
Engineering Geology for Society
and Territory – Volume 6

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Editors

Engineering Geology for Society and Territory – Volume 6

Applied Geology for Major Engineering Projects

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Cover Illustration: Pont Ventoux, Val di Susa, north western Italy. Tunnel Boring Machine (TBM) used during the construction of the gallery used as deviation channel for a hydroelectric power plant. The TBM was used to drill a gallery of 4.3 km long and with circular diameter of 4.05 meters. *Photo:* Giorgio Lollino.

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Disaster Awareness Education for Children in Schools Around Geological Hazard Prone Areas in Indonesia

19

Muslim Dicky, Evi Haerani, Motohiko Shibayama, Masaaki Ueshima, Naoko Kagawa, and Febri Hirnawan

Abstract

Geological disaster awareness has been increasing recently in Indonesia, especially since the great Aceh's Tsunami & Earthquake. It is important that all stakeholders have reasonable understanding on disaster response. School communities generally have limited disaster education opportunities and knowledge. This could imply a low level of disaster awareness. This paper aimed to examine the knowledge on disaster response and to highlight the needs to introduce earth science for school communities by exploring three areas: (i) disaster education, (ii) respond to disaster event, (iii) knowledge of earth science. The study had been started since 2006, targeted on schools located on the areas that experienced and/or potential to earthquake and tsunami in the future. Several schools around the coastline of Indian Ocean of Sumatera, Java, Bali & Lombok islands had been visited. In each school, we examined the curriculum, preparedness to face disaster, and activity of mitigation. Our posters and pamphlets were also distributed. Presentation and short drama were performed in the classroom to measure understanding of the contents. Result showed that disaster awareness were generally out of curriculum, due to limited knowledge of the curriculum development. For the respond to disaster event, most of participants are unaware what to do when disaster happens. Our visit had increased the curiosity of school communities to learn more about these disasters. These results suggest that dissemination of entry level of earth science is deeply needed, since there is no such subject (especially geology) in primary to secondary level schools in Indonesia.

Keywords

Disaster awareness • Earthquake • Tsunami • School children • Indonesia

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19.1 Introduction

Since the aftermath of great Aceh's Tsunami & Earthquake in December 2004, geological disaster awareness has been increasing recently in Indonesia. It is important that all stakeholders including school communities have reasonable understanding on disaster response. School communities generally have limited disaster education opportunities and knowledge. This could imply a low level of disaster awareness.

This paper aimed to examine the knowledge on disaster response and to highlight the needs to introduce earth science for school communities by exploring three areas: (i) disaster education, (ii) respond to disaster event, (iii) knowledge of earth science.

19.2 Methodology

The activities had been started since 2006 and had targeted on elementary to senior high schools in several places, which located as the earthquake hazard and tsunami prone areas that experienced as well as potential areas of geological disaster in the future. Several schools around the coastline of Indian Ocean of Sumatera, Java, Bali & Lombok islands had been visited. In total, within 6 years there were more than 50.000 pamphlets and posters of earthquake and tsunami (Fig. 19.1) had been distributed in several schools and districts so far.

Participants in this study were stakeholders of education sectors in a remote area. For the purpose of this paper, the students & teachers were the focus of the study. The survey was piloted on a group of students & teachers from highest grade of each school.

Students & teachers involved in this research occupied public schools in the study area. The highest grade of each school was chosen as they have ability to read and write their opinion though in simple form. Teacher participants were chosen as they were the guardian of each classroom. We involved also the participation of the school principals as well as local government officers.

Pamphlets and posters for the tsunami and earthquake disaster prevention education are distributed directly as teaching materials. Pamphlets were prepared and printed in

Osaka-Japan by several group of volunteers (Fig. 19.2), which then brought to Indonesia for this study. The posters are then posted in announcement board of each school, and the pamphlets are distributed to students and teachers in their classroom. Discussion session and short drama were performed in the classroom to measure understanding of the contents. The aim of discussion was to explore students & teachers' perceptions and knowledge of disaster education & response through a series of questions and answers (Shibayama et al. 2006).

