The Effectiveness of a School-Based Disaster Risk Reduction Program in Indonesia: A Case Study in the Klaten Regency's Junior High Schools

Nur Tjahjono Suharto[a], Slamet PH[b], Amat Jaedun[c], Hieronymus Purwanta[d]*, [a,b,c]Doctorate Program, Department of Educational Research and Evaluation, State University of Yogyakarta, Indonesia, [d]Doctorate Program, Department of History Education, Sebelas Maret State University, Surakarta, Indonesia, Email: [a]fahrangga_cahya@yahoo.com, [b]slametph@yahoo.com, [c]zaedun0808@gmail.com, [d]*hpurwanta@staff.uns.ac.id

Three significant disasters, i.e., natural, non-natural, and social disaster, hit Indonesia every year causing material loss and victims. Therefore the government introduced a program, named safety school for disasters. This program is implemented in all provinces and regencies in Indonesia. The objectives of this research were to evaluate the effectiveness of the implementation of the School-based Disaster Risk Reduction program. The training program includes seven subjects, (1) Disaster potentials in Indonesia (earthquake, tsunami, flood, eruption of volcano, landslide, and typhoon), (2) First aid, (3) Arranging evacuation routes for School, (4) Arranging evacuation signs, (5) Early warning systems, (6) Composing scenario of simulation, (7) Simulations/drills. In measuring the effectiveness of the program, this research used four levels of the Kirkpatrick evaluation model: reaction, learning, behaviour and results. The results show that students are interested in disaster mitigation activities. However, the training was not supported by school teachers and principals.

Key words: *Disaster risk reduction program, Klaten regency, Junior high School, evaluation, Kirkpatrick model.*

Introduction

Indonesia is a supermarket for disaster in the world. There are 14 types of disaster occurring regularly and periodically (Badan Nasional Penanggulangan Bencana, 2010). All three kinds of disasters, those are natural disasters, non-natural disasters, and social disasters, exist in Indonesia. Additionally, the geographic site of Indonesia, which is lying on 'the ring of fire' line, causes the geology disaster to hit. The eruption of volcanoes and earthquakes are the geological disasters as an impact of the position of Indonesia on 'the ring of fire'. These two big disasters cause thousands of people harm, and millions of houses get damaged.

From 2005 through 2015, there occurred 1800 disasters (BNPB or Badan Nasional Penanggulangan Bencana, 2016). Most of the disasters are hydro-meteorological disasters (more than 78%), and around 22% are geological disasters. Although the number of geological disaster is smaller than the hydro-meteorology disasters, it is considered as one of the most threatening, uncontrollable, and causes devastating impacts (Farooqui et al., 2017). In the 2004 Aceh earthquake and tsunami, 128 thousand people died, and they caused around 4.5 Million US Dollar in damage loss (Ma'arif, 2010). The disaster destroyed various infrastructure that had been built, such as housing, offices, shops, and other public buildings. Not only that, for survivors, the earthquake and tsunami disaster caused posttraumatic stress reactivity (PTSR) (Frankenberg et al., 2008).

Not much different from the disaster in Aceh, the earthquake that occurred on Saturday 27 May 2006 caused the province of Yogyakarta and the surrounding area to be severely damaged. 6,234 people died; thousands more people suffered severe and minor injuries. 160,109 houses collapsed, 81,536 units were moderately damaged, and 168,827 units were slightly damaged (Isbandiyah, 2008).

The devastating impacts of disaster not only occur for people's houses and offices but also on school buildings. There were 750 schools destroyed in the earthquake and tsunami in Aceh 2004 (Petal, 2008), and 9,051 classes of schools damaged in the earthquake of West Sumatra 2009 (The_Consortium_for_Disaster_Education, 2011). The data show that schools have a vulnerability in disaster. The impact of disaster for schools not only hits the physical building but also has non-physical impact such as the economics and psychosocial impact.

