Student Knowledge about Disaster in Vocational School

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Student Knowledge about Disaster in Vocational School and High School: Case study in Lombok, Indonesia

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Abstract. Indonesia is one of the disaster-prone countries. Disaster mitigation requires the role of the community. Schools have an important role in providing knowledge about disaster mitigation. The research aims to understand the level of student knowledge about the disaster. The research population were SMA / SMK in Lombok Regency, especially North Lombok, East Lombok and West Lombok. Respondents were students who were from 10 high schools; the total respondent was 779 people. To find out about student knowledge about disasters associated with six aspects, among others: 1) knowledge of disaster risk; 2) student responses to disasters; 3) disaster warning system; 4) disaster information system; 5) Local wisdom; 6) emergency planning. Data was analysed by using percentage calculations illustrated by pie charts. The results of the study concluded that based on the description of the six aspects of the disaster knowledge shows that the average level of the disaster's knowledge has not reached more than 50% good category. The data means that schools must provide socialization that is more effective and training to students about disaster knowledge. This is very important sufficient knowledge, students and schools will play a greater role in disaster mitigation.
Keywords: disaster mitigation, disaster knowledge, disaster risk

Introduction

Disaster management in Indonesia requires the support of community knowledge about disaster. Efforts to overcome disasters will not be effective, if public awareness about disaster in supporting disaster mitigation have not been pursued optimally [1]. Schools have an important role in providing knowledge about disaster. The role of schools in building disaster awareness has been carrying out in school; however, the results have not been optimal. Dwiningrum's research results, prove that the level of awareness and knowledge of students about disaster in general is still below 50 percent [2, 3, 4]. Schools currently started to implement and develop school programs in building disaster in school environment. Although it is still not optimal yet, there are many of schools in Indonesia that have integrated disaster knowledge into school inter-curricular and extracurricular activities. Likewise, the school collaboration program with the government in overcoming the impact of disasters has been carried out intensively after the disaster.

　　Knowledge capital about disaster is very important for people in disaster prone areas. This based on Indonesia's location, which has great potential in dealing with disasters. However, disaster educations still have not carried out optimally. In fact, disaster education, which is related to all efforts, methods, and operations to provide knowledge, understanding, and positive attitudes of the community

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towards disaster situations are needed to create a sense of knowledge and proportional attitude in dealing with disaster hazards. Disaster education is not easy, because it must be well prepared by all community elements. Disaster education is important to build community preparedness and awareness. With disaster education, mitigation goals can be more optimal and the community can be more responsive and proactive in dealing with disasters.

The phenomenon of disaster continues to occur and is difficult to predict. Therefore, the community must have the knowledge to build a culture of disaster response, which supported by the results of data analysis from National Disaster Management Agency (BNPB). It was recorded that as many as 148.4 million people living in earthquake prone areas, 3.8 million people in tsunami prone areas, flooding, 40.9 million people live in areas prone to landslides and 11.1 million people in areas with high waves and abrasion[5]. Based on the analysis of these data, it could be interpreted that the damage caused by disaster is relatively very high both materially and non-materially. It also needs large amount of funds for rehabilitation. This proves that disaster management requires strong mitigation, both related to the material aspects and non-material aspects. Therefore, disaster mitigation both structural and non-structural must be built synergistically so that the results are more optimal in reducing the impact of disasters. This social reality requires comprehensive treatment for disaster mitigation. Indonesia is a disaster-prone area that has not yet succeeded optimally in disaster mitigation.

Damage and casualties that were still large at the time of the disaster proved that community knowledge was still relatively low. This is in accordance with the predictions of Briceno, which states that for 25 years the evolution of knowledge and the application of Disaster Risk Reduction (DRR) were not evenly distributed [5]. This analysis proves that adequate socialization about disaster knowledge to people living in disaster prone areas is still needed. The domain of disaster risk reduction, knowledge management, and social learning that are interrelated and connected can be used to increase DRR. This view is supported by scientific research, and international organizations [3, 6, 7]. In addition, the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR), which adopted by representatives of 187 UN member states on March 18 2015 at the UN Third World Conference on Disaster Risk Reduction (WCDRR-3) in Sendai, Japan; confirms in paragraph 14 opening that "to reduce disaster risk, there is a need to overcome existing challenges and prepare for future challenges by focusing on: monitoring, assessing and understanding disaster risk and sharing that information and how the information is created; strengthen disaster risk governance and coordination across related institutions and sectors and the full and meaningful participation of relevant stakeholders at the appropriate level" [7].

