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Earthquake training is gaining importance: the views of 4th and 5th year students on Earthquake

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Abstract

It is known that many studies on informal earthquake training are being carried out in primary schools. Therefore, it is of interest whether an awareness and consciousness have been formed in the views of the students and their knowledge about earthquake in this province where the earthquake happened severely. With this purpose, the views of 96 primary school students at the 4th and 5th years on their knowledge on earthquake were attempted to reach through open-ended questions. According to the results of the study, it was seen that students defined the earthquake mostly as a natural disaster and quake. It was determined that almost half of the students did not know that the region they lived in was under the risk of earthquake.

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1. Introduction

Natural, technological and human-induced events' results are called the disaster which rises the physical, economic and social losses for people, affects communities by stopping or interrupting the normal life and human activities and using the affected community's own facilities and resources to overcome unavoidable (Ergünay, 1996). The earthquake is an event that comes first to mind in Turkey, when the disaster is called. The disaster is used to use the earthquake almost the same (Arslan, 2003). The real reason for this is Turkey is a country of the earthquake since the early ages due to the geographical position and geological structure (Arslan, 2003; Kadioğlu & Özdamar, 2008). The earthquake of Marmara, whose size is 7.4, is effective in Istanbul, Kocaeli, Sakarya, Yalova, Bolu, Bursa and Eskisehir at 17 August 1999 and the earthquakes, whose size are 7.2, occurred on November 12, 1999 in Bolu have caused us to large losses that can be described as near the past (Kadioğlu & Özdamar, 2008).

The negative impact of the earthquake is caused to people to social, economic and psychological harm. It is possible to prevent damage or reduce the impact. The damage of people from the earthquake is a result of people does not receive the necessary and sufficient measures not a situation of the earthquake caused directly (Başbüyük, 2004). Many research emphasized that public awareness to minimize the harmful effects of the earthquake

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(Ergünay, 1996; Hurnen & McClure, 1997; Erçetin, 2003; Taş, 2003; Başbüyük, 2004; Kibici, 2005; Öcal, 2005). In the study of the awareness of earthquake preparedness, Kocak (2004) identified that local people see the most important problem is economy and education about the earthquake preparedness.

The schools are the places where we can learn from the ground up and the right way for what an earthquake is, how it occurs, how earthquakes affect the environment, what kind of needs to be done to protect against an earthquake (Öcal, 2005). People, who learned about earthquakes in informal ways by randomly not as accurate in formal ways, can fall into misconceptions (Ross & Shuell, 1993). In a study conducted in our country, It has been seen a positive relation between the causes of earthquake damage with that people's fate belief (Aydın & Esen, 1997). In Tsai's study in Taiwan after the earthquake, the students said the causes the occurrence of an earthquake a) supernatural powers, b) cultural myths and c) sudden changes of the gravity (Tsai, 2001). The students may fall into misconceptions even if they learned the subject of earthquake in the formal education (Barrow & Haskins, 1993; Tsai, 2001; Oğuz, 2005; Şimşek, 2007). Students can obtain the misconceptions about the earthquake from TV, movies, their environments or any location (Barrow & Haskins, 1993; Şimşek, 2007). In the study of primary school students' understanding of earthquake and their perspectives towards earthquake, Demirkaya (2007) have found that a part of students identified that the earthquake is a natural disaster; some students took to the fore the psychological factors resulting from the earthquake; a group of students mentioned the issues such as damaged of buildings, death, property loss as a result of earthquake after it occurred. A part of the students reported that they did not have any information about the cause of the earthquake. Çelen and Üner (2002) give an earthquake-related training in a lesson at health vocational school and expressed the students' levels of earthquake information increased even in one time of the course and they addressed it is necessary to put the earthquake training into practice in the other levels of education. Başbüyük (2004) emphasized that it is necessary earthquake-related educational activities from the primary school to learn to live with earthquakes and the earthquake should be given due importance in the educational programs in national and regional level through mass media. Özgüven and Öztürk (2006) determined the students' knowledge level increased after the basic earthquake awareness training in 90 minutes and suggested the basic earthquake awareness training should be taken in education curriculum by the Ministry of Education and should be given to the large groups of students continuously. It gains importance to examine the students' opinions in-depth for instructional programs for inclusion in a section on earthquake education. The students' information about the earthquake in Turkey have been studied on the literature (Çelen & Üner, 2002; Başbüyük, 2004; Oğuz, 2005; Öcal, 2005; Özgüven & Öztürk, 2006; Demirkaya, 2007; Öcal, 2007; Şimşek, 2007; Buluş Kırıkkaya, Bali & Bozkurt, 2009; Aydın & Coşkun, 2010). Differently the literature in this study, primary 4 and 5 grade students' views were examined in-depth with qualitative data about what an earthquake is, how it occurs, what losses it is caused and what can be done to protect against earthquake. This study shall be capable of guiding for the determination of considered the inclusion of gains on the Primary 4th and 5th class curriculum and also the data obtained in accordance with the curriculum about the earthquake have been made comments about the effectiveness of the gains. This study will provide important contributions to the literature in terms of area.

