



## The Effective of FlashCard Media for Vulcano Disaster Response and Preparedness Knowlegde

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### ABSTRACT

Volcanic eruption guidance is one of the effective strategies in enhancing community preparedness against volcanic eruptions. This guidance involves students of sdn 04 tumpang in grades 3 and 4 as part of a dynamic and strategic disaster mitigation program. The purpose of this guidance is to increase the knowledge and skills of sdn 04 tumpang students in facing volcanic eruptions, as well as to reduce casualties and losses that may occur. During the guidance, students are introduced to the concept of disasters, their impact, the causes of volcanic eruptions, disaster mitigation steps, and the pre-disaster stages of volcanic eruptions. This guidance enhances students' preparedness in facing volcanic eruptions, therefore reducing the negative impacts of this volcanic eruption. The media used in this guidance is flashcards. The materials in the flashcards include the concept of disasters, their impact, the causes of volcanic eruptions, disaster mitigation steps, and the pre-disaster stages of volcanic eruptions, which will be explained by the guidance