

Impact of Disaster Prevention Education Training in Thailand: Insights from Instructor Training

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Abstract: This study examines the impact of evacuation drill training in formal schools in Thailand. We conducted a two-day training session on December 24 and 25, 2023, for 15 participants, including university professors and students, local government officers, and schoolteachers. This training focused on planning evacuation drills in schools. We distributed a questionnaire to participants to determine their understanding of the training content and its effects. The results indicated that the participants had acquired considerable knowledge and skills through the training, particularly in understanding the significance of evacuation planning in schools and imparting knowledge to students before disasters occur, based on the Japanese experience. These findings highlight the importance of learning concrete examples of natural disasters.

Key words: disaster education, evacuation drill, disaster preparation, instructor training,
Thailand

Background

The growing threat of climate change has highlighted the importance of preparing for natural disasters worldwide. Disaster risk reduction is a key Sustainable Development Goal (SDG) 11 focus. Additionally, schools linked to SDG 4 play a significant part in this effort. Thailand has experienced several severe natural disasters. In 2004, an Indian Ocean tsunami devastated the west coast of Southern Thailand, causing over 4,000 deaths, more than 8,000 injuries, and nearly 4,500 missing persons. In 2006, heavy rainfall triggered flash floods and landslides in Uttaradit, Sukhothai, Phrae, Lampang, and Nan, resulting in over 80 fatalities. In 2010, floods affected multiple regions and led to approximately 260 deaths. Between 2011 and 2012, widespread flooding affected most provinces of the country, claiming more than 800 lives. Additionally, in 2014, Thailand experienced its most powerful earthquake on record in Chiang Rai's Mae Lao District, causing a few deaths and injuring more than 20 people.

In Japan, the Noto earthquake of January 1, 2024, remains vivid in the memory of its people. This earthquake of magnitude 7.6 resulted in over 260 fatalities. Japan experienced several other devastating earthquakes, including the 1993 Hokkaido, 1995 Kobe, 2004 Chuetsu, 2011 Tohoku, and 2016 Kumamoto

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earthquakes. In addition to earthquakes, severe flooding caused by heavy rainfall leads to a significant loss of life and property. For instance, heavy rainfall in Nishinohon in 2018 caused more than 200 deaths and destroyed more than 6,700 homes.

Japan has strengthened its national disaster preparedness significantly since the Tohoku and Kumamoto earthquakes. Similarly, disaster education has gained importance in Thailand's formal school system, particularly following major events such as the 2004 Sumatra Earthquake, 2011 Thailand flood, and 2014 M6.3 Chiang Rai earthquake. However, Thailand lacks a systematic and continuous approach toward disaster education. The School Safety Report developed by the Office of the Basic Education Commission (OBEC), Save the Children, and United Nations Children's Fund (UNICEF) in 2016, along with the National Disaster Risk Management Plan issued in 2015 by the Department of Disaster Prevention and Mitigation (DDPM), addresses some aspects of school safety; nonetheless, comprehensive disaster preparedness education remains insufficient. Although natural disasters are briefly covered in the science and social studies curricula, these lessons often omit practical guidance on how to prepare for or respond to them. Consequently, a notable gap exists in effective disaster education (Maki et al., 2022).

To address this gap, we conducted disaster prevention education training for university professors, municipal officers, and school teachers in Thailand on December 24 and 25, 2023. This training was conducted in collaboration with Kumamoto University and Hiroshima University in Japan and Mae Fah Luang University in Thailand. The training was part of a joint research under the Fostering Joint International Research B in the Japan Society for the Promotion of Science (JSPS) Grants-in-Aid for Scientific Research. In this study, we examine the impact of this training, focusing on evacuation drill preparation in formal school settings.

Disaster Prevention Education

In recent years, disaster prevention education has gained increasing attention because of the growing need to minimize risks and improve disaster preparedness (Towers et al., 2016). In Japan, the Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted during the 3rd United Nations World Conference on Disaster Reduction in Sendai, Miyagi Prefecture, in 2015. Similarly, Australia has implemented the National Strategy for Disaster Resilience framework, which has systematized disaster prevention education across elementary and secondary school curricula. This emphasis on disaster education has also been observed in countries such as Vietnam (Tong et al., 2012) and Malaysia (Abas et al., 2020).

However, there are several challenges in implementing disaster prevention education. Even within established frameworks, there is often a lack of practical training in school systems (Tong et al., 2012), insufficient integration into curricula (Dufty, 2014), and gaps in the availability of appropriate teaching materials and trained educators (Nahayo et al., 2018). Additionally, while monitoring and evaluating the effectiveness of these frameworks are crucial (Sakurai and Sato, 2016), municipal authorities do not consistently conduct these processes.

