



Analysis of Analogies in Geography Textbooks *

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Abstract

In this study, the analogies in the secondary school geography textbooks have been analyzed according to their quantity and quality. In this study conducted via document analysis method, 9th, 10th, 11th, 12th grade geography textbooks published by Ministry of Education have been analyzed; the analogies have been classified separately in the form of personal analogies and according to their relationship, presentation format, condition, position, and level of enrichment. In order for the reliability of the study, the classifications of the analogies have been done by the two researchers separately. To make an agreement on their classifications, the researchers discussed on the issue and opinions of another expert have been asked. Then, data have been analyzed and reported. The research revealed out that the analogies were not quantitatively enough and were some lack in quality.

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Introduction

Geography, which is basically an earth science, is one of the sciences having the oldest history. Young and old alike everybody has more or less “geography knowledge image” in their minds related to this science area (Doğanay, 2011, p. 3). This image existing in people’s minds should be supported considering the fact that geography is a science which brings individuals identity and aims at enabling people to perceive, know and make sense of their environment, and in this regard it is important to carry out geography lessons in enriched learning environment as far as possible, with various student centered approaches, methods and techniques (Alaz, 2009, p. 2).

Differentiate into the expectations from education caused by the rapid changes and developments in social, cultural and economic fields around the world has also affected especially the learning method techniques in teaching geography (S. Şahin, 2010, p. 129). Geography teaching programs which are based upon maximizing the students’ abilities, in which use of technology is needed in every stage of the teaching process and which prescribe students’ active participation into the learning process, bring with a lot of new teaching approaches and methods (İncekara, Karakuyu & Karaburun, 2009, p. 305). Within the context of geography lesson, there are a lot of concepts and situations which are defined as abstract and difficult to bring to classroom environment. Therefore, in conveying the abstract concepts and situations to the students in an effective way, using student centered modern methods and techniques has a big importance since they help to increase the persistency of geographical knowledge in their minds (İncekara, Karakuyu & Karaburun, 2009, p. 305). As Doğanay (2011, p. 4) stated: “in geography science there has never been a learning and teaching principle or method such as ‘memorization’. While teaching most subjects of geography, we have to

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force and manage the students' imagination to the end. This is possible by means of using visual images frequently and with enough number of equipment."

With the development of technology, it became possible to use elements such as computer, television, and slide as the effective equipment to carry out the educational activities (Kılıç & Seven, 2008, p. 33), however, in the present applications of the educational system, books come into prominence as a tool (Demirel & Kiroğlu, 2008, p. 9). In some regions of our country, equipment and laboratory facilities are limited, the classes are too crowded, and family support is insufficient and that makes textbooks main material that will support the learning. Within this respect, it can be claimed that textbooks which are the main printed materials for the education environment have great importance in education system (Ünlü, 2010, p. 100). Thus, textbook is one of the most suitable tools that provide students with the information about the education programs, give some clues and guide them to make research and investigation (Kılıç, 2008, p. 39). But it may create problems for students and teachers that the definitions for the concepts are incorrect or uncertain, the books don't have any arrangements which will enable the characteristics of the concepts to be understood, and the characteristics of the concepts are not presented with examples in some situations (Karataş, 2011, p. 4). Considering this fact, negative circumstances in the textbook should be minimized and books need to support the new approaches, methods and techniques based on the student centered learning (Nakiboğlu, 2009, p. 92). In geography teaching, both textbooks' and teaching activities' being supported with this kind of modern methods and techniques will contribute to increase the memorability of the students' knowledge, and enable students to perceive the meaning and importance of geography and will make them develop a positive attitude towards the geography lesson.

Ideally conveying the knowledge that will shape our future and move us towards a more livable world in all aspects to the young who are the owner of the future is only possible via modern teaching methods and techniques (Alım & Gül, 2013, p. 359). Otherwise, trying to enable students to comprehend the knowledge just notionally will have a negative effect on the teaching period and will make the knowledge difficult to be understood, coded and recalled when needed (Özşahin, 2009, p. 105). In geography teaching, in order to prevent such negative circumstances, distribution constituting the principles of geographical thinking, depending on the cause, effect and relationship principles, interaction between human being and environment, the problems caused by this interaction and to what extent these problems can be solved should be discussed with students and enable them to have new perspectives. Students need to be made active during the classes, and it should be paid attention to students' being in the center of the learning process (Akbulut, 2004, p. 222), while the concepts and terms are being thought, the methods which may lead students to memorization should be avoided as far as possible, and modern methods and techniques that will lead them to learn the concept should be used, instead. Thus, concepts and terms compose the word groups, that is, the building block of the knowledge which will be taught to students and geographical facts and events are imprinted on the students' minds by means of concepts and terms (Turan, 2002, p. 70). It is clear that there are a lot of modern methods and techniques that can be used in teaching the concepts and carrying out other educational activities in geography learning. "Analogies" that makes the abstract concepts more comprehensible by concretizing them and that increase the memorability of the concepts can be suggested as one of the most important modern techniques which will be able to be used in geography teaching.

