Improving Student Internalization of Disaster Knowledge by Participating in Learning Package Development

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Abstract *In the subject of disaster education, it is crucial to establish a practical approach to give an impactful impression for the student so that it can increase self-awareness as well as for it to be applicable in daily life and memorized longer in each individual. This community services program titled "Development of Learning Packages by and for Students towards a Smart and Resilience Generations in dealing with Disaster." aims at developing creative and innovative disaster education learning packages that meet the needs and characteristics of students. This activity was carried out using a participatory method, through three (3) stages, namely: i) design phase, ii) production stage, and iii) evaluation phase. This activity adopts the experiential learning process, to assist the students in internalizing disaster knowledge in order for them to be able to apply the principles and develop the characters and competencies needed when disasters occur. The implementation of the program has resulted in the compilation of creative and innovative disaster education learning packages that meet the needs and characteristics of students, namely posters, poems, short stories, videos, and dances.*

1. INTRODUCTION

Aceh Besar District is one of the regencies in Aceh Province, which consists of 5.2°–5.8° North Line and 95.0°–95.8° East. This region has great potential for disaster risk, both natural, and human-made. Natural hazards that often occur in Aceh Besar District were geological (earthquakes, tsunamis, mass-movements, and volcanic eruptions) and hydrometeorological (floods, droughts, and tornadoes). Meanwhile, non-natural hazards in this region included outbreaks of diseases and plant/livestock diseases) (BPS Aceh Besar, 2018). With the variety of disaster risks in the Aceh Besar District, serious efforts are needed in building and improving community preparedness towards disasters.

Aceh Besar Regency is one of the region which received major destruction due to the earthquake and tsunami in December 26th 2004. The tsunami severely destroyed various government buildings, residential housing, facilities, and infrastructure that stand along the coastline. The tsunami also caused countless lives, lost families, and properties (Gaillard et al., 2008).

SMA Negeri 1 Peukan Bada, one of the public senior high school located in Aceh Besar district, was also devastated by the tsunami waves. The school was later rebuilt with support from the Turkish Red Crescent donor. Various efforts to improve the preparedness of the community of this school have been carried out, both by government agencies, non-governmental institutions, academics, and private institutions.

One effort that has been made is the Disaster Preparedness School program or the Disaster Safe School program. However, based on the results of evaluation studies, many of these schools did not continue their Disaster Risk Reduction activities, even though some of their teachers understood how to do it, including in SMA Negeri 1 Peukan Bada. This condition was due to the teacher's assumption that

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disaster education activity required a large number of funds (costly) and a sense of dependence on the assistance of other parties. In general, schools and school principals are not aware that ensuring the sustainability of disaster education is their responsibility (Oktari et al., 2015; Sakurai et al., 2015; Oktari et al., 2017; Nurdin et al., 2017; Oktari et al., 2018; Sakurai et al., 2018).

Based on the aforementioned statement, there are two main problems that occur in SMAN 1 Peukan Bada, including the need to improve the preparedness of the school community, and the need to ensure the effectiveness and sustainability of disaster preparedness education in schools. The proposed solutions to address these two problems was implemented through this community service program.

The objectives of this program were to develop creative and innovative disaster education learning packages according to the needs and characteristics of students so that they can contribute to the efforts to increase sustainable disaster preparedness in schools. This activity also aims to help the process of internalizing the knowledge gained by students about disaster preparedness by being directly involved in each stage of developing the learning package.

The learning process is an important starting point for building individual and community resilience in dealing with disasters. Learning is defined as a process whose results lead to 'changes in knowledge, beliefs, behaviors, or attitudes that are the result of experience' (Ambrose et al., 2010). Learning is also understood as experience and built socially with the power to be transformative when individuals are challenged and given expertise, knowledge, and time for reflection (Sharpe, 2016).

Most of people assumed that if individuals have the 'right' knowledge and education, then a culture of safety will follow. But in practice, information alone is not enough to direct someone to take action, especially in a disaster situation. Therefore, the process of internalizing knowledge is needed to ensure the inculcation of the values and character of preparedness in dealing with disasters (Oktari et al., 2015).

