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Children's Ideas about Earthquakes

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Abstract: Earthquake, a natural disaster, is among the fundamental problems of many countries. If people know how to protect themselves from earthquake and arrange their life styles in compliance with this, damage they will suffer will reduce to that extent. In particular, a good training regarding earthquake to be received in primary schools is considered as higly important for raising concious citizens regarding this field. Consiquently this study aim, what kind of thoughts do kindergarden students, grade 1, 2, 6 and 8 students, who are attending primary schools, have regarding earthquake phenomena? This study has a descriptive aim. A qualitative method based on semistructured interview method has been used in this study to analyze children's thoughts about earthquake and ways of protection from it deeply. Sampling group of this study is composed of a total of 40 students and 16 of these felt earthquake and only one student experienced earthquake in real terms. As a result of this study, it has been thought that there is an adverse image in students' minds regarding earthquake phenomena and this results from deficiency in knowledge obtained. It has been observed that few students can give rational answers for the causes of earthquake and no one can explain the causes of earthquake completely and scientifically.

Key words: Earthquake, elementary science

INTRODUCTION

Earthquake, a natural disaster, is among the fundamental problems of Turkey. This problem is placed on the agenda permanently especially after the devastating earthquake occured in Marmara in 1999.

It is a fact that it is impossible to prevent earthquake as it is a natural disaster. But it is another fact, which should not be ignored, that extent of the damage this disaster will cause is inversely proportional with consciousness level of people. If people know how to protect themselves from earthquake and arrange their life styles in compliance with this, damage they will suffer will reduce to that extent. At this point the importance of training regarding earthquake and protection aiming at individuals comes into light. In particular, a good training regarding earthquake to be received in primary schools is considered as higly important for raising concious citizens regarding this field.

Earthquake has been conveyed only with the extension of intensive tremors, collapsed buildings due to these tremors and people damaged during formal and non-formal education. Earthquake issue in primary schools Science and Social Sciences lessons, which is under the scope of this study, has been evaluated only with its aspects causing damage as the way it is known in public in parallel with experiences. While ways of protection from earthquake are dwelled upon in education programmes of the relevant lessons, damages of earthquake are also mentioned in these books and general opinion related to that earthquake is not merely a devastating natural disaster, thus a disaster, which we hope doesn't cause damage, has been created either with expressions in the text or visual elements chosen regarding the issue. But, the role of earthquake in carbon cycle, which makes world livable has not been mentioned (Gurdilek, 1999, p.4). Whereas to highlight this aspect of earthquake, which distinguishes it from other disasters, should be considered important in two ways. One of them is the necessity that education provided should be scientifical. And the other one is that education provided together with the fact that "It is an important phenomenon for life in the world" will be more interesting and comprehensible.

When literature regarding earthquake is searched thoroughly, it has been observed that any study regarding teaching this concept to primary school students in the country has not been carried out. In abroad, two study regarding teaching this concept in primary school level has been encountered. This study has the title "Children's beliefs about earthquakes" and was published in Science Education in 1993 by Ross and Shuell. Other study has been titled as "Ideas about earthquakes after experiencing a natural disaster in Taiwan: An analysis of students' worldviews"in 2001 by Tasai. The objective of this study was to explore students' worldviews as revealed by their ideas about the causality of earthquakes after experiencing the natural disaster. Thus, it is considered important to put forward what kind of perception primary school students have regarding earthquake. This is also strengthened in terms of the value which constitutive approach implemented

in primary schools today attaches to beliefs and opinions of students.

PROBLEM OF THE STUDY

What kind of ideas do kinder garden students, 1st, 2nd, 6th and 8th grade students, who are attending primary schools, have regarding earthquake phenomena?

Sub-problems of the Study

According to kinder garden students, 1st, 2nd, 6th and 8th grade students, who are attending primary schools;

1. How is the earthquake image?
2. What are the causes of earthquake?
3. What are the ways of protection from earthquake?
4. What are the resources from which students get this information?