Knowledge that is integrated and can be applied. Like knowledge, wisdom applies to people. Experiences that create building blocks for wisdom can be shared, but need to be communicated with more understanding of personal contexts than in terms of sharing knowledge. Through the transition from facts to wisdom, not only increased understanding but also the level of participation and connectedness, results in higher complexity. As summarized by Cleveland, information is horizontal, knowledge is hierarchical, and wisdom is flexible. Furthermore, facts, data, and information relate to the past, while knowledge relate to the present. When we gain wisdom, we add more context and start dealing with the future because we can now imagine the way ahead and design what will happen, rather than dwelling in the past. Furthermore, the results of the study conclude that abstract concepts and distinctions are clearly difficult, differentiating the level of qualitative understanding seems useful for identifying deficiencies in current DRR. Systematic research on knowledge systems related to DRR will not only advance schematic understanding, but also provide important insights about the role of knowledge in DRR [8, 9].

Disaster management in Indonesia has not been carried out effectively, so the casualties are still quite high. It happened because disaster management has not fully used an integrated approach. Interdisciplinary and integrated approaches are considered more effective in managing disasters [10, 11, 12]. In addition, disaster management is not only understood as a momentary event, but requires a gradual and sustainable strategy, especially for people who have experienced disaster. Therefore disaster management should not only be overcome by a physical approach but should be carried out in accordance with the socio-economic life of local communities that are prone to disasters or affected by

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[5] https://www.bbc.com/indonesia/berita_indonesia/2011/08/110810indonesia_tsunami)

disasters and carried out sustainably [11]. Likewise, a cultural approach is needed for the purpose of disaster mitigation.

The implementation of knowledge in DRR has not been optimally applied in schools. Therefore, research that examines knowledge related to disaster mitigation is still urgent to do by selecting a school setting. Likewise, the practice of DRR has not been used maximally by hazard experts to integrate the problem of knowledge in the learning process at school. This study attempts to uncover the profile of the knowledge possessed by students, as an initial basis for developing learning models in strengthening the knowledge needed for school mitigation in disaster prone areas.

1. Literature Review

The study of disasters can be carried out from various disciplines, including geography, anthropology, engineering, health, development studies, and sociology. The sociological approach discusses the vulnerability and impact of disasters on human behaviour patterns and their effects on the functioning of community structures and organizations [13]. During a disaster event, sociologists ask about "how do humans or groups of people respond to a disaster?". In this context, epistemologically, all disaster events are unique historical events. Comparative analysis can be carried out to formulate the general parts of the behaviour patterns of individuals and their social units, from the family to the organization to the community [4, 13, 14]. Furthermore, Drabek developed materials that focus on the social dimension of disasters, a number of post-disaster study results, preparedness and mitigation, causes of disasters, and a number of post-disaster assessments, including studies on disaster preparedness [13]. In a sociological perspective, disasters are often understood based on human or community perceptions, and for what they feel, regarding emotional experiences in events that can threaten their survival [8, 13].

Knowledge about disasters has not been considered important for disaster mitigation. Disaster events certainly tend to cause large losses, both material and non-material. On the other hand, the risks of natural hazards that caused disasters have also not been studied. This phenomenon proves that there is still a gap between the need and awareness of knowledge with the ability to respond to disaster events. White's research results suggest a gap between what is known about natural hazards and disaster mitigation and how research findings can be translated into disaster risk reduction (DRR) policies and programs [15]. This proves that disaster knowledge is in fact not enough as an effort to reduce casualties in the event of a disaster, so research is still needed on the knowledge held by the community regarding post-disaster impacts. Weichselgartner and Obersteiner claim that although there is a broad expansion of risk-related knowledge systems; special research programs and institutions, special journals, sophisticated technology, increased financial resources, and so on; turns out that it is not enough if it cannot be applied in practical DRR management [16, 17, 18].