Analogies are the arts of exemplifying the real life situations, which provide the most effective and the shortest way of concretizing abstract concepts and realizing permanent learning for new knowledge (Dincer, 2011, p. 113; Şaşmaz Ören, Ormancı, Babacan, Koparan & Çiçek, 2011, p. 30). Analogy whose lexical meaning is "resembling, resemblance, simulation" is identified as "the process of explaining the unknown features of other event, fact or object having similar features by benefitting from the known features of an event, fact or object (Newton, 2003, p. 353; Cin, 2005, p. 159). In analogies, known state is called as "source" and unknown state is called as "target. In order to reach

the target, existing concepts are used to evoke. In this sense, in analogical thinking, a person develops knowledge about unfamiliar target concepts by using the information about the familiar knowledge (English, 1998, p. 128; Küçüküran, 2003, Akt. Kayhan, 2009, p. 15; Paatz, Ryder, Schwedes & Scott, 2004, p. 1066). As a result of this kind of active thinking action, individuals may establish relationships among the concepts and may make the new knowledge meaningful for their realm of personal knowledge. Analogies contribute to the realization of meaningful learning based upon giving an opinion in terms of two aspects. The first enables individuals to correlate the new information with their previous knowledge and make it an integrated part of their mental maps. The second one lightens the cognitive load on human mind; that is, it helps people to keep the knowledge in their minds longer by using shorter codes for rich and extend information. This brings along some facilities such as recalling the knowledge and their being used by adapting it to different areas (Bayazit, 2011, p. 141).

Analogies can be investigated under six main titles as: according to the relationship between target and source, presentation format of analogy, conditions of target and source factors, the position of the analogy, enrichment level of the relationship formed between target and source, and personal analogy. These are sub-categorized among themselves except for the personal analogies. This classification having formed by utilizing the studies done by Curtis & Reigeluth (1984); F. Şahin (2010); Kaya & Durmuş (2011); Iding (1997); Şaşmaz Ören, Ormancı, Babacan, Koparan & Çiçek (2011) and Thiele & Tregust (1991) is presented in Figure 1 as a summary.

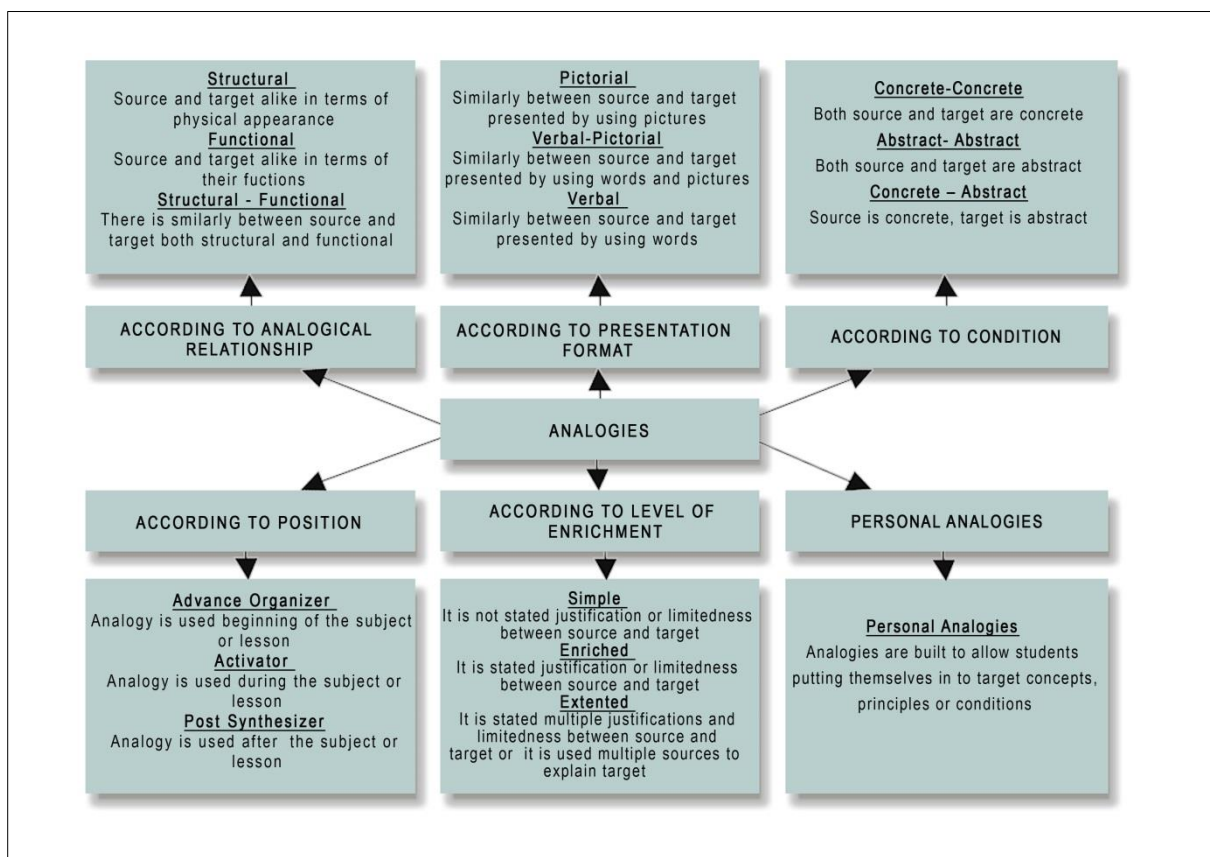


Figure 1. Types of Analogies

It is thought that it will be beneficial to present an example for each kind of analogy explained in Figure 1 from secondary education geography textbooks in order to make analogy types more meaningful.

