Soil as a Growing Entity	Mother (14), Life (6), Mother and Father (3), My Father (3), Tree (2), Family (1), Friend (1), Human (1), Woman (1), Book (1), School (1)	11	34	7.54
Soil as a Place to Return	Home (2), Life (2), Quilt (2), Forgiving Presence (1), Mother (1), Garbage (1), Cover (1), Wardrobe (1), Grave (1), Fear of Death (1), Cotton (1), Sponge (1), Body (1), Birth and Death (1), Clothing (1), Heart (1), Shroud (1), Furrier's Shop (1), Housing (1), Infinity (1)	20	23	5.10
Soil as a Shelter	Home (6), Mother (2), Homeland (2), Anatolia (1), World (1), Human (1), Big Plane Tree (1), Stomach (1), Shelter (1), Mystery (1), Vase (1), Life (1), Bed (1), Nest (1)	14	21	4.66
Soil as a Comforting Being	Friend (3), Electric Receiver (2), Medicine (2), Shoulder (2), Shoe (1), Chocolate (1), Electroscope (1), Life (1), Human (1), Hometown (1), Perfume (1), Battery (1), Darling (1), Stress Ball (1), Rain (1)	15	20	4.43
Soil as a Raw Material	Human (6), Life (2), Mother (2), Home (1), Human Body (1), Art (1), Paper (1), Toy (1), Mercy (1), Creation (1)	10	17	3.77
Soil as a Living Being	Human (7), Heart (1), Slave (1), Stomach (1), Lifetime (1), Skeleton of The Body (1)	6	12	2.66

Developed metaphors related to the concept of soil have been studied under 10 categories. These categories the soil as a source of life ($f=129$, 28.60%); the soil as a food supplier ($f=85$, 18.85%); the soil as a formatted entity ($f=61$, 13.53%); the soil

as a valuable asset ($f=49$, 10.86%); the soil as a growing entity ($f=34$, 7.54%); the soil as a place to return ($f=23$, 5.10%); the soil as a shelter ($f=21$, 4.66%); the soil as a comforting being ($f=20$, 4.43%); the soil as a raw material ($f=17$, 3.77%); and the soil as a living being ($f=12$, 2.66%). All are arranged in Table 3. The resulting categories show that students' perceptions of the concept of soil and land are multifaceted. It seems that student perceptions are focused on the fact that soil is a source of life, a supplier of nutrients, a valuable asset shaped by people (71.84%). However, there is also a significant group of students (28.16%) who perceive the soil with its characteristics such as vitality, aquaculture, relaxation and raw materials.

