

*Full Length Research Paper*

# Observation of the students' "earthquake" perceptions by means of phenomenographic analysis (primary education 7th grade – Turkey)

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The purpose of this research is to define and explain how 7th grade students' in Turkey perceive "earthquake" concept using phenomenographic research methods. The research group of the study is comprised of 553 7th grade students in four cities (Ankara, Adana, Antalya and Karabük) in Turkey. The data of the research was gathered by students' completing "I think earthquake means ...", "In my opinion earthquake is....". statement. After phenomenographic analysis "7 different earthquake definition categories" were determined. 22.6% of the 7th grade primary school students in Turkey who contributed the research defined the earthquake as "destruction of the buildings and death of people", 19.7% "shakes related to the movements of the earth crust and fult line", 19.5% "natural disaster", 13.8% "swinging of the ground", 11.6% "a natural disaster whose effects increases as a result of people's unconscious and insensible acts" and 10.7% as "a disaster whose defects can be reduced by taking the necessary precautions".

**Key words:** Primary education, earthquake, phenomenography, environmental education.

## INTRODUCTION

Earthquakes are the primary natural disasters the world has faced throughout history. It is possible to define "earthquake" in many ways. According to Hosgören (1997) earthquakes are transient shocks that occur in the earth crust or rarely in the upper mantle by the effect of the natural factors and processes. According to Sahin and Sipahioğlu (2002) the vibrations and swingings which occur by means of natural factors and lead to a significant change on the earth are called earthquakes. According to Atalay (1998), earthquakes are the earth crust movements whose durations are defined by means of seconds and occur by the the rupture of the soil crust or the outcropping of the energy reserved in the magma from the weak parts of the earth. According to Özey (2000), earthquakes are the movements of flips which can occasionally be massive, occurring by means of the sudden earthing of the energy reserved in the earth crop.

Turkey is situated on the Alpine-Himalayas faulty line which is one of the three important earthquake zones. Because of this Anatolia which was dismantled with the faults encountered very violent and destructive earthquakes and it is still continuing. When the earthquakes occurred, affect the people deeply in terms of social, financial and psychological issues. However, not having enough consciousness about earthquakes causes big damages in Turkey. On the contrary there are countries that earthquake damages can be reduced to the lowest level. As in Japan and similar countries, an effective and continuous education can reduce the damages caused by the earthquakes in Turkey as well (Basıbüyük, 2004; Atalay, 1987).

Turkey and many regions of the world are under earthquake risk. Owing to people who have knowledge about what earthquake is, to which possible results it would lead and what kind of precautions to be taken against it, the next generation will take its place as adults who are sensitive to the natural disasters, fulfilling their social and individual responsibilities in the society. The main way to

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cope with the earthquakes and other natural disasters passes through a conscious and organized natural disaster education. The main objective of the earthquake and other natural disasters education is to raise awareness in every segment of the society about the environment, bringing them in the positive and permanent changes of behaviour and realising the active contribution. Natural disaster education should be a lifetime education starting from the pre-school through all formal and informal education stages.

### The purpose of the research

The aim of this research is to analyse the perception of "earthquake" notion of the primary education 7th grade students by means of using phenomenographic research methodology.

It is impossible to completely eliminate the problems that occur after the earthquakes. On the other hand; the effects can be reduced if every individual does his best that is, if he gains awareness about earthquakes. Gaining awareness of earthquakes is the gaining of knowledge of the student about what to do before, during and after the earthquake and applying them correctly. For this reason, in order to determine the acts that are effective on gaining awareness of earthquakes in primary education, the things to be done depending on the environment before, during and after the earthquake should be determined and comprehended by the students (Cakar, 2008).

Education of the students in the fields of earthquakes and disasters have gained more importance in the recent years. It is important that the 7th grade primary school students acquire sufficient information, meaning that they become conscious about earthquakes. No other research exists in Turkey that presents the 7th grade primary school students' earthquake perceptions in a phenomenographic pattern. From this point of view, this first research has an importance by means of being a source for both the field and the researchers. Concordantly, the aim of the research is to compose categories by determining the 7th grade primary school students' definitions of the notion of "earthquake" by leaning against their background and experiences.

### MATERIALS AND METHOD

#### METHOD

In this research phenomenography was used among qualitative research methods. It is possible to define qualitative research as a research that qualitative data gathering tools such as observation, interview and document analysis are used and perceptions and events are put forth with a qualitative process is followed towards a realistic and coherent way (Yıldırım and Simsek, 2006).

Phenomenography is a qualitative research approach that investigates qualitatively different ways in which people experience something or think about something (Patton, 1980).