The results of the study noted that there are several barriers to adequate education and learning regarding Disaster Risk Reduction (DRR). These obstacles include: 1) the existence of doubts about the effectiveness of a particular action, 2) the lack of confidence in one's personal ability to carry it out, and 3) the existence of apathy in considering situations that are deemed impossible (Sharpe & Kelman, 2011).

One of the efforts to overcome these obstacles is through experiential learning or experiential learning in the learning process. With this approach, individuals can activate all aspects of themselves totally, touching cognitive, affective, and psychomotor aspects.

Knowledge gained through experience can be appreciated by individuals so that they can increase self-awareness, can be applied in daily life, and be stored longer in each individual's memory (Sharpe, 2016).

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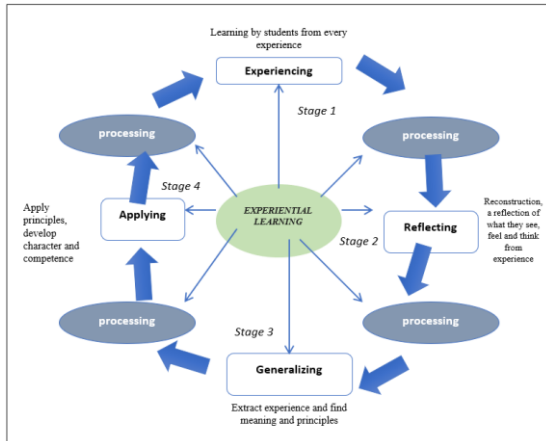
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2. RESEARCH DESIGN

The development of the disaster learning package was carried out through three (3) stages, namely: i) design phase, ii) production phase and iii) evaluation phase. In the design phase, the team had involved the school, especially students, in designing education material that accommodates students' needs. Previously, the team had conducted literature studies and expert interviews on effective learning media to help students internalize knowledge and values related to disaster preparedness. The team had also managed a preliminary survey of students regarding their knowledge and interest in disaster education. There are

33 students (which involved in the Intra-School Student Organization/OSIS) have been selected using purposive sampling method to obtain the empirical data.

In general, the implemented program adopts experiential learning, as presented in Figure 1.

Source: Modified from Sharpe & Kelman, 2011; Sharpe, 2016
Figure 1. The process of internalizing disaster knowledge by students in this program

During the development of the learning package, students actively participate in each stage, from creating designs/scenarios to executing product development. Students were divided into groups according to their interests/learning styles (visual, auditory, and kinesthetic). This approach allows students with dominant skills, talents, and learning styles to develop roles that they feel comfortable. This method can also build communication and teamwork skills as part of the learning process.

As part of evaluating program implementation, a questionnaire survey had been carried out. The evaluation aim at assessing whether there is a change in the level of students' knowledge and preparedness about disasters after the involvement of students in the development of the disaster learning packages.

4. RESULTS AND DISCUSSION

This section will describe the results and discussion of the three phases carried out in this program, namely: i) design phase, ii) production phase, and iii) evaluation phase.

4.1 Design Phase

Before the design phase, it is essential first to analyze student needs. The needs analysis aims at providing a reference in developing learning materials later. Data was collected through a pre-activity survey to measure the extent of students' knowledge and interest in disaster education. This program was carried out by involving 33 students. The results of the needs analysis of students were used to choose and determine what media designs will be developed.

Figure 2 shows the percentage of students' interest in each type of media that will be developed for disaster education.
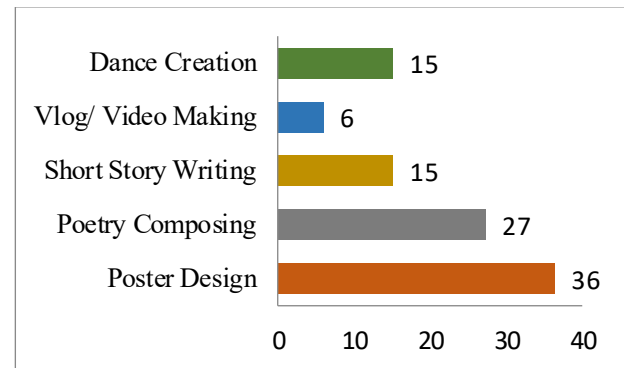

Figure 2. Percentage of Students based on Interest in Type of Media Development

Based on Figure 2, it can be perceived that the majority of students (36%, N = 33) prefer posters as the preferred media. This preference is because posters are more attractive by combining letters, numbers, images, and colors and are better understood as a medium for delivering information and knowledge.