If it is analyzed according to the relationship between source and target, it is conspicuous that in one of the structural analogies layers of the earth are tried to be explained with a peach's layers as:

“When we cut a peach, we realize that it is similar to Earth’s structure. The peel of peach may be associated with earth’s crust, its pepo may be associated with mantle and its stone may be associated with Earth’s core” (MEB, 2010, p.96). In one of the functional analogies, urban functions and what these functions mean are tried to be explained with student activities by an analogy like that: “Each student comes into prominence with their own characteristics which make them different from others. For example, while some students play football very well, some draws pictures very well. Similarly, cities also come into prominence with one or some of the activities done. They represent urban functions” (MEB, 2011b, p. 33). In the example of structural-functional analogy, on the other hand, in order to concretize inflection and diffraction events: “students were asked to stick two pieces of paper together and press it sideward. Then they were enabled to associate this result with the formation of Fold Mountains. Besides, it was enabled to make the formation of fold mountains concrete by asking what would have happened if they had done the same with ruler instead of paper (MEB, 2010, p. 103).

If we analyze it according to the format of analogical presentation, in one of the verbal analogies, the gravity force of New York city was tried to be explained with a magnet’s gravity force with an analogy like this: “throughout the history, with economic, political and cultural sources New York has always created a gravitational field like a magnet which forms large magnetic fields around” (MEB, 2011b: 41). Also, in pictorial analogy sample, “how physical weathering happens was tried to be explained with the cracking happened as a result of pouring hot water into a cold cup” and a picture was presented in this direction (Figure 2, MEB, 2011a, p. 39). In the example of verbal-pictorial analogy, “the movement of mantle inside the earth’s crust” is tried to be demonstrated with “the movement of water heating in the teapot”, and in addition to verbal expressions, pictures were also included to make the analogy effective (Figure 3, MEB, 2010, p. 99).



Figure 2. Example of Pictorial Analogy

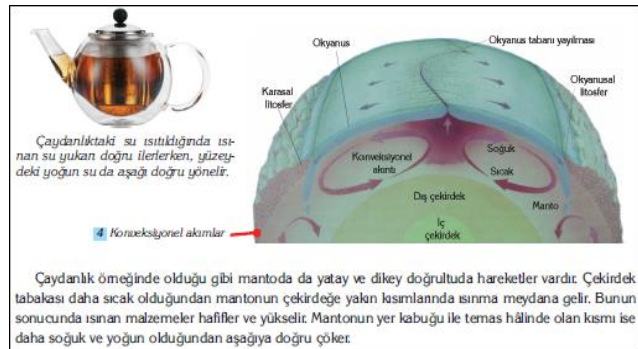


Figure 3. Example of Verbal-Pictorial Analogy

If it is analyzed according to source and target factors, in one of the concrete-concrete analogies; it was aimed to enable students easily distinguish the plant species with this analogy: “Stone pine which is a typical Mediterranean tree, is commonly seen especially in the West and South Anatolia. Its height is 15-20m. In its early years it is round, in its late years it can be distinguished from other pines at first sight with its umbrella shaped crown” (MEB, 2011a, p. 138). In concrete-abstract analogy; the effect of atmospheric pressure on human body which is an abstract situation for students, is tried to be explained with the analogy: “Can you lift about five tons of weight? Let’s say it is too much, then can you lift one tone of weight? What would you say if it is said that there is about 10-15 tons weighing down your body? You didn’t misunderstand; the gases composing the atmosphere weigh about 1033g down for every 1 cm² of your body. This means weighing down about 14 tons on an adult’s body... (MEB, 2010, p. 66)

If it is analyzed in terms of the position of analogy while starting the subject in one of the advance organizer: in order to teach that in mapping different methods are determined according to their aim of being mapped, the similarity explaining that the vehicles students use in transportation are chosen according to their own aims was used with the following analogy “A group of students who study in İstanbul want to go their hometown. There is no doubt that each one will choose the most suitable vehicle to go their home. For example, a students who wants to go to Kahramanmaraş cannot arrive his/her home

directly by a ship. For the student wanting to go to Yalova the best means of transport is ferry. Similarly, the most suitable method for the aim of map use is chosen in mapping" (MEB, 2010, p. 14). When the activator analogy example is handled, in one of the activities in the subject; an analogy that was used is: "There are 15 desks in the classroom. Suppose that at most 2 people will sit on each desk, the maximum student capacity becomes 30. If we want to increase the maximum student capacity of the classroom, we need to enlarge the classroom. Let's say there are 24 students today in the classroom which allows for maximum 30 students. Then, the occupancy rate of the classroom is $(24 \times 100 / 30)$ 80%. If 33 students come to the class allowing for maximum 30 students, 3 students stay standing or they need to go out. That is, the occupancy rate of the classroom would exceed $(33 \times 100 / 30)$ 100%. Let's associate the described example with humidity." (MEB, 2010, p. 77) about the humidity and rain subjects which are generally difficult for students an analogy was drawn with the occupancy rate of a classroom, and it was aimed to enable students to associate this activity with concepts and situations such as absolute humidity, maximum humidity, relative humidity, humidity deficit and rain formation. In the post synthesizer analogy example, at the end of the subject with the intent of reinforcing that deformations happen on the maps while using projection methods a photograph was presented to students and they were asked to associate this photo with a projection method (Figure 4, MEB, 2010, p. 19).