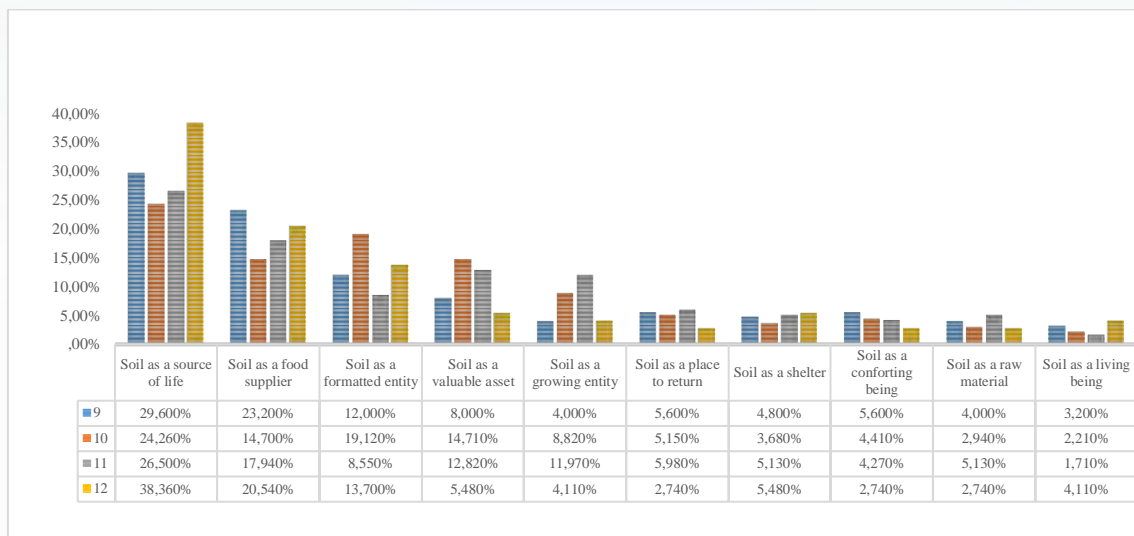


Figure 1. Distribution of classes by categories

When the distribution of classes into categories are examined, the categories in which the classes are dominant are as follows. Students in 9th Grade are in soil categories as a food supplier and as a comforting being. Students in 10th Grade are in the soil categories as a formatted entity and as a valuable asset. Students in 11th Grade are in soil categories as a growing entity, as a place to return and as raw material. Students in 12th Grades are in soil categories as a source of life, as a shelter and as a living being (Figure 1).

While the soil perceptions of students in 9th and 12th Grades' are concentrated into three categories in which all students produce the most metaphors, the soil perceptions of students in 10th and 11th Grades' are concentrated in the five categories that all students produce the most metaphors. In the Geography course, the acquisitions directly related to the soil are included in the 10th Grade curriculum. In the 11th Grade curriculum, soil is addressed that biodiversity within the natural factors affecting the formation of economic activities and historical trade routes. Besides, issues related to soil such as landslides, erosion, drought, soil pollution and desertification are also included. On the contrary, in curricula for 9th and 12th Grades, soil-related issues are less common than in curricula for the 10th and 11th Grades. Therefore, it is thought that the density of topics related to soil in

the curriculum is effective in the diversification of soil perceptions from students in 10th and 11th Grades.

Soil as a source of life. There were 39 different metaphors produced by 129 students in this category. The proportion of these metaphors as valid metaphors produced in the study is 28.60%. The most preferred metaphors in the category are *heart* (22), *life* (22) and *water* (20) metaphors (Table 3).

According to the students, soil is the source of life of all living things. Living things meet their needs for life from the soil. Without land, there would be no life. Some of the metaphors and justifications that students produce in this category are as follows:

Soil is like a heart, because the life of all plants is in his hands (S9). Soil is like a water, because it gives life (S62). Soil is like a nest, because it gives life to food and living things (S191). Soil is like breathing, because without soil, life on soil is reset (S170). Soil is like life, because without it nothing happens (S129). Soil is like life, because we can neither live nor feed without it (S67). Soil is like a spirit, because no matter how bad it is, there is always hope sprouting in it (S420). Soil is like the human heart, because it meets the necessary life needs (S127). Soil is like blood cells, because without it we cannot live (S169). Soil is like food, because we always need it (S27).

Soil as a food supplier. There were 35 different metaphors produced by 85 students in this category. The proportion of these metaphors in valid metaphors produced in the study is 18.85%. The most preferred metaphors in the category are *mother* (20), *factory* (6), *human* (5) and *market* (5) metaphors (Table 3).

According to the students, soil is where people supply the nutrients necessary for their lives, and meet their needs. Some of the metaphors and justifications produced by students in this category include:

Soil is like a mother, because it meets everything we need (S244). Soil is like a mother, because a child takes things from his mother, and people take food from the soil (S195). Soil is like human, because it constantly produces something (S260). Soil is like a factory, because it has workers and produces something (S199). Soil is like a greengrocer, because we can get what we want (S240). Soil is like a market, because it contains all kinds of nutrients (S98). Soil is like a blessing, because it meets our food sources (S212). Soil is like fruit, because it provides the necessary nutrients (245). Soil is like a life source of human, because crops grow in the soil (S205). Soil is like protein, because it has natural minerals (S19). Soil is like a cover, because it covers the entire world and provides a source of food for us living things (S418).

Soil as a formatted entity. There were 28 different metaphors produced by 61 students in this category. The proportion of these metaphors in valid metaphors produced in the study is 13.53%. The most preferred metaphors in the category are *human* (19), *child* (6), *love* (4) and *flower* (3) metaphors (Table 3).

