



# Student Perceptions of Volcanic Eruption Disaster Preparedness in Sleman

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**Abstract:** Preparedness is known as an effort to respond effectively when a disaster occurs. Improving disaster preparedness attitudes is an important element of reducing disaster risk before it occurs. This study was conducted to determine students' perceptions of disaster preparedness for volcanic eruptions. The type of research used is descriptive qualitative research. The analytical technique used is to convert qualitative data into quantitative data. The instrument used is a student knowledge questionnaire about volcanic eruption disaster preparedness which is distributed to 7th-grade students of SMP in Sleman Regency. From the results of the analysis calculation, it was obtained that students' perceptions of volcanic eruption disaster preparedness in the knowledge aspect were 70% in the good category, planning was 67% in the good category, the warning system was 66% in the good category, and resource mobility was 73% in the good category good. Based on the results, it can be concluded that students' perceptions of disaster preparedness with this knowledge, planning, warning systems, and resource mobility are in the good category with an average percentage of 69%. Therefore, it is necessary to increase knowledge about preparedness attitudes towards volcanic eruptions in junior high schools.

**Keywords:** Perception; Knowledge; Preparedness volcano

## Introduction

Indonesia is a country that has 17,000 islands, so it is often referred to as an archipelagic country. Indonesia is also the meeting place of the world's three main plates, namely the Indo-Australian Plate, the Eurasian Plate, and the Pacific Plate. This interaction makes Indonesia an area that has the potential for earthquakes and high volcanic activity (Suryadi et al., 2021).

Indonesia's geographical location on the Pacific Ring of Fire causes a high rate of volcanic eruptions (Siagian et al., 2014). One of the mountains with a high level of activity in Indonesia is Mount Merapi, which is located on the border between the Special Region of Yogyakarta and Central Java. Mount Merapi is one of the most active volcanoes in the world. Almost every period Mount Merapi erupts. The eruptive activity of Mount Merapi with the characteristic of releasing incandescent lava and hot clouds, without forming a caldera (crater) (Susilo & Rudiarto, 2014). During the 2010 eruption, laterally directed explosions occurred repeatedly due to the collapse of the top of the lava dome blocking the

upper magma channel (Nakada et al., 2019). The results of the 2010 National Disaster Management Agency reported that the impact of the eruption of Mount Merapi on October 26, 2010, resulted in 347 deaths and 258 injuries.

Due to the high intensity of the eruption of Mount Merapi and a large number of casualties, concrete steps will be needed to reduce the risk and the number of fatalities. One of them is by transferring knowledge about disaster preparedness in schools through learning activities. Disaster preparedness is part of the disaster management process. Improving disaster preparedness attitudes is an important element of reducing disaster risk before it occurs. The disaster management process is represented as a cyclical model for improving disaster preparedness as part of the disaster risk management process (Suryadi et al., 2021).

Many factors shape preparedness, ranging from knowledge and attitudes, policies, emergency response plans, and resource mobility. Education also has a significant influence. Individuals with higher levels of education, theoretically have better opportunities and are more professional (Apriyatno et al., 2020).

## How to Cite:

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Preparedness is known as an effort to respond effectively when a disaster occurs. These efforts aim to ensure the availability of resources, include steps to improve life safety and include actions to increase the ability to take emergency actions when a disaster occurs (Nurjanah & Rezza, 2021).

Lessons about disasters are certainly different from ordinary lessons (Rusilowati & Binadja, 2012). Disaster learning should be designed considering disaster-prone areas, disaster characteristics, and prior knowledge about the disaster itself. Disaster mitigation education is integrated into learning without going through special subjects and requires the involvement of many parties, including schools, parents, communities, and government. Disaster knowledge can help address the four main areas of disaster cycle management: mitigation, preparedness, response, and recovery. In Indonesia, the school curriculum already includes many subjects, it is recommended that disaster prevention education be integrated into the main subjects and not considered as a separate subject (Tuswadi & Hayashi, 2014). The advantage of integrating disaster education into schools is to be able to increase disaster knowledge among students because disaster knowledge decreases over time (Adiyoso & Kanegae, 2013).

Knowledge is an important factor in the preparedness of a school. Disasters that often occur can be used as a very valuable experience or lesson on the importance of knowledge about disasters that must be owned by every individual, especially those who live in disaster-prone areas. Disaster knowledge that is owned greatly influences attitudes and concerns to be prepared in anticipating disasters (LIPI-UNESCO/ISDR, 2006). Research shows that grade VIII junior high school students around Mount Merapi have good knowledge about knowing the danger signs of an eruption by 29% and disaster preparedness attitudes by 59% (Wardaya et al., 2021).