The most threatening of geological disasters is it is unpredictable and uncontrollable factors. Therefore, one of the most critical steps that must be taken is to prepare the community to be able to reduce the number of victims, both in damage to buildings and humans (Shaw, Shiwaku, & Takeuchi, 2011). In Indonesia, two geological disasters (Aceh 2004 and Yogyakarta 2006) led the government to launch Act 24/2007 on Disaster Management. The

Act is a foundation of the establishment of the Board of Disaster Management at the national and regional levels, as well as the disaster risk reduction (DRR) program.

Through the DRR program, the Board of Disaster Management conducts socialisation and training for the public about the risks of natural disasters and various ways to overcome them. Disaster risk reduction requires the involvement and partnership of all elements in society. Therefore, this step requires empowerment and participation that all parties are included in, is non-discriminatory, and easily accessible. Following UNISDR's recommendations, the Board of Disaster Management needs to pay special attention to disproportionately affected people, especially the poorest. Gender, age, disability, and cultural perspectives must also be considered in all policy-making processes and practices. Also, the Board of Disaster Management needs to encourage the involvement and leadership of women and youth to be promoted, so that they become the leading force in natural disaster management. In this context, special attention must be paid to increasing the voluntary work of organised citizens (UNISDR, 2015).

One of the community groups that were the main target of DRR training were students. The program aims to arrange school building safety, to develop the capacity of students and teachers in facing disasters, and to establish the school management of the disaster. Based on the program, all of the regular attendees should conduct the school safety management for disaster. In certain regencies, the name of the program is the School Alert for Disaster.

DRR training has been conducted in various regions in Indonesia. For example, the local government, BMKG (Meteorology Climatology and Geophysics Agency), and village leaders in North-Sumatra have a good collaboration on disaster preparedness training (Romo-Murphy, 2012). The government has made substantial contributions to organising the simulations. The BMKG cooperates with the media, and they have made additional contributions by creating dialogue concerning the overall issue of disasters and what to do during disasters. To keep the people informed in all circumstances, village leaders expect more community/village level of disaster training and printed materials and lectures on disaster preparedness given out in local offices and mosques.

The same thing was done in West Sumatra. Research by Taubenböck and team show that an active local tsunami early warning system in Padang has been accomplished by jointly developing, discussing and finalising an official set of tsunami hazard and risk maps and help to commence to generate and upgrade further preparedness measures and implications for adequate disaster management (Taubenböck et al., 2013). However, a long road is still ahead. In the Klaten District, disaster training for school students is carried out based on BNPB Regulation No. 4/2012 concerning Guidelines for Implementing Schools and/or Madrasas Safe from Disasters. The aim is to: (1) After participating in activities students understand the

potential of disaster threats in the Klaten district and the environment around their school, (2) Students can design and create evacuation routes, evacuation plans and evacuation signs at school, (3) Students can simulate disasters under the potential threat of disaster that may occur and afflict the School.

Ideally, training involves all elements of School, such as students, teachers, and school management. Even Honesti & Djali (2012) proposed for the disaster education to be incorporated in Social Studies, Science, Indonesian Language, Mathematics and Religion, so the students can functionally manage the disaster and the disaster mitigation can be carried out and have a domino effect to others outside the schools. However, a study conducted by UNESCO together with UNICEF found that the training was only cognitive; namely, the teacher explained information about natural disasters in Indonesia and efforts to minimize the risk of victims, both to humans and physical buildings (UNESCO & UNICEF, 2012). From the perspective of students, this training only gives knowledge. The most important goals, namely motoric and organisational skills to cope with disasters, failed to be realised.

The crucial problem of DRR for schools or better known as DRR-based schools, is that disaster management is not enough just as cognitive knowledge. If natural disasters occur, all parties will be unsure what to do, because there is no organisation and motor skills possessed for the response. The Assessment of DRR is limited to summative and formative tests. The researcher did not comprehensively find the impact of disaster risk reduction learning for students (UNESCO & UNICEF, 2012).

The failure of DRR training in schools is an iceberg of problems in disaster management, especially at the local level, both on provincial and district level. Critical barriers in the implementation of decentralisation on disaster risk reduction in Indonesia are capacity gaps at lower institutional levels, low compliance with legislation, disconnected policies, issues with communication and coordination, and inadequate resourcing (Grady, Gersonius, & Makarigakis, 2016).