Figure 4. Example of Post Synthesizer Analogy

If it is analyzed according to the level of enrichment of the relationship between source and target, in one of the simple analogies; population attracting force of industrial zones was associated to the gravity force of magnet with the analogy like that: "In Turkey, mechanization in agricultural land and industrialization attacks in certain big cities after 1960s are the most important reasons of population growth in big cities. In Gebze, especially after the construction of highway, building industrial zones and huge industrial enterprises having constructed around this way functioned as a magnet attracting population." (MEB, 2009, p. 42). In the enriched analogy example, in order to explain the role of raw material, production and market, engine and tire of car were given as examples, and the reason of this analogy was described by stating that without one of these elements, others will not function, as well: "Nowadays, raw material which has an important role in trade between countries and regions is the main resource of production and economy. There is a close relationship between them in the economic system. Just as an engine and tire are inseparable parts of a car, so are these three elements inseparable parts of trade. Unless one of them exists, the other does not carry on, too." (MEB, 2011b, p. 142) In the extended analogy example, to clarify the functions of elements composing the natural environment such as atmosphere, lithosphere, hydrosphere and biosphere firstly an analogy was used such as "We can associate natural environment to a football team. Each player has a task. For instance, unless the goal keeper caught the coming balls, if a forward waited in defense, if the coach watched the match on television, what would happen?" the tasks of team members were associated examples. Then, with an analogy like that: "At your school, administrators, teachers, parents and assistant officers co-operate for your success. If the headmaster and deputy headmaster didn't come to school, teachers didn't get into the class, parents didn't interested in whether you are taught at school or not, if you take whichever class you want, and always do noise during the classes, would you be successful?" the tasks of occupational groups at school were associated (MEB, 2010, p. 8).

Also, in one of the personal analogy examples; with an analogy like "Look at one of your photos from old days and your today's headshot photo. What kind of changes in your appearance are seen in your photos from old towards today? Do you think that there is a similar change in nature?" (MEB, 2010, p. 116) the

change happens in time in the nature was tried to be clarified with the change happened in an individual's two photos belonging to past and today.

The analogy which is one of the effective mechanisms people use is a very influential learning and teaching tool, besides it is also a very effective tool for a lot of objectives such as problem solving, explanation, and creating a discussion environment (Dilber, 2006, p. 9). It is possible to state that analogies are related to the teaching principles of "Proceed from the center to the away" and "proceed from the known to the unknown" (Kemertaş, 2003, p. 149) and when it is handled in terms of teaching technique, analogies can be easily used in all teaching strategies. For example, it may serve as an advance organizer for a meaningful learning in the expository teaching. Advance organizers, as is known, are the initiative statements which constitute structures for new knowledge, draw a frame for the new knowledge and make the new information to be associated with the former ones (Tosun, 2011, p. 13). (In this regard, analogies can facilitate the conceptual learning by providing advantages in terms of new learning's being associated with pre-learning. When it is regarded educationally, analogies are among of the most important tools that motivate students by attracting their attention (F. Şahin, 2010, p. 302), help students to develop their cognitive skills (Iding, 1997, p. 240), facilitate creating a relationship between the knowledge students try to learn and the knowledge they have already had (Glynn & Takahashi, 1998, p. 1130; Mayo, 2001, p. 188), develop the skills of reasoning and creating a cause and effect relationship by revealing the similar and different sides of the concepts, provide an easier learning for the objects which are difficult to be brought into the classroom (Cin, 2005, p. 160–162) and affect the learning (Atav, Erdem, Yılmaz & Gücüm, 2004, p. 22).

Even though analogies have many advantages as an educational tool, there may be some drawbacks of using analogies depending upon the degree of matching between the target and source. It may cause misconception as a reason for ambiguity caused by the fact that students aren't at the appropriate level of understanding analogies, there aren't a lot of similarities among the concepts in analogies, also, unlike or different sides between the source and target are not emphasized (Duit, 1991; Dönder, 2010, p. 17–18; Özcan, 2013, p. 37–39; Özgürbüz, 2013, p. 12–13). Considering the difficulty in correcting the misconceptions happening related to analogy, teachers and the authors of textbooks should pay attention to some points in using analogies. Within this respect, presenting objectives of analogy should be pre-determined, whether the source concept describes the target concept properly or not should be considered, and the level of the students should be regarded in explaining the relationship between the source and target concepts in using analogies (Harrison & Treagust, 1993, p. 1292; Guerra Ramos, 2011, p. 30; Iding, 1997, p. 241; Orgill & Bodner, 2004, p. 17). In addition to all these, it is also crucial that teachers need to be well equipped in knowledge and they need to present positive ideas related to the use of analogies (Demir, Önen & Şahin, 2011, p. 93).

The most important factors representing the quality of education are the approach, method and techniques that are used. Therefore, a qualified geography education is closely related to the quality of techniques and books used for the class. Considering the advantages that use of analogies in the class provides and the role of the textbook in teaching, it is possible to state that including a modern teaching technique such as "analogy" in the textbook will increase the efficiency of geography teaching; and by investigating whether the textbooks include such kind of modern methods and techniques sufficiently, making necessary regulations in this direction will contribute to geography teaching.

From this point of view, in the research as problem status, secondary school geography textbooks were investigated in terms of analogy use and answers for the following sub problems were looked for;

- 1- How is the distribution of analogies in the geography textbooks according to the analogical classification?
- 2- How is the distribution of analogy types in the geography textbooks according to the class levels?

Method

This study which aims at establishing the analogies involved in secondary school geography textbooks, was carried out based on the qualitative approach. Determining the analogies needs a detailed investigation into the secondary school textbooks. Thereby, to realize this aim document analysis method which is one of the most suitable methods that can be used in qualitative approaches was determined as a method for the study. Document analysis which is a process of coding and investigating the existing record and documents related to the study that will be carried out, according to a certain norm or system can be also described as documental observation or scanning the document (Çepni, 2010, p. 106). The important point in document analysis is that the researcher should know what, why, how and where to search. By using this method, the document which is valid for the problem status should be given priority instead of every kind of documents (Sönmez & Alacapınar, 2011, p. 83). In this sense, document analysis or scanning the document involve in finding the resources, reading, taking notes, and evaluation for a certain goal (Karasar, 2000, p. 183).