According to the students, soil is an asset that needs care and being shaped by people. In order to get the desired yield from the soil, it is necessary to take good care of it. The better the soil is cared for, the more crops it yields. The metaphors and justifications developed by the students in this category are as follows:

Soil is like a human, because if you love it, it becomes a vineyard, if you don't love it, it becomes a mountain (S100). Soil is like a human, because you react the way you act (S108). Soil is like a child, because if you look well, you get a good crop (S112). Soil is like life, because you reap what you plant (S211). Soil is like love, because the more you value, the more you benefit (S215). The soil is like a flower, because it needs care (S158).

Soil as a valuable asset. There were 28 different metaphors produced by 49 students in this category. The proportion of these metaphors in valid metaphors produced in the research is 10.86%. The most preferred metaphors in the category are *homeland* (11) and *gold* (6) metaphors (Table 3).

According to the students, the soil is very valuable. Human should be aware of the value of the soil. As it is exhausted, it will become more valuable. Some of the metaphors and justifications produced by students in this category are as follows:

Soil is like gold, because it is increasingly valued (S216). Soil is like a mother, because it is valuable and source of need for us (S124). Soil is like natural gas, because it is valued as it is depleted (S255). Soil is like a partner, because it is not shared with everyone (S228). Soil is like a homeland, because every bit of it is precious, every bit of it lies life. (S193). Soil is like soap, because if its value is not known, it slides out of the hand (S204). Soil is like an emerald, because you can't appreciate it (S225). Soil is as a whole, because it contains material and spiritual values (S432). Soil is like the vein of a country; landless nation is not nation (S330). Soil is like war, because blood has been shed for years (S363).

Soil as a growing entity. There were 11 different metaphors produced by 34 students in this category. The proportion of these metaphors in valid metaphors produced in the study is 7.54%. The most preferred metaphors in the category are *mother* (14) and *life* (6) metaphors (Table 3).

Students think that the soil grows plants just as mother, family, school and life raise children. Some of the metaphors developed by the students are given below along with their reasons:

Soil is like a mother, because it allows plants to grow and develop (S88). Soil is like mother and father, because it grows planted plants like a child (S223). Soil is like life, because it helps plants grow (S180). Soil is like a school, because it raises and develops plants (S141). The soil is like a family, because it grows plants like children (S200).

Soil as a place to return. There were 20 different metaphors produced by 23 students in this category. The proportion of these metaphors in valid metaphors produced in the research is 5.10%. The most preferred metaphors in the category are *home* (2), *life* (2) and *quilt* (2) metaphors (Table 3).

According to the students, soil is the place where people return after death, where life ends. The metaphors and justifications developed by some of the students in this category are as follows:

The soil is like our home, because we will return and go there (S267). The soil is like a grave, because it is the place where we will go back (S230). The soil is like a cover, because it envelops you forever (S86). Soil is like the fear of death, because when we die, we enter it (S84). Soil is like a sponge, because it likes to inhale (S50). Soil is like a wardrobe, because when people die, they get into it. (S233). Soil is like a comforter, because first we live on it, and then we sleep under it (S47). Soil is like a forgiving presence, because when our life ends, it accepts us as we are (S72). Soil is like garbage, because he accepts the dead with everything (S122). Soil is like life, because we exist from it, we go to it (S182).

Soil as a shelter. There were 14 different metaphors produced by 21 students in this category. The proportion of these metaphors in valid metaphors produced in the research is 4.66%. The most preferred metaphors in the category are *home* (6), *mother* (2) and *homeland* (2) metaphors (Table 3).

According to the students, the soil is a place where plants, animals, that is, all living things reside. It provides living space for many creatures on and inside. Some of the metaphors developed by the students are given below along with their rationale.

Soil is like homeland, because it opens its arms to us (S167). Soil is like a home, because it contains animals (S130). Soil is like the home of plants, because the root of plants is there (S140). Soil is like a nest, because it is the place of life of some creatures (S173). Soil is like world, because thousands of different lives grow in it (S53). Soil is like a human, because bacteria live in it (S95). Soil is like a stomach, because it keeps fossils alive in it (S208).

Soil as a comforting being. There were 15 different metaphors produced by 20 students in this category. The proportion of these metaphors in valid metaphors produced in the study is 4.43%. The most preferred metaphors in the category are *friend* (3), *electric receiver* (2), *medicine* (2) and *shoulder* (2) metaphors (Table 3).