Of the various problems faced by DRR programs in the regions, this study aims to examine the effect of comprehensive DRR training, both knowledge and motor skills, on students' habits of doing and habits of thinking about natural disasters. The research questions raised in this study are: (1) how effective is the implementation of the school-based disaster risk reduction program by implementing the Kirkpatrick model? (2) What kind of obstacles are there in the implementation of the school-based disaster risk reduction programs?

Methodology

The research conduct is in the Klaten regency, Central Java Province, which develops school-based disaster risk reduction by implementing school safety for disaster programs. There are 15 junior high schools following the program. Based on the local regulation of disaster learning guidelines, the program could be implemented by training, and facilitators conduct training for students. Respondents of this research are students who were involved in the program in two Junior high schools, i.e., SMP Negeri 1 Klaten and SMP Negeri 3 Manisrenggo. Sixty students were participating in this research. Besides students, this study also used teachers and school principals as respondents. There were two principals and four teachers who accompany facilitators in training.

The training was guided by the Regional Disaster Management Agency of Klaten Regency, SAR, and the Fire Department. DRR training materials, according to the Hyogo Framework for Action 2005-2015 recommendations, there are five Priorities for Action, namely: (1) DRR governance, (2) risk assessment and early warning, (3) knowledge and education, (4) reducing the underlying risk factors, and (5) disaster preparedness and response (Djalante, Garschagen, Thomalla, & Shaw, 2017). In the Sendai Framework for Disaster Risk Reduction 2015-2030 there are four priorities for action: (i) Understanding disaster risk; (ii) Strengthening disaster risk governance to manage disaster risk; (iii) Investing in disaster reduction for resilience and; (iv) Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation, and reconstruction (Stough & Kang, 2015; UNISDR, 2015). Based on the recommendations of the Hyogo Framework for Action and the Framework for Disaster Risk Reduction, the training is focused on seven major subjects, i.e. (1) Disaster potentials in Indonesia (earthquake, tsunami, flood, eruption of volcano, landslide, and typhoon), (2) First aid, (3) Arranging evacuation routes for schools, (4) Arranging evacuation signs, (5) Early warning systems, (6) Composing scenarios of simulation, (7) Simulation.

In measuring the effectiveness of the program, this research evaluates every training process. Evaluation is an applied inquiry process for collecting and synthesising evidence that culminates in conclusions about the state of affairs, value, merit, worth, significance, or quality of a program, product, person, policy, proposal, or plan (Mertens, 2015). Furthermore, Mertens explained that evaluation is a selective exercise that attempts to systematically and objectively assess progress towards and the achievement of an outcome. Evaluation is not a one-time event, but an exercise that involves assessments of differing scopes and depth carried out at several points in time in response to evolving needs for evaluative knowledge and learning during the effort to achieve an outcome.

Students and teachers are treated as the informants of research. Therefore, in composing the results of research, aspects that can be measured, are such as reaction, learning, behaviour and result. On the reaction level, reactions, feelings, and thoughts are measured as critical incidents. Typical question evaluation for incident reactions are "Does the required level for participants ensures the most of learning can be made?" and "Is it practical and is there potential for the participant applying the learning." Typical questions evaluation for feeling is "Did the participant like and enjoy the training?" and "Did they like the venue, the style, and the timing?" Typical evaluation questions for thought is "Did they consider the training relevant?", "Was it a good use of their time?" and "Is it easy to participate in the training?".

In ensuring whether the training program is successful to get the objective, an evaluation is needed. Kirkpatrick (2009) stated that training evaluation is the process of collecting information and data systematically. This training evaluation is planned along with the training program, based on the planning of objectives and goals that the training wants to obtain. The evaluation is to obtain information about the training program results. Training evaluation will later result in feedback, including the reaction of the participants, learning outcomes of the participants, behavioural changes of the participants in the workplace, and the results obtained (Kirkpatrick & Kirkpatrick, 2005).

