The actualization of student’s disaster preparedness at the elementary and secondary education level of disaster-aware school

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Abstract. As a country located in the ring of fire, the Republic of Indonesia is one of the countries with the highest potential status of disasters in the world and causes great material and moral damage. This phenomenon is one of the big challenges in achieving national development goals. Among the efforts to reduce the impact of disasters is to increase disaster preparedness by all elements of society, especially in the education sector through the application of the concept of Environment and Disaster Mitigation-Based School (SWALIBA). The big goal to be achieved from the application of the SWALIBA concept is to shape the attitude and mentality of disaster preparedness from an early age. This research focuses on measuring the level of disaster preparedness for elementary and middle school students in the central part of Java who have applied the SWALIBA concept. The method used in this study is structured interviews and systematic measurements using a questionnaire to analyze and find scientific correlations between school strategy variables and the level of student disaster preparedness. The results showed that although students' perception of disaster preparedness began to take shape, it had not yet reached the expected level of disaster preparedness.

1. Introduction

The central part of Java Island is one of the most densely populated areas and also the region with the most variation in potential disasters in Indonesia, including earthquakes, tsunamis, mountain eruptions, floods, landslides and droughts [1]. In principle, disasters cannot be prevented, various efforts were made to minimize the damage caused by nature and the disasters caused by humans [7]. The existing efforts of disaster risk reduction had been conducted cross-border or multidisciplinary involving various fields, started from health, urban planning, public policy, education, management which were the fields of the various intergovernmental and non-governmental organizations [13]. Structural/geographical variables also play a role as one of the important elements of disaster preparedness [4].

Some local communities which were affected or vulnerable to the disaster risk had formed a disaster preparedness community. The coordination between these institutions is a serious challenge for the stakeholders [9]. The role of the community in enhancing the resilience and sustainability of disaster mitigation education is very important. Among the institutions that have a major role in the field of education are schools with their role as catalysts for knowledge of disaster preparedness for students and society. [6]. The disaster management increases the school competence in managing the disaster risk. In addition, schools
should not only emphasize the hardware and environmental security but also conduct training and formulate the various types of software plans also the standard operating procedures (SOP) to explain the pre-disaster, disaster, and post-disaster stages [16]. The disaster mitigation education is expected to provide understanding to students about threats, risks and disaster response actions. The implementation is projected to be able to help the community at large scale, in the form of knowledge transfer to the community by students (especially about the disaster risks around their environment) [8].

Experience proves the positive impact of education on disaster risk management. Children who have been taught about how to react to the disaster conditions have the ability to respond quickly and precisely, so they can warn others and protect themselves during disaster emergencies [10]. Disaster education activities are an initiative action which is a technical implementation with two main focuses: (1) disaster risk reduction, and (2) efforts to reduce the negative impact of disasters [5]. Strengthening and implementing the effective disaster preparedness and mitigation stages is effective to reduce the damage [11]. The gap on the current disaster education as implemented in the primary and secondary education level are expected to provide direction for the future disaster preparedness education [17]. The recent trends in the implementation of disaster risk management programs have a more comprehensive concept to achieve sustainability aspects, namely by educating agents of change to strengthen the level of disaster preparedness [2]. From the perspective of current disaster management, the efforts to improve the efficiency disaster preparedness strategy require a review towards the theoretical basis and data relevancy to facilitate the interpretation and application [3].

2. Method

To be able to reveal the formed disaster preparedness level of the students at primary education level in the central part of Java region, the sample in this study focused on the schools that had adopted the concept of the Environment and Disaster Mitigation-Based School (SWALIBA) for more than 5 years in central part of Java region. SWALIBA is basically a concept which is developed to improve the disaster preparedness capabilities in Indonesia, started from the primary and secondary education sector to higher education. This research was conducted in the beginning of 2019 by taking samples from students and teachers of three schools which had adopted the SWALIBA concept in the central part of Java region, namely Nogopuro Elementary School (Sleman Regency), Junior High School 41 of Semarang (Semarang City) and Senior High School 2 of Klaten (Klaten Regency).