Within the scope of the research, at first national and foreign literature were reviewed within the context of the descriptions and types of the concept "analogy" and their usage in education, and the conceptual frame of analogies were formed. Later on, 9th, 10th, 11th and 12th grade geography textbooks published by the Ministry of Education and being taught at the level of secondary school were analyzed within the context of analogy content. In determining, analyzing and categorizing the analogies in the secondary school geography textbooks, the classification of analogy which was used by Curtis & Reigeluth (1984) and which was established after a literature research about the subject as one of the largest analogy classifications was applied and this classification also involved in "personal analogy" type that was used in the studies of Thiele & Treagust (1991). For the reliability of the research during the determination and classification of analogies, the results were compared after being analyzed by a researcher and an expert independently. By this way, it was enabled to do coding with a common perspective and free from bias and misconceptions. The integration percentage was calculated with the proportioning of agreed analogies to the number of all analogies. Regarding this fact, it can be claim that integration coefficient is at a reliable rate (>%80). In other words, it was seen that coding was done coherently at a high rate for the classification of each analogy on the average. Another field expert was consulted for the solution of limited number of inconsistencies, and the classification on which a consensus was achieved, was taken for granted. Researchers' reaching a consensus was observed in order to be able to finalize the classification. This condition is said to increase the reliability of the research. Lastly, the data were analyzed again and the research was put into a report form.

Results

The analogy classification and the its distribution to class levels that were determined in the secondary school geography textbooks having been analyzed in this part were presented as tables.

In the first sub problem of the study; an answer was tried to be found out for the question: "How is the distribution of analogies in the textbooks according to the analogical classification?"

Table 1. Distribution of the Analogies in Geography Textbooks According to Analogical Classification

Analogies		
According To Relationship	Structural	16 (%22,5)
	Functional	31 (%43,6)
	Structural-Functional	13 (%18,4)
According To Presentation Format	Verbal	42 (%59,1)
	Pictorial	7 (%9,9)
	Verbal-Pictorial	11 (%15,5)
According To Condition	Concrete-Concrete	9 (%12,7)
	Abstract-Abstract	----
	Concrete-Abstract	51 (%71,8)
According To Position	Advance Organizer	23 (%32,4)
	Activator	34 (%47,9)
	Post Synthesizer	3 (%4,2)
According To Level Of Enrichment	Simple	27 (%38)
	Enriched	23 (%32,4)
	Extended	10 (%14,1)
Total		60 (%84,5)
Personal Analogies		11 (%15,5)
General Total		71 (%100)

Totally 71 analogies were determined in the analyzed grade geography textbooks (Table 1). While the analogies were being categorized, determined 11 personal analogies (%15,5) were taken as a separate type, the rest 60 analogies (%84,5); were categorized according to presentation format, according to condition, according to function and enrichment levels.

When they were analyzed in terms of the relationship between source and target, 43,6 % of the analogies in secondary school geography textbooks were functional, 22,5 % of them were structural, and 18,4 % of them were structural-functional analogy types (Table 1). When they were analyzed according to the presentation format, it is seen that 59,1 % of the analogies in the secondary school geography textbooks were verbal, 15,5 % of them are verbal pictorial and 9,9 % of them are pictorial (Table 1). When they were analyzed according to the condition of source and target elements, it was seen that 71, 8 % of the analogies in the secondary school geography textbooks were concrete-abstract, 12, 7 % of them were concrete-concrete type (Table 1). When they were analyzed according to the function of the analogies in the secondary school geography textbooks, 47, 9 % of them were determined as activators, 32, 4 % of them were advance organizers, and 4, 2 % of them were post-synthesizers (Table 1). When they were analyzed according to level of enrichment of the relationship, 38 % of them are simple, 32, 4% were enriched and 14, 1 % of them are extended (Table 1). Lastly, when the personal analogies were analyzed it is clear that 15, 5 % of them are personal analogy type (Table 1).

In the second sub problem of the study; an answer was tried to be found out for the question "How is the distribution of analogies in textbooks according to the class levels?"

Table 2. Distribution of the Analogies in Geography Textbooks According to Class Levels

