Full Length Research Paper

Metaphors developed by secondary school students towards "earthquake" concept

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This research was conducted to reveal the metaphors of Secondary school students about "earthquake" concept. About 105 students in two schools in Karabük city centre participated in the research within 2009 - 2010 academic year. The research Data were obtained by students' completing the statement "Earthquake is like .... , because........".. Content Analysis Technique of Qualitative Research Method was used to analyse and interpret the collected Data. According to the outcome of the research, secondary school students created 55 different and acceptable metaphors related to "earthquake" concept. These metaphors were classified under 6 different conceptual categories after being studied carefully in relation with their common features. At the end of the research, It was understood that 34% of the secondary school students perceived earthquake as 'a burning and destroying event', 12.5% of them perceived it as 'scary and terrifying', 12.5% of the students as a 'worrying event', 10.2% of the students as 'an exemplary event', 18.1% as 'a way of expressing death' and 9.0 % as 'a prudent event'.

Key words: Earthquake, metaphor, conceptual categories, geography education.

INTRODUCTION

Metaphor is defined by Lakoff and Johnson (1980) as understanding one conceptual domain (the target domain) in terms of another conceptual domain (the source domain) which leads to the identification of a conceptual metaphor. As an efficient research tool, metaphor is a useful way of bringing implicit assumptions to awareness, encouraging reflection, finding contradictions, and fostering change in educational beliefs and practice (Cameron, 2003). As he (1993: 210) states, metaphor is not a figure of speech, but a mode of thought, so, it characterizes thinking.

The standard approach to metaphor comprehension, treats metaphors as comparisons that highlight preexisting but potentially obscure similarities between the target and base concepts. The process is assumed to be one of feature-matching (e.g., Johnson and Malgady, 1980; Malgady and Johnson, 1980; Miller, 1979 ; Ortony, 1979; Tversky, 1977). The concept mainly, has meanings such as transfer, quote, to give one meaning to another word (Arslan, 2008: 1). Metaphor was defined differently by the researchers. As Morgan (1998) explains metaphor as a way of thinking and perceiving, Lakoff and

Johnson (2005) explains it as a material to think. He explains it as not only a shape of understanding of human and a figure of words but also a figure of thought. Metaphor is being regarded as a very powerful mental tool to understand and express an abstract, complicated and therotical fact which an individual can use (Saban et al., 2006: 1).

The concept of Methaphor which has a close meaning with figure of speech can be defined as explained by transfering unknown to the known or a word or a vision tool which works by transfering qualities from a reality level to another one (Mutlu, 1995: 106). The degree of similarity between target and base, has been found to be positively related to the aptness and interpretability of metaphors (Johnson and Malgady, 1979; Malgady and Johnson, 1976 ; Marschark et al., 1983). Cooke and Bartha (1992) states that the use of such mental metaphors by psychology students actually tends to increase with expertise. For example, people's interpretations of metaphors tend to include more relations than simple attributes, even for statements like Tree trunks; are drinking straws in which both types of commonalities

seem potentially salient (Gentnerand, 1988; Shen, 1992;Tourangeau and Rips, 1991) .

Metaphors are viewed as how people perceive life, environment and objects. They are tools which are used to explain with different metaphors (Cerit, 2008; p. 694). Metaphor is taken into consideration by individuals as a powerful mental mapping and modelling mecanism to understand their own life and also design it (Arslan ve Bayrakçı, 2006: 103). Metaphors give oppotunities to educators to make comparisons, to draw attention to the similarities between two things or to explain something by replacing it with one another. For example when we say that Geography is like an ocean or Geography is similar to ocean. We use "ocean" concept to draw attention to the similarities between Geography and ocean. As a result, any metaphor relation must at least have three main elements. These three main elements are (Forceville, 2002; As cited in: Saban, 2004: 2):

1. The topic of the metaphor (for example:Geography is like an ocean. As the word 'geography' in the sentence).
2. The source of the metaphor (Geography is like an ocean. As the word 'ocean'in the sentence)
3. The features attributed from the source of the metaphor (for example:how an ocean is deep,wide and eternal), geography is also like that. It is a multidisiplined feature that has a wide range of studying area.