Data collecting/testing towards the research samples was conducted using a purposive random sampling technique which was followed by data collecting using the questionnaire method. The number of samples in this study were 60 students consisting of 20 elementary school students (10 students from grade 3rd, 5 students from 4th grade and 5 students from 5th grade), 20 junior high school students (5 students from 7th grade, 5 students from 8th grade and 10 students from 9th grade), 20 senior high school students (5 students from 10th grade, 5 students from 11st and 10 students from 12nd grade) and SWALIBA accompanying teacher. The collected data from the questionnaires filling result by students was then analyzed to provide the correlation between the formed perceptions of disaster preparedness of the students with the school strategies/policies in the context of disaster preparedness education. The data and information about the school strategies/policies were obtained from the results of interviews conducted with teachers who were involved in SWALIBA activities in each school. The used research method scheme can be seen in Figure 1.
3. Result and discussion

3.1. School Strategy
By looking at the roles and linkage between the institutions which were involved in the implementation of the SWALIBA concept at the primary and secondary education level, it was not surprising if all school samples recognized the SWALIBA concept from the universities in their area. Despite having the same source in accepting the SWALIBA concept, three school samples began to adopt it in different years. In terms of the used method in transferring knowledge about disaster preparedness, all sample schools still used conventional methods such as the insertion/integration of material in classroom teaching and extracurricular activities (scout movement) and integrated socialization in the orientation period of new students. The interview results also showed the trend that these schools had taught the disaster preparedness based on the existing potential disasters in their school.

Regarding to the supporting infrastructure, all schools were equipped with evacuation equipment, but only 2 schools were equipped with the first aid and safety signs. However, most of the schools sample of this study still focused on their collaboration with higher education institutions and still the lack in cooperation/collaboration with the organizations/institutions which had the technical capabilities in disaster management such as the Regional Disaster Management Agency, Indonesian National Army, Republic of Indonesia Police or Indonesian Red Cross. Only Senior High School 2 of Klaten had collaboration with the Regional Disaster Management Agency. In a more technical context, with the material insertion/integration into the extracurricular activities of the scout movement, no school had been equipped with the formation of a disaster response group.

Table 1. Indicators of the implementation of the SWALIBA concept

| CATEGORY          | Nogopuro Elementary School - Sleman | Junior High School 41 Semarang | Senior High School 2 Klaten |
|-------------------|------------------------------------|--------------------------------|-----------------------------|
| Mentor            | Class Teacher                      | School Organization Mentor    | Geography Teacher           |
| SWALIBA Source    | University                         | University                    | University                  |
| Starting Years    | 2011                               | 2014                           | 2011                        |
3.2. Student Perception

The implementation of Environment and Disaster Mitigation-Based School (SWALIBA) aimed to: a) Developing schools as a base for environmental and disaster knowledge; b) Implementing the concept of school as a source/laboratory for environmental education and disaster mitigation; c) Forming an agent of change in the field of disaster response and having an environmental concern with a formal school base [12]. Basically, students who participated in the disaster preparedness education at school had the higher level of disaster anticipation, but at the same time, had the much lower level of anxiety compared to the students who did not participate the disaster preparedness education programs [14]. Therefore, the student perceptions of disaster preparedness played an important role in making improvements and improving disaster preparedness.

Based on the research results on the student perceptions of disaster preparedness it was known that all respondents already knew the SWALIBA concept, wherein more detail, as much as 86.7% of respondents (52 people) knew the SWALIBA concept from their schools, while 13.3% of respondents (8 people) knew it from public media outside the school. Although the SWALIBA concept in general (80% of respondents) was considered interesting, in terms of disaster training only 71.7% (43 people) of respondents had received disaster response training from schools, while 28.3% (17 people) stated if they had never received disaster emergency response training from the school (see Figure 2). In terms of the capacity to identify potential disasters in the surrounding environment, in general, the students already had good knowledge, this was indicated by the ability to inventory and describe the existing potential disasters in their school environment. The efforts to form a disaster preparedness mentality were strengthened by the availability of evacuation equipment, but only 83.3% (50 students) knew that their school was equipped with the equipment, while 16.7% (10 students) did not know this (see Figure 3.).
The strategy implemented by schools in the case to form disaster preparedness for their students had not reached an optimal level because it did not touch the substance of disaster preparedness education. Therefore it was necessary to take strategic steps to improve the student disaster preparedness to make it able to form the disaster resilient community started from the primary and secondary education level. One of the strategic steps that should be taken in improving the perception of students' disaster preparedness was to include the broader communities (including the relevant agencies in the field of disaster management community, such as mountaineering club as well as the general public community) in a constant planning, observation, and critical reflection could facilitate the positive change which allowed the strategies sharing in learning, reading the renewed literature, student performance transformation, and sharing the more effectively activities [15].

4. Conclusion
The achievement of the disaster preparedness level which is implemented through the school strategy/management and disaster preparedness perceptions is not yet at an optimal level. There are several things that needed to be followed up in order to achieve a better disaster preparedness conditions. Some steps that can be taken include: a) Putting the material of environmental insight and disaster mitigation as the core part which is integrated with the education material, one of the possible way is by formulating the more structured and massive disaster preparedness education concept (such as: disaster emergency response simulations), b) Building and strengthening the related cross-sectoral cooperation to increase the knowledge and understanding of disaster preparedness by the students and other school communities, c) Improving the availability and accessibility of the disaster response equipment based on the standards in the SWALIBA concept along with the development of other supporting equipment such as: the emergency response pocketbook), and, d) The establishment of disaster emergency response groups as pioneers of disaster preparedness in schools which is affiliated with related institutions in the field of disaster.