Knowledge becomes meaningful if people understand its function for human life. In this case, knowledge is created by gathering and organizing information in terms of breadth, depth, and amount. Facts, data and information are the media needed to generate and build knowledge. According to Davenport and Prusak knowledge is "a fluid mixture of framed experience, contextual information, values and expert insights that provides a framework for evaluating and combining new experiences and information" [19]. While information is static, knowledge is dynamic, built through social interaction and experience, with the result that facts, data, and "objective" information are considered and evaluated from various perspectives. One cannot rely on one's knowledge transferred to another person, or assume that the transfer of knowledge will have the desired impact. This is why raising awareness, training, and education is a reasonable component of DRR policy, and why integrated and expanded knowledge is very important to apply. In the "linear" knowledge production model, academics' best contribution to problem solving lies in the transfer of adequate knowledge (through communication, education, patents or publications) to other actors assigned to implement that knowledge in the form of products, procedures, regulations, or problem solutions. However, nonlinear understanding of knowledge production assumes that relevant knowledge can be generated by any actor -academics or lay people- who must be recognized because of his specific perspective on a particular problem [9].

The power of knowledge tends not to be the same between individuals. Knowledge embedded in physical objects, whether people or organizations are determined by many factors such as perception,

experience, socialization, and culture. On the other hand, there are also knowledge products such as databases, knowledge management, information platforms, or lesson documents. The understanding in the knowledge discussed in the SFDRR should be distinguished between implicit and explicit knowledge [19]. Implicit knowledge is knowledge that is still embedded in the form of one's experience and contains non-tangible factors such as personal beliefs, perspectives, and principles. Explicit knowledge of a person is usually difficult to transfer to others. The ability to speak, designs, or operate complex machines or devices requires knowledge that cannot always be explicitly seen, nor is easy to transfer it to others explicitly. A simple example of implicit knowledge is the ability to ride a bicycle. However, knowing the theory to ride a bicycle is not enough for a beginner to be able to drive a bicycle. Someone who has implicit knowledge usually does not realize that he actually has it and also does not know how that knowledge can benefit others. To get it, it takes learning and skills, but not necessarily written forms. Implicit knowledge often contains habits and cultures that are under consciousness. Explicit knowledge is knowledge that has been documented or stored in real form in the form of media or something that has been articulated in formal language and can be spread widely relative easily. Knowledge can also be provided audio-visual. The work of art and product design can also be seen as an explicit form of knowledge which is an externalization of human skills, motives and knowledge [20, 21]. Explicit knowledge can be easily processed by computers, sent to others in formal and electronic languages, or stored in databases.

It is this type of explicit knowledge that is attempted to be captured by current knowledge management practices and most of the knowledge issues discussed in the SFDRR agreement. In contrast, implicit knowledge is difficult to be encoded, formalized, and articulated in formal language; is personal knowledge that is embedded in individual experiences and involves intangible factors, such as personal beliefs, insights, perspectives, and value systems. Because it is temporary, personal, and context specific, implicit knowledge cannot be resolved to be information or be specified by means of information characteristics. Before it can be communicated, implicit knowledge must be transformed into forms - words, models, or numbers - that can be understood. In addition, implicit knowledge has two dimensions: technical (procedural), covering the types of informal experiences and skills that are often captured in terms of knowledge, and cognitive, including beliefs, perceptions, ideals, values, emotions, and mental models.

Knowledge about disaster must be understood comprehensively. Dwiningrum research results explain that in general several aspects of disaster knowledge [22, 23, 24]. Firstly, knowledge about disaster risk is needed in building objective awareness of the stages in disaster mitigation. Disaster risk tends to be different between regions; this can be understood because the type of disaster has different characteristics, especially regarding signs of impending disaster. However, there is a tendency for schools to disseminate knowledge about disasters that is difficult to predict. Secondly, policies, regulations, guidelines and authorities, and community responses to government policies on disasters tend to be different. The different responses that occur are caused by different conditions and situations. There is a similar tendency in collecting data on the physical environmental conditions that cause disasters between the three regions, which is the government has made data collection. Thirdly, the disaster warning system is an important aspect in the disaster mitigation system. The warning system is the starting point for awareness of the emergence of disasters that have different signs, even for earthquake disasters it is difficult to create a disaster warning system that can be automatically understood by the public immediately. In this case the disaster information system is very necessary for the process of disaster mitigation. With systemic information, it is hoped that the community will have the ability and awareness in disaster mitigation. Fourthly, participation is manifested in various emergency response teams within the school and in the community.