Program evaluation is implemented to develop an understanding of the program, particularly the outcome. It is also able to develop a cost analysis and the cost benefits of the program (Wang, 2009). Evaluation is needed to determine the effectiveness of training. Training evaluation is also needed to make decisions (Kirkpatrick & Kirkpatrick, 2009). There are models of evaluation implemented in the research of the evaluation program, such as the logic model, Ciro, Stake Model, Saratoga, CIPP, and Kirkpatrick. This research is implementing the four levels of the Kirkpatrick evaluation model.

Kirkpatrick's four-level model is now considered an industry standard across the HR and training communities (Kirkpatrick & Kirkpatrick, 2007). The four levels of training evaluation models were later redefined and updated in Kirkpatrick's book; Evaluating Training Programs: The Four Levels. The four levels of Kirkpatrick's evaluation model necessarily measure: (1) Reaction - the reaction of students; (2) Feeling - what they think and feel about the training; Learning - the resulting increase in knowledge or capability; (3) Behaviour - extent of behaviour and capability improvement and implementation/application; (4) Results - the effects on the business or environment resulting from the trainee's performance (Tamkin, Yarnall, & Kerrin, 2002).

Tamkin stated that the first level of Kirkpatrick's model, reaction, is evaluated by tools and methods like; 'happy sheets', feedback forms and also verbal reactions, post-training surveys, and/or questionnaires (Tamkin, et al., 2002). Researchers commonly use this type of

evaluation because it is quick, straightforward to obtain, and not expensive to gather or to analyse. The second level, learning, is typically evaluated by assessments or tests before and after the training, and interviews or observations can also be used. Researchers use this type of evaluation because it is relatively simple to set up, clear-cut for quantifiable skills, but less easy for complex learning. The third level, behaviour, is evaluated through observation and interview over time to assess change, the relevance of change, and the sustainability of change. Measurement of behaviour changes typically requires the cooperation and skills of the students. The fourth level, the measurement of the effect of the training materials into the school system. The result of the evaluation is the individual. It is not complicated like the evaluation of the whole school organisation, but the process needs clear accountability.

Findings

The training was held from the 19th to the 22nd of April 2017 in two schools that were used as research subjects. In order to run effectively, the students participating in the training were divided into four groups with 15 people and one teacher each. On the first day, the training material was about Disaster potentials in Indonesia (earthquake, tsunami, flood, the eruption of volcano, landslide, and typhoon). Through class discussions, students are directed to recognize potential disasters in the Klaten Regency region and especially in the area/environment around the School. During this session, a video of the damage caused by the 2006 earthquake was played. Although the epicenter was in the province of Yogyakarta, the Klaten Regency was one of the areas that experienced the worst damage, because the area is directly adjacent to Yogyakarta. In addition to earthquakes, natural disasters that often occur in the Klaten region are typhoons and volcanic eruptions of Mount Merapi.

On the second day, the training was opened with the steps to save themselves that might be done when a disaster occurs. The students were explained the risks that are faced when natural disasters occur, such as a class wall collapsing or even the whole building collapses. The death toll from the earthquake in Yogyakarta, which was 6,234 people, was due to being hit by collapsed buildings. Therefore, to reduce the number of victims, knowledge, and skills to save themselves are needed. The explanation then continued by showing the slides of correct self-rescue and question and answer time. The question that often arises is about security by taking cover under the table. Does that method not make them die crushed?

After the discussion, the training continued with the practice of self-rescue. Students are trained to apply proper methods of self-rescue when earthquakes and hurricanes occur while the teaching-learning process is in progress. Self-rescue includes the duration of a disaster and the process of moving from being in a classroom to an open space in the School.

The next training material is giving first aid to those who are victims of the disaster. In this session, students are trained to help and deal with victims of open wounds, cracked/broken bones, and those that have died. On the material for handling open wounded, students are trained to clean wounds, provide treatment, and bandage the wound with a bandage. In handling fractured or broken bones, training includes how to lift victims and evacuate to safe areas. Meanwhile, for handling dead victims, the training material is focused on how to lift and put the body into a body bag.