In this study, the views of the primary 4th and 5th grade students about the earthquake tried to put forward by considering the above issues raised and some suggestions were made. In this context, it is tried to find the following problem and sub-problems' answers:

1. What are the views of primary 4th and 5th class of the students about the earthquake?
 - 1.1. How do the students describe the earthquake?
 - 1.2. What do the students consider about occurrence of the earthquake?
 - 1.3. Are the students associate the earthquake with weather phenomena?
 - 1.4. Do the students think that the earthquake is in a relation to movements of the sun, moon or planets?
 - 1.5. What are the students' ideas on the earthquake prediction?
 - 1.6. What are students' thoughts about the damages caused by earthquakes?
 - 1.7. What are students' thoughts about the protection from the earthquake?
 - 1.8. What are earthquake areas at risk for students?

2. Method

The research was carried out within the Social Service Course with a sampling group of a total of 96 students from two primary schools. 51 of students are 4th grade and 45 of students are 5th grade. In the study, survey model is used because of the subject of the research is tried to be defined in the natural conditions as it is (Karasar, 2007).

As a result of the literature study, students’ ideas for the earthquake were decided to examine 8 categories. The first of these categories is related to how the students describe the earthquake. Second, how it occurs. Respectively, these categories follow that the relationship between weather events and the earthquake, the relationship between the movements of the sun, moon or planets and the earthquake, prediction of the earthquake, the damages caused by earthquakes, the protection from the earthquake and knowledge of earthquake risk areas. It was developed as an open-ended question in each category was created to collect data. The formation of a data collection tool is an open-ended question due to allow the students give more detailed information about the issue. The reason of taking the views in writing, exposure data in any orientation is only based on the individual's own perception and knowledge. The prepared questions were examined by two experts.

Evaluation of the data collection tool was done with content analysis from the qualitative analysis methods. Three student responses to questions have not been considered due to leave most of them empty. As is known, based on the qualitative research’s goal is not to make generalizations through the numbers. The obtained results are limited only the students’ responses who participated in the survey because purpose is not generalization. Data analysis was conducted by two researchers of the study. The first phase of content analysis of the data coding were made based on students’ responses. However, to ensure the reliability of coding, one half of the 8 categories were coded by one researcher and the other half were coded by another researcher.

3. Findings and Comments

In order to reach primary 4th and 5th grade students’ knowledge of the earthquake, 7 asked questions’ responses were evaluated to the categories and collected under these categories of the concepts’ frequency and percentage values are counted and placed in tables for every answer.

3.1. The findings and comments for the first question

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The findings of students’ responds to the question of “What is the earthquake?” were placed in Table 1.

Table 1: The frequency and the percentage of responds to the question: “What is earthquake?”