Students believe that there is a side of the soil that gives people confidence, comfort, peace and energy. The metaphors and justifications developed by some of the students in this category are as follows:

Soil is like an electric receiver, because it receives electricity from human (S42). Soil is like a friend, because whether we beat or curse, it is always with us (S426). Soil is like medicine, because it is good for human (S20). Soil is like a hometown, because it gives peace when you see it (S45). Soil is like a shoulder to lean on, because it is a foundation that people like parents can trust (S99). Soil is like a stress ball, because the nerve attracts stress (S172). Soil is like perfume, because it smells very good after the rain (S30). Soil is like a battery, because it fills you with the most beautiful energy (S320). Soil is like chocolate, because it takes all the evil energy of human (S319).

Soil as a raw material. There were 10 different metaphors produced by 17 students in this category. The proportion of these metaphors in valid metaphors produced in the research is 3.77%. The most preferred metaphors in the category are *human* (6), *life* (2) and *mother* (2) metaphors (Table 3).

According to the students, soil is the first substance, that is, the raw material of people and many objects. The metaphors and justifications developed by some of the students in this category are as follows:

“Soil is like human, because everyone was created from soil (S157). Soil is like art, because pottery is made (S161). Soil is like life, because everything from human to plant consists of it comes out of it (S366).”

Soil as a living being. There were 6 different metaphors produced by 12 students in this category. The proportion of these metaphors in valid metaphors produced in the study is 2.66%. In the category, *human* (7) metaphor was the most preferred metaphor (Table 3).

According to the students, soil is a living being, just like humans. Like them, it breathes, feeds, grows and dies. And when he dies, it won't work. Some of the metaphors produced by the students are given below along with their reasons:

Soil is like human, because it needs water like we do (S138). Soil is like human, because it breathes, and feeds like us (S159). Soil is like human, because it grows and dies (S261). Soil is like a slave, because it does not work when it dies (S10). Soil is like a heart, because it is always alive with love (S392).

Results and Discussion

In this study 133 different metaphors were produced by the students, in which the perceptions of high school students about the concept of soil were examined through metaphors. Among the metaphors produced, the most preferred ones were the *mother* (48), *human* (47), *life* (40), *heart* (29), *water* (22) and *homeland* (16) metaphors. The metaphorical preferences of the students were similar to the findings obtained in various studies with students at different levels for the perception of the concept of soil. In the studies, it was determined that primary school students prefer mother, sand and home concepts (Albayrak & Hakverdi-Can, 2012), whereas secondary school students prefer human, life and mother concepts (Güllü & Dönel-Akgül, 2020), and university students prefer family, life, food source and living space concepts (Gürten & Köseoğlu, 2019). It is possible to say that the metaphors preferred by students at four different levels of teaching for the concept of soil are similar. The variety of metaphors produced suggests that students' perceptions of the concept of soil are multifaceted.

In the current study, when the distribution of classes by category was examined, students in 9th and 12th Grades, where soil-related issues were less intense in curriculum meant that students' perceptions of soil were concentrated into 3 categories. In 10th and 11th Grades, where soil-related topics are more intense in the curriculum, students' perceptions of the soil were concentrated into 5 categories. Thus, it has been found that there is a direct relationship between the intensity of soil-related subjects in the curriculum and the diversification of student perceptions.

In the current study, it was also determined that students were influenced by mythological, religious and cultural factors in their choice of metaphor and their justification of these metaphors. For example, loading maternity into the soil is a common condition in many societies. Past-to-present breeding, feeding and growing, healing, and collecting on the functions of conservation have caused the soil to match its main connotation (Harmanlı, 2014). In the traditional worldviews of the Turkish peoples, the sky was considered ancestor and the soil as the mother, and childbearing and the productivity of the soil were compared to each other (Aça, 2018). Due to its historical and cultural background, meanings in the form of "female" and "mother" were loaded into the soil within the Sufi motifs of the Anatolian peoples of soil origin (Mustan & Dönmez, 2019).

Students perceive land as a source of life, a supplier of nutrients, a valuable asset shaped by humans. In addition, the soil is seen as a living being that grows, offers shelter to living things, comforts people, is used as raw materials, and is the place where everyone will return with death. These perceptions of soil as shelter and helpful are similar to existing studies, such as the perceptions of elementary school students who see soil as an important asset and a source of food (Albayrak & Hakverdi-Can, 2012); and the perceptions of college students who say we need to protect and develop the concept of land as an asset so soil must be taken care of (Gürten & Köseoğlu, 2019). In this regard, the results of the studies can be said to support each other.

