

Full Length Research Paper

Analysis of social sciences high school students' remarks on underground resources – Kütahya sampleⁱ

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The purpose of this study is to explain secondary school students' perceptions of underground resources through metaphors. 154 students studying at Social Sciences High School of Kütahya during 2014-2015 educational year are included in this study. Questions asked in this study are 1-Which metaphors did the secondary school students use in order to express their perceptions of the underground resources? 2- Under which categories these metaphors are grouped by their common features? Data are compiled through students' answers to the sentence "Underground resources are like..., because...". Data are analyzed using content analysis method on phenomenology design. Findings show that the secondary school students produced 74 valid metaphors on the concept of underground resources. These metaphors are allocated to four different sections by their common features. As a result of this study, it is seen that Social Sciences High School students perceive the concept of underground resources as Source of Economic Value and Wealth (47%), Future Guarantee (22%), Life Source (19%) and Expression of Love (12%). Metaphors created in relation with the concept of underground resources may be used as a strong research element to explain how secondary school students perceive and comprehend the concept of underground resources.

Key words: Social sciences, metaphor, geography education.

INTRODUCTION

Having been considered as a figure of speech, metaphors are our way of seeing and comprehending the world (Morgan, 1998). A metaphor may be explained as identifying something as being the same as some unrelated thing (Lakoff and Johnson 1980), and as mental models that help people understand one phenomenon through another (Saban, 2008). Metaphor has three elements such as ground, figure and figure's features (Saban, 2004). In a metaphorical expression,

words should be used literally, analogy has to be meant and there has to be a situation that also works with the literal meaning of the word (Yıldırım and Şimşek, 2013). Metaphors help us relate an object or a phenomenon that we want to understand to some concepts of another semantic field, recognize our re-conceptualization from different perspectives and clarify things that we overlooked (Taylor, 1984, 103). There have been many studies conducted on metaphors in recent years due to

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Table 1. Allocation of Students by Gender (f- %).

Gender	Frequency (f)	Percentage
F	85	55.2
M	69	44.8
T	154	100

their significant influences on social sciences (Bredeson, 1988).

Metaphors are considered to provide new perspectives for educators to reveal their secondary school students' perceptions on the concept of underground resources that they developed on their backgrounds. Purpose of this study is to explain Social Sciences High School students' perceptions of the concept underground resources through metaphors. In accordance with this purpose, answers to the following questions are sought:

- 1-Which metaphors do explain Social Sciences High School students' perceptions of the concept of underground resources?
- 2- Under which categories these metaphors are grouped by their common features?

METHOD

Phenomenological method is employed in this qualitative study. "Phenomenology focuses on phenomena that we recognize but cannot comprehend in a detailed and profound way. Phenomena emerge in our daily lives as various forms like perceptions, experiences, concepts, tendencies and situations. We may not fully understand phenomena that emerge before us in our daily lives. Phenomena that we are completely unfamiliar with or we do not fully comprehend may make a useful field for a phenomenological research (Yıldırım and Şimşek, 2013).

330 students studying at Social Sciences High School of Kütahya during 2014-2015 educational year constitute the environment of this study. The reasons why the author applied this research at Social Sciences High School of Kütahya is explained below. The first reason is Kütahya has several underground resources such as lignite, boron, and magnesium. Also, social science high schools focus on geography as well as history, philosophy, literature etc. In addition, high school geography curriculum includes topics of underground resources. The author chose Kütahya Social Sciences High School because he works at Kütahya. Having this school provides an opportunity to apply the research in a convenient way. Study sample is selected using simple random sampling. Each member of the study group has equal chance to be selected. The advantage of simple random sampling is that it is very likely to produce a representative sample (Fraenkel and Wallen, 2003). A sample to be studied is randomly selected from a list. All listed members should have identical features (Çepni, 2010). Study sample is formed of 154 students from the Social Sciences High School of Kütahya. Allocation of Students by gender is given in Table 1.

Data are collected from the former studies in literature that aim to reveal individuals' perceptions (Töremen and Döş, 2009; Inbar, 1996; Pishghadam and Navari, 2010; Guerrero and Villamil, 2002; Saban et al., 2006; Saban, 2004, 2008, 2009; Aydoğdu, 2008; Kalyoncu, 2013; Shaw et al., 2008; Pishghadam et al., 2009; Cerit,

2008; Öztürk, 2007; Semerci, 2007; Alger, 2009;). In those studies, participants were mostly asked to complete open ended sentences. In order to reveal Social Sciences High School students' perceptions on the concept of underground resources, we asked students to complete the open ended sentence "Underground resources are like..., because...". Students were asked to write their metaphors on the concept of underground resources in 25 min, which is the database of the study.