Pupils Answers’	4. Grade			5. Grade			Total		
	N	f	%	N	f	%	N	f	%
Natural disaster	50	19	38	43	9	21,0	93	28	30,1
Swinging of the ground	50	16	32	43	19	44,1	93	35	37,6
The destruction and collapse of buildings and homes	50	8	16	43	6	14,0	93	14	15,1
Moving of plates.	50	1	2	43	-	-	93	1	1,1
Pressure of the earth's crust	50	1	2	43	2	4,7	93	3	3,2
I don't know	50	5	10	43	7	16,2	93	12	12,9
Total	50	50	100	43	43	100	93	93	100

When the Table 1 examined, the findings of 4th and 5th grade students are examined in total it appears that they describe the earthquake mostly as swinging of the ground (f=35), natural disaster (f=28) and the destruction and collapse of buildings and homes (f=14). These findings consistent in Aydın & Coşkun (2010) and Demirkaya

(2007)'s studies of primary students' views of the earthquake that some of the students described the earthquake as a natural disaster and swinging of the ground. It is established that a small number of the students described pressure of the earth's crust ($f=3$) and moving of plates ($f=1$) and 12 students could not give an answer to this question. Similarly, the findings of 4th and 5th grade students were examined separately; they describe the earthquake mostly as swinging of the ground, natural disaster and the destruction and collapse of buildings and homes.

The unit of "natural processes" at 8th grade in primary school includes acquisition and activities to be informed the natural process of plate tectonics and the results caused by these movements; to ensure that notice of the earthquake is a natural process by students. However, in this study, as in many studies, the students thought the earthquake as a disaster not a natural process it was thought that may be related to the first three classes' lessons in primary education. In the 1st and 3rd classes, "disaster prevention and safe life" is worked up as the subject of a separate unit in Life Science course. In the acquisitions, hazards are discussed rather than natural events or risks. It may cause the students' perception of disaster in many natural phenomena such as earthquake, volcanic activity. Whereas, as defined in the Presidency of the Prime Ministry of Disaster and Emergency Management (2010), the earthquake is an event of shaking of the ground surface that is the result of spread in waves of sudden vibrations with the reason of breakages in Earth's crust (www.deprem.gov.tr). In other words, an earthquake is defined as a natural process or a natural event.

3.2. The findings and comments for the second question

The findings of students' responds to the question of "How does the earthquake occur?" were placed in Table 2.

Table 2: The frequency and the percentage of responds to the question: "How does the earthquake occur?"

Pupils Answers'	4. Grade			5. Grade			Total		
	N	f	%	N	f	%	N	f	%
With cracking the Earth's crust	50	11	22	43	6	14	93	17	18,3
With swing of the Earth's crust.	50	7	14	43	12	27,9	93	19	20,4
With damaged of the fault line.	50	1	2	43	-	-	93	1	1,0
With being shaken buildings and houses.	50	8	16	43	1	2,3	93	9	9,6
With movement of stones in underground.	50	1	2	43	3	7,0	93	4	4,3
With explosion of the core.	50	3	6	43	-	-	93	3	3,3
With erosion.	50	3	6	43	2	4,7	93	5	5,3
With collapse of buildings	50	1	2	43	2	4,7	93	3	3,3
With movement of plates	50	-	-	43	5	11,6	93	5	5,3
With wind.	50	1	2	43	-	-	93	1	1,1
Released temperature from underground.	50	2	4	43	1	2,3	93	3	3,3
I don't know.	50	12	24	43	11	25,5	93	23	24,8
Total	50	50	100	43	43	100	93	93	100

When the Table 2 examined, the findings of 4th and 5th grade students are examined in total it appears that they did not know that how the earthquake occurs ($f=23$). These findings consistent in the studies in the USA (Ross & Shuel, 1993) and in the United of Kingdom, many primary children from 5 to 11 year-olds have little understanding of the causes of earthquakes. It is established that students thought the earthquake occurred the most with swing of the Earth's crust ($f=19$), with cracking the Earth's crust ($f=17$), with being shaken buildings and houses ($f=9$). A small number of the students thought it occurs with damaged of the fault line ($f=1$) and with wind ($f=1$). Similarly, the findings of 4th and 5th grade students were examined separately; they thought the earthquake occurs mostly with swing of the Earth's crust. Also Aydın (2010) identified the 8th grade students saw the cause of earthquake as a swing of the Earth in his study.

3.3. The findings and comments for the third question

The findings of students' respond to the question of "Is there a relationship between weather events and earthquake? How?" were placed in Table 3.

Table 3: The frequency and the percentage of responds to the question: “Is there a relationship between weather events and earthquake? How?”