Methodology

Prior to the training, we designed a disaster prevention workshop using insights gained after the 2016 Kumamoto earthquakes, supplemented with relevant experiences from natural disasters in Thailand. The workshop focused on planning and executing evacuation drills in schools and encompassed 12 training sessions (Table 1).

To evaluate the participants' understanding and the training's effectiveness, we developed a

questionnaire comprising 10 items—eight multiple-choice questions and two open-ended questions. The multiple-choice questions were categorized as follows: three questions on personal experiences with natural disasters, training, and evacuation drills; two questions assessing knowledge of the training content before the session; two questions evaluating knowledge of the training content after the session; one question on confidence in applying the learned concepts. The open-ended questions sought feedback on the applicability of the training content in the participants' workplaces and invited comments and suggestions for improving the training.

The two-day training session was conducted at Mae Fah Luang University, Thailand, on December 24 and 25, 2023. The session included 15 participants, comprising university professors, students, local government officers, and schoolteachers. After each day, a questionnaire was distributed to assess the participants' learning outcomes.

Table 1 Sessions of training content

Session	Content
1	Guidance, Introduction to disaster prevention and mitigation
2	Lessons learned from the 2014 earthquake disaster and previous disasters in Chiang Rai (Information sharing)
3	School safety overview and evacuation drills
4	Check disaster information
5	School safety plan development and timeline 1
6	Develop a school safety plan and Timeline 2
7	Developing an evacuation drill plan 1: Learning from case studies in other regions
8	Developing an evacuation drill plan 2: Setting conditions and goals /preparation
9	Conducting an evacuation drill
10	Reflection on the evacuation drill
11	Presentation for the purpose of application and continuity
12	Conclusion

We first applied descriptive statistics to analyze the participants' experiences with natural disasters and their training in evacuation drills. To assess the impact of the training, we employed the Wilcoxon signed-rank test to compare the participants' understanding of the training content before and after the session. Content analysis was used to examine and describe the responses to the open-ended questions. Finally, text mining techniques were utilized to identify significant patterns and key terms in the written feedback.

Findings

Participants' Experience with Natural Disasters and Evacuation Drills

The participants reported significant exposure to natural disasters in Thailand, including flooding and earthquakes. Notably, 86.7% of participants had experienced natural disasters. Evacuation drills are crucial to minimize damage during such events. Contrary to expectations, 66.7% of participants had attended at least one evacuation drill training session, whereas 33.3% had never participated in such training. Nevertheless, implementing evacuation drills has proved challenging in various workplaces, including municipal offices, schools, and universities. Only 53.3% of the participants had conducted evacuation drills at least once—46.7% had never implemented such steps in their workplace. This highlights the need for effective and practical training for participants to conduct evacuation drills in

their respective environments.

Impact of Training

Table 2 presents a comparison of the mean scores for the knowledge of evacuation drills before and after training. Prior to training, the mean scores for all sessions ranged from 2.000 to 2.400—most participants had a moderate level of knowledge about evacuation drills. Conversely, after training, the mean scores increased from 3.000 to 3.300, reflecting a significant improvement in the participants' knowledge. This increase demonstrates that the participants' understanding of evacuation drills improved following the training. The Wilcoxon signed-rank test further confirmed this improvement, revealing statistically significant differences across all sessions (Table 3). These findings suggest that the training had a substantial effect on enhancing participants' knowledge of evacuation drills.

Table 2 Comparison of knowledge of evacuation drills before and after training

Day	Session	Question	Before		After		Difference M
			M	SD	M	SD	
1 st day in the morning	1 and 2	How well do you know/ understand the content of the lecture?	2.133	0.640	3.067	0.458	0.933
1 st day in the afternoon	3 and 4	How well do you know/ understand the content of the lecture?	2.000	0.756	3.067	0.594	1.067
2 nd day in the morning	5, 6, 7 and 8	How well do you know/ understand the content of the lecture?	2.357	0.929	3.071	0.616	0.714
2 nd day in the afternoon	9, 10, 11, and 12	How well do you know/ understand the content of the lecture?	2.357	1.008	3.286	0.469	0.929

Note. Likert scale: 1= Slightly, 2 = Moderately, 3 = Very, and 4 =Extremely

Table 3 Difference in knowledge of evacuation drills before and after training

Day	Session	Sign	Ranks sum	<i>z</i>	<i>p</i>
1 st day in the morning	1 and 2	Positive	7.5	-3.142	**
		Negative	111.5		
		Zero	1		
		All	120		
1 st day in the afternoon	3 and 4	Positive	0	-3.199	**
		Negative	110		
		Zero	10		
		All	120		
2 nd day in the morning	5, 6, 7 and 8	Positive	0	-2.614	**
		Negative	77		
		Zero	28		
		All	105		
2 nd day in the afternoon	9, 10, 11, and 12	Positive	0	-2.774	**
		Negative	84		
		Zero	21		
		All	105		

Note. *p* * < 0.05, *p* ** < 0.01, and *p* *** < 0.001

Table 4 displays participants' confidence in implementing evacuation drills at the workplace. The results revealed that most participants felt confident in their ability to execute evacuation drills effectively in their respective environments.