Data were evaluated using content analysis technique. The essential aim of using this technique is to reach concepts and connections that might formulate the collected data. In content analysis, a more detailed process is applied on the data interpreted and summarized through descriptive analysis. Motifs and concepts that are not noticed through the descriptive approach may be found out thanks to the content analysis. Similar data are gathered within a similar context and are organized in a readable way, which is the purpose of the content analysis (Yıldırım and Şimşek, 2013). Metaphors created by the students were analyzed and interpreted in five steps, which are (Saban, 2008, 2009; Yıldırım and Şimşek, 2013): Naming, Classification, Category Development, Validity and Reliability, and Data Processing, respectively.

In the naming step, the metaphors created by the participants were listed in alphabetical order. All of the metaphors students wrote on the papers were checked to see if they served the intended metaphorical study. Metaphors on the collected papers were classified under specific groups such as diamond, fuel, coal, water, wealth, treasure, raw material etc, and were temporarily listed in a alphabetical order. Papers without metaphors were not evaluated.

In the classification step, metaphors were split into pieces by their similarities/common features, and were analyzed separately again. Metaphors given by the students were analyzed considering their themes, sources and the relationship between their themes and sources. 74 out of 154 students provided valid metaphors. These metaphors were listed again in alphabetical order, raw data were revised, exemplary metaphors representing the list were picked, and a new representative list was compiled. This list was formed for two fundamental purposes, which are: 1-using them as a reference while classifying metaphors, and 2-validating the data analysis step and interpretations of this study.

In the Category Development step; the metaphors were evaluated considering their common features in terms of the underground resources concept. The "list" of 74 valid metaphors were assessed, and were classified under 4 different categories of motifs. For example, all of the metaphors classified under the "Underground Resources as an Economic Value and Source of Wealth" category took underground resources as wealth and economic value. "Underground resources occupy an important position in human life and amount of mines determine the level of development. They are effective on a country's economic condition. Raw materials mean wealth, because countries trade for their precious underground resources."

In the Validity and Reliability step, conclusiveness of the science studies is a really important measure. These two significant values are widely implemented in the studies. In general meaning, validity means the results of the study are correct, and reliability means the study is reproducible (Yıldırım and Şimşek, 2013: 289). In order to determine if the classified metaphors validated the categories where they belong to, opinions of two experts were taken. The metaphors list was arranged into categories to reflect common features of the metaphors. Experts arranged the categories, compared them, and employed a joint study for the categorization. Experts' metaphor allocation was compared with the researchers', amounts of the similarities and contrasts were found, and reliability of the study was calculated on the "Reliability = ((Similarities) : (Similarities + Contrasts)) x 100" equation (Miles and Huberman, 1994: 64). In qualitative studies, the level of reliability is satisfying when evaluations of experts and the researchers conform 90% and

above (Saban, 2009: 288). The expert, opinion of whom was taken for the reliability study, allocated 6 metaphors to different categories, and matched them. According to this, the equation is $Reliability = ((74) / (74+6) \times 100 = 0.92,5 (0.93\%))$, which is enough level of reliability.

In the Data Processing step, data provided by the students were analyzed and classified. 74 metaphors were selected, and 4 conceptual categories were developed using these metaphors, and then these data were entered into a computer. Following this step, frequency and percentage value representing 74 metaphors and 4 categories were calculated.

FINDINGS

Findings acquired in relation with the Social Sciences High School students' metaphors on the concept of the underground resources were tabulated, classified, analyzed and interpreted. In Table 2, the metaphors created by the students are listed in alphabetical order, and the amount of students and respective metaphors are given. Students have provided 74 valid metaphors on the concept of underground resources. 14 students created invalid metaphors that do not serve the intended purpose. 68.9% of these 74 metaphors are represented by one person. 2-9 students represent the remaining 31.1% (23 metaphors).

Findings acquired in relation with the Social Sciences High School students' metaphors on the concept of underground resources

As tabulated in Table 2, metaphors created by more than one student on the underground resources are: Capital (9 students, 12.16%), Gifts of the Nature (7 students, 9.45%), Treasure (6 students, 8.10%), Money-National Wealth-Raw Material (5 students 6.75%), Diamond-Power-Water-Fundamental Need-Wealth (4 students, 5.40%), Gold-Natural Gas-Coal-Potential Development-Expendable Source (3 students, 4.05%), and Basis of a Country-Level of Development-Endangered Animal-Fuel-Measure of a Country's Prestige-Escape of a Country (2 students, 2.70%).

Underground resource-related metaphors of students studying in Social Sciences High Schools are classified under four categories, which are: Underground Resources as an Economic Value and Source of Wealth, Underground Resources as an Expression of Love, Underground Resources as a Source of Life, and Underground Resources as a Future Guarantee. These categories are demonstrated in Table 3.