Participation is an important aspect for disaster mitigation. Even with optimal participation, the process of disaster mitigation has not held optimally in reducing disaster victims. Communities still need to be given knowledge about mitigation to be more responsive to disaster events. Fifthly, local wisdom and culture are part of the safety element involved in efforts reducing risks, facing and saving themselves from disasters. The recent natural disasters have provided many valuable lessons for practitioners and policy makers on the importance of local wisdom for disaster risk reduction. Local wisdom is the ways and practices developed by a group of people, which comes from their deep understanding of the local

environment, which is formed from living in the place for generations. Local wisdom is a broad and comprehensive phenomenon. The scope of local wisdom is so numerous and varied that it is not limited by space. Local wisdom places more emphasis on the place and locality of that wisdom. So that wisdom in a community is the result of interactions with the environment, nature and its interactions with other people and cultures. Sixthly, Emergency Planning can be designed before and after a disaster. In the context of mitigation, emergency planning, as part of disaster management needs to be understood by governments and communities that located in disaster prone areas. Based on the rationale above this research will explore more specifically about the importance of disaster knowledge in students. With enough knowledge students have capital for disaster mitigation. In addition, with the knowledge, students will play a role in disaster response, having the resilience needed by students to be calm when a disaster occurs. We realized that catastrophic events that are difficult to predict require resilience at all times. Therefore, with this research which aims to describe the profile of students' knowledge about disaster will become important data for schools to make policies on disaster mitigation education in schools.

2. Research Methodology

Knowledge is one of the important aspects needed for disaster mitigation. To find out the initial data about the profile of knowledge about disaster, a survey was conducted on students in Lombok. The study population was High/Vocasional Schools (SMA / SMK) in Lombok Regency, specifically North Lombok, East Lombok and West Lombok. Respondents used were high school students in 10 schools that live in disaster area in Lombok, there were 779 high school students. To explore data about disaster knowledge, there are 6 aspects used in the questionnaire , namely: (1) knowledge about disaster risk (8 ; (2) policies, regulations, guidelines and authorities; (3) disaster warning system; (4) participation is manifested in various emergency response teams within the school environment and in the community; (5) Local Wisdom and Culture; and (6) Emergency Planning which can be designed before and after a disaster. Data analysis was performed by calculating percentages to describe the profile of disaster knowledge. As for understanding the strategy in developing students' knowledge and resilience, it was conducted by FGD and interviews with 40 teachers.

3. Results

Knowledge is an important aspect to enhance the role of schools in disaster mitigation. Most schools are not optimal in providing knowledge about disaster to students. Students' understanding of disaster events is not always obtained from schools. The data below illustrates the picture of each aspect related to disaster knowledge, which is as follows:

3.1 Knowledge about disaster risk

Majority of high school / vocational high school students in Lombok (see Figure 1), amounting 67.00%, are very understand about disaster risk, 19.00% are students in the category of understanding, 10.00% are less understand and 4.00% does not understand at all. The interview results showed that students had received information about disaster risks and faced it themselves. This is marked by the understanding of signs of impending disaster, such as volcanic eruptions, earthquakes, floods, tsunami waves and so on; which is marked by the heat, a roar, many animals go down the mountain, incandescent lava from the belly of the mountain and rain of ash. Disaster risks are not the same between regions, because different disasters have different signs of impending disaster. However, even though the chances are small, there is still a chance that it can be predicted. Based on the above data it can be designed more systemically in both schools and the community. This is very important because with sufficient knowledge about disaster the impact will be more positive for the purpose of disaster mitigation.
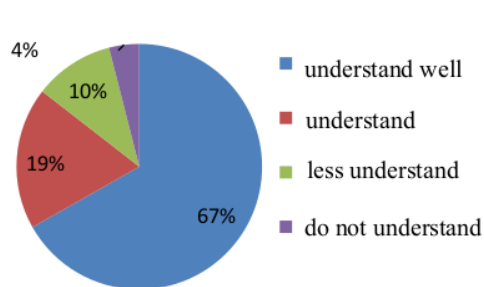
Figure 1. Knowledge of high school students in Lombok about disaster risk
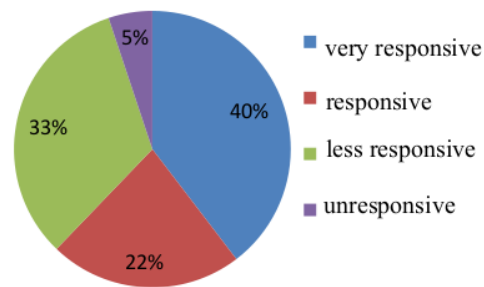
Student responses to disasters