METHOD OF THE STUDY

This study has a descriptive aim. In such studies, it is known that qualitative methods offering in-depth information, which are away from generalization, are also important as well as quantitative methods (based on digitizing) aiming at generalizing. A qualitative method based on semistructured interview method has been used in this study to analyze children's thoughts about earthquake and ways of protection from it deeply. Before main interviews are materialized, pre-application with 2 students for each level between kinder garden and 8th class, who are attending Cacabey Primary School, has been carried out and preparations for main interviews have been completed by analyzing data obtained. Main interview has been materialized with 5 students selected randomly from all degrees between nursery school kinder garden, 1st, 2nd, 6th and 8th class from Suleyman Turkmanî Primary School on 30 May-10 June 2005. Data obtained has been analyzed and interpreted in respect of variables.

Universe and Sampling of The Study

Universe of the study is composed of kinder garden students and 1st, 2nd, 6th and 8th grade students from Suleyman Turkmanî Primary School and sampling of the study is composed of students randomly selected from these classes. Distribution of sampling according to classes have been presented in table 1.

Sampling group of this study is composed of a total of 40 students and 16 of these felt earthquake and only one student experienced earthquake in real terms.

Collecting, Analyzing and Interpreting Data of The Study

Data has been collected through semistructured interview method, one to one interview with each subject and using voice recorder. Interview has been materialized with each student within the framework of the following questions (Ross and Shuell, 1993):

5. What is an earthquake?
6. How does an earthquake occur?
7. Why does an earthquake occur?
8. Have you ever experienced an earthquake?
9. What should be done during an earthquake?
10. Is earthquake a good or bad thing?
11. Have you watched anything regarding earthquake on TV?

A standard period has not been determined for the answers given by subjects during the interview, thus it has enabled subjects to make extensive clarification of answers. Voice records obtained as a result of interviews have been converted into text on the basis of qualitative study.

Later, it has been analyzed with an analitical approach and percentage distribution has been determined. Furthermore, in this study on condition that interesting thoughts and approaches of subjects regarding the issue are conveyed exactly, they have been interpreted.

FINDINGS

Findings of this study are classified as "earthquake images" in children's minds (whether earthquake is good or bad and images in minds regarding earthquake), "Causes of earthquake", "Ways of protection from earthquake", "Resources of information regarding earthquake".

Images regarding Earthquake

While 37 of the total of 40 students participating this study qualified earthquake as a bad event, only 3 of them have tried to explain with reasons that it may be good. Some of the 37 students emphasizing that earthquake is a bad natural event and natural disaster have put forward these reasons:

- As people die
- As it injures people
- As it destroys houses
- As it causes loss of life and property
- As it frightens everyone
- As it destroys human labour, shakes and causes theft

2 of 3 students saying that earthquake may be a good thing are attending 4th class. Of these, Emine has said that "It is neither a good thing nor a bad thing. It cannot be considered bad as it is a natural disaster, but it is not a good thing, either. It shows that buildings should not be close to each other. Thus, it also has good aspects." Umit from the same class has said that "it may be a good thing as it affects shape of the earth." Sena from the 6th class has said that "it may be good. It prevents compaction of the ground."

It can be said that all of the 3 answers here are not scientifical. Of these, Sena's statement that it prevents compaction of the ground has a few crumbs of scientific knowledge but it is not true. Because no student has expressed that earthquakes arrange gas circulation for all livings, which is their fundamental benefit to the world. This situation displays deficiency in handling the issue in lessons.

When we examine what the images created in students' minds are as earthquake is mentioned, the following points have been determined:

- Collapsed houses
- Dead people
- Paniced people
- Objects falling in the house
- Trembling buildings
- Swinging lamps
- Sliding land
- Shaking ground

If attention is paid, image of "collapsed or trembling houses" appears to be the most common element in students' minds and another important element appears to be "dead people". In this situation it seems impossible to expect students to think earthquake can benefit nature.

Cause of the Earthquake

Although it has been observed that sufficiency of students regarding explaining causes of earthquake in a logical and coherent manner increases together with the increase in class level, it is interesting that a scientific explanation regarding cause of earthquake has not been encountered. However, it has been observed that some of the students have tried to answer even the question of "what is an earthquake?" through explicating ways of protection from earthquake. In the formal education and training provided the effort for making students acquire information regarding "How to be protected from earthquake?" rather than "What is an earthquake? How does it occur? What kind of meaning does it have as a natural disaster?" are thought to be effective for this situation. "Explicating only ways of protection from it" regarding earthquake in mass media makes this finding are comprehensible.