In this design phase, students were taught about the causes and signs of earthquakes and tsunamis as well as the preparedness steps to respond to the hazards. At this stage also, students were allowed to look for additional information and knowledge related to the earthquake and tsunami as well as preparedness steps, so that it assisted students in making learning media.

4.2. Production Phase

At the production stage, the activity was focused on developing various learning media for earthquake and tsunami preparedness in the form of i) poster; ii) poetry; iii) short stories; iv) videos, and v) creative dance. From the results of the collection of materials and information carried out in the previous design phase, students then create their learning media. From this production phase, various learning media have been created by students.

4.2.1. Poster

A poster is one of the media the graphics that show the most strength as a tool for delivering messages. Media graphics are visual media that presents facts, ideas, and ideas through words, sentences, numbers, and various symbols or image. This media is functioning channel messages from the message source to the recipient, attract attention, clarify the idea presentation, and illustrate a fact that is quickly forgotten so that it's easy to keep in mind if illustrated graphically or through a visualization process, simple as well easy manufacturing. Graphic media give priority to the sense of sight by pouring a symbol of communication visuals and message symbols that need to be understood (Rauschenbach et al., 2018).

The poster has the power to digested by people who see because the poster further highlights the power of the message, visuals, and colors. A poster is an intense medium color, message, and intent catch the attention of passersby, but long enough to instill ideas which mean in his memory. The poster prepared attractively, in the form of pictures of color, so that it invites people's attention by inserting a specific meaning that the poster maker will express, according to the intent of the poster's sense of purpose. In theory, a poster created for learning material applies a concept that is apprehended in the form of illustrations of objects, which are pictures that are condensed and rendered to a large scale (Rauschenbach et al., 2018).

The poster created by the students contained several messages such as: how to foster a culture of disaster preparedness, preparing survival bags for disaster; as well as actions are taken before, during, and after the earthquake and tsunami. Some poster designs can be seen in Figure 3.
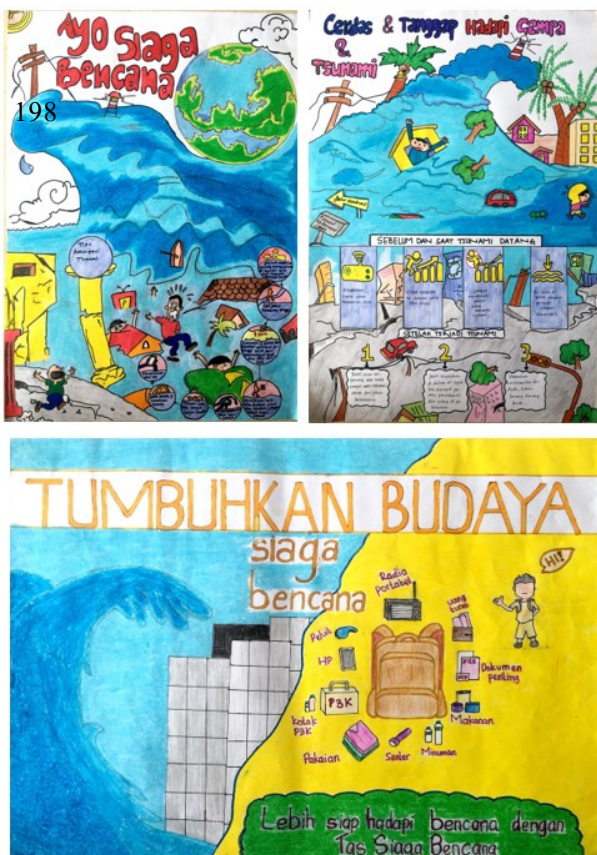

Figure 3. Poster created by students

4.2.2. Poetry

Poetry is a literary work with a language that is condensed, shortened, and given the rhythm with a unified sound and the choice of words that are decorative or imaginative. Poetry is a literary work imaginative. Poetry is a network of rhythms and sounds, as well as a network of images and symbols (Jack & Illingworth, 2019).