Figure 2. High school students in Lombok response to disasters

3.2 Students responses to disasters

As many as 40.00% of high school/vocational high school students in the Lombok area are very responsive to disasters, as many as 33.00% are not responsive, 22.00% are quite responsive, and 5.00% are unresponsive to disasters (see Figure 2). From these explanations, it is shown that high school students in the Lombok region do not have a good response to disasters. Community responses to government policies on disasters tend to be different. The difference in response occurs due to different conditions and different situations. However, both the government and the community have collected data on the physical environmental conditions that have caused disasters in three regions.

People's ability to respond is influenced by the learning process. As explained by behavioristic theory prioritizing changes in student behavior as a result of stimulus and response. In other words, learning is a form of change experienced by students in terms of their abilities aimed at changing behavior by means of interaction between stimulus and response. Thus, to improve the ability of students' positive responses to disaster events, school must give students a sufficient intensive knowledge and training by teachers [25].

Behavioristic theory emphasizes the formation of behaviors that appear as learning outcomes. Behavioristic theory with its stimulus-response relationship model, seeks people to learn as passive individuals. Specific responses or behaviors could arise with training or habituation methods only. the analysis of this theory reinforces that learning about the problem of disaster is really the impact of the interaction between stimulus and response [26, 21]. Someone is considered to have learned something if he can show changes in behavior. According to this theory important learning is input in the form of stimulus and output in the form of response. Stimulus is anything that is given by the teacher to students, while the response in the form of a reaction or response from students to the stimulus provided by the teacher. The process that occurs between stimulus and response is not important to note, because it cannot be observed and cannot be measured. Which can be observed is the stimulus and response, therefore what is given by the teacher (stimulus) and what is received by students (response) must be observable and measured. This theory prioritizes measurement, because measurement is an important thing to see whether changes in behavior occur or not. Therefore, to be able to improve the profile of students' responses to disaster events can be done by applying the three main learning laws, according to Thorndike namely (1) securities law; (2) the law of training and (3) the law of readiness [21]. These three laws explain how certain things can strengthen responses.

3.3 Disaster warning system

Disaster warning system according to 46.00% of high school/vocational students in Lombok is still ineffective, 23.00% mentions it has been effective, 24.00% mentions it has been very effective and by 7.00% feels it is still ineffective (see Figure 3). Based on the statement of Lombok high school student's which disaster warning system is still ineffective explains that the Lombok region is still not ready and does not yet have a disaster information tool and system that can cope with disaster risk properly.
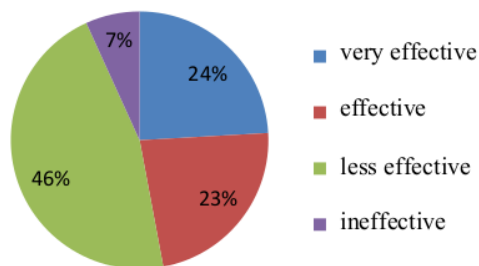
Figure 3. Disaster warning system in Lombok according to local high school
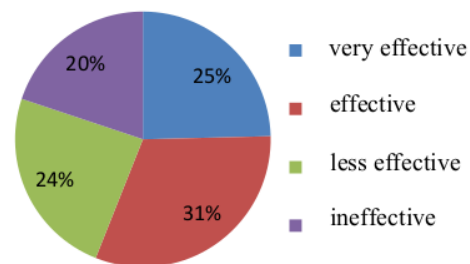

