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# THE PERCEPTION OF PRIMARY SCHOOL STUDENTS ABOUT THE EARTHQUAKE IN SABAH MALAYSIA

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### *Abstract*

The Ranau earthquake that struck on June 5, 2015 was the strongest ever experienced in Sabah causing locals, especially children at the epicenter of the earthquake to panic. Consequently, it was decided to undertake a qualitative research study to determine the perceptions and knowledge of primary school students in Ranau on earthquakes, and to identify factors influencing their knowledge and perceptions. Purposive sampling was used to select the school that had suffered the worst damage due to the earthquake. Six of the level two students from this school were randomly selected to be interviewed: Three male and three female. Qualitative data was collected using a semi-structured interview method. The findings show that primary school students in Ranau have no knowledge about the concept of 'earthquake'. The respondents' perceptions of the earthquake evoked phrases and comments such as 'scary disaster', 'swirling houses', 'houses collapsed', 'damaged roads' and 'quakes will cause death'. The Damage to the school buildings made them frightened to go to school amid fears that the buildings would collapse. The findings also show that the perceptions of these school children were influenced by their experience in the face of the earthquake, as well as factors related to their cultural and religious backgrounds. The results of this study can be used to devise educational programs to educate school children and provide them with a clearer picture of an earthquake disaster so that they will be better prepared to face this kind of disaster in the future.

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## 1. Introduction

An earthquake occurs when energy is released due to disputes or plate friction. The resultant shocks produce a seismic wave that is circular and emanates from the center of the quake. Generally, these tremors occur in three stages: initial shaking, main tremors and ultimate shaking. Experts say the stronger the tremors are, the greater the seismic waves to be released and the more powerful the earthquake. According to Arbogast (2014) and Strahler (2013), the friction between the two plates allows energy to accumulate until it can no longer be contained below ground. This causes the earth's crust to shake. Most earthquakes occur along the continental plate, with 75% taking place within the notorious 'Ring of Fire' in the Pacific Ocean. Generally there are two types of earthquakes, tectonic and volcanic earthquakes. Tectonic earthquakes are said to occur as a result of the sudden release of energy caused by the collision divergence or diffusion of tectonic plates. Conversely, volcanic earthquakes are said to result from eruptions that cause magma movement and the breakdown of the rocks in the volcanic hole.

## 2. Problem Statement

Malaysia is one of the safest countries in the world in terms of the likelihood of earthquake disasters because it is located outside the Pacific 'Ring of Fire' that spans the major volcanoes and converging plates (Tongkul, 2015). However, Malaysia has experienced a number of small earthquakes due to its proximity to the Philippines and Indonesia, which are located within the zone of the earthquake circle (Unnip, 2015). For example, in 2007 an earthquake with a magnitude of between 2.7 and 3.5 occurred in Bukit Tinggi. Researchers reported that the major cause of the earthquake was a strike-slip; it was also associated with the release of pressure due to earthquakes occurring in Sumatra, Indonesia (Malaysian Meteorology Department, 2009). Additionally, since the 1960s, Sabah which is located in the north of Borneo Island, has experienced 80 series of earthquakes with strengths ranging from 3.3 to 5.0 on the Richter Scale. A geologist from Universiti Malaysia Sabah stated that all areas in Sabah are at risk of earthquakes. However, the degree of risk varies according to the position and the level of movement activity under the earth's crust (Tongkul, 2015). In addition, the Sabah Meteorological Department has predicted that a strong scale earthquake is likely to hit Sabah within the next 20 years.

An earthquake is likened to a fire in the husk because it is difficult to predict. Earthquakes also cause loss of life and damage infrastructure facilities. The event that occurred in Ranau on 5 June 2015 also resulted in considerable damage to infrastructure and buildings, especially schools that were near to the epicenter. In addition, this disaster has also had a significant psychological effect on the school children. This indicates that loss of life and unpleasant psychological effects can be effectively reduced if people in risk areas are educated through formal campaigns, programs and education in schools.

Shiwaku and Fernandez (2011) suggested that the best way to produce knowledgeable people suitably prepared to face an earthquake disaster is through formal education. A study by Sharpe and Izadkhah (2014) reported that formal education helps children living in the earthquake area to be more prepared and confident in the face of the earthquake. In addition, Ronan, Alisic, Towers, Johnson and Johnston (2015) study proves that the participation of students in education initiatives about earthquakes will produce a generation that is better prepared to face them. However, Şimsek (2007), Sharpe and

Kelman (2011) argue that before earthquakes are introduced as a subject in schools, perceptions and knowledge of pupils should be taken into account in order to know their existing level of knowledge. It is very important to help design programs and curriculums related to earthquake so that they can be implemented and taught in schools.