A mixed method of descriptive and exploratory research design underpins this research. Descriptive & exploratory research designs are appropriate when little is known about the topic being investigated. Integration of quantitative and qualitative data which was generated from the survey, lends itself to the mixed method approach. According to Polit and Beck (2008) the greatest advantage of survey research for disaster issue is its flexibility and broadness of scope. Due to the limited amount of knowledge in the study area, the authors thought that a survey research would be more appropriate as it would generate a basic understanding of the phenomenon as well as reach a larger proportion of the population.

19.3 Result and Discussions

The word 'disaster' encompasses a myriad of occurrences and the meaning of the word is relative to each and every person experiencing the disaster. Generally speaking, a disaster or a major incident will overwhelm existing resources. However, in the context of this study it may be suggestive of a limited understanding as to what constitutes

Fig. 19.1 Pamphlets of earthquake (*left*) and tsunami (*right*) education for children in Bahasa Indonesia

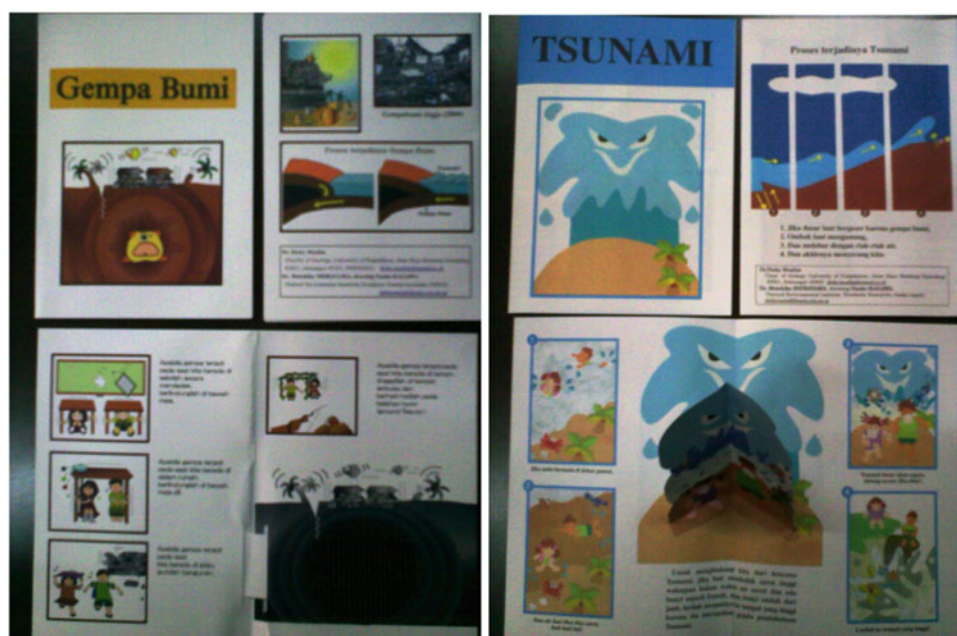


Fig. 19.2 Activities to prepare the pamphlets of tsunami and earthquake by volunteers in Osaka, Japan



a disaster or major incident especially related with geological event or hazard such as earthquake & tsunami as they are major disaster in Indonesia (Anonymous 2006).

19.3.1 Disaster Education

When we came to each school, first we introduced ourselves and discussed with the school principal and teachers about disaster education in their school, especially related with disaster curriculum development and teaching materials for earth science. After introduction session in front of the classroom, participants were asked to identify their perceptions of their own level of disaster knowledge and experience of earthquake or tsunami in simple form. Although most of all participants stated they know about earthquake or tsunami events but many stated they have no ideas about kinds of natural disaster in their area. It is possible that the majority of participants answered since they have read newspaper or watch TV about the recent disaster events in Indonesia and elsewhere but unfortunately they don't have idea for their own area.