Poetry is one form of literary works that can be utilized as learning resources for self-development, maximize control of emotional intelligence, and develop personality quality. Poetry has values that can be extracted and used as guidelines in everyday life that will affect the character of people who look, understand, and discuss the contents of the poem (Jack & Illingworth, 2019).

Poetry compiled by students mostly contain messages about the enormity of a disaster that not only caused damage to human life but also left deep sorrow for the victims and their families. Besides, students also write messages about the importance of building preparedness in dealing with disasters. The following is one of the poems created by student.

Buaian Bumi (*Cradle of the Earth*)
By. Meurah Tulip Raihan

Getaran datang dari bumi (*Vibration comes from the earth*)
Tanah bergoncang dengan kuatnya (*The ground shook strongly*)
Semburan air menyelami dunia (*Bursts of water into the world*)
Menghempaskannya di atas massa (*Flung it over the mass*)
Gemuruh air datang menghadang (*Rumbling water came in the way*)
Melahap semua di depan mata (*Devouring everything in plain sight*)
Mengubah nasib para manusia (*Change the fate of humans*)
Atas kehendak Yang Maha Kuasa (*By the will of the Almighty*)

Lembaran kehancuran dimulai (*The sheet of destruction began*)
Memberi luka yang begitu dalam (*Giving a deep wound*)
Meninggalkan jejak yang begitu kentara (*Leaving a trail that is so obvious*)
Memulai hidup menyelami takdir (*Starting life to dive into destiny*)

Insan berdiri di hadapannya (*People stand before Him*)
Terpaku pada satu titik (*Glued to one point*)
Juga barpacu pada waktu (*Also a race on time*)

Bergenggam tangan menghadap bahaya (*Clasping hands facing danger*)
Menjaga jarak dari bencana (*Keep your distance from the disaster*)

Isak tangis menghampiri (*Sobs approached*)
Menyentuh kalbu yang terdalam (*Touch the deepest heart*)
Menuai rasa penyesalan (*Reap regret*)
Menciptakan banyak pertanyaan (*Create lots of questions*)

4.2.3. Short Stories

Short stories are a work of fiction, the same as novels and novellas. The short story is a prose essay that contains the story of a human life event perpetrators/characters in the story. Through short stories, many moral messages can be conveyed and can be quickly received by students. Especially if the short stories told contain moral messages and are relevant to students' daily lives (Rezaei & Naghibian, 2018).

Writing short stories has the purpose of expressing feelings to its authors and also to channel the matter of human life, which often burdening good thoughts with other people or writers themselves. The short story is one teaching material that can improve student writing skills (Rezaei & Naghibian, 2018).

Short stories occupy strategic positions in teaching. This matter caused by the form of the short story itself, which has advantages over the genre of other types of literature. Short stories are also full of teaching even enjoyable from aspects of time and space. That is, teaching can take place in a relatively short term. Short stories are usually always synonymous with folktales; short stories always present works that are still very traditional. But currently, the short story does not only contain stories that rely on the story the first time. The development of short stories is very rapid. Short stories, has been widely used as a medium of learning in schools, the material is delivered/taught to students presented in the plot of a story, which is expected to attract the attention of students and foster passion for learning (Rezaei & Naghibian, 2018).

One of the students' short stories is titled "Gelombang Nestapa" (A Wave of Sorrow). This short story narrated of a family who experienced an earthquake and tsunami. There are three main characters in this story, namely: Zahra, his father, and mother. The story time setting is Sunday morning, where Zahra and her parents are going to shop for school supplies for Zahra. Suddenly, in the middle of the trip, there was a massive earthquake, and in a short period, a big tsunami occurred.