On the third day, the training was directed at the mass evacuation process. The first step is to identify open areas within the School that are safe for evacuation sites. After identifying, the students asked to calculate the capacity of each open space.

In the next stage, the trainees were asked to make an evacuation route design by considering the safety and time to reach the open area location. After a lengthy discussion, finally, the evacuation route was agreed to the two central locations of the open space, namely the middle yard and the basketball court located in the backyard of the School. The session ended with creating and installing signs along the evacuation path.

While the students practice mass evacuation, the teachers asked to design an early warning system that can reach all classes and keeps going despite disasters. Early warning system equipment is provided free of charge by the Klaten District Disaster Management Agency.

The third day of training ended with designing a disaster response simulation scenario. The scenario includes all training material from the initial alert of the early warning system to rescue, evacuation, and first aid. During the simulation, mass evacuations are directed to the school center yard.

The measurement results of training success include four aspects, namely reaction, learning, behaviour, and result. In the reaction aspect, the majority of students (86%) stated that the training material was very satisfactory and satisfied them. The rest (14%) informants answered that the training is neither or good. On the other hand, in the applicability aspect of training materials, all participants (100%) stated that the material of training could be implemented in their schools. It means the subjects of lessons in the training are a match to the conditions of schools in facing a natural disaster. The existing conditions of schools are vulnerable when disaster hits; therefore, the training materials are needed to solve the problems.

In expressing their feeling about training, 97% of participants very enjoyed and/or enjoyed following the training, and 3% or two persons of participants stated neither. Their answer is in line with the comfortability aspect, as 98% of the informants stated they were comfortable,

and 2% or one person stated that he/she was not comfortable. Similarly, 61 of 64 participants stated that the setting of the training was very good and good. Two persons stated that the setting was acceptable, and one person said it was poor. From the involvement aspect, the result is also linear. 97% of participants said that they could actively participate in every step of the learning process, express their opinions, and freely ask questions. The ability of the trainer is also seen as mastering the materials so that any problems that arise can be found in rational solutions. The trainer's personality is also considered quite friendly, so the participants do not feel scared and tense during the training. From this perspective, the transfer of Disaster Risk Reduction of knowledge and skills ran well and did not get trapped in the indoctrination model. Most of the participants of the training were enjoying and comfortable with all the processes.

The teaching-learning process that ran democratically, along with the four days of training, made all participants could absorb and understand the knowledge and skills of Disaster Risk Reduction. From the questionnaire filled, 58 persons or 91% said that their capacity and capability in DRR were significantly increased, 6% increased, and 3% enough increased.

On the learning level, successful learning and advanced effects from measured learning about critical incidents. Questions for successful learning incident evaluation that were asked on the questionnaire sheet are: "Did the trainees learn what was meant to be taught?" and "Did the trainee had a meaningful experience?" Question for advanced effect is "What is the change for the trainee after following the training, especially in the DRR capacity?".

In the successful learning aspect, 92% of the training participants or as many as 59 people feel they have been able to achieve all the goals set, while 6% had control over 80% of the material, and only one person (2%) had control over 70% of the material. In the advancing effect of learning, 90% of students stated that the materials of training would have had an advancing effect. The learning from facilitators was engaging for students.

On the behaviour level, applications to work and change of behaviours are measured as critical incidents. Questions for application to work evaluation are "Did the trainees put their learning into effect in the school?", "Were the relevant skills and knowledge used?" Moreover, "Would the trainees be able to transfer their learning to another student?" Questions for change of behaviour that are asked on the questionnaire sheet are: "Were there noticeable and measurable changes in the activity and performance of the students in their schools?" and "Is the participant aware of the change in behaviour, knowledge, and skill levels?"

In addition to answering questions in the questionnaire as posed to students, teachers who become DRR trainees in their schools also asked to answer specific questions raised through

in-depth interviews. The teachers consider training very useful for schools. Students who take part in the training will become their peers so that all school members can own knowledge and skills in dealing with disasters. However, when the question continued to the practical stage, namely "How will the school leader implement the DRR program for all students?", the answer is extracurricular activities. The answer shows that the council of teachers is less serious in responding to the DRR program because a small proportion of students will only attend extracurricular activities. In other words, the DRR program cannot be implemented for all students.