Analogies	9. Class	10. Class	11. Class	12. Class	Sum	
According To Relationship	Structural	11 (%69)	3 (%18,6)	1 (%6,2)	1 (%6,2)	16 (%100)
	Functional	12 (%38,7)	1 (%3,2)	10 (%32,3)	8 (%25,8)	31 (%100)
	Structural-Functional	9 (%69,2)	1 (%7,7)	2 (%15,4)	1 (%7,7)	13 (%100)
According To Presentation Format	Verbal	20 (%47,6)	3 (%7,2)	9 (%21,4)	10 (%23,8)	42 (%100)
	Pictorial	4 (%57,1)	1 (%14,3)	2 (%28,6)	---	7 (%100)
	Verbal-Pictorial	8 (%72,8)	1 (%9,1)	2 (%18,1)	---	11 (%100)
According To Condition	Concrete-Concrete	3 (%33,3)	2 (%22,2)	---	4 (%44,5)	9 (%100)
	Abstract-Abstract	---	---	---	---	---
	Concrete-Abstract	29 (%56,9)	3 (%5,9)	13 (%25,4)	6 (%11,8)	51 (%100)
According To Position	Advance Organizer	14 (%60,9)	1 (%4,3)	5 (%21,7)	3 (%13,1)	23 (%100)
	Activator	17 (%50)	4 (%11,8)	7 (%20,6)	6 (%17,6)	34 (%100)
	Post Synthesizer	1 (%33,3)	---	1 (%33,3)	1 (%33,3)	3 (%100)
According To Level Of Enrichment	Simple	16 (%59,3)	4 (%14,8)	4 (%14,8)	3 (%11,1)	27 (%100)
	Enriched	14 (%60,9)	1 (%4,3)	4 (%17,4)	4 (%17,4)	23 (%100)
	Extended	2 (%20)	---	5 (%50)	3 (%30)	10 (%100)
Personal Analogies	3 (%27,3)	3 (%27,3)	4 (%36,3)	1 (%9,1)	11 (%100)	
Total	35 (%49,3)	8 (%11,3)	17 (%23,9)	11 (%15,5)	71 (%100)	

Totally 71 analogies were determined in the analyzed 9th, 10th, 11th, and 12th grade geography textbooks. 49,3 % of the determined 71 analogies are involved in 9th grade textbook, 23,9 % of them are in 11th grade textbook and 15,5% of them are in 12th grade textbook and 11,3% of them are involved in the 10th grade textbook (Table 2).

When they were analyzed according to the relationship between source and target, 69 % of the 16 structural analogies determined in the secondary school geography textbooks were found at the 9th grade, 18, 6 % of them were at the 10th grade, 6, 2% of them were at the 11th grade and 6, 2 % of the were at the 12th grade. Structural analogies are weighted at the 9th grade (Table 2). 38,7% of the 31 functional analogies determined in 4 textbooks are at the 9th grade, 32,3 % of them are at the 11th grade, 25,8 %of them are at the 12th grade and 3,2 % of them are at the 10th grade. Similarly, functional analogies also center on the 9th grade (Table 2). 69,2 % of the 13 structural- functional analogies determined in 4 textbooks are at the 9th grade, 15,4 % of them are at the 11th grade, 7,7 % of them are at the 12th grade. Structural-functional analogies are weighted at the 9th grade, too (Table 2). When they are analyzed in terms of the presentation format, 47,6 % of the 42 verbal analogies found out in the secondary school geography textbooks are at the 9th grade, 23,8 % of them are at the 12th grade, 21,4 % of them are at the 11th grade, and 7,2 % of them are at the 10th grade. Verbal analogies are weighted at the 9th grade (Table 2). 57,1 % of the 7 pictorial analogies determined in 4 textbooks, are at the 9th grade, 28,6 % of them are at the 11th grade, and 14,3 % of them are at the 10th grade. No pictorial analogy was determined at the 12th grade. Pictorial analogies are common at the 9th grade (Table 2). 72,8 % of the 11 verbal-pictorial analogies determined in 4 textbooks are at the 9th grade, 18,1 % of them are at the 11th grade and 9,1 % of them are at the 10th grade. No verbal-pictorial analogy was determined at the 12th grade. Verbal-pictorial analogies are weighted at the 9th grade (Table 2). When they were analyzed according to the condition of the source and target elements, 44, 5% of 9 concrete-concrete analogies determined in the secondary school geography books were at the 12th grade, 33, 3% of them were at the 9th grade, 22, 2% of them were at the 10th grade levels. At the 11th grade no concrete-concrete analogy was able to be determined. Concrete- concrete analogies are weighted at the 12th grade (Table 2). 56,9% of the 51 concrete-abstract analogies that were determined in 4 textbooks are at the 9th grade, 25, 4% of them are at the 11th grade, 11, 8% of them are at the 12th grade and 5, 9 % of them are at the 10th grade levels. Concrete-abstract analogies are weighted at the 9th grade (Table 2). No abstract-abstract analogy was able to be determined in the analyzed secondary school geography textbooks. When they were analyzed according to their positions, 60,9% of the 23 advance organizer analogies having determined in the secondary school geography textbooks were at the 9th grade, 21,7% of them were at the 11th grade, 13,1% of them were at the 12th grade and 4,3% of them were at the 10th grade levels. Advance organizer analogies are weighted at the 9th grade level (Table 2). 50% of the 34 activator analogies having determined in 4 textbooks are at the 9th grade, 20, 6 % of them are at the 11th grade, 17, 6 % of them are at the 12th grade and 11, 8%of them are at the 10th grade levels. Activator analogies are weighted at the 9th grade level (Table 2). 33,3% of the 3 post synthesizer analogies found in 4 textbooks are at the 9th grade, 33,3% of them are at the 11th grade, 33,3% of them are at the 12th grade level. No post synthesizer analogy was able to be determined. Post synthesizer analogies are generally dispersed equally to the class levels (Table 2). Having been analyzed according to the enrichment level of the relationship between target and source, 59,3% of 27 simple analogies that were determined in the secondary school geography books were at the 9th grade, 14,8 % of them were at the 10th grade, 14,8% of them were at the 11th grade and 11,1 % of them were at the 12th grade level. Simple analogies are weighted at the 9th grade level (Table 2). 60,9 % of the 23 enriched analogies that were determined in 4 textbooks are at the 9th grade, 17,4 % of them are at the 11th grade, 17,4 % of them are at the 12th grade and 4,3 % of them are at the 10th grade level. Enriched analogies are weighted at the 9th grade level (Table 2). 50 % of the 10 extended analogies determined in 4 textbooks are at the 11th grade, 30% of them are at the 12th grade and 20 % of them are at the 9th grade levels. No extended analogy was able to be determined at the 10th grade. Extended analogies are weighted at the 11th grade level (Table 2). When they are handled in terms of the personal analogies, 36,3 % of the 11 personal analogies having been determined in the secondary school geography textbooks are at the 11th grade, 27,3 % of them are at the 9th grade, 27,3 % of them are at the 10th grade and 9,1% of them are at the 12th grade levels. It is seen that personal analogies are weighted at the 11th grade level (Table 2).