The writer described how panic happened. Behind a tense and sad story, the writer also tries to include messages of preparedness, where the main character in this story prays and recites verses from the Holy Qur'an amid panic situations caused by the earthquake and tsunami. Besides, the author described about how the main character made an evacuation effort to a higher area to avoid the danger of a tsunami.

4.2.4. Video

The most important general steps in a scientific approach are observing activities. Learning activities in observing activities include reading, hear, and see. Video media here combines hearing and seeing, so this media is excellent and suitable if used in learning.

Video media also has a learning media function, which is a fixative function (Kang & van Es, 2019).

This fixative function is related to the ability of the media to capture, store, and display an object or event, function manipulative relating to the ability of the media to re-display objects or events with various changes (manipulation) as needed. This function also has a distributive function associated with the ability of the media to reach a broad audience in one presentation at a time (Kang & van Es, 2019).

Video media meet the criteria of these three functions. Another function of video media is that it can eliminate verbalism only wording. Video media here can visualize the subject matter/messages to be conveyed in learning.

Figure 4. Screenshot of the video produced by students

One of the videos made by students (see Figure 4) tells about the steps when an earthquake occurs. At the beginning of the video, the story of the 2004 tsunami was also described along with the tsunami monuments.

4.2.5. Creative Dance

The dance learning approach refers to the principles of student development. Students learn well when their physical needs are met and feel psychologically safe and secure. It is instilling creative values in students through dance by one of them introducing creative dance. Creative dance is a dance that is played with the search for ideas of motion and tools full of values and norms that are useful for students to understand and seek the balance of search results according to ability with full awareness or without coercion (Anttila et al., 2019).

Dance has concepts that emphasize in the form of motion and arrangement of motion (choreography), dance teaching, and dance learning as well as results from a dance process. The concept is part of the essential elements of dance, including motion as a raw material in the form body movements whose media covering space, energy and time, to mastery of motion, taste, and rhythm developed into a dance learning (Anttila et al., 2019).

One of the dances performed by students was the themed earthquake and tsunami (see Figure 5). This dance combined movements that describe how the dancer before and during the earthquake and tsunami. The dance also illustrated the sadness felt after the

earthquake and tsunami. But after that, the dance exemplified the spirit and bounced back after the disaster experienced.

Figure 5. Student performed the dance (Source: Author)

4.3   Evaluation Phase

As part of the evaluation phase, questionnaires were given to 33 students before and after students created disaster learning media. The tool used in this evaluation adopted the LIPI/UNESCO questionnaire to measure the level of student preparedness in the face of the earthquake and tsunami. There were four parameters used in this questionnaire, including i) knowledge, ii) preparedness plan, iii) disaster warning system, and iv) capacity to mobilize resources (LIPI/UNESCO, 2016).

Calculation of index values using the following formula:

$$Index = \frac{Total\ Riil\ Parameter\ Score}{Maximum\ Parameter\ Score} \times 100$$

The maximum score for a parameter was obtained from the number of questions in the indexed parameter (each question answered correctly was given a score of one). If in 1 question, there were sub-questions (a, b, c, and so on), each sub-question was given a score of 1/number of sub-questions. The total real score parameter was obtained by adding up the real score of all questions in the parameter concerned.

The index value was in the range between 0-100, the higher the index value, the higher the level of preparedness. Index values are divided into the following categories shown in Table 1.