When the categories created by taking into account the justifications of the metaphors produced by the students are examined, the evaluations made for the concept of soil and the discussions about these evaluations are as follows:

1- Soil is a natural environment where the necessary needs for life are met. Students identify life with the soil and see the soil as one of the reasons for life's existence. According to Öztaş (2017), soil is a natural environment and a biological generator that contains living things inside and on it, making a significant part of the food taken and the material used dependent on it. According to the Aça (2018), in religion, science and mythology, the view of the soil reaches a universal dimension is related to the recognition of the soil as a source of life. In the life cycle, which is considered infinite, the soil is one of the central symbols of this infinity.

2- Soil is an entity that meets the nutritional needs of people. According to Efe (2010), the ability of plants to produce and store nutrients by providing interaction between water, air, sunlight, rocks, plants and animals is the most important feature of the soil.

3- Soil is a being whose control is in the hands of people and shaped by them. In order to get something from the soil, first of all, the soil must be taken care of well. If you look well, the soil will pay off. Mevlana's saying, "the soil is sure; whatever you plant in it, you collect and reap its kind without seeing betrayal" supports this view. Proverbs such as "if you look, it becomes a vineyard, if you don't look, it becomes a mountain", "if you don't give it to the ground, it doesn't give it", "if you cheat the place, you starve yourself", "if you sow, you reap, you take it", "the person who cultivates the soil teeth the bread" used in Turkish, Turkmen and Kyrgyz societies appear as expressions of this geographical reality (Gülüm, 2009; Gülüm & Boz, 2011). The Turkmen Sufi poet Mahtumkulu also stated in his poems that the soil will respond to the person who takes care of himself, and that human will not leave his labor unanswered (Sağlam, 2018).

4- Soil is a valuable wealth and it's increasing in value even further day by day. The best example regarding value of the soil is undoubtedly of the United States. It was reply by Indian chef Seattle, to Franklin Pierce 14th U.S. president in response to an offer to purchase Indian lands for white immigrants. Seattle's reply stated that soil, water and air are the assets that are too precious to buy with money.

For the Turkish nation, the soil gains its true value when used together with the concept of homeland. For Turks, the land of the homeland is sacred. The following facts are the greatest proofs of the importance of homeland given by Turks: When the Tungus asked Hun Emperor Mete Khan for a piece of barren land, Khan declined that he had no authority of selling a state property to someone else. Namık Kemal, who accept the Turkish nation as a unifying element, expressed the homeland as the soil surrounded by the armies in his poems. According to Mithat Cemal Kutay, the soil which anyone dies for its sake is a homeland (Taşcıoğlu, 2018). Arif Nihat Asya made the soil sanctified by associating the soil with prayer with the lines "I made you homeland, O soil, stamped five times with my forehead" in her poem. Similarly, Azerbaijani Turks' proverbs about the land are centered around the meaning of the place (homeland) in which they live, issues such as beauty, sanctity of the homeland,

possession of the homeland, separation from the homeland, labor on the land are brought to the fore (Büyükokutan and Töret, 2019).

5- Soil is an entity that allows plants to grow on it. According to Atalay (2002), soil is extremely important in the growth of herbaceous plants, because herbaceous plants, whose roots are mostly in the soil floor, receive their nutrients from the soil (p. 24). According to Ergene (1997, p. 264), 13 of the 16 basic plant elements that plants absolutely need for their normal development are in the soil.

The role of soil cultivation is also found in the work called Garib-name of Aşık Pasha, one of the founders of classical Turkish literature. According to Aşık Pasha, soil is an element in which Allah cultivates food. In a section of the work of Aşık Pasha, he mentions six requirements for farming. One of these six is soil. Others are the planter, the seed, the water, the sun, the permission of the Allah. In them, the soil is described as the place where the grain is rooted. Seed needs soil, soil needs water (Çelik, 2019).