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References
[1] BAPPENAS RI 2009 Rencana Aksi Nasional Pengurangan Risiko Bencana 2006-2009 (1st ed.). Jakarta: BAPPENAS RI. Retrieved from https://www.bappenas.go.id/index.php/download_file/view/14063/3930/
[2] Brundiers, K 2018 Educating for post-disaster sustainability efforts. International Journal of Disaster Risk Reduction, 27 (October), 406–414. https://doi.org/10.1016/j.ijdrr.2017.11.002
[3] Chou, J. S., Yang, K. H., & Ren, T. C 2015 Ex-post evaluation of preparedness education in disaster
prevention, mitigation and response. International Journal of Disaster Risk Reduction, 12, 188–201. https://doi.org/10.1016/j.ijdrr.2015.01.002

[4] Hoffmann, R., & Muttarak, R. 2017 Learn from the Past, Prepare for the Future: Impacts of Education and Experience on Disaster Preparedness in the Philippines and Thailand. World Development, 96, 32–51. https://doi.org/10.1016/j.worlddev.2017.02.016

[5] Johnson, V. A., Ronan, K. R., Johnston, D. M., & Peace, R 2014 Evaluations of disaster education programs for children: A methodological review. International Journal of Disaster Risk Reduction, 9, 107–123. https://doi.org/10.1016/j.ijdrr.2014.04.001

[6] Oktari, R. S., Shiwaku, K., Munadi, K., Syamsidik, & 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, 300–310. https://doi.org/10.1016/j.ijdrr.2015.02.006

[7] Ozkazanc, S., & Yuksel, U. D 2015 Evaluation of Disaster Awareness and Sensitivity Level of Higher Education Students. Procedia - Social and Behavioral Sciences, 197 (February), 745–753. https://doi.org/10.1016/j.sbspro.2015.07.168

[8] Pujianto, Prabowo, P., & Wasis, W 2018 Profile of elementary school science teacher instruction in disaster risk reduction: Case study of volcano disaster. Journal of Physics: Conference Series, 1006(1). https://doi.org/10.1088/1742-6596/1006/1/012013

[9] Quero, R. A 2012 Reframing Coordination Challenges for Public-Private Partnerships in Disaster Preparedness. Procedia - Social and Behavioral Sciences, 57, 440–447. https://doi.org/10.1016/j.sbspro.2012.09.1209

[10] Shaw, R., Takeuchi, Y., Gwee, Q. R., & Shiwaku, K 2011 Chapter 1 Disaster Education: An Introduction. Disaster Education (Vol. 7). Emerald Group Publishing Ltd. https://doi.org/10.1108/S2040-7262(2011)000007007

[11] Shiwaku, K., & Shaw, R 2008 Proactive co-learning: A new paradigm in disaster education. Disaster Prevention and Management: An International Journal, 17(2), 183–198. https://doi.org/10.1108/09653560810872497

[12] Suratman, & Nugroho, A. S 2011 SWALIBA Sebuah Rancangan Sekolah Bervawasan Lingkungan dan Mitigasi Bencana (1st ed.). Yogyakarta: Fakultas Geografi UGM Press.

[13] Tatebe, J., & Mutch, C 2015 Perspectives on education, children and young people in disaster risk reduction. International Journal of Disaster Risk Reduction, 14, 108–114. https://doi.org/10.1016/j.ijdrr.2015.06.011

[14] Tuswadi, & Hayashi, T 2014 Disaster Prevention Education in Merapi Volcano Area Primary Schools: Focusing on Students’ Perception and Teachers’ Performance. Procedia Environmental Sciences, 20, 668–677. https://doi.org/10.1016/j.proenv.2014.03.080

[15] Villaluz, G., Malonjao, M., Trinidad, C., & Bojos, M 2018 Community engagement in teaching-learning : A pathway to quality education. ASEAN Journal of Community Engagement |, 2(2), 239–264. https://doi.org/10.7454/ajce.v2i2.133

[16] Wang, J. J 2016 Study on the context of school-based disaster management. International Journal of Disaster Risk Reduction, 19, 224–234. https://doi.org/10.1016/j.ijdrr.2016.08.005

[17] Zhu, T. T., & Zhang, Y. J 2017 An investigation of disaster education in elementary and secondary schools: evidence from China. Natural Hazards, 89(3), 1009–1029. https://doi.org/10.1007/s11069-017-3004-2