Figure 4. Disaster information system in Lombok according to local high school

3.4 Disaster information system

According to 31.00% of high school students, Lombok regional disaster information system is still in the effective category, very effective at 25.00%, less effective at 24.00% and ineffective at 20.00% (see Figure 4). The variety of high school students' statements related to the Lombok region disaster information system explains that most high school students in the Lombok region do not yet understand their regional disaster information system. Participation has been realized in various emergency response teams within the school environment and in the community at large. Participation is an important aspect for disaster mitigation. Even with optimal participation, the process of disaster mitigation is not necessarily running optimally in reducing disaster victims. Communities still need to be given knowledge about mitigation to be more responsive to disaster events. To increase knowledge about disaster information systems requires management training. IT based training is very important to improve learning effectiveness. As explained by Arafa [27]. it can be done with individual or collaborative training. Management training with disaster content, especially for schools has not been done much, because it is still limited to human resources directly involved in disaster management. Therefore, training on disaster information systems requires the role of schools so that the results can be disseminated to students by teachers at school, so students have better emergency response knowledge.

3.5 Local wisdom

According to 46.00% of high school students, the local wisdom of the Lombok region is in the category of very effective, less effective at 37.00%, and ineffective at 17.00% (see Figure 5). The statement from the Lombok regional high school student explained that the local wisdom of the Lombok region had not yet played an active role in disaster prevention efforts. Local wisdom and culture are part of the safety element involved in reducing risks, facing and saving people from disasters. The recent natural disasters have provided many valuable lessons for practitioners and policy makers on the importance of local wisdom for disaster risk reduction. Local wisdom is the ways and practices developed by a group of people, which comes from their deep understanding of the local environment, which is formed from living in the place for generations. Local wisdom is a broad and comprehensive phenomenon. The scope of local wisdom is so numerous and varied that it is not limited by space. Local wisdom places more emphasis on the place and locality of that wisdom. Wisdom arises in a community as a result of interactions with the environment, nature and its interactions with other people and cultures.

To strengthen local wisdom in disaster mitigation requires the revitalization of the values of local wisdom in the learning process at school. Local wisdom refers to a variety of cultural wealth that grows and develops in a society that is known, trusted, and recognized as important elements that are able to strengthen social cohesion in the community [28].The basic thoughts contained in the definition are (1) cultural characters, (2) groups of cultural owners, and (3) life experiences born from cultural characters. Local wisdom has the following significance and functions: 1) the identity marker of a communication; 2) adhesive elements (cohesive aspects) across citizens, across religions, and beliefs; 3) cultural elements that exist and live in the community (bottom up); 4) the colors of togetherness of the communities; 5) will change the mindset and reciprocal relationships of individuals and groups by putting it on a common ground / culture that is owned; 6) encourage the building of togetherness,

appreciation as well as a joint mechanism to ward off various possibilities that reduce and even destroy the communal solidarity that is trusted and realized growing on the shared awareness of an integrated community. Therefore, each school needs to study the values of local wisdom that can be used to shape the knowledge needed for disaster mitigation. From the FGD data with students there was a tendency that students in Lombok began to lack understanding the role of local wisdom in disaster mitigation. With the FGD, students begin to realize the importance of strengthening the values of local wisdom in disaster management.
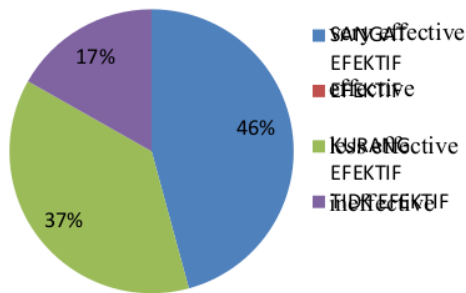
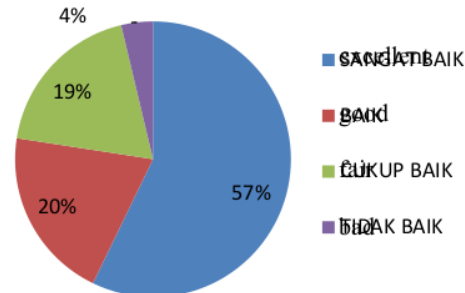**Figure 5. Local wisdom in Lombok according to local high school students**