According to Marton (1994), as data gathering method for

phenomenographic research face-to-face interviews, group interviews, surveys and written responses are used amidst the subjects.

#### Study group

The study group of the research is composed of 553 7th grade primary school students from 4 different cities (Ankara, Adana, Antalya ve Karabük) in 2009 – 2010 academic year. The 7th grade primary school students contributed to the research are composed of 287 girls and 266 boys. In other words, 52% of the study group are girls, 48% are boys. The frequency and percentage distribution according to the gender of the students contributed is shown in Table 1.

#### Data gathering and evaluation

In order to detect earthquake perceptions of primary education 7th grade students participating in research group, they have been asked to answer a semi-structured form enclosing short and open ended questions. In this form, there are expressions like "I think earthquake means ...", "In my opinion earthquake is....". Sufficient amount of time has been given to primary education 7th grade students to state their opinions on earthquake. Descriptions students wrote in their own hand writing constituted the main data source of research. Subsequently data gathered from students have been studied via phenomenographic analysis method data analysis technique. In this analysis, at first all the responses given to earthquake concepts were read aloud quickly in one session. Later the same responses were read quickly for a second and third time. After the third reading some temporary pre categories were set generally and these pre-categories served as a foundation in future readings. In other words these categories were tested against student responses. Advanced readings were used the verification of categories and similar responses were placed in certain categories.

By classifying the responses of primary education 7th grade students certain description categories were formed. In situations when a student's response occupied two or more categories it was included into the hierarchically highest category. At the end of analysis, (7) seven different earthquake concepts have been obtained.

### FINDINGS

As the descriptions given by primary education 7th grade students to earthquake have been analyzed, (7) seven dissimilar qualitative earthquake concepts have been determined. These description categories have been placed in a hierarchical order from the simplest (concept 1) to the complex and comprehensive one (concept 7). Hereinafter, definition categories consisting of expressions of 7th grade students in the secondary school in Turkey, model student expressions, frequency and percentage values of the girls and boys within these categories have been introduced.

Definition category 1: Earthquake is a natural disaster (108 students).

Definition category 2: Earthquake is the swinging of the ground (76 students).

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

Gender	Frequency (f)	Percentage
Female	287	52
Male	266	48
Total	553	100.0

**Table 2.** Expressions belonging definition category 1.

Definition category	Expressions	Number of students (n)			Percentage
		Female	Male	Total	
Earthquake is a natural disaster...	Earthquake is a natural disaster.	26	15	41	7.4
	Earthquake is disaster.	4	5	9	1.6
	Earthquake is an indeterminate disaster.	5	2	7	1.3
	Earthquake is a natural disaster, we should be cautious.	13	7	20	3.6
	A natural disaster which causes loss of life and property.	17	14	31	5.6
Total		65	43	108	19.5

Definition category 3: earthquake is the quake which occurs due to the movement of earth crust and faults (109 students).

Definition category 4: Earthquake is death of people cause and collapse of the buildings(125 students).

Definition category 5: Earthquake is a natural disaster that negative effects are gradually increasing because of unconscious and unknowing behavior of the people (64 students).

Definition category 6: Earthquake is disasters, which negatively affects the people from psychological aspect and leaves deep marks (11 students).

Definition category 7: Earthquake is a natural disaster that the damages can be decreased as long as the required precautions are taken (60 students).

Below are given conceptual categories comprising expressions of primary education 7th grade students:

#### **Definition category 1: Earthquake is a natural disaster**

108 of 7th grade students in the elementary education have made this definition. The students have featured the natural disaster property of the earthquake in this category. The expressions taken place in this category has been shown in Table 2.

As it's seen in Table 2, 19.5% (108 students) of 7th grade students in the elementary education have defined earthquake as a "natural disaster".

#### **Definition Category 2: Earthquake is the swinging of the ground**

76 of 7th grade students of elementary education have

made this definition. In definition category 2, the students have defined the earthquake as the "swinging of the ground". The expressions are introduced in Table 3.

As it is seen in Table 3, 13.8% (76 students) of 7th grade students of elementary education have featured the quake and swinging property of the earthquake and made definitions.

#### **Definition category 3: Earthquake is the quake which occurs due to the movement of earth crust and faults**

109 of 7th grade students of elementary education have made this definition. While the students have been expressing their opinions regarding the earthquake, they have featured "the earth crust's movements and faults". The expressions in this category have been given in Table 4.

As it's seen in Table 4, 19.7% (109 students) of 7th grade students who participated to the research have defined the earthquake as "it's a quake which occurs due to *the movement of earth crust and fault lines*".