Discussion, Conclusion and Suggestions

In this study carried out with the aim of investigating into the analogies involved in the secondary school geography textbooks; the distribution of the analogies according to the analogical classification was examined.

It is remarkable that vast majority of the analogies involved in textbooks are functional analogies when they are analyzed according to the relationship between source and target elements. Thus, analogies are built according to the similarities of functions between two concepts or situations. Having analyzed the related literature; similar results with the studies which were carried out by Curtis & Reigeluth (1984), Curtis (1988), Thiele & Treagust (1994) and Demirci Güler (2007) were reached. In a study done by Newton (2003), it was seen that structural analogies, that is the analogies in which image fiction is only formally created, are weighted.

When analyzed according to presentation format, it is notable that majority of the analogies are verbal. That is, generally only verbal expressions were used to create analogies. In the literature review, this situation shows parallelism with the studies of Curtis & Reigeluth (1984), Curtis (1988), Thiele & Treagust (1991), Thiele & Treagust (1994) and Newton (2003). However, when analogies are supported with visual elements, they may turn into very useful tools for education (Orgill & Bodner, 2004, p. 29). Also, the use of some tools such as model, picture and photo enables this technique to be more effective (Cin, 2005, p. 160). In this sense, it can be stated that verbal analogies' being weighted in geography textbooks is a negative result for the efficiency of analogy technique. In the study in which Demirci Güler (2007) analyzed the use of analogies in science textbooks, it was established that verbal pictorial analogies according to presentation format are weighted.

When they were analyzed according to condition of source and target elements, it was seen that analogies were mostly concrete-abstract. Considering the role of analogy in concretization of the abstract concept and situations, it is possible to say that this result is relevant with the nature and aim of the analogies. In textbooks no abstract – abstract analogies in which an abstract situation is described with another abstract tool, were found out. Similarly, it is possible to say that this condition overlaps with the reason of analogy. Concrete- abstract analogies' being weighted has parallelism with the studies done by Curtis & Reigeluth (1984), Curtis (1988), Thiele & Treagust (1994), and Demirci Güler (2007). Unlike these findings, in Newton's study (2003) concrete–concrete analogies were used more frequently than concrete- abstract analogies.

When they were analyzed according to the position they have, it was seen that a large part of the analogies were activators. This situation proves the fact that analogies are generally used during the process in which the subject is being taught, instead of at the beginning of the subject or in the summarization of the subject. This situation shows parallelism with the studies done by Curtis & Reigeluth (1984), Curtis (1988) and Demirci Güler (2007). Besides, in Newton's study (2003) all of the analogies determined in 35 textbooks were found out as activators with regards to their positions.

When they were analyzed in terms of the enrichment level of the relationship between source and target, majority of the analogies in the textbooks were determined as the simple type of analogy. Therefore, the reason and the limitations of the similarities between source and target weren't generally mentioned. When the related literature was investigated, 70 analogies in 8 chemistry textbooks were determined in the study done by Thiele & Treagust (1991) and it was seen that majority of these analogies are simple types. In another study done by Thiele and Treagust (1994), about 50% of the 93 analogies determined in 10 textbooks consisted of simple type analogies. Similarly, in the study done by Newton (2003) majority of the 92 analogies determined after investigating 35 textbooks consisted of simple analogies according to the enrichment level. Also, 46 of the 89 analogies determined in the studies at which Demirci Güler (2007) analyzed the science textbooks were established as the simple type of analogies. In order for analogy technique to be efficient the number of the common features of selected samples should be increased (Cin, 2005, p. 160). Besides, using more than one images and associating these images facilitate the learning of the

subject (F. Şahin, 2010, p. 301). Consequently, it is possible to say that it is not a positive result for the efficiency of this technique that the analogies are weighted on the simple type according to their enrichment levels. In the study done by Curtis & Reigeluth (1984), they found out that majority of the analogies in the books that they were analyzed are enriched type of analogies. In a similar way, Curtis (1988) found out that about 50 % of the 64 analogies determined as a result of the analysis of 26 social science books in his research are enriched type of analogies. It stands out that extended analogies are weighted in Kaya's (2010) study.

Personal analogies determined in the secondary school geography textbooks constitute 15, 5 % of all the analogies. With reference to these findings, it can be stated that personal analogy use is not at a sufficient level. Similarly, Kaya (2010) determined totally 10 personal analogies in 16 books as a result of the study he investigated into the science and technology textbooks and present an opinion that personal analogies can be increased. Asking students to create their own analogies will be beneficial both for students and for the success of the technique (Pittman, 1999, p. 19).