Pupils Answers'		4. Grade			5. Grade			Total		
		N	f	%	N	f	%	N	f	%
There isn't	There was no explain.	50	13	26	43	6	14,0	93	19	20,0
	Related with ground.	50	2	4	43	3	7,0	93	5	5,3
	Related with wind.	50	10	20	43	4	9,0	93	14	15,0
There is in my opinion.	Related with rain and flood.	50	10	20	43	6	14,0	93	16	17,1
	Related with tornado	50	2	4	43	3	7,0	93	5	5,3
	Related with lightning and thunder.	50	2	4	43	3	7,0	93	5	5,3
I don't know.		50	11	22	43	18	42,0	93	29	31,0
Total		50	50	100	43	43	100	93	93	100

When the Table 3 examined, the findings of 4th and 5th grade students are examined in a total it appears that they thought there is a relationship between weather events and the earthquake. The students' opinion is mostly related with rain and flood (f=16) and related with wind (f=14), who thought there is a relationship between weather events and the earthquake. The students who thought there isn't a relationship between weather events and the earthquake didn't have any explanation (f=19). It is also determined that the most of the students don't have any idea about the relationship between weather events and the earthquake (f=29). Similarly, the findings of 4th and 5th grade students were examined separately; they mostly thought there is a relationship between weather events and the earthquake. It can be comment as an indication of being internalized the information of they heard in an informal way.

3.4. The findings and comments for the fourth question

The findings of students' respond to the question of “Do the motions of the planets, sun or moon cause an earthquake? How?” were placed in Table 4.

Table 4: The frequency and the percentage of responds to the question: “Do motions of the planets, sun or moon cause earthquake? How?”

Pupils Answers'		4. Grade			5. Grade			Total		
		N	f	%	N	f	%	N	f	%
No	There was no explain.	50	18	36	43	13	30,3	93	31	33,2
Yes	There was no explain.	50	16	31	43	12	27,9	93	28	30,1
	The earthquake is occurred due to approaching of planets to the world..	50	2	4	43	-	-	93	2	2,2
	Meteorites in the planet can bump to the world.	50	-	-	43	1	2,3	93	1	1,1
	1 cm shifting of the world axis could be caused earthquake.	50	-	-	43	1	2,3	93	1	1,1
	Planets are shaken or it is hit each other.	50	-	-	43	1	2,3	93	1	1,1
	Sun light	50	1	2	43	-	-	93	1	1,1
	They are not close to the ground and can be shaken.	50	1	2	43	-	-	93	1	1,1
Soil may shift with the sun hitting the ground.	50	1	2	43	-	-	93	1	1,1	
I don't know.		50	11	22	43	15	34,9	93	26	27,9
Total		50	50	100	43	43	100	93	93	100

When the Table 4 examined, the findings of 4th and 5th grade students are examined in a total it appears that most of them thought that the motions of the planets, sun or moon cause an earthquake (f=37), many of them didn't think (f=31), some of the students haven't got any idea about the question (f=25). Many of the students who thought that the motions of the planets, sun or moon cause an earthquake (f=28) and all the students who didn't think it (f=31) don't have any explanation about their answers. Generally students' judgments of the motions of the planets, sun or moon cause an earthquake would be thought originating from the media and the internet. It is possible to be considered especially some of the statements made by the scientists on the internet pages (<http://www.cnnturk.com>; <http://www.vatanbir.org>).

3.5. The findings and comments for the fifth question

The findings of students' responds to the question of "Are the earthquakes predictable? How?" were placed in Table 5.

Table 5: The frequency and the percentage of responds to the question: "Are earthquakes predictable? How?"