Table 4 Confidence of implementation in the workplace

Day	Session	Question	M	SD
1 st day	1 - 4	How confident are you in implementing what you have learned today in your workplace?	3.067	0.594
2 nd day	5 -12	How confident are you in implementing what you have learned today in your workplace?	3.214	0.699

Note. Likert scale: 1= Slightly, 2 = Moderately, 3 = Very, and 4 =Extremely

Contents of training used in the workplace

In the questionnaire, participants were asked to identify aspects of the training that they could apply in their workplace. The analysis revealed five key themes.

1. Significance of Information

- Participant A noted, “Awareness of the use of crucial information for managing various disasters.”
- Participant B mentioned, “Information on the process of students’ training in disaster situations to keep themselves safe.” .

2. Significance of Preparing a Plan

- Participant C stated, “Planning and rehearsing before a disaster occurs, including preparing various pieces of information and creating dissemination plans to assist disaster victims, are essential.”
- Participant D highlighted “Proper preparation for dealing with disasters in educational institutions.”

3. How to Evacuate

- Participant E explained, “The useful content includes technical methods for self-preservation during earthquakes, such as covering our heads and carefully evacuating from the room to the outside.”
- Participant F added, “Learned how to evacuate during an earthquake.”

4. Significance of Giving Information and Practice to Students in School

- Participant G emphasized, “Creating knowledge for students and training them to understand natural disasters.”
- Participant H stated, “Information on training students in disaster situations to ensure their safety. Teachers must recognize the importance of various learning processes and engage in practical training methods for children.”

5. Learning from Japanese Experience

- Participant I stated, “Understanding disaster management in Japan provides a valuable example for application in Thailand.”
- Participant J remarked, “Lessons learned from Japanese schools.” :

These responses illustrate the participants’ recognition of the practical applications of the training and the significance of implementing comprehensive disaster preparedness strategies in their workplaces.

Most participants emphasized the importance of essential knowledge and concrete examples in school disaster education. They considered school disaster response crucial, such as advanced preparation, immediate response, and post-disaster recovery. Examples of evacuation drills from schools for disabled students and nurseries informed their understanding. They highlighted the need to prepare evacuation plans and gather the relevant information. Setting clear training requirements and goals was seen as essential. Additionally, some responses referred to specific evacuation methods, such as “Ohashimo,” “Dangomushi,” and “ShakeOut.” While the training content was primarily based

on Japanese experiences, participants also compared Thailand and Japan, noting the critical role of teachers in Japan's disaster preparedness strategies.

Text mining was used to analyze participants' responses. Figure 1 illustrates the results for several high frequency words displayed in sizes corresponding to their prominence. Color coding distinguishes between parts of speech: blue for nouns, red for verbs, green for adjectives, and gray for interjections. The analysis revealed key terms such as "information," "preparation," "plan," "school," and "student." We also asked the participants for their comments and suggestions regarding the training, focusing on topics in which they were interested regarding disaster prevention. Four main keywords emerged: cardiopulmonary resuscitation, methods, techniques, adapting plans to the Thai context, cooperation between schools and communities, and mental health.

Further text mining of these suggestions is shown in Figure 2. The keywords identified were "local," "community," "school people," "regular," "school," and "expand." The participants expressed a desire to learn about local wisdom and community practices in Thailand and Japan. They were particularly interested in understanding the role of community involvement in disaster training drills and exploring ways to enhance cooperation between schools and local organizations for effective disaster management.