Table 1. Category level of preparedness based on index score (Source: LIPI/UNESCO, 2006)

Index Score	Level of Preparedness
80.00 – 100	Very High
60.00 – 79.99	High
40.00 – 59.99	Medium
20.00 – 39.99	Low
0 – 19.99	Very Low

Based on the results of the evaluation carried out, there was an increase in student preparedness before and after engaging in the development of disaster learning media, as shown in Figure 6 below.
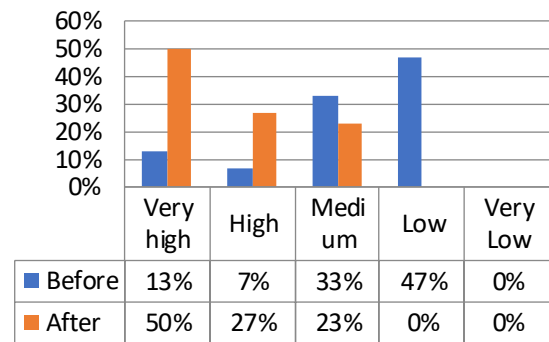

	Very high	High	Medium	Low	Very Low
Before	13%	7%	33%	47%	0%
After	50%	27%	23%	0%	0%

Figure 6. The level of student preparedness before and after engaging in the development of disaster learning media

Before students were involved in the development of learning media, 47% of students had a level of preparedness in the low category, and 33% were in the medium category. But after students were directly involved in the development of various disaster learning media, including posters, poems, short stories, videos, and dances there was an increase in the number of students who had very high levels of preparedness (50%). Some students were in the high (27%), and moderate (23%) category.

These results indicate that the involvement of students in the development of instructional media could increase the level of student preparedness in facing disasters. In the process of making instructional media, students learned, and collected materials related to earthquake and tsunami preparedness. These materials were used by students to make learning media. During the process of gathering this material/knowledge, an indirect process of internalization took place in each student. After that, the students carried out the process of externalizing the knowledge gained by translating it into various forms of media, namely posters, poems, short stories, videos, and dances.

The process of internalizing disaster knowledge by students in this program had demonstrated the success of transformative learning. Previous studies had also indicated the positive outcome of transformative learning, which leads to a change in an individual frame of reference (concept, value, feeling, and response) (Sharpe, 2016; Sharpe & Kelman, 2011; Sharpe, 2017).

5.   CONCLUSIONS

Most of the people assumed that if individuals have the 'right' knowledge and education then a culture of safety will follow. But in practice, information alone

is not enough to direct someone to take action, especially in a disaster situation. Therefore the process of internalizing knowledge is needed to ensure the inculcation of the values and character of preparedness in dealing with disasters. Disaster education needs to consider a practical approach to give a deep impression for the student so that it can increased self-awareness, applied in daily life, and memorized longer in each individual.

Based on the explanation in the previous section, the implementation of the program has resulted in the compilation of creative and innovative disaster education learning packages that meet the needs and character of students, namely posters, poems, short stories, videos, and dances. This program adopts the experiential learning process so that it can help the process of internalizing disaster knowledge by students in applying the principles and developing the character and competencies needed when facing a disaster.

The involvement of students in the development of instructional media could increase the level of student preparedness in facing disasters. There was an increase in the number of students (50%) who had very high levels of preparedness. Therefore, the authors suggest to involve students more actively in the development of instructional media used in disaster education, not only involved when implementing disaster education programs in schools, but also involved starting from planning (design phase).

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REFERENCES

Ambrose SA, Bridges MW, DiPietro M, Lovett MC, Norman MK. (2010). How learning works: seven research-based principles for smart teaching. Jossey-Bass: San Francisco. Retrieved from: https://firstliteracy.org/wp-content/uploads/2015/07/How-Learning-Works.pdf.

Anttila, E., Martin, R., & Nielsen, C. S. (2019). Performing difference in/through dance: The significance of dialogical, or third spaces in creating conditions for learning and living together. Thinking Skills and Creativity, 31, 209-216. doi:10.1016/j.tsc.2018.12.006.

BPS Aceh Besar (2018). Kabupaten Aceh Besar Dalam Angka 2017. BPS, Aceh Besar. Retrieved from: https://acehbesarkab.bps.go.id/ .

Gaillard, J. C., Clavé, E., Vibert, O., Denain, J. C., Efendi, Y., Grancher, C.C. Liamzon, D.S.R. Sari, R. Setiawan. (2008). Ethnic groups' response to the 26 December 2004 earthquake and tsunami in Aceh, Indonesia. Natural Hazards, 47(1), 17-38. doi: 10.1007/s11069-007-9193-3.