Underground resources as economic value and Source of Wealth

All metaphors in this category take underground resources as an economic value and source of wealth. In this category, 78 students created 35 metaphors, which are mainly Capital-9, Treasure-6, Developed country-5, Raw material-5, Money-5, Wealth-4, Diamond-4,

Expendable resource-3, Gold-3, Natural gas-3, Coal-3, Level of development-2, Measure of a country's prestige-2, Fuel-2, Escape of a country-2, Antique, Prey, Bank, Boron mine, Heaven, Football, Dream world, Gift or Disaster, Mitochondria in a cell, Heat source, Thermal springs, fresh water, Grown up tree, Miracle, Dowry prepared with care, Secret heaven, , Soil, Biggest reason the countries' fight for, Source of income for a country, Economy of the countries, Overground resources, Examples for metaphors in this category are given below.

"Underground resources are like capital. Because they are a country's monetary power. "

"Underground resources are like treasure. Because as soon as they are discovered, they get more valuable. Very valuable things are under the ground. "

"Underground resources are like raw material. Because if they are appraised well and processed, foreign dependency will reduce. "

"Underground resources are like a developed country. Because when underground resources increase, levels of development and income increase. "

Underground resources as an expression of love

All metaphors in this category take underground resources as an economic value and source of wealth. Metaphors are Mom's hand, Is love, Father, Spring flower, Gifts for us, Friend, Son, Spiritual beauty, Love. Examples for metaphors in this category are given below.

"Underground resources are like love. Because invisible part of the soil is clear and pure."

"Underground resources are like father. Because they look tough, but are really precious."

"Underground resources are like gifts to us. Because when we dig the ground, we find surprising beautiful materials."

"Underground resources are like mom's hand. Because we inherit mom's hand, just like underground resources."

Underground Resources as a Source of Life

All metaphors in this category take underground resources as an economic value and source of wealth. Metaphors are Gifts from nature-7, Water-4, Fundamental needs-4, Fundamental of a country-2, Endangered animals-2, Columns of a house, Lifelines of a country, Source of life, Human brain, Blood circulating in the veins, Main trigger of human life, Human organs, Beloved ones, Heart of the countries. Examples for metaphors in this category are given below.

"Underground resources are like gifts from nature. Because underground resources provide us with energy."

Table 2. Amount of students and percentages representing the Social Sciences High School students' metaphors on "underground resources" (by frequency).

Order	Name of the valid metaphor	Frequency (f)	Percentage (%)
1	Capital	9	12.16
2	Gifts from nature	7	9.45
3	Treasure	6	8.10
4	Developed country	5	6.75
5	Raw material	5	6.75
6	National treasure	5	6.75
7	Money	5	6.75
8	Wealth	4	5.40
9	Diamond	4	5.40
10	Power	4	5.40
11	Water	4	5.40
12	Fundamental needs	4	5.40
13	Potential development	3	4.05
14	Gold	3	4.05
15	Natural gas	3	4.05
16	Coal	3	4.05
17	Expendable source	3	4.05
18	Fundamental of a country	2	2.70
19	Development level	2	2.70
20	Endangered animal	2	2.70
21	Fuel	2	2.70
22	Measure of a country's prestige	2	2.70
23	Escape of a country	2	2.70
24	Mom's hand	1	1.35
25	Antique	1	1.35
26	Is love	1	1.35
27	Prey	1	1.35
28	Father	1	1.35
29	Spring flower	1	1.35
30	Bank	1	1.35
31	Columns of a house	1	1.35
32	Lifelines of a country	1	1.35
33	Gifts for us	1	1.35
34	Boron mine	1	1.35
35	Heaven	1	1.35
36	Resource not extracted	1	1.35
37	Is a means of continuity	1	1.35
38	A country's roots	1	1.35
39	Friend	1	1.35
40	Heart of the economy	1	1.35
41	Son	1	1.35
42	Football	1	1.35
43	Future life source	1	1.35
44	Secret treasure	1	1.35
45	Dream world	1	1.35
46	Life source	1	1.35
47	Gift or disaster	1	1.35
48	Mitochondria in a cell	1	1.35
49	Heat source	1	1.35
50	Human brain	1	1.35

Table 2. Cont'd

51	Blood circulating in the veins	1	1.35
52	Main trigger of human life	1	1.35
53	Human organs	1	1.35
54	Thermal springs, fresh water	1	1.35
55	The Central bank	1	1.35
56	Grown up tree	1	1.35
57	Heritage	1	1.35
58	Miracle	1	1.35
59	Dowry prepared with care	1	1.35
60	Spiritual beauty	1	1.35
61	Secret heaven	1	1.35
62	Beloved ones	1	1.35
63	Love	1	1.35
64	Soil	1	1.35
65	Is Turkey's eternal richness	1	1.35
66	Fundamental of a country's development	1	1.35
67	Biggest reason countries' fight for	1	1.35
68	Source of income for a country	1	1.35
69	Economy of the countries	1	1.35
70	Heart of the countries	1	1.35
71	Value of a country	1	1.35
72	The country itself	1	1.35
73	Dress on the showcase	1	1.35
74	Over-ground resources	1	1.35
TOTAL		100(f)*	100(%)

Table 3. Categories of metaphors by the Social Sciences High School students on the concept of "underground resources".