Some of the recent studies on metaphors put forth their power as educational tools. One recent study about geography education was published in 2007 by Öztürk. He explained that the purpose of his research was to determine the perceptions of the teacher candidates who would teach geography as teachers of different branches at the beginner level, using metaphors. A total of 357 senior class students at Ahi Evran University, Educational Faculty, have participated in this research. The research data have come up by completing the statement: "Geography is like ………………, because……………" According to the research results, it has been seen that 33% of the teacher candidates perceive geography as the sources of life, 23.2% of them see it as the life area, 8.1% of them sees it as a path finder, and 7.5% of them perceive it as something that includes different branches. 56% of the students, who took part in the research, defined it as the life itself.

PURPOSE OF THE RESEARCH

The purpose of this research is to find out secondary school students' perceptions towards "earth-quake" concept with the assistance of metaphors. Answers to the following questions were thus examined to achieve the purpose mentioned ealier:

1. Which metaphors were used to explain the perception of the secondary school students about "earthquake"?
2. Under which categories can proposed metaphors about "earthquake" concept by secondary school students be classified in terms of their common features?

METHODS

The method of the research

The research was carried out within content analysis technique which is regarded in qualitative research method with phenomeno-logic scientific design. The main target in content analysis is to reach the concepts and relations that will explain the collected data. The interpreted and outlined data within descriptive analysis were taken deeply in content analysis and in this way, new themes and concepts that could not be found out by descriptive analysis can be discovered throughout this process. The main process in content analysis is to bring the similar data together within some certain concepts and themes and to organise and interpret them so that readers can understand them (Yıldırım and Şimşek, 2003: p.162).

Study group

One hundred and five (105) students attending two high schools in Karabük city centre joined the study in 2009 - 2010 academic year. 53 out of 105 students (50.47%) were schoolgirls, 52 students were schoolboys (49.52%) Table 1.

Collecting the research data

In order to reveal the perception of the students about the concept of "earthquake", students were asked to complete "Earthquake is like.....; because.................." statement. An empty paper on which was written "Earthquake is like.....; because.................." was given to the students. Students were demanded to write their thoughts by focusing on just one metaphor.

The analysis and evaluation of the data

The metaphors developed by the students were analyzed and interpreted in five levels. These levels are: (1) The level of coding, (2) Classification level, (3) Category development level, (4) Validity and reliability level, (5) Transferring Data to the computer

The level of coding

In this level, a temporary list of metaphors created by the students taking part in the study was prepared according to the alphabetical order. It was figured out if metaphors were used noticeably by the students. All the metaphors written on the paper were coded (for example:disaster, death, fire). The paper with no metaphors written was marked. 17 of the papers were left out after this phase.

Classification level

Every metaphor was classified into 6 parts by using metaphor analysis (Saban et al., 2006; Saban, 2008; Saban, 2009) and content analysis techniques (Yıldırım and Şimşek, 2003). They were examined to find out the similarities or common features with

Table 1. Distribution of frequency and percentage of the students according to gender.

Gender	Frequency (f)	Percentage (%)
Girls	53	50.47
Boys	52	49.52
Total	105	100

other metaphors. The target metaphors written by students were checked one after the other and (1) The topic of the metaphor, (2) The source of metaphor and (3) The connection between the topic of metaphor and the source of the metaphor were analyzed.

In this research, because of the fact that four papers did not contain any metaphors, one paper was left blank, and the relation between the subject and the source of the metaphor in 12 papers were incompatible, totally 17 papers were excluded. After the participants' papers containing weak structured metaphors have been extracted, 55 valid metaphors were gathered. In one example, a student wrote: "Earthquake is like an onion, because ……" as seen, the second part was left blank so it was considered as invalid.

Category development level

At this level, metaphors produced by the participants were analyzed due to common characteristics that they have in relations with the "earthquake" concept. During this process, how all metaphors conceptualized in relation with the "metaphor" list which contains 55 metaphors was examined. With this aim; 6 different conceptual categories were formed related to particular themes according to any metaphors produced by the students considering "earthquake" concept.

Validity and reliability level

Validity and Reliability are the most important criteria to provide persuasion. To provide the reliability of the study, with the assistance of the experts about the metaphors given under 6 conceptual categories formed in the study, represent the mentioned category or not. For this purpose, the experts were given the two lists:

1. The list that have 55 samples of metaphors in an alphabetical order.
2. The list containing the names and features of 6 conceptual categories.