Jack, K. and Illingworth, S. (2019). Developing Reflective Thinking through Poetry Writing: Views from Students and Educators. International journal of nursing education scholarship, 16(1). doi: 10.1515/ijnes-2018-0064.

Kang, H. and van Es, E. A. (2019). Articulating design principles for productive use of video in preservice education. Journal of Teacher Education, 70(3), 237-250. doi: 10.1177/0022487118778549.

LIPI-UNESCO (2006). Kajian Kesiapsiagaan Masyarakat Dalam Mengantisipasi Bencana Gempa Bumi & Tsunami. LIPI-UNESCO, Jakarta.

Nurdin, N., Rafliana, I., Hidayati, S., Oktari, R. S., and Djalante, R. (2017). Integrating Disaster Risk Reduction and Climate Change Adaptation into School Curricula: From National Policy to Local Implementation. In Disaster Risk Reduction in Indonesia (pp. 213-234). Springer, Cham. doi: 10.1007/978-3-319-54466-3_8.

Oktari, R.S., Shiwaku, K., Munadi, K. and Shaw, R., (2015). A conceptual model of a school–community collaborative network in enhancing coastal community resilience in Banda Aceh, Indonesia. International journal of disaster risk reduction, 12, pp.300-310. doi: 10.1016/j.ijdrr.2015.02.006.

Oktari, R.S., Shiwaku, K., Munadi, K. and Shaw, R. (2018). Enhancing community resilience towards disaster: The contributing factors of school-community collaborative network in the tsunami affected area in Aceh. International Journal of Disaster Risk Reduction, 29, pp.3-12. doi: 10.1016/j.ijdrr.2017.07.009.

Oktari, R. S. (2017). Role of the disaster education laboratory in enhancing preparedness of elementary school student. In AIP Conference Proceedings (Vol. 1857, No. 1, p. 110004). AIP Publishing. doi: 10.1063/1.4987123.

Rauschenbach, I., Keddis, R. and Davis, D. (2018). Poster Development and Presentation to Improve Scientific Inquiry and Broaden Effective Scientific Communication Skills. Journal of microbiology & biology education, 19(1). doi: 10.1128/jmbe.v19i1.1511.

Rezaei, S. and Naghibian, M. (2018). Developing Intercultural Communicative Competence through Short Stories: A Qualitative Inquiry. Iranian Journal of Language Teaching Research, 6(2), 77-96. Retrieved from: https://eric.ed.gov/?id=EJ1183791.

Sakurai, A., Bisri, M.B., Oktari, R.S. and Oda, T. (2015). The 11th years assessment on school

safety and disaster education at the public elementary schools in Banda Aceh after the 2004 Aceh tsunami: preliminary findings. TDMRC Universitas Syiah Kuala, Banda Aceh, pp.146-154 Simposium. Retrieved from: http://tdmrc.unsyiah.ac.id/id/download/full-prosiding.

Sakurai, A., Bisri, M.B.F., Oda, T., Oktari, R.S., Murayama, Y. and Affan, M. (2018). Exploring minimum essentials for sustainable school disaster preparedness: A case of elementary schools in Banda Aceh City, Indonesia. International Journal of Disaster Risk Reduction, 29, pp.73-83. doi: 10.1016/j.ijdrr.2017.08.005.

Sharpe, J. (2016). Understanding and unlocking transformative learning as a method for enabling behaviour change for adaptation and resilience to disaster threats. International journal of disaster risk reduction, 17, pp.213-219. doi: 10.1016/j.ijdrr.2016.04.014.

Sharpe, J. and Kelman, I. (2011). Improving the disaster-related component of secondary school geography education in England. International Research in Geographical and Environmental Education, 20(4), pp.327-343. doi: 10.1080/10382046.2011.619810.

Sharpe, J. (2017). Learning to be practical: A guided learning approach to transform student community resilience when faced with natural hazard threats. In Observing the Volcano World (pp. 715-731). Springer, Cham. doi: 10.1007/11157_2017_1