Table 1. Distribution of sampling according to classes

Classes	Students feeling earthquake	Students experiencing earthquake as a disaster	Students who did not experience earthquake	Total
Nursery School	1	--	9	10
1.	1	--	11	12
4.	6	--	1	7
6.	5	--	--	5
8.	3	1	2	6
Total	16	1	23	40

It can be said that answers given by students as from nursery school are partially more rational as of 1st class. In particular, causes of earthquake are classified as "because children light a fire and forget it", "because God wants it that way", "digging with a scoop", " boiling of water in the underground", "landslide", "because water coming from underground", "flash of ligthning" in the nursery school. It can be seen that first point is clearly outstanding here. The first of these is an effort towards connecting the cause with a metaphysical element as well as displaying unscientificness of answers given. This situation emerges three times in the sampling composed of 40 people. The first one of these is as "God wants it, thus it happens" and belongs to Gulsum from nursery school, the second one is as "Because God orders it" and belongs to Tuğce from 6th/C class and the third one is as "God created a circle and earthquake occurs due to some causes such as removing pollution. Although it is possible to evaluate answer of Gulsum from nursery school together with unrational answers of her other friends, it can be preceived as a problem that two students, who are attending 6th and 8th class, have

tried to explain the cause of earthquake only with a metaphysical cause such as "God wants it" and could not explain the real cause. However, this problem is better understood when the finding obtained by Adem Basibuyuk thanks to the question "why does an earthquake occur?" asked to 120 people in Erzincan, an earthquake area, stated in the article titled "Earthquake Knowledge in Adults and Analysis of Effective Factors" published in National Education periodical in 2004 that 30% of adults believe that earthquake is not a natural disaster and people, who commit offence in terms of religion and morality are punished by God is taken into account.

Another striking point in the answers given is that children confuse earthquake with other natural disasters. Some children confuse it with fire, some with flood and some with landslide. This finding is parallel with "children's confusion earthquake with other disasters" in the study of Ross and Shuell (1993:194). Apart from this, another striking point is that some of the children have made up new disasters. These are "landslide occuring due to flash of ligthning", "water flood occuring due to water pipe explosion" and "landslide occuring due to water coming from underground".

Confusion of earthquake with other disasters is as "heavy rains" in 1st classes, "storms, winds are also surface tremors" in 4th classes, "ground shaking due to the effect of rails", "layer crack in the atmosphere", "big bang occuring due to nuclear fission in the underground" in 6th classes, "erosion" and "contaminating nature" in the 8th class. This situation is suprising. Because it can be accepted that nursery school students create new reasons depending on the vastness of their dream worlds. But confusion about earthquake and natural disaster phenomena at all levels in these classes, where formal education is provided, puts forward a crucial deficiency in explicating earthquake to children.

It is possible to say few answers given for the causes of earthquake are compatible with scientifical explanation. These are as follows:

- It has been observed that only 3 students in 1st class have intended to say "tremor beneath the earth's crust" in their answers.
- When 2 students from 4th class have said that "movements occuring due to the breaking along faults in the underground" and Bengisu from the same class has said that "It occurs due to the breaking along faults beneath the earth's crust as a result of shifting of magma from one place to the other", they have exhibited a scientifical approach.
- No scientifical approach has been observed in 6th class students. Of these, Hava have said that "it occurs due to cracking of resources in the underground" and Sena have said that "due to compaction of ground as a result of air pressure in the ground".
- Although 2 students from 8th class have said that earthquake results from fault lines, they have not made any further explanation. Yusuf from this class with his answer "due to shifting of some rocks and breaking of some fault lines" have given the closest answer.

Of these findings, as the approach towards connecting the cause of earthquake with erosion or other geological phenomena has also been encountered in the findings of Ross and Shuell (1993, p.196), this situation points out that this can be a universal problem.

In conclusion, it has been determined that while some of the students have given answers close to scientifical answers, no student has made a completely scientifical explanation. This finding similar to Tsai's finding. Acoording to Tsai, (2001: 1007) "many students held a scientific/myths dual perspective about the causes of earthquakes."