Figure 6. Emergency planning in Lombok according to local high school students

3.6 Emergency planning
According to 57.00% of high school students, emergency planning in the Lombok region is in the excellent category, good category by 20.00%, fair category by 19.00%, and bad category by 4% (see Figure 6). The statement of Lombok high school students explained that the planning for an emergency in the Lombok region was not in line with what was expected in a disaster prevention effort. Emergency Planning can be designed before and after a disaster. In the context of mitigation, emergency planning is part of disaster management and needs to be understood by governments and communities in disaster prone areas. Based on the initial description of students' opinions on emergency planning it can be concluded that the majority of respondents stated that the government integrated with the local community had made disaster management plans, but had not been fully socialized to the public. Based on the description above, it can be concluded that high school/vocational students in Lombok are not ready to deal with the risk of future disasters. Dissemination and training system of data collection/documentation of disaster risk still needs to be improved. Besides that, it is necessary to improve and provide disaster information tools and systems in disaster prone areas in order to minimize the risk of future disasters. Based on an analysis of six aspects of disaster knowledge needed for disaster mitigation, if all indicators are calculated by categorizing the level of student knowledge, the profile can be described in Figure 7.
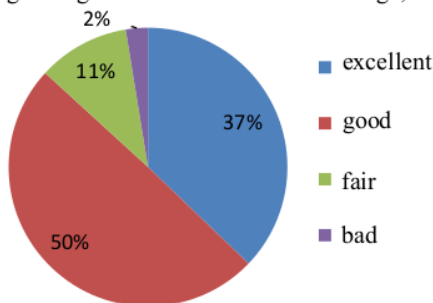
Figure 7. Disaster knowledge profile of high school students in Lombok

According to high school students the location of Lombok explains that the mitigation referred to as preventing the occurrence of disasters in the Lombok region in the good category is 50.00%, the very

good category is 37.00%, the category is quite good at 11.00% and the bad category is 2.00% (see Figure 7). Seeing the opinions of high school students in the Lombok region who mentioned only 50.00% of the efforts of the Lombok area in preventing disaster risk.

4. Discussion

Based on the description of the knowledge profile of students in Lombok, it can be concluded that the socialization of disaster knowledge is still needed and schools have an important and strategic role to integrate knowledge about disaster mitigation. This was also revealed from the results of the FGD with teachers in Lombok, that they still need materials about disaster knowledge that can be integrated in the learning process. The teachers hope to develop topics of disaster and mitigation material that can be integrated according to the lessons taught in each subject. Some of the problems faced by schools in building knowledge about disaster can be concluded as follows:

Table 4.1 Description of the problem building knowledge about disaster

Aspect	Description of the problem
Knowledge about disaster risk	Disaster risks are not the same between regions, because different disasters have different signs of impending disaster. Data have not to design systemically in both schools and the community. The knowledge about the disaster has not with sufficient impact will be more positive for disaster mitigation.
Student responses to disasters	The difference in response occurs due to different conditions and different situations. However, both the government and the community have not collected data on the physical environmental conditions.
Disaster warning system	The disaster warning system is still ineffective, and still not have a disaster information tool of the system that can cope with disaster risk properly.
Disaster Information System	Disaster information does not yet understand its regional disaster information system. Participation has not been realized in various emergency response teams within the school environment and the community at large
Local Wisdom and Culture	The local wisdom had not yet played an active role in disaster prevention efforts. Local wisdom and culture are not part of the safety element involved in reducing risks, facing, and saving people from disasters.
Emergency Planning	The planning for an emergency was not in line with what was expected in a disaster prevention effort. Emergency planning cannot be designed before and after a disaster. In the context of mitigation, emergency planning is part of disaster management and needs to be understood by governments and communities in disaster-prone areas.

Based on the qualitative data above, it can be concluded that schools still have to design optimal effective disaster mitigation education, so that the impact on students' awareness of disaster knowledge can increase.