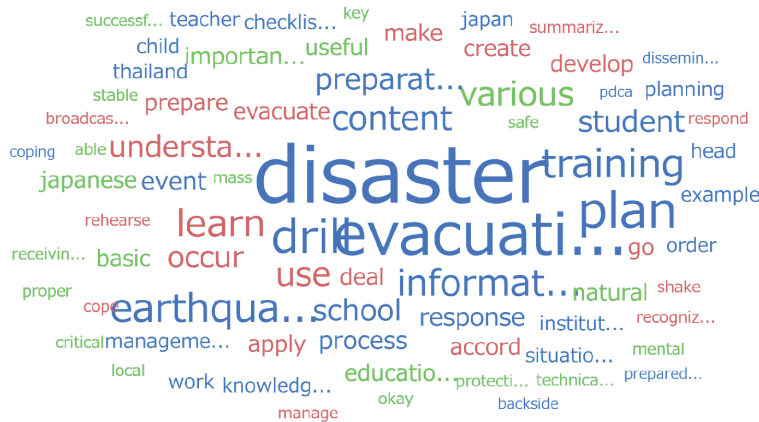


Figure 1 Results of text mining for training content applicable in the workplace

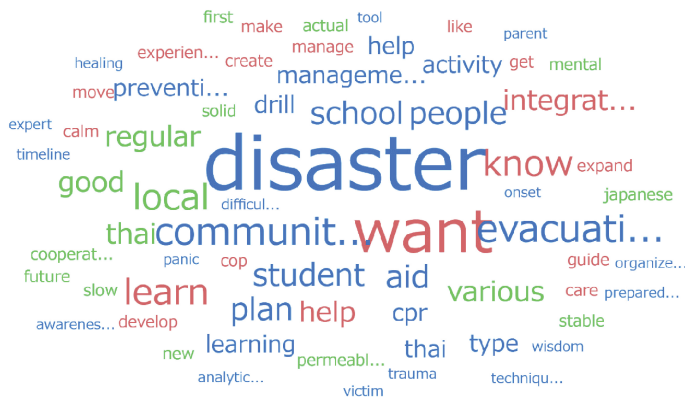


Figure 2 Results of text mining for participants' comments and suggestions on training

Discussion and conclusion

This study evaluated the effectiveness of disaster education, focusing on evacuation drill training for various instructors in Thailand, including university professors, students, local government officers, and school teachers. The findings indicated that specialized training significantly enhanced participants' knowledge and confidence regarding the implementation of evacuation drills. The results suggest that concrete training led to a marked improvement in the participants' understanding of evacuation procedures and their ability to apply these practices in their respective environments. Moreover, the participants expressed a strong interest in further adapting the training content to better fit the Thai context by incorporating local community practices and engaging schools more effectively. It is crucial to develop and implement a comprehensive training module specifically tailored to Thailand's needs. This should involve expanding the reach of training programs to include a broader audience, such as community members and parents. Thus, a more widespread and robust approach to disaster preparation can be ensured.

This study underscores the significance of practical real-world examples of natural disasters in educational settings. Learning from concrete case studies and experiences is essential to improve disaster preparedness and response capabilities.

In conclusion, this study highlights the need for the continued development and expansion of disaster education programs to enhance community resilience and preparedness in Thailand. Future efforts should focus on integrating local knowledge and fostering collaborative disaster management approaches.

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References

- Abas, M. A., Ibrahim, N. E., Wee, S. T., Sibly, S., & Mohamed, S. (2020, August). *Disaster resilience education (dre) programmes in schools: a case study in Kelantan, Malaysia*. In IOP Conference Series: Earth and Environmental Science (Vol. 549, No. 1, p. 012078). IOP Publishing.
- Duffy, N. (2014). Opportunities for disaster resilience learning in the Australian curriculum. *Australian Journal of Emergency Management*, *29*(1), 12-16.
- Department of Disaster Prevention and Mitigation (DDPM), Ministry of Interior, Thailand (2015) *National Disaster Risk Management Plan*. Bangkok, Thailand.
- Maki, T., Takeuchi, Y., & Sakata, N. (2022). A Preliminary Study on Education for Disaster Risk Reduction in Thailand. *Studies in education*, *3*, 275-279.
- Nahayo, L., Li, L., Habiyaemye, G., Richard, M., Mukanyandwi, V., Hakorimana, E., & Mupenzi, C. (2018). Extent of disaster courses delivery for the risk reduction in Rwanda. *International journal of disaster risk reduction*, *27*, 127-132.
- Office of the Basic Education Commission (OBEC), Save the Children, and United Nations Children's Fund (UNICEF). (2016) *Basic Education Sector Snapshot for Comprehensive School Safety and Education in Emergencies in Thailand*. Bangkok, Thailand.
- Sakurai, A., & Sato, T. (2016). Promoting education for disaster resilience and the Sendai framework for disaster risk reduction. *Journal of Disaster Research*, *11*(3), 402-412.
- Tong, T. M. T., Shaw, R., & Takeuchi, Y. (2012). Climate disaster resilience of the education sector in Thua Thien Hue Province, Central Vietnam. *Natural hazards*, *63*, 685-709.

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Towers, B., Ronan, K., Haynes, K., & Noonan, R. N. (2016). *Disaster resilience education: a practice framework for Australian emergency management agencies*. Bushfire and Natural Hazards CRC.