Pupils Answers'	4. Grade			5. Grade			Total		
	N	f	%	N	f	%	N	f	%
Impossible, Suddenly revealed.	50	11	22	43	12	27,9	93	23	24,8
No explain.	50	10	20	43	-	-	93	10	10,7
Barking of dogs	50	6	12	43	8	18,6	93	14	15,1
Meteorology experts and scientists.	50	2	4	43	4	9,4	93	6	6,5
Can be	50	-	-	43	3	7,0	99	3	3,2
With a device	50	4	8	43	2	4,6	93	6	6,5
With the weather change	50	3	6	43	-	-	93	3	3,2
Due to jolt	50	3	6	43	-	-	93	3	3,2
However, it can not be with current technology.	50	-	-	43	2	4,6	93	2	2,1
Structure of the region.	50	1	2	43	1	2,4	93	2	2,1
I don't know.	50	10	20	43	11	25,5	93	21	22,6
Total	50	50	100	43	43	100	93	93	100

When the Table 3.5 examined, the findings of 4th and 5th grade students are examined in a total it appears that most of them thought that earthquakes can be predictable (f=49) and some of them thought impossible because of suddenly revealed (f=23). It is also determined 21 of the students don't have any idea about the question. Some of the students who thought that earthquakes can be predictable explained their idea with the barking of dogs (f=14), some of them didn't explain (f=10). Similarly, the findings of 4th and 5th grade students were examined separately; they mostly thought that earthquakes can be predictable and in the both grade-level students explained this situation with the barking of dogs. In a study Buluş Kırıkkaya, Bali and Bozkurt (2009) stressed that the students largely think the earthquake will be predicted with the barking of dogs.

The findings for the 4th and 5th questions show that the students had false information and understandings about the prediction of the earthquake and the factors that cause earthquakes from informal sources. Also it shows it is necessary for the students' more accurate information through the formal at school.

3.6. The findings and comments for the sixth question

The findings of students' responds to the question of "if you know, Please write damages caused by earthquakes." were placed in Table 6.

Table 6: The frequency and the percentage of responds to the question: "If you know, Please write damages caused by earthquakes"

Pupils Answers'	4. Grade			5. Grade			Total		
	N	f	%	N	f	%	N	f	%
Death of people.	50	21	42	43	12	27,9	93	33	35,0
Destroying of houses.	50	5	10	43	3	7,0	93	8	8,5
Injuring of people.	50	4	8	43	3	7,0	93	7	7,5
Loss of the goods.	50	8	16	43	14	32,5	93	22	24,2
I don't know.	50	12	24	43	11	25,6	93	23	24,8
Total	50	50	100	43	43	100	93	93	100

When the Table 3.6 examined, the findings of 4th and 5th grade students are examined in a total it appears that most of them thought that the damages caused by earthquakes are mostly death of people (f=33) and loss of the goods (f=22). 23 of the students didn't answer the question. Similarly, the findings of 4th and 5th grade students were examined separately; they mostly thought that the damages caused by earthquakes are death of people and loss of the goods. These findings can be interpreted the students' ideas within the framework of the harmful effects of the earthquake happened in Kocaeli who lived the earthquake seriously. Similar findings of Aydın and Coşkun (2010) overlapped with the students' explanations the earthquake as the death of people and destroying the buildings at their study of observation of the 7th grade students' "earthquake" perceptions by means of phenomenographic analysis.

3.7. The findings and comments for the seventh question

The findings of students’ respond to the question of “Is it possible to avoid an earthquake? How is protected?” were placed in Table 7.

Table 7: The frequency and the percentage of responds to the question: “Is it possible to avoid an earthquake? How is protected?”

Pupils Answers’	4. Grade			5. Grade			Total		
	N	f	%	N	f	%	N	f	%
No	50	2	4	43	-	-	93	2	2,2
With taking precaution	50	10	20	43	4	9,3	93	14	15,1
With assemble of furniture	50	5	10	43	8	18,6	93	13	13,9
With entering the bottom of secure things	50	8	16	43	4	9,3	93	12	12,9
With prepared earthquake bag	50	10	20	43	4	9,3	93	14	15,1
Yes	50	8	16	43	-	-	93	8	8,6
With Preserving our heads with our hands	50	8	16	43	-	-	93	8	8,6
Drop, Cover, and Hold	50	3	6	43	9	20,9	93	12	12,9
With strong building	50	4	8	43	9	20,9	93	13	13,9
I don’t know.	50	-	-	43	5	11,7	93	5	5,4
Total	50	50	100	43	43	100	93	93	100

When the Table 7 examined, the findings of 4th and 5th grade students are examined in a total it appears that many of the students thought protection from the earthquake is possible (f=85). Many of these students reported protection from the earthquake with assemble of furniture (f=13), with prepared earthquake bag (f=14) and with taking precaution (f=14). This finding may be comment that students’ knowledge about the protection from the earthquake is righter than the other information and thoughts.