### **3. Research Questions**

The model of risk perception developed by Renn and Rohrman (2000) shows that knowledge, cultural and social factors influence the perception of risk when facing a natural disaster. Renn and Rohrman (2000) defines risk perception as an individual's assessment of the dangers they may be exposed to, before, during and after a disaster. According to Västfjäll, Peters & Slovic (2014) natural disaster hazard perception is a combination of individual interpretations of natural disasters and cataclysmic hazards based on personal experiences and beliefs embedded in the norms and cultures of every society. Therefore, this study was conducted to:

- 3.1. evaluate the understanding of primary school students on earthquake phenomena,
- 3.2. review the perception of primary school students on the dangers and effects of Earthquakes,
- 3.3. review the student's views about the factors that caused the earthquake.

### **4. Purpose of the Study**

The perception of earthquake risk among the people in Sabah, especially in the Ranau division, was never studied. The literature review on Sabah's risk perceptions of the earthquake was extremely poor and no studies were conducted to assess the perception of schoolchildren about the dangers and risks of the earthquake. Therefore, this study was based on a qualitative method to study the perception of primary school students on the risk of earthquake struck in Ranau by 2015.

### **5. Research Methods**

This study incorporated a qualitative study method within an intrinsic research design framework. This particular methodology was used as it was believed that it would help the researcher to understand the key issues in more depth (Johnson & Christensen, 2015).

#### **5.1. Sample of the study**

An aiming sampling method was used to determine the primary school in Ranau that had suffered the worst damage due to the earthquake that struck Ranau in 2015. Random sampling method was also used to select six level two students (primary 4, 5 and 6), and as a result three male students and three female students were selected as the sample for this study.

## 5.2. Interview

A partial interview approach was used to obtain the following data from respondents: a) understanding of the earthquake concept, b) perception of earthquakes, and c) views on factors influencing earthquakes. While the questions asked were determined by the researcher, the sequence of questions and the way the questions were asked were dependent on the reactions and responses of the respondents. In this study, researchers used an open-ended interview approach, which entailed all respondents being required to answer the same questions.

## 5.3. Interview Procedure

Selected students were briefed by the researchers on the purpose of the interviews. The interview procedures were designed to extract information from students on their concept of an earthquake and perceptions about its occurrence. Interviews were conducted face-to-face in the school meeting room, which was chosen because it was the most comfortable venue and the place where they would be least likely to be disturbed. Each interview session began with a brief description of the structure of the interview to be conducted, and ended with the student researchers thanking the students for participating in the session. Each interview session lasted from 50 to 60 minutes and was recorded with the aid of a voice recorder

## 6. Findings

The data from the study were analyzed using the thematic method and in accordance with the qualitative data analysis procedures suggested by Braun and Clarke (2006). First, the interview data recorded in the transaction was transcribed into verbatim form. The data was then read several times by the researchers and notes were taken to ensure thorough understanding. Then the researchers used open coding to encode the data, a process which enabled researchers to create new sub-codes. The next phase involved the researchers examining the validity of the predefined theme by comparing it with the data collected as a whole. Consequently, the validity of the theme was revised by reproducing data that agreed and conflicted with the original data

### 6.1. Understanding the concept of earthquake

An analysis of the interview data from the level two students showed that 90 percent of the respondents did not understand the concept of earthquake and could not explain earthquake incidents with reference to the right facts. Generally, the respondents stated that the earthquake was a catastrophic disaster caused by tremors in the earth's stomach. Examples of their comments are as follows:

*Earthquake...is when the inside of the earth is shaking. I don't know why the earth's stomach is shaking either (Respondent 1: Primary 4)*

However, female students demonstrated a fair understanding of earthquakes. For example, Respondent 6 from Year 6 stated that

*What I understand is, it happens because the energy that is kept inside the earth is suddenly released. and the friction inside the earth happens. (Respondent 6: Primary 6)*

## **6.2. Student's perception towards earthquake disaster**

Interviews conducted among the level two students showed that they had various perceptions about the 2015 earthquake occurrence. Four of the students interviewed assumed that the earthquake caused the houses, school and building to sway. This made them feel very scared when the earthquake took place. For instance, respondent 5 stated:

*This earthquake... made my house shake... me and my family were afraid.. the house shaking so vigorously also scared my little brother and made him cry. (Respondent 5: Primary 6)*

*This earthquake... made buildings, houses and the school shake... that made me scared. (Respondent 3: Primary 5)*

Interviewed respondents also explained that when the earthquake occurred the school buildings, houses and shops began to collapse or suffered considerable damage to the structures.