For the purpose of this study the term 'education' refers to any didactic formal education included in curriculum, where 'training' refers to practical hands on approach to disaster knowledge. Both of terms constitute activities such as lectures, desk top exercises, real-time exercises, etc. Many of participants had never attended specific disaster training or education outside their schools. Only a small amount of participants stated they had attended minor disaster specific courses in an extra-curricular activity such as "boy scout".

For the purpose of this study 'disaster specific courses' were considered as those that have been created specifically with the purpose of training common people in any aspects of disaster preparedness and response.

It was interesting to note that many of participants reported that they have experienced a disaster or major incident in their life. Some examples provided by the participants included examples such as house fire, flood, landslide, etc. The terms 'disaster' and 'major incident' were not qualified in the survey, however participant responses are suggestive of limited understanding of what constitutes a disaster or a major incident. Questions regarding the disaster event did not differentiate between -to some extent- predictable (i.e. house fire, flood, drought, etc.) and unpredictable (i.e. earthquake, tsunami, etc.).

Coastal area of Indian Ocean had experienced natural disasters with mass casualties due to earthquake & tsunami events. But it seemed from our study that there were no particular developments on the school's curriculum to include disaster education so far in the study area.

19.3.2 Respond to Disaster Event

Using our teaching materials in the classroom, we discussed with participants to rate their knowledge in their own level about disaster preparedness, especially about respond when an earthquake or tsunami happen. Majority of participants stated they do not know about what to do when a disaster occurs in their area. When participants were asked to rate their level of knowledge about how preparedness had been

Fig. 19.3 Classroom situation during discussion and short drama in Indonesia



constructed in their school and surrounding area, many of them do not know about school preparation to prepare for a disaster event.

Majority of the participants did not know about simple form of disaster preparedness for earthquake and tsunami events such as evacuation route, safety area, survival kit, communication tools, etc. This result is parallel to the above data regarding students & teachers' own level of education for disaster. In both instances more than half the sample had less than optimal confidence in their own disaster awareness. This suggests a feeling among students & teachers of limited preparedness to respond to a disaster event.

After a series of discussion, we then performed drama and/or story telling with our teaching materials to emphasize the need for understanding the subject of tsunami and earthquake hazard to all participants in the classroom (Fig. 19.3). Especially to stress out the need to be calm in panic situation to escape from disastrous event in time of earthquake or tsunami occur. It is worthy to note that pamphlets adopted from Japanese comic created and produced in Japan along with the appearance of foreign researcher in the classroom seemed had increased psychologically the enthusiastic attention from students and teachers in each school.

19.3.3 Knowledge of Earth Science

Based on the discussions with school principal, teachers & students as well as local education section office, it is interesting to note that based on national curriculum, earth science is included in the subject of Geography instead of Geology

course in all level of elementary to high school. Even in a region where previous geological disaster had occurred, local content of curriculum for disaster is not developed yet so far. This might be due to limited knowledge and understanding of teachers in each school we visited.

An overwhelming of participants in the classroom stated that earth science education for students & teachers is very important. The form of earth science education and/or disaster training that most respondents believed would be beneficial for students & teachers were real-time exercises. Lectures provided by other competent institution (i.e. university, company) is the most stated by participants.

Education and training opportunities for participants in this study appear to be difficult to access due to their location and availability. While literature highlights the importance of disaster education and training for students & teachers but little appears to be understood about what type of education and training would be the most appropriate for a particular attendees (Duong 2009).

19.4 Conclusion

Previous disaster response experience and appropriate disaster or earth science education appear to be essential ingredients in providing a prepared and safe school. In a community where previous disaster response experience is limited, appropriate disaster education and training for students & teachers may increase the level of disaster awareness and help to make school community feel less vulnerable when having to face the unexpected (Aguilar and Retamal 2009).

Standardizing disaster and earth science education and making it more available may create a more cohesive and self-assured workforce. Further research needs to be conducted in order to close the gap in knowledge that exists in this area and to determine appropriate strategies for increasing disaster awareness among stakeholders.

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