On the result level, 'schools preparedness and schools mitigation efforts' measured as critical incidents. Typical questions for Schools' preparedness is, "Do the schools have awareness against disaster?" A typical question for Schools' mitigation effort is, "Do the schools have mitigation activities in avoiding material loss or victims of disaster?"

In schools' preparedness, students are assisting their teachers to arrange school evacuation route maps, evacuation signs, preparing early warning systems, and scenarios for drills. In the School's mitigation efforts, there are two kinds of mitigation, first is structural mitigation, and the second is non-structural mitigation. According to teachers, students who followed training are doing the non-structural mitigation for schools, such as composing contingency planning of disaster and standard operating procedures for each hazard. The materials for doing these documents are based on training material from facilitators.

Discussion

Several essential points of view can be discussed from the research results. First, related to the reaction level. At the level, most students are interested and appreciate the training. From this viewpoint, it can be understood that the training program is relatively new for schools. The students who became trainees are the first participants for junior high school level in the Klaten Regency. Therefore it becomes a particular motivation for them to learn about disaster risk reduction.

On the other hand, trainees have time to explore their capability by presenting the result of group discussion on each material. In the learning level, the participants could answer the group task and individual tasks of each subject. It has the possibility for trainees to implement the materials they learned in schools. For behaviour level, training could change the students' behaviour from before to after the training. It proves that before they followed the training, the knowledge about the disasters was limited. The students just know disaster information through social media and others sources. However, in this training, students have much time to discuss anything disaster related. Training is also providing media for the students to develop their ability by presenting discussion results. Therefore trainees could implement it

after completing the training. In the result level, there are trainees conducting activities which are supporting School-based disaster risk reduction programs. Teachers and school principals stated that after completing the training program, schools want to arrange a new program, namely mitigation as an extracurricular subject. In this program, trainees must teach their friends about the DRR program.

Conclusion

The disaster safety school program is a long term program for schools. The main aim of the program is reducing disaster impact for school members, such as students, teachers, and all other elements of a school by increasing the capability of students and teachers. Unfortunately, activities for reducing school risk are limited. It depends on the school principal's vision. The students have a high interest in disaster mitigation activities in School. However, the limited support from the principal and teachers make the activity useless. On the other hand, when the support of teachers and the principal is excellent, the activity will be running well. Therefore the support from teachers and the principal is the vital element to develop a safety school program.

The research suggests (1) Increasing teachers' capacity in the disaster safety school program by conducting training for the teacher; (2) The disaster safety school program should be a part of school accreditation assessment. A school could have an accreditation if they thoroughly implement the disaster safety school program.

REFERENCES

Badan Nasional Penanggulangan Bencana. (2010). *Rencana Nasional Penanggulangan Bencana 2010-2014 [National Disaster Management Plan 2010-2014]*. Jakarta: Badan Nasional Penanggulangan Bencana.

Badan Nasional Penanggulangan Bencana. (2016). Data dan Informasi Bencana Indonesia (DIBI/ Data and Information of Disaster in Indonesian). Jakarta: Badan Nasional Penanggulangan Bencana.

Djalante, R., Garschagen, M., Thomalla, F., & Shaw, R. (2017). Introduction: Disaster Risk Reduction in Indonesia: Progress, Challenges, and Issues. In R. Djalante, M. Garschagen, F. Thomalla & R. Shaw (Eds.), *Disaster Risk Reduction in Indonesia*. Cham, Swiss: Springer International Publishing.