Table 2. Ways of protection from earthquake according to answers of students

Ways of protection from earthquake	Percentage
Stay near solid furniture (Take cover near couch, sofa, refrigerator or washing machine)	42.5
Take cover under a table or desk	40
Cover your head with your arms and stay in the position of embrio. Stay near a door.	32.5
Stay away from lift, stairways and balcony	17.5
Go to clear spots	15
Do not panic	7.5
Installing wardropes	7.5
Wait for help	2.5
	2.5

Ways of Protection from Earthquake

It has been observed that almost all of the students participating to this study have some sort of knowledge regarding ways of protection from earthquake. Increases in age and mental development in parallel with class level have demonstrated that they have an effect upon

the answers given. For example; few nursery students have given rational answers and many proposed some sort of ways, which can not help to be protected from earthquake. Although this situation has been partially found in higher classes, it can be said that most students have rational, realistic knowledge regarding ways of protection from erthquake.

Some of the unrational answers are as follows:

- In nursery school level the most reiterated ones of these answers are "we escape to some place where earthquake does not occur" (4), "We take cover in the bathroom", "we call for help in the window" and "we have a suitcase and an earthquake bird".
- In 1st class, "call fire brigade", "try to exist" have been mentioned.
- Hasan from 8th class has said that "run towards the top floor of building". The frequency of mentioning of methods mentioned by students in relation to protection from earthquake has been presented in Table 2.

When Table 2 is taken into account, it has been observed that best known protection methods are to take cover near a solid furniture, to take cover under a table, to cover head with arms and to stay near a door. But the low percentage of mentioning these has demonstrated that students do not have sufficient knowledge regarding protection from earthquake. It has been realized that some methods mentioned are due to misunderstanding. For example, while "life triangle" term, which is of crucial importance during an earthquake, covers a person's crouching in the position of embrio by covering his head with his arms near a solid furniture, it has been mentioned only by one student and it has been understood that he deduces from life triangle only covering his head with his arms. This situation displays insufficiency of education provided in schools regarding earthquake in relation to achieving its aim.

Resources of Earthquake Knowledge

Although all of the students have some sort of knowledge about earthquake, many have not furnished information about where they have learnt these from. Of these, while 8 students have said that "they have not watched and learnt anything in school" regarding earthquake, 5 students have told that they do not remember and 3 students have not answered at all. Except these, it has been observed that 24 students have given answers in relation to knowledge resources. Distribution of these answers have been presented in Table 3.

As can be deduced from Table 3, TV, teacher, "CD of Deprem Dede and field exercise are the leading resources from which children get informed. It is sad that only 5 students have mentioned field exercises to which we attach more importance. Because that field exercises, where ways of protection from earthquake are demonstrated practically, are not embedded in students' minds brings up the quality of education provided. This situation makes us think that "prohibition evasive" perception may also disclose itself in field exercises as in celebrating important days and weeks. Besides, the necessity to dwell upon earthquake in lessons formally emerges.

CONCLUSION

As a result of this study carried out with 40 students selected randomly from kinder garden, 1st, 4th, 6th and 8th classes of primary school, it has been thought that there is an adverse image in students' minds regarding earthquake phenomena and this results from deficiency in knowledge obtained. It has been observed that few students can give rational answers for the causes of earthquake and no one can explain the causes of earthquake completely and scientifically. Besides, it has been thought that although students have some different sort of knowledge about protection from earthquake, these are insufficient. It has been realized that a more qualified education should be provided for acquiring students with some sort of knowledge about the causes of earthquake, ways of protection as from Science and Technology lesson and Social Studies Lesson in schools. In addition, it has been realized that students are insufficient in terms of connecting knowledge they have with a resource. That field exercises, which should be one and the most effective of those resources, have not been given place satisfactorily brings up the necessity that field exercises should be carried out in such a quality that they are embedded in minds.

As a result of this study, the necessity that a more qualified earthquake education should be provided to students and while materializing this, benefits of earthquakes for our world should also be taught emerges. It can be suggested that this study should be

Table 3. Resources of students' knowledge about earthquake

Resources of earthquake knowledge	Percentage
TV	50
Teacher	33.3
Cd of Deprem Dede (earthquake grandfather)	20.8
Field exercise	20.8
Natural Sciences Lesson	16.6
Social Studies Lesson	8.3
Traffic Lesson	4.2
Optional Subject	4.2
Parent	4.2
Periodicals	4.2

restudied with a wider sampling and different measurement tools should be developed and applied for obtaining more in-depth information.

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