For the second sub problem of the research, the analogies in the secondary school geography textbooks were analyzed according to their distribution to the class levels and it was concluded that analogies are weighted firstly at the 9th grade, and then at the 11th, 12th and 10th grades. It can be stated that the 9th grade' being the level at which analogies are majorly used overlaps with the logic of analogy use. Because, analogies are the important tools to concretize abstract conditions. Analogies' being dense at the lower class levels in which need for concrete examples increase, supports this condition. Regarding 10th class level, it is seen that the use of analogy decrease substantially. Even though this condition seems to overlap with the reason of analogies the analogy use in the 11th grade textbook increased two times more than it is in the 10th grade textbook. And, it supports the fact that analogy distribution is not proportional. Similarly in the study done by Kaya (2010), it is clear that analogies are used majorly at the lowest grade level. Unlike this condition, in Demirci Güler's study (2007), majority of analogies are used at the highest grade level.

Analogies' being weighted at the 9th grade, paved the way for the density of analogy sub types to be weighted generally at this level, too.

When they were analyzed according to the relationship between source and target elements, it was seen that majority of the structural analogies were in the 9th grade textbooks. This finding supports the fact that the structural analogies are frequently used at lower levels as a result of the study done by Curtis & Reigeluth (1984). Similarly, both structural and structural functional analogies are weighted at the 9th grade level.

When they were analyzed according to the presentation format, verbal, pictorial and verbal-pictorial analogy types were weighted again at the 9th grade level. Only verbal types of analogies were determined in the 12th grade textbook and this can be explained just by the fact that students' concretizing abilities increase in proportion to the class levels. However, supporting analogies with pictures has an important role in terms of the efficiency of this technique. The findings in the Curtis' (1988) study support the previous explanations about verbal pictorial analogies' being frequently used in social sciences.

When they were analyzed according to the condition of the source and target elements, it was seen that majority of the concrete-concrete analogies having been determined in the secondary school textbooks were weighted at the 12th grade level. It can be claimed that this situation is caused by the fact that students' need for concretization decreases in proportion to the development of their abstract thinking skills. Also, it is possible to state that at the 12th grade level, instead of concretizing the abstract conditions analogies are used to increase the memorability of concrete things. No abstract-abstract analogy was able to be determined in the analyzed secondary school geography textbooks. This result contrasts with the finding of the research done by Curtis (1988) which claims that abstract-abstract analogy use is more frequent in social sciences. It may be thought that this situation is caused by the fact that the position of geography discipline in science and social sciences differentiates in

various countries. When concrete-abstract analogies are analyzed, it is seen that these analogies are weighted at the 9th grade level. Considering that the need for concretizing an abstract situation might be more at lower levels, it is possible to mention that this finding has a positive feature in terms of the analogy use in textbooks.

When they were analyzed according to the position they have, it is clear that advance organizers were weighted at the 9th grade level. Thus, it can be stated that analogies are used with the aim of prologuizing, getting attention or motivating in this class level. This result overlaps with the finding claiming that analogies are used more frequently at the beginning of the education and at low levels, in the research done by Thiele & Treagust's (1994). Activators and post-synthesizers are similarly weighted at the 9th grade level. Presenting post-synthesizer analogy in the 10th grade textbook proves that it is used in that book by way of a summary or a reinforcement at the end of the subject.

When they are handled according to the enrichment level of relationship between source and target, it is clear that simple analogies are weighted at the 9th grade level. Therefore, the reason and limitations of similarities between source and target weren't mentioned while the analogies were being created at these class levels. Whereas concretization, and consequently description of the relationships between source and target for low level of classes in which analogy is needed more, have great importance for the success of the technique. But, enriched analogies' being weighted at the 9th grade levels more or less reliefs this negative situation. Extended analogies with which multiple comparisons are made between source and target are weighted at the 11th grade level. That there isn't any extended analogies at the 10th grade textbook shows that the analogies at this class level are at a simpler level.

It is observed that personal analogies having been determined in secondary school geography textbooks are respectively weighted as 11, 9, 10 and 12th grade levels. 3 of the 10 personal analogies determined in a study carried out by Kaya (2010) are at the 5th grade level, 4 of them are at the 6th grade, 3 of them are at the 7th grade levels and at the 4th and 8th grades personal analogy were not determined. As it was stated before, increasing the number of the personal analogies at every class level which has a great importance in increasing the students' interest in the lesson will ensure this technique to be more effective.

These suggestions can be presented as a result of the findings of the study:

- With reference to the result that functional analogies are weighted in terms of their relationships, the number of the structural-functional analogies that explain the relationship between source and target both in terms of form and position can be increased.
- In the study, it was established that verbal analogies are weighted according to the presentation format. Considering the fact that visual elements are more memorable, the number of the pictorial and verbal-pictorial analogies can be increased in addition to verbal analogies.
- No abstract-abstract analogy was able to be determined in the secondary school textbooks according to the condition of source and target elements. Regarding the fact that students' abstract thinking skills are developed at the secondary education level, the number of the abstract - abstract analogies can be increased.
- Analogies were used majorly as activators according to the positions they have. However, analogies are important tools both for getting attention at the beginning of the class and for summarizing the subjects at the end of the class. In this sense, the number of the advance organizer and post synthesizer analogies can be increased.
- The enrichment level of analogies should be increased in order to minimize the misconceptions and to make analogies more effective. In this sense, instead of using simple analogies, enriched and extended analogies should be given importance.

- The number of the personal analogies in the textbooks isn't considered as sufficient. Considering the role of students' making sense of the concepts and occasions by themselves, the number of the personal analogies can be increased.
- Teachers can be informed about the use of this technique after their opinions towards the analogy use in geography classes are investigated.
- Considering the role of analogies in geography teaching, some studies that will enlighten the textbook authors about the use of this technique in secondary school textbooks can be organized.

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