6- Soil is a place to return when death comes. In the formation of this perception in students, there is no doubt that religious teachings have a large share. Situated in the Qur'an, "(O people!) we created you from the soil, (with your death) we will return you there and we will take you out of there once more (Taha, 20/55)" and in the Bible (Torah-Psalms-Bible) "with the hard work of your hands you will get your bread till you go back to the earth from which you were taken: for dust you are and to the dust you will go back (Genesis, 3/19)" with the verses, humankind has been informed that they will be returned to the soil along with death.

Among the forms of burial in beliefs, the most common procedure is burial in the ground. Soil, the source of life, is also the source and place of recycling, which will begin with death (Aça, 2018). Since soil is considered the ore of the human body in a material sense, it also determines the direction of return of the body after arrival. In this aspect, the soil is at the center of the metaphor of formation and death (Dağlar, 2017). The proverb "we were created from mother soil, and we will return to mother soil (Shenandoah)", used by Native Americans, has a similar meaning (Gülüm & Avşar). In Mahtumkulu's poems, soil is included as an element of nature, and under the influence of Sufi culture, it is most often considered in connection with the idea that "we came from the soil, we will return to the soil again". Mahtumkulu used the soil as an image, especially when he said his thoughts on issues such as mortality and transience of the world (Sağlam, 2018).

7- Soil contains many creatures and is their habitat. According to Ergene (1997) numerous species of microorganisms that are too small to be seen even with the strongest microscope from microorganisms belonging to plant and animal life live, develop and die in the soil. One of the main factors that distinguish soil from rocks in a geological sense is that the soil contains a large population of living things (p. 279). According to Ehlers (2015), more microorganisms, bacteria, fungi and Arche bacteria live in a handful of soils than the number of people on earth. These organisms decompose plant residues, turn them into humus, and disperse this fertile substance into the soil.

Soil animals are mostly common in the area of the soil from the top to a depth of 5 cm because this region, which is close to the surface, is rich in nutrients and organic matter. However, some groups can be found at depths of meters (Mısırlıoğlu, 2016). Erzurumlu İbrahim Hakkı, one of the important scholars and thinkers of the Ottoman 18th century, in his work *Marifetname*, states that the main feature of the soil element is coldness and dryness, thanks to these qualities, living things can be sheltered on its surface, it can be a source of mines and plants (Karataş, 2014).

8- Soil is a comforting being that comes to people's aid in difficult moments, giving them peace of mind. According to Gökçe (2010), soil, like water, allows the removal of static electricity from the body, which accumulates on a person and giving a person a feeling of fatigue and weakness. According to Sakıcı (2017) when natural elements such as soil, water, land, green area, plant, rocky environment that make up natural areas be used in daily life, they contribute to physical relaxation, stress reduction, refreshing memory and increasing motivation.

9- Soil is seen as the raw material of many products and objects, especially the pulp of human creation. According to the European Environment Agency (2019), soil is the basis for 90% of food, feed, fiber and fuel production and provides raw materials for many activities from garden agriculture to the construction sector.

What was the first substance of existence was one of the topics that pre-Socrates ancient Greek philosophers were interested in. The first substance of existence is water according to Thales, apeiron (indefinite, infinite) according to Anaximander, air according to Anaximenes, number according to Pythagoras, fire according to Heraclitus (Esenyel, 2014). Subsequent philosophers have claimed that the first substance of existence cannot be reduced to one, that it is plural, and that by merging or separating them, diversity in the world is formed. From these philosophers, Empedocles argued that existence came from four roots: "fire, soil, air, water". According to Empedokles, it is love that unites these four elements, and hate that dissociates (Baykent, 2018). The theory of four elements, systemized by Aristotle, has become the dominant view in the natural sciences over time. This theory, which was thoroughly adopted in the Hellenistic period, was transferred to Arabic through the Syriacs and used in a wide range of fields from physics to medicine, from medicine to morality (Karlığa, 1991 to ref. Çelik, 2019). The theory of four elements, conceptualized as "Anasır-ı Erbaa" in Islamic terminology, formed the philosophical basis of approaches to the formation of existence.