Farooqui, M., Quadri, S. A., Suriya, S. S., Khan, M. A., Ovais, M., Sohail, Z., . . . Hassan, M. (2017). Posttraumatic stress disorder: a serious post-earthquake complication. *Trends Psychiatry Psychother, 39*(2), 135-143. doi: https://doi.org/10.1590/2237-6089-2016-0029

Frankenberg, E., Friedman, J., Gillespie, T., Ingwersen, N., Pynoos, R., Rifai, I. U., . . . Thomas, D. (2008). Mental Health in Sumatra After the Tsunami. *American Journal of Public Health, 98*(9), 1671-1677. doi: https://dx.doi.org/10.2105%2FAJPH.2007.120915

Grady, A., Gersonius, B., & Makarigakis, A. (2016). Taking stock of decentralized disaster risk reduction in Indonesia. *Natural Hazards and Earth System Science, 16*, 2145–2157. doi: https://doi.org/10.5194/nhess-16-2145-2016

Honesti, L., & Djali, N. (2012). Pendidikan Kebencanaan Di Sekolah – Sekolah Di Indonesia Berdasarkan Beberapa Sudut Pandang Disiplin Ilmu Pengetahuan [Disaster Education in Indonesia Schools Based on Multiple Perspective Disciplines Science]. *Jurnal Momentum, 12*(1).

Isbandiyah, H. (2008). Wajah Spanduk Solidaritas Gempa Yogyakarta: Tinjauan dari Perspektif Komunikasi. *Jurnal Ilmu Sosial dan Ilmu Politik, 11*(3), 1-18. doi: https://doi.org/10.22146/jsp.10991

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2005). *Transferring Learning to Behaviour* (Third ed.). California: Berrett-Koehler Publishers, Inc.

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2007). *Implementing the Four Levels* (First ed.). California: Berrett-Koehler Publishers, Inc.

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2009). *Evaluating training programs. The four levels. Third edition. Berret-Koehler Publisher.* (Third ed.). Oakland, California: Berrett-Koehler Publishers, Inc.

Ma'arif, S. (2010). Bencana dan Penanggulangannya: Tinjauan dari Aspek Sosiologis [Disasters and Its Mitigation: An Overview of Sociological Aspects]. *Jurnal Dialog Penanggulangan Bencana, 1*(1).

Petal, M. (2008). Disaster prevention for school. Guidance for education sector decision-makers. Retrieved from https://www.preventionweb.net/files/7556_7344DPforSchoolssm1.pdf

Romo-Murphy, E. (2012). Monitoring Disaster Preparedness Education in Northern Sumatra. *Media Asia, 39*(3). doi: https://doi.org/10.1080/01296612.2012.11689928

Shaw, R., Shiwaku, K., & Takeuchi, Y. (Eds.). (2011). *Disaster Education*. Bingley: Emerald Group Publishing Limited.

Stough, L., & Kang, D. (2015). The Sendai Framework for Disaster Risk Reduction and Persons with Disabilities. *International Journal of Disaster Risk Science (IJDRS), 6*, 140–149. doi: https://doi.org/10.1007/s13753-015-0051-8

Tamkin, P., Yarnall, J., & Kerrin, M. (2002). *Kirkpatrick and beyond: A review of models of training evaluation*. Brighton: Institute for Employment Studies.

Taubenböck, H., Goseberg, N., Lämmel, G., Setiadi, N., Schlurmann, T., Nagel, K., . . . Klüpfel, H. (2013). Risk reduction at the "Last-Mile": an attempt to turn science into action by the example of Padang, Indonesia. *Natural Hazards and Earth System Science, 65*, 915–945. doi: https://doi.org/10.1007/s11069-012-0377-0

The_Consortium_for_Disaster_Education. (2011). A framework of school-based disaster preparedness Retrieved from https://www.preventionweb.net/files/26013_26008aframeworkofschoolbaseddisaste.pdf

UNESCO, & UNICEF. (2012). Disaster risk reduction in school curricula: Case studies from thirty countries. Retrieved from https://www.unicef.org/environment/files/DRRinCurricula-Mapping30countriesFINAL.pdf

UNISDR. (2015). *Sendai Framework for Disaster Risk Reduction 2015-2030*. Geneva: United Nations Office for Disaster Risk Reduction (UNISDR).

Wang, V. C. (2009). *Assessing and evaluating adult learning in career and technical education*. Zhejiang: Zhejiang University Press.