*That earthquake... caused buildings to collapse.. sometimes the roof also collapsed. (Respondent 4: Primary 5)*

*This earthquake was scary...schools, houses and roads collapsed due to the powerful shaking... Look at the school's rooftop, it collapsed already. (Respondent 6: Primary 6)*

*The earth shaking caused roads, hills and trees to collapse. (Respondent 1: Primary 4)*

## **6.3. Knowledge about earthquake**

Nearly one hundred percent of the respondents interviewed said they had no knowledge or guidance to inform them what to do before, during and after the earthquake. Only one student, a Year 6 student respondent said that he had learned about earthquake disasters while attending a district level camp in Ranau.

*I have learned how to face an earthquake.. I need to protect myself under the table if the quake occurs.. emmm I will also have to run to safe ground after the quake has stopped. (Respondent 6: Primary 6)*

## **6.4. Factors influencing students' perceptions of earthquakes**

The findings show that several factors influenced the respondents' perceptions about earthquakes. One of these factors is religion. This was made clear when the respondents stated that one of the causes of

the earthquake in Ranau was God's wish to test their faith. For example, a primary 5 student who was the third respondent for this study stated:

*I guess this earthquake happened because God wanted to test us as his subjects.*

When questioned as to why he thought this way, the respondent explained that his father explained that the earthquake happened because God wanted to test their faith in the only God. In addition, Respondent 1, a primary 4 student explained:

*I guess this earthquake occurred because human beings love to commit sin.*

Furthermore, Respondent 5, a primary 6 student also concluded that the earthquake occurred because God decided to exact retribution on human beings for destroying the environment.

*From what I know, earthquakes happen because God is angry... God is mad because human beings do not respect the Mother Nature. (Respondent 5, Primary 6)*

The respondents' interviews also showed that their perceptions of earthquakes were influenced by customs and culture. For example, a primary 6 student respondent stated that the earthquake in Ranau was caused by the spirit of Mount Kinabalu getting angry because of tourists being disrespectful of local customs and culture. For instance, Respondent 4, a primary 5 student stated:

*I think.. the earthquake occurred due to Aki Kinabalu getting angry because the tourists were getting naked there.*

The respondent explained that he got this information from his uncle, who was the chief of the village where the earthquake occurred.

## **7. Conclusion**

In analyzing the data from this study, it can be concluded that nearly 90 percent of the primary school children in the study area did not understand the process of earthquake formation. The findings are similar to those of Baytiyeh and Öcal (2016) who conducted a study in Lebanon and Turkey. The study concluded that primary school students do not have sufficient knowledge to be able to protect themselves during an earthquake disaster. The findings of this study support the research conducted by Blake and Newton (2017), Raccanello, Burro and Hall (2017), which concluded that teachers need to teach students about the formation process of earthquake in school lessons. The researchers suggested that this teaching session can be combined with other subjects or implemented as one of the school's co-curriculum activities. Additionally, the researchers also believed that knowledge about what to do in the event of an earthquake and other natural disasters should be taught in schools to create a more knowledgeable and resilient community who is capable of surviving future earthquake crises. This view is also supported by Shiwaku and Fernandez (2011) who explained that the active involvement of students in co-curricular

activities, and teaching combined with earthquake education increased their understanding of the concept of an earthquake. In addition, the findings show that primary school children think that earthquakes will result in the shaking of buildings, such as homes and schools, causing damages to properties and deaths. These findings are consistent with the study conducted by Santos-Reyes, J., Santos-Reyes, Gouzeva, & Velazquez-Martinez, (2017) which showed that local religious, cultural and indigenous factors influence the perceptions of school children about earthquakes. The findings of this study are parallel to those of Baytiyeh and Öcal's (2016) which demonstrated that the perceptions of school children in Lebanon and Turkey about earthquakes were heavily influenced by the culture, customs and religions of the local community. Recent research findings conducted by Gianisa, and Le De (2018) in Indonesia also support the conclusions of this study

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