Students' perceptions of volcanic eruption disaster preparedness are very urgent for residents on the slopes of the mountain. Students become targets who are expected to have strong disaster knowledge to become educational agents in their area. Based on these problems, this study aims to determine students' perceptions of disaster preparedness for volcanic eruptions in Sleman.

## Method

This research is a qualitative descriptive study to determine students' perceptions of volcanic eruption disaster preparedness. The sample in this study was 50 seventh-grade students spread across Sleman Regency. Sampling using a random sampling method. The instrument used is a questionnaire on student perceptions of volcanic eruption disaster preparedness

which consists of 10 statements covering four aspects of disaster preparedness attitudes, namely knowledge, planning, warning, and resource mobility. The questionnaire in this study used a Likert Scale (strongly agree, agree, disagree, and strongly disagree). The instrument has been validated by statistical analysis by IBM SPSS Statistics 22 software.

Data analysis in this study uses (a) qualitative data analysis techniques by collecting statements selected by respondents on a scale of 1 (low) to 4 (very good), (b) qualitative data analysis techniques are converted into quantitative data: 4, agree: 3, disagree: 2, strongly disagree: 1. The data from the analysis of student answers is then calculated by dividing the total score by the maximum score. The following equation is used:

$$P = \frac{A}{B} \times 100\% \tag{1}$$

with:

P = Percentage

A = Total Score

B = Maximum Score

After the results of data analysis are calculated using interval equations, they can be categorized. The category of preparedness attitudes can be seen in Table 1.

**Table 1.** Perception Category on Preparedness

Skor Interval (%)	Kategori
81-100	Very good
61-80	Good
41-60	Enough
21-40	Not enough
0-20	Very less

(Wardaya et al., 2021)

## Result and Discussion

Volcanic eruptions have a significant impact on the environment (Carr et al., 2020). Therefore, there is a need for disaster management if it occurs at any time. Disaster management requires preparedness and effective mitigation. Disaster events in Indonesia increase every year so that disaster preparedness becomes a priority in disaster-prone areas. The definition of preparedness is an effort made to anticipate the possibility of a disaster to minimize casualties through effective and organized preventive actions (Ayub et al., 2019).

Science learning is one of the subjects which in its basic competence includes knowledge about a disaster. Science in junior high school contains the topic of disasters in the structure and dynamics of the earth. To find out how students perceive volcanic eruption disaster preparedness, it is necessary to research students who live in mountain slope areas.

Students' perceptions of preparedness in the face of volcanic eruption disasters were measured using preparedness parameters that had been determined by researchers referring to several sources. There are 4 parameters used, namely, knowledge, planning, warning systems, and resource mobility. Based on these parameters, indicators are determined including knowledge of disasters, types of disasters, causes of disasters, the intensity of disasters, attitudes to reduce the impact of disasters, important actions that must be taken, items that need to be saved, knowledge of warning systems, actions when hearing warnings, and simulation. Students' perceptions of preparedness attitudes were measured by 10 statements that were validated using SPSS Statistics 22, the results are shown in Table 2.

**Table 2.** Instrument Validation Results

Item Number	Sig. (2-tailed)	Result
1	0.004	Valid
2	0.000	Valid
3	0.046	Valid
4	0.000	Valid
5	0.000	Valid
6	0.000	Valid
7	0.000	Valid
8	0.002	Valid
9	0.000	Valid
10	0.041	Valid

Table 2 shows that all statements are valid because the significance score (2-tailed) < 0.05. In addition to validation, the questionnaire was also piloted for reliability using SPSS Statistics 22 with the results shown in Table 3. It shows that Cronbach's Alpha value is 0.641 > 0.60, so the result is reliable.

**Table 3.** Instrument Reliability Results

Cronbach's Alpha	Result
0.641	Reliable

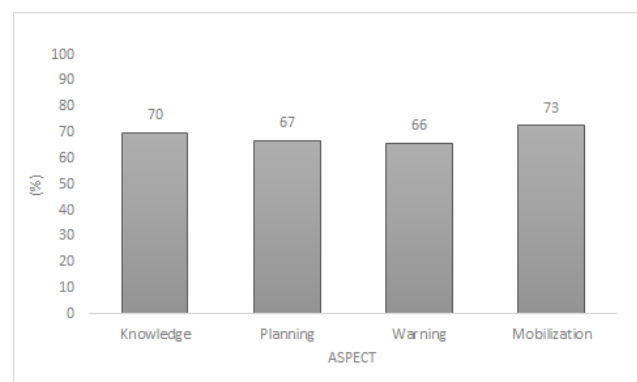
Besides Indonesia, Japan is one of the countries that are in a circle of fire with earthquake points almost scattered in every region. However, Japan made efforts to prevent loss of life and damage by creating disaster-resistant urban designs. This means that the Japanese government pays more attention to disaster preparedness (Okubo, 2016). The sophistication of mitigation efforts in Japan directly affects the understanding of disasters and the preparedness of its people. Meanwhile in Indonesia, especially in areas prone to the eruption of Mount Merapi in Sleman, it can be seen in Table 4.