According to Aça (2018), mythological data on the creation of the first human shows that the soil was at the center. In Turkish, Babylonian, Sumerian, Egyptian, Greek, Chinese, New Zealand and Nigerian mythologies, the sacred text of Zoroastrianism, *Avesta*, contains narratives and texts about the creation of the first human from soil. Enveri (2018) stated that the myth of creation from the tree in Turkish mythology were transformed into the myth of creation from the soil under the influence of steppe-animal nomadism and celestial religions. The creation of human from soil is mentioned in 11 different places in the Qur'an (Âl-i İmrân, 3/59; Hicr, 15/28-29; Hud, 11/61; Kehf, 18/61; Taha, 20/55; Hac, 22/5; Rûm, 30/20; Fâtır, 35/11; Mü'min, 40/67; Necm, 53/32; Sad, 38/71). Also in the Bible there are verses that provide evidence that is human (Genesis, 2/7, 3/19; Corinthians, 15/47-48-49) and animals (Genesis, 2/19) were created from soil.

10- Soil is a being that breathes, grows and dies like other living things. As with other creatures, death is an end that ends the function of the soil. Soil, which is a living being today, is in danger of extinction due to many natural and human factors such as improper land use, excessive fertilizer and drug use, urbanization, concretion, erosion. The world in order to ensure conservation and sustainable use of soils of the World Soil Resources report published in 2015 by United Nations Food and Agriculture Organization (FAO) says that among the most important threats to soil functions which are directly related to crop production; acidification, salinity, soil erosion, loss of soil biodiversity, contamination, compaction, permeability, loss of soil organic carbon and plant nutrient balance is located (Ref: Erpul, Madenoğlu, & Topçu, 2016).

According to Dunbar and Montanarella (2015), for the first time in human history, the population living in cities surpassed the rural population in 2007. As a result of this, the growing cities are expanding into first-order agricultural areas. Spreading cities cover the soil with concrete and asphalt, preventing rainwater from being absorbed by the soil, causing floods. In Europe, the amount of soil “sealed” by concrete and asphalt increased by 8.8% between 1990 and 2006, and in 2006 2.3% of Europe’s soil surface became covered with such an artificial material (Dunbar & Montanarella, 2015).

According to the FAO (2015), 11 hectares of land per hour are below the growing cities in Europe. Globally, 50 thousand km² of land is lost, which corresponds to the area of Costa Rica every year. It is noted by experts that only the upper layer of soil remained for 60 years (FAO, 2015). The situation in Turkey is no different. In the territory of Turkey, the area covered by processed agricultural areas and perennial plants decreased from 27.8 million hectares in 1989 to 23.1 million hectares in 2019 (Turkish Statistical Institute, 2020). These data show that 4.7 million hectares of agricultural land have been excluded from production use for various reasons over the past 30 years.

Suggestions

At the beginning of this study, it was aimed to reveal the perception of soil by students, which is a geographical concept yet staying within the limits set by the geographical literature. However, the results of the study showed that the meaning contained in the concept of soil cannot be understood by abstracting it from its mythological, cultural and religious contexts. A significant part of the students justified the metaphors they chose for the concept of soil by being inspired by these contexts. Based on this point, soil-related content contained in Geography and Social Studies educational programs should be prepared taking into account the versatility of soil. Only educational programs that include soil formation, soil types and soil distribution on soil are not sufficient for students to understand the importance of soil in living life. In textbooks, content should be presented that will convey to the student the importance of soil, which is a living being, a source of life, a valuable and exhaustible resource. As Kowasch (2017) suggests, Geography courses should include action-oriented activities aimed at sustainable use and consumption of natural resources. According to Artvinli (2010b), teaching Geography lessons as student-centered and action-oriented will positively change students' view of the

lesson and helps teachers to create fun and non-boring lesson processing environments.

It is recommended to use literary texts (Öztürk, 2007), proverbs (Gülüm, 2009), myths (Güleç, 2018) in Geography teaching because of their contribution to learning. However, a study conducted by Koç, Sönmez and Çifçi (2012) in Turkey found that there is very little place for literary products in Geography textbooks, which are the primary source for students. Content should be presented in textbooks, taking into account the meanings expressed by the soil in mythological, cultural and religious contexts.

Despite all technological advances, the value expressed by the soil for humanity in the Neolithic Revolution, which took place about 10000 years ago, continues today without decreasing (and increasing). A sustainable use of this natural being is only possible with the correct perception of the value it expresses for humanity.

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