#### **Definition category 4: Earthquake is cause death of people and collapse of the buildings**

125 of the students in 7th grade in elementary level have made this definition. In definition category 5, the students have emphasized the effects of the earthquake. The expressions taken place in this category are given in Table 5.

As it is seen in Table 5, 22.6% (125 students) of the 7th grade students who have participated in the research have defined the earthquake as "the collapse of the buildings and death of people".

**Table 3.** Expressions belonging to definition category 2.

Definition category	Expressions	Number of students (n)			Percentage
		Female	Male	Total	
Earthquake is the swinging of the ground	It's a quake	2	14	16	2.9
	It's a great quake	4	7	11	2.0
	It's swinging of the ground	15	11	26	4.7
	It's swinging of the earth's crust.	19	4	23	4.2
	Total	40	36	76	13.8

**Table 4.** Expressions belonging definition category 3.

Definition category	Expressions	Number of students (n)			Percentage
		Female	Male	Total	
It's a quake, which occurs due to the movements of earth crust and faults	It arises due to the movement of earth crust.	4	15	19	3.4
	It's a quake, which occurs by the replacement of plates underground with the effect of magma.	6	9	15	2.7
	It occurs depending on fault line.	3	4	7	1.3
	It occurs in the result of replacement of faults underground.	7	14	21	3.8
	It occurs in the result of breaking of earth crust.	11	2	13	2.4
	It occurs in the result of the movements of fault lines.	6	28	34	6.1
	Total	37	72	109	19.7

**Table 5.** The expressions belonging to definition category 4.

Definition category	Expressions	Number of students (n)			Percentage
		Female	Male	Total	
Earthquake is death of people and collapse of the buildings	Earthquake is the collapse and swinging of the buildings.	14	11	25	4.5
	The people are buried in the wreckage and the buildings collapse.	11	4	15	2.7
	Earthquake is a death.	9	8	17	3.1
	It's the collapse of the buildings and death of people due to breaking of the fault lines underground.	11	8	19	3.4
	Earthquake is loss of life and property.	16	5	21	3.8
	It's the collapse of buildings and swinging of earth crust.	10	18	28	5.1
	Total	71	54	125	22.6

**Definition category 5: Earthquake is a natural disaster whose negative effects are gradually increasing because of unconscious and unknowing behavior of the people**

64 of 7th grade students have made this definition. In definition category 6, the students have emphasized the

“people” factor for the damages of the earthquake. The expressions taken part in this category have been given in Table 6.

As it is seen in Table 6, approximately 11.6% (64 students) of 7th grade students who participated in the research have defined the earthquake as “it’s a natural disaster that negative effects are gradually increasing

**Table 6.** Expressions belonging definition category 5.

Definition category	Expressions	Number of students (n)			Percentage
		Female	Male	Total	
Earthquake is a natural disaster that negative effects are gradually increasing because of unconscious and unknowing behavior of the people	Earthquake is a natural disaster but people and other living things die because of unconscious behaviors of people (such as not making the buildings well-supported, stealing the material or deficiency of earthquake information etc.).	27	13	40	7.2
	It's dying of people and collapse of the buildings due to not making the buildings well-supported.	7	17	24	4.4
	Total	34	30	64	11.6

**Table 7.** The expressions belonging definition category 6.

Definition category	Expressions	Number of students (n)			Percentage
		Female	Male	Total	
Earthquake is disasters, which negatively affects the people from psychological aspect and leaves deep marks	The roof of the people falls in and they lose their families.	1	2	3	0.6
	The people have to live in panic.	-	3	3	0.5
	The earthquake is a fear.	-	1	1	0.2
	The earthquake mentally depress people.	-	1	1	0.2
	Earthquake is pain, tear and leaving homeless.	-	3	3	0.6
	Total		1	10	11

because of unconscious and unknowing behavior of the people”.

**Definition category 6: Earthquake is disasters, which negatively affects the people from psychological aspect and leaves deep marks**

11 of 7th grade students in elementary level have made this definition. In definition category 6, the students have emphasized the psychological effects of the earthquake on people. The expressions taken place in this category have been given in Table 7.

As shown in Table 7, approximately 2.1% (11 students) of 7th grade students who participated in the research have defined earthquake as “a disaster, which negatively affects the people from psychological aspect and leaves deep marks”.

**Definition category 7: Earthquake is a natural disaster that the damages can be decreased as long as the required precautions are taken**

60 of 7th grade students in elementary level have made

this definition. In definition category 7, the students have emphasized that some precautions should be taken against the effects of earthquake. The expressions taken place in this category have been given in Table 8.

As shown in Table 8, approximately 10.7% (60 students) of 7th grade students who participated in the research have defined the earthquake as “a natural disaster that the damages can be decreased as long as the required precautions are taken.