3.8. The findings and comments for the eighth question

The findings of students’ responds to the question of “Which areas are at risk of an earthquake?” were placed in Table 8.

Table 8: The frequency and the percentage of responds to the question: “Which areas are at risk of an earthquake?”

Pupils Answers’	4. Grade			5. Grade			Total		
	N	f	%	N	f	%	N	f	%
Marmara region.	50	8	16	43	-	-	93	8	8,6
Japon	50	5	10	43	2	4,6	93	7	7,5
Kocaeli	50	2	4	43	2	4,6	93	4	4,3
Places where the robust houses are not built.	50	6	12	43	5	11,8	93	11	11,8
Blacksea region	50	1	2	43	-	-	93	1	1,1
Foreign countries.	50	4	8	43	2	4,6	93	6	6,5
Places where nature is damaged.	50	2	4	43	-	-	93	2	2,2
Sea borders	50	-	-	43	2	4,6	93	2	2,2
Places without trees	50	2	4	43	-	-	93	2	2,2
I don’t know.	50	20	40	43	30	69,8	93	50	53,6
Total	50	50	100	43	43	100	93	93	100

When the Table 8 examined, the findings of 4th and 5th grade students are examined in a total it appears that 50 of 93 students didn’t know which ones are the areas of earthquake risk. The findings show only 12 students knew that their region or area are at the risk of earthquake. This result is similar Rutin and Sofer (2007)’s study in Israel 77% of the students were unaware that their school was situated in a high-risk area. The students who answered mostly saw the places where the robust houses are not built as an area of earthquake risk (f=11). This shows that is incomplete knowledges and having misconceptions about the earthquake of the students.

4. Results And Conclusions

Comments on the findings of the study are given under the title of findings and comments, directly, in this section the results of the research and some recommendations are made accordingly.

50 of students are 4th grade and 43 of students are 5th grade, totally 93 students' views are taken about the earthquake in this study, following results were obtained:

- Students described the earthquake as shaking and natural disaster, damaged and destroying the buildings and homes. Some of the students don't know what an earthquake is. It seems the students exactly don't know what the earthquake is.
- Many of the students don't know how the earthquake occurs. It established that some of the students thought it occurred by swing of the Earth's crust, cracking the Earth's crust, being shaken buildings and houses.
- That was determined that many of the students thought there is a relationship between earthquake and weather condition. Also students thought earthquake is related to the wind, rain, flooding, tornado, lightning and storm. It was determined that a few of the students thought there isn't a relationship between earthquake and weather condition but only 5 students know there is a relationship between earthquake and the ground.
- Amount of the students thought the motions of the planets, sun or moon cause an earthquake. They showed that non-science reasons as approaching of planets to the world, 1 cm shifting of the world axis, Soil may shift with the sun hitting the ground. Some students were not able to execute an idea about this subject, some of them thought the motions of the planets, sun or moon don't cause an earthquake but they didn't explained it.
- Some of the students thought the earthquakes aren't predictable cause it is related suddenly, and some of them didn't have any idea about this issue. Amount of the students thought it is possible to predict it mostly with barking of dogs and measuring with tools.
- The students expressed the damages caused by earthquakes are death of the people, loss of the goods and destroying the houses.
- The students determined to protect from the earthquake mostly with assemble of furniture, with prepared earthquake bag, with entering the bottom of secure things and drop, cover, and hold.
- It was determined that many of the students don't know which ones are the areas of earthquake risk and the most important of these, they are unaware that their province carry a high risk of earthquakes.

As it seems the results of this research, the students usually have wrong information and understandings about the earthquake. It was thought that these wrong information and understandings mostly learnt in informal way. In this context, it may be suggested revised the curricula, more effectively activities planned in and out of the lessons and applications made. The basic earthquake awareness training may be given to the primary school's students. Students will be watched a variety of animations prepared. Observatory trips arranged, it may be provided to the students to observe the tools in person.

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