Category	Metaphor	Frequency # of students	# of students
1. Underground Resources as Economic Value and Source of Wealth	Capital-9, Treasure-6, Developed country-5, Raw material-5, Money-5, Wealth-4, Diamond-4, Expendable resource-3, Gold-3, Natural gas-3, Coal-3, Level of development-2, Measure of a country's prestige-2, Fuel-2, Escape of a country-2, Antique, Prey, Bank, Boron mine, Heaven, Football, Dream world, Gift or Disaster, Mitochondria in a cell, Heat source, Thermal springs, fresh water, Grown up tree, Miracle, Dowry prepared with care, Secret heaven, , Soil, Biggest reason the countries' fight for, Source of income for a country, Economy of the countries, Over-ground resources,	78	35
2. Underground Resources as an Expression of Love	Mom's hand, Is love, Father, Spring flower, Gifts for us, Friend, Son, Spiritual beauty, Love.	9	9
3. Underground Resources as a Source of Life	Gifts from nature-7, Water-4, Fundamental needs-4, Fundamental of a country-2, Endangered animals-2, Columns of a house, Lifelines of a country, Source of life, Human brain, Blood circulating in the veins, Main trigger of human life, Human organs, Beloved ones, Heart of the countries	28	14
4. Underground Resources as a Future Guarantee	National treasure-5, Power-4, Potential development-3, Resource not extracted, Is a means of continuity, Roots of a country, Heart of economy, Future source of life, Secret treasure, the Central bank, Heritage, Is Turkey's eternal wealth, Fundamental of a country's development, Value of a country, the Country itself, Dress on the showcase	25	16
Excluded	-	14	0
Total		154	74

"Underground resources are like water. Because they are sources of life, they are mighty."

"Underground resources are like fundamental needs. Because underground resources are essential."

"Underground resources are like endangered animals. Because unconscious behaviors may cause them extinct."

Underground Resources as a Future Guarantee

All metaphors in this category take underground resources as an economic value and source of wealth. Metaphors are National treasure-5, Power-4, Potential development-3, Resource not extracted, Is a means of continuity, Roots of a country, Heart of economy, Future source of life, Secret treasure, the Central bank, Heritage, Is Turkey's eternal wealth, Fundamental of a country's development, Value of a country, the Country itself, Dress on the showcase. Examples for metaphors in this category are given below.

"Underground resources are like power. Because we are a strong nation as long as we have and take advantage of them."

"Underground resources are like potential development. Because they might be useful for our country, only if we employ them."

"Underground resources are like national treasure. Because they improve economy and trade relationships."

"Underground resources are like a source of life. Because they will get more valuable in time, and development depends on them."

DISCUSSION

In this study, 74 metaphors created by Social Sciences High School students are classified under 4 categories. The Social Sciences High School students' remarks on the underground resources are analyzed thanks to these metaphors. Range of metaphors (such as the Central bank, National treasure, Heritage, Potential development, Beloved ones, Water, Fundamental needs, Friend, Son, Spiritual beauty, Football, Level of Development-2, Dream world, Gift) points out that that underground resources may not be explained by just one metaphor.

Students of the Social Sciences High School take geography courses that provide knowledge on physical, human and economic geography, from 1st grade to 4th. Students were asked to complete "Underground resources are like..., because..." sentences, and it may be said that they all exhibited what they had before the metaphor study and what they learned during their high school years.

It is understood that Social Sciences High School students (154) perceive the concept of underground resources as Source of Economic Value and Wealth

(47%), Future Guarantee (22%), Life Source (19%) and Expression of Love (12%). It may be seen that 66% of the participants took underground resources as a material value, in compliance with definition of underground resources.

We have shown that metaphors may be used for the education process in quite range of ways. It is showed that metaphors are useful for materializing abstract concepts. Moreover, it is seen that students may more easily recall what they have been taught before, and metaphors facilitate the recalling process. However, one has to remember that metaphors may be misunderstood if they are used under different categories.

As understood from the metaphors provided by the participants, the concept of underground resources may be explained through more than one metaphor. This study is in parallel with Öztürk (2007), Geçit and Gençer (2010), Aydın (2010), Kaya (2013), Tuna and Budak (2013).

Study results given above provide significant findings that include levels of knowledge on the underground resources within the scope of the geography course taught to the Social Sciences High School students. Based on this approach, additional studies may be conducted about the changes of Social Sciences High School students' geography perceptions, in compliance with the objectives of geography education.

Conflict of Interests

The author has not declared any conflicts of interest.

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