## CONCLUSION AND DISCUSSION

The results of the research show that the notions of 7th grade primary students in Turkey do not comprise a complete definition and their knowledge about the issue is in “general knowledge” level, acquired particularly from the various pulpits, their experiences and the environments. 22.6% of the 7th grade primary school students in Turkey who contributed the research defined the earthquake as “destruction of the buildings and death of people”, 19.7% “shakes related to the movements of the earth crust and fault line”, 19.5% “natural disaster”, 13.8% “swinging of the ground”, 11.6% “a natural disaster whose effects increase as a result of people’s unconscious and insensible

**Table 8.** The expression belonging definition category 7.

Definition category	Expressions	Number of students (n)			Percentage
		Female	Male	Total	
Earthquake is a natural disaster that the damages can be decreased as long as the required precautions are taken	The earthquake cannot be prevented but the damages can be decreased as long as the required precautions are taken.	1	4	5	0.9
	The earthquake occurs suddenly so we should always be ready.	5	3	8	1.4
	We should know what to do before, during and after the earthquake.	6	2	8	1.4
	The awareness of the people should be raised in the matter of earthquake.	4	-	4	0.7

acts” and 10.7% as “a disaster whose defects can be reduced by taking the necessary precautions”.

19.5% of the 7th grade primary school students in Turkey who contributed the research defined the earthquake as “natural disaster”, 13.8% “swinging of the ground”, 19.7% “shakes related to the movements of the earth crust and fault line”, which match the definitions of Sahin and Sipahioglu (2002), Özey (2000), Hosgören (1997) and Atalay (1998).

There are also results that are thought to be interesting and worth-stressing. A part of the students, leaning against their experiences and what they heard, defined the earthquake by the words like “death”, “an event that corrupts human psychology” and “destruction”. These definitions also present the emotional burnouts caused in the inner world of the students by the earthquake. There are several existing researches that support such opinions of the students. For example, Berkem and Bildik (2001) have determined in their research the mental disorder observed in children after the 1999 Bosphorus earthquake.

10.7% of the 7th grade primary school students in Turkey who contributed the research defined earthquake as “a disaster whose defects can be reduced by taking the necessary precautions”. According to the similar research of Demirkaya (2007), primary school students thought that the damages of the earthquakes could be minimized when the people take the necessary precautions. Öcal (2005) stated about the subject that:

“in order to determine the acts that are effective on gaining awareness of earthquakes in primary education, the things to be done depending on the environment before, during and after the earthquake should be determined and comprehended by the students”.

In this research, the sum of 553 7th grade primary students have been sequenced. By the phenomenographic research method, examinations of perceptions of similar notions like environment, earthquake, species facing extinction of different students from different parts

of the world can be realised. The results of the researches can be compared. The reason why the definitions of 7th grade primary school students in Turkey about the earthquake notion being external could be the usage of traditional education methods – teacher originated educational methods – in the courses. In the new configurative approach based primary education programs, the student is placed in the center of the learning process. Thus, the student contributes the class actively. In the classes where the student originated educational methods are used, the success, behavior, motivation and interest of the student increases. Furthermore, another reason for this could be the multiple choice structure of the university entrance exams not allowing the students to configure their own knowledge. The superficiality of the earthquake definitions given by primary education 7th grade students may be attributed to the fact that in classes primary education 7th grade students receive education, it is highly possible that teachers centered learning approaches are practiced because teacher centered learning, approaches teacher for the aim of transferring continuous knowledge, adopts a didactic teaching model and views the students as passive receivers. In such class environments it is not possible that students acquire high-level skills like critical thinking, creative thinking, problem solving, questioning (Coskun, 2010; Aydın, 2010). Harmonizing several scientific disciplines, environmental education should be treated in a way to cover all educational levels in and out of school and should be public oriented. In other words, it should not merely include school subjects but students should be able to transfer the knowledge and experiences they learn at school into social life. Primary education 7th grade students should be given a chance to take part in environmental education project works. During lessons, it should be emphasized that environmental issues do not merely impact one region or nation but the whole world. Based on the findings obtained from this research some suggestions can be rendered related to primary education 7th grade program applications. A more realistic and up-to-date program on global issues may be taught to primary education 7th grade students.

Before teaching concepts about near environment, teachers should bear in mind that students might have been misinformed earlier. Within that scope, earthquake concepts of participant primary education 7th grade students are not that scientific. It is envisaged that description categories put forth are mostly based on students' experiences on television, internet, news and documentaries rather than a planned course schedule at school. By taking the results of this research into consideration, several findings can be achieved for the primary education program. A more realistic and updated program regarding the natural disasters can be applied to primary school students.

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