**Table 4.** Percentage of Student Perception Indicators on Volcanic Eruption Disaster Preparedness

Indicator	%	Category
Knowledge of natural disasters in general	75%	Good
Types of natural disasters	79%	Good
Causes of catastrophic volcanic eruptions	59%	Enough
The intensity of the catastrophic volcanic eruption	75%	Good
Attitudes to reduce the impact of catastrophic volcanic eruptions	63%	Good
Important actions to take to survive a catastrophic volcanic eruption	68%	Good
Items that need to be saved during a volcanic eruption	66%	Good
Knowledge of the existence of a volcanic eruption disaster warning system	75%	Good
Actions to take if you hear a warning sign of a volcanic eruption disaster	57%	Enough
Evacuation drills and simulation	73%	Good

Based on the results of students' perceptions of volcanic eruption disaster preparedness, 8 indicators meet the good category and 2 indicators meet the sufficient category. The good category states that students know natural disasters in general, know the types of natural disasters, know the intensity of volcanic eruptions, know attitudes to reduce the impact of volcanic eruptions, know important actions to take to survive a volcanic eruption know the items that need to be saved in the event of a volcanic eruption disaster, know of the existence of a volcanic eruption disaster warning system, and have participated in evacuation drills and simulations.

Indicators that meet the sufficient category include knowledge about the causes of volcanic eruptions and actions taken when they hear warning signs of volcanic eruptions. This is a special note because the knowledge contained in these indicators is the key to determining the evacuation actions that must be taken in the event of a disaster. In summary, the percentage of each aspect can be seen in Figure 1.



**Figure 1.** Percentage of Aspects of Student Perception on Preparedness

Based on the graph above, it can be seen that the knowledge aspect has a percentage of 70%, the planning aspect has a percentage of 67%, the warning aspect has a percentage of 66%, and the mobility aspect has a percentage of 73%. Of the four aspects included in the good category. Good knowledge and experience will affect the formation of good and appropriate attitudes in dealing with disasters. Overall knowledge of students' preparedness attitudes is in the good category with a percentage of 69%. This is because some students already understand the perception of preparedness but it needs to be improved again and really understood in order to reduce the number of fatalities when a volcanic eruption occurs.

Based on the HyogoFramework framework, disaster risk reduction is an international concern which is one of the efforts to develop an attitude of disaster preparedness. Knowledge in disaster risk reduction in the younger generation by incorporating knowledge material on disasters in the learning curriculum and training for disaster preparation programs. Thus the program is expected to make the younger generation understand disasters, how to reduce disaster risk, and what to do if a disaster occurs (United Nations International Strategy For Disaster Reduction, 2009).

According to research conducted by (Oktavianti & Fitriani, 2021) states that understanding disasters can increase knowledge to protect themselves from disasters so that if someone has good knowledge then he will be ready to face disasters and vice versa if someone has less knowledge it will result in unpreparedness in dealing with disasters.

Education and experience are factors that influence knowledge. Knowledge, attitudes, and skills must be formed in students so that a level of awareness of disasters arises (Ayub et al., 2019). This corresponds to (LIPI-UNESCO/ISDR, 2006) that knowledge and attitudes regarding disaster preparedness are abilities that must be possessed by every individual as a form of preparedness in dealing with disasters. Changes in student behavior due to the experience of solving the problems at hand.

The Sendai Framework by the United Nations (UN) has 4 priorities because disaster action and mitigation are part of it. Adopt measures to address the three dimensions of disaster risk, prevent the creation of new risks, reduce existing risks, and increase resilience.

Disaster knowledge indirectly affects the country's resilience and disaster preparedness. The higher the knowledge of disaster preparedness attitudes, the smaller the number of victims in the event of a disaster. To increase students' perceptions of volcanic eruption disaster preparedness, some recommendations must be implemented, namely the integration of knowledge and attitudes of disaster preparedness in science lessons. In this study can show that the importance of students'

perceptions of preparedness in order to reduce the impact of disasters, especially volcanic eruptions.

## Conclusion

The results of the research on student perceptions of volcanic eruption disaster preparedness in Sleman Regency with this knowledge, planning, warning systems, and resource mobility are in the good category with an average percentage of 69%. Therefore, it is necessary to increase knowledge about preparedness attitudes towards volcanic eruptions in junior high schools by integrating subjects at school, especially science.

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