4.1 Identifying the knowledge of disasters in the school environment

To increase students' knowledge about disasters, it is necessary to learn the conditions of the school environment [29]. Disaster events can be analysed using a contextual approach. This is very important because the community's knowledge of disasters does not guarantee that the community is aware of the importance of disaster mitigation. A community will do disaster mitigation if it is explicitly supported by knowledge, awareness, and culture of disaster response. A contextual approach is important to provide relevant data to be used as a starting point in developing disaster mitigation education. As explained by Oliver and Kandadi , disaster is a period when people experience mixed emotional turmoil, between anxiety, fear, terror, loss, sadness, gratitude, anger, frustration, freedom, resignation in all shadows and intensities [10]. The effects of disasters can be interpreted as events whose impacts can be

quite long in the process of human life so that the phenomenon of disasters sociologically needs to be studied and examined from all dimensions of socio-culture. Kreps argued that each hazard always contains disaster risks which are considered as nonperiodic events in the middle of the community or larger subsystems (regional, global, etc.) that cause social disruption and physical damage [30]. Disasters have common characteristics including (1) presence or absence of a warning; (2) intensity of the destructive effects caused; (3) scope of the destructive effect; and (4) duration of perceived destructive effects.

4.2 Mapping and evaluating students' knowledge about disasters
To increase students' knowledge, it begins by identifying the level of disaster knowledge that is designed by the government for mitigation purposes. There is an evaluation process and it reflects understanding, as follows: First, a better assessment is needed from the actual results of applying the best available knowledge in the best way at the community level and others; Second, there is a need to build on past achievements in creating more understanding of natural hazards, by integrating that knowledge into broader efforts directed at sustainable development. Similar observations have been made by other scholars [21, 31]. It is therefore necessary to analyse scientific assessments in the domain of DRR and identify some functional, structural, and social factors that hinder the production of knowledge together with producers and users. In this case, researchers do not consider the needs of potential users in policies and practices when conducting research and do not systematically produce risk information that can be directly used and, also, decision-makers do not always use the most appropriate available scientific information to make policy decisions [9, 18].

4.3 Developing the students' knowledge disaster
Students who have responsive and resilient face to disaster need to study disaster every time because of knowledge disaster who can safety in their life. Knowledge is not static, but dynamic. Knowledge can flow in all directions and develop according to social needs and roles. Likewise, knowledge related to disaster risk illustrates that knowledge can be a multidisciplinary study. However, in the DRR domain, limitations of knowledge re-production and implementation gaps between research and practice remain. Most of the research on disaster risk is still one or multidisciplinary centric, which is mostly carried out by North American and European scholars, where in principle the research is used as a basis of evidence for policy improvement [32]. White et al. examined four possible explanations for situations where more lost knowledge was related (1) knowledge continues to be defective by ignorance; (2) knowledge is available but is not used effectively; (3) knowledge is used effectively but takes a long time to apply; and (4) knowledge is used effectively in some ways but is covered by increased vulnerability and in population, wealth, and poverty [15, 33].

Knowledge management is very important to transform implicit knowledge into explicit knowledge at schools. Debowski [33], knowledge management is influenced by the attitude of each individual knowledge students towards their own knowledge society and the role they should play. Knowledge management requires broad acceptance of the values and principles of knowledge by the school. Therefore, in societies that seek to create a culture of knowledge, each individual recognizes and accepts knowledge sharing as desirable behaviour [32]. For disaster mitigation, knowledge management is needed, so schools must be able to design disaster management knowledge into the learning process at school.

Conclusion
Disaster knowledge is important for everyone. Knowledge becomes meaningful if people understand its function for human life. Knowledge about disaster is not only limited to the cognitive level, it should still be strengthened at the applicative level, especially for disaster mitigation. Therefore, the knowledge given to students should not only be implicit, but up to explicit knowledge. Knowledge management is very important to be built and developed by schools so that knowledge about disasters can be processed in the learning process at school.

Schools have a very important role in providing knowledge about disaster. Knowledge systems about disasters must become the basis and strategy for schools to be involved in disaster mitigation.

Schools must instil the importance of having disaster knowledge, which consists of 6 aspects namely knowledge about disaster risk; policies, regulations, guidelines and authority; disaster warning system; participation manifested in various emergency response teams within the school environment and in the community; the role of local wisdom and culture; and Emergency planning that can be designed before and after a disaster. In addition, disaster mitigation is an effort to prevent or reduce disaster risk through physical development as well as an effort for awareness raising and capacity building to face the threat of disaster. Disaster mitigation is a must for areas of low levels of disaster vulnerability to high levels of vulnerability. Efforts made in disaster prevention are meant by implementing knowledge-based mitigation management in schools.

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