Using both two lists, an expert was asked to match the sample metaphor in the first list with 6 conceptual categories in the second list (without leaving out any metaphor). Then, the categories made by the expert were compared with the ones made by the researcher. In the comparisons, the reliability of the research was calculated to determine the number of common points and differences using Miles and Huberman's (1994) formula (Reliability = Consensus/ Consensus + dissidence).

In qualitative studies, the desirable level of quality is provided in any cases where the compliance between the reviews of experts and researchers is over 90% (Saban et al., 2006; Saban, 2009). In reliability phase which is specific to this research, a consensus of 94% is provided. Within context of reliability, an expert referred to his opinion associated three metaphors (leaves of a tree, despair and bull) placing them into a different category made by the

researcher. In this case, reliability was calculated as Reliability = 55 / (55 + 3) = 0.94

Data transfer to computer level

All of the data were transferred to a computer after designing 55 metaphors and the development of 6 conceptual categories formed by metaphors. After this process, the number of participants representing 55 symbols and 6 categories were calculated.

FINDINGS

In this section, findings regarding the metaphors about "earthquake" concept developed by the secondary school students who participated in the research were analyzed and interpreted in sub headings in relation with the research questions.

Which metaphors were used to explain secondary school students' perceptions towards "earthquake" concept?

Secondary school students produced 55 valid mental images that belong to "earthquake" concept. 40 of the 55 valid metaphors were produced by only one student. These are; 'pain, hot pepper, leaves of a tree, mirror, bull, pieces of glass, archangel of death, hurting, monster, illiteracy, despair, wave, sudden guest, deep well, lesson, state, natural disaster, swine flu, grader, enemy, worry, activity, disaster reporter, harmful food, ghost, destruction of dreams, lifeline, permanent wound, accident, winter, fear, advice, university entrance exam, wind, quake, eraser, oral exam, discussion, slap and black'. The rest of the metaphors are between 2 and 10. The most preferred images for "earthquake" concept chosen by the students are disaster (f = 10), the judgment day (f = 6), death (f = 6), quake (f = 3) and fire (f = 3). Out of these, separation, angel of death, despair, avalanche, storm, life, massacre, war, destruction and disappearance (f = 2) metaphors were chosen. As seen, a wide range of metaphors were used by the secondary school students for the "earthquake" concept.

Taking common features of metaphors developed by the students about "earthquake" concept, under which categories can these metaphors be listed?

The metaphors that the secondary school students produced for the "earthquake" concept were examined in 6 categories. Among the categories, the one which have the most frequency of metaphors is "Earthquake, as a burning and destroying event". This category contains 30 metaphors as; disaster (10), fire (3), avalanche (2), storm. These metaphors were produced by 14 students. Then comes "Earthquake as a scary and terrifying event"

category. This category includes 11 metaphors such as; shake (3), disappearance (2), bull (1), deep well (1). The third category is "Earthquake as a worrying event" containing 9 metaphors such as; separation (2), despair (2) and pain (1) Table 2. In "Earthquake as an exemplary event" category, there are 8 metaphors like; sudden guest, pieces of glass and swine flu. The rest of the categories are; "Earthquake as a way of expressing death" with 5 metaphors and "Earthquake as a prudent event" category that contains 8 metaphors. The categories of the metaphors that secondary school students produced about "earthquake" concept were shown in Table 3.

Conceptual categories

Category 1: Earthquake as a burning and destroying event

When Table 3 was examined, "earthquake as a burning and destroying event" category" had 14 metaphors produced by 30 students (34%). The distribution of frequencies in this category is as follows; disaster (10), fire (3), avalanche (2), storm (2), massacre (2), war (2), destruction (2), monster (1), wave (1), natural disaster (1), grader (1), enemy (1), wind (1) and eraser(1). The following were the examples given by students in this category:

"Earthquake is like a war. Because it burns and destroys everywhere."
"Earthquake is like a disaster. Because everybody gets damaged."

Category 2: Earthquake as a scary and terrifying event

According to Table 3, there are 11 metaphors in "Earthquake as a scary and terrifying event" category. These metaphors were brought forth by 14 students (16%). When the distribution of metaphors in this category was examined, the most frequent ones were; shake (3), disappearance (2), bull(1), deep well (1), ghost(1), fear(1), oral exam(1), university entrance exam (1), quake (1), black(1) and disaster reporter(1). The following were the examples given by the students in this category:

"Earthquake is like a bull. Because it frightens everybody."
"Earthquake is like a ghost. Because it frightens people as ghosts do."

Category 3: Earthquake as a worrying event

There are 9 metaphors in "Earthquake as a worrying event"

category. These metaphors were produced by 11 students (12.5%). When the distribution of metaphors in this category were examine, the most frequent ones were; separation(2), despair (2), pain (1), hot pepper(1), suffering (1), worry(1), destruction of dreams(1), permanent wound(1) and accident (1). The following were the examples given by students in this category:

"Earthquake is like separation. Because it separates lovers."
"Earthquake is like being despair. Because earthquake areas cause despair."

Category 4: Earthquake as an exemplary event

According to Table 3, there are 8 metaphors in "Earthquake as an exemplary event" category. These metaphors were developed by 8 students (9.0 %). When we examine the distribution of metaphors in this category, each student produced a metaphor, these are; sudden guest (1), pieces of glass(1), swine flu(1), activity(1), harmful food(1), illiteracy(1), examination(1) and winter(1). The statements made by the students of this category are:

"Earthquake is like an examination. Because if we do not study we get collapsed."
"Earthquake is like a sudden guest. Because if you do not get prepared you will be disgraced."

Category 5: Earthquake as a way of expressing death

"Earthquake as a way of expressing death" category contains 5 metaphors. These metaphors were produced by 16 students (18.1%). When we examine the distribution of metaphors in this category, the most frequent ones are; death (6), the judgement day (6), the angel of death (2), black angel (1) and lifeline (1).
The statements made by the students of this category are:

"Earthquake is like death. Because it kills."
"Earthquake is like a sudden guest.. Because it necessitates preparation."

Category 6: Earthquake as a prudent event

According to Table 3 there are 8 metaphors in "Earthquake as a prudent event" category. These metaphors were developed by 9 students (10.2%). When we examine the distribution of metaphors in this category, each student produced a metaphor, these are; life (2), lesson (1), state (1), advice (1), discussion (1), slap (1), leaves of a tree (1) and mirror (1). The following were the

Table 2. Valid metaphors formed by the students about "earthquake" concept, their corresponding number of students and percentage.

Order of metaphors	Names of the metaphors	Frequency (f)	Percentage (%)
1	Pain	1	1.1
2	Hot Pepper	1	1.1
3	Leaves of a Tree	1	1.1
4	Fire	3	3.4
5	Mirror	1	1.1
6	Seperation	2	2.3
7	Angel of Death	2	2.3
8	Bull	1	1.1
9	Pieces of glass	1	1.1
10	Black angel	1	1.1
11	Hurting	1	1.1
12	Monster	1	1.1
13	Illiteracy	1	1.1
14	Despair	2	2.3
15	Avalanche	2	2.3
16	Wave	1	1.1
17	Sudden guest	1	1.1
18	Deep well	1	1.1
19	Lesson	1	1.1
20	State	1	1.1
21	Natural Disaster	1	1.1
22	Swine Flu	1	1.1
23	Grader	1	1.1
24	Enemy	1	1.1
25	Worry	1	1.1
26	Activity	1	1.1
27	Disaster	10	11.4
28	Disaster reporter	1	1.1
29	Storm	2	2.3
30	Harmful food	1	1.1
31	Ghost	1	1.1
32	Destruction of dreams	1	1.1
33	Life	2	2.3
34	Lifeline	1	1.1
35	Permanent wound	1	1.1
36	Massacre	2	2.3
37	Accident	1	1.1
38	Winter	1	6.8
39	The Judgement day	6	1.1
40	Fear	1	1.1
41	Advice	1	1.1
42	Death	6	1.1
43	University Entrance Exam	1	6.8
44	Wind	1	1.1
45	Quake	1	1.1
46	Shake	3	3.4
47	War	2	2.3
48	Eraser	1	1.1
49	Black	1	1.1
50	Oral Exam	1	1.1

Table 2. Contd.

51	Discussion	1	1.1
52	Slap	1	1.1
53	Examination	1	1.1
54	Destruction	2	2.3
55	Disappear	2	2.3
		88	100
	Total metaphors: 55	88(f)	100(%)

Table 3. The categories of the metaphors that secondary school students produced about "earthquake" concept.

Categories	Metaphors	Frequency of metaphors (f)	Number of metaphors
Earthquake, as a burning and destroying event	Storm, fire, avalanche, massacre, monster, enemy, wave, natural disaster, grader, disaster, wind, war, eraser, destruction	30	14
Earthquake as a scary and terrifying event	Bull, deep well, ghost, fear, oral exam, university entrance exam, quake, shake, black, disappear, disaster reporter	14	11
Earthquake as a worrying event	Pain ,hot pepper, seperation, damaging, despair, worry, destruction of dreams, a permanent wound, accident	11	9
Earthquake as an exemplary event	Illiteracy, pieces of glass, sudden guest, swine flu,examination, activity, harmful food, winter	8	8
Earthquake as a way of expressing death	Angel of death, black angel, the judgement day, death	16	5
Earthquake as a prudent event	Lesson, state, life, advice, discussion, slap, leaves of a tree, mirror	9	8
Total		88	55

statements made by students in this category:

"Earthquake is like a lesson. Because it teaches a lot."
"Earthquake is like a piece of advice. Because the witnesses of the earthquake take a good lesson."

DISCUSSION AND CONCLUSION

This research has been prepared to find out the metaphors about "earthquake" concept that the seconddary school students produced, to classify them under certain categories and examine them in terms of particular features. The findings of this research drew attention to several important points. The metaphors that were produced by the students towards "earthquake" concept reminded the students of bad experiences they had either lived or heard from the media. Starting from this point, most of the students see earthquake as burning, destroying, scaring and warning. Such concepts are the reflection of the participants' background or their experience. To explain the earthquake concept thoroughly, a large number of metaphors were necessary. It is not possible to explain the concept of "earthquake" with only one metaphor as a whole. As Yob (2003) stated, basically, metaphor is not the case it mentions, it is only an image. If it were the case, metaphor would not be required. Therefore, metaphor is different from the case, although it provides a very strong perspective related to the case, it is often less. To compensate for this situation, there must be a lot of metaphors (Saban et al., 2006: 504; Saban, 2009: 307). Another point is that, although teacher qualifications, the curriculum, textbooks, social environment, students' interests and audio-visual aids are some of the significant factors in teaching, the negative reflections of secondary

school students about "earthquake" concept may direct teachers in planning the lesson. If those metaphors are chosen as the starting point and the importance of precautions as stated in some of the metaphors by the participants, students may pay attention more than a usual way. Since the majority of the metaphors and the categories indicate similar dimensions of "earthquake" concept, almost all of the students may exhibit similar learning approaches.

Based on this study, it can be seen that "Earthquake, as a burning and destroying event" category had the most frequency of metaphors (f = 30). This may show that secondary school students perceive "earthquake" concept as burning and destroying. Another category "Earthquake as a way of expressing death" comes next with the frequency of 16 metaphors (f = 16). This category contains "death" and related metaphors with the background that in most of the influential earthquakes there are great deal of deaths or injuries. "Earthquake as a scary and terrifying event" with the frequency of 14 metaphors emphasizes fear of the earthquake and there comes "Earthquake as a worrying event" category (f = 11). The other categories are "Earthquake as a prudent event" (f = 9) and "Earthquake as an exemplary event" (f = 8). The last two categories show another dimension of earthquakes that if earthquakes are usual, then they are prudent events and should be taken as examples for the future ones.

As a result, this research finding provides clues of how secondary class students perceive "earthquake". Metaphors are means of teaching instruments as Quale (2002: 454) states, the act of teaching implies conveying a certain body of knowledge to the learners, and in so doing we cannot avoid also projecting an image of the "meaning" of this information. Metaphors can be used as powerful research tools in understanding, explaining and revealing the perception about the "earthquake". In educational studies, metaphors can be used to explain the meaning of the words assisting to determine what most important issues are. Educators who think what they do when they teach can develop their thoughts, images and applications using metaphors. Teachers can develop and change their classroom activities through metaphors to explain their own roles and responsibilities for a better education (Çelikten, 2006: 276 - 277). Taking this into account, such studies may be carried out to develop new dimensions for teachers in classroom activities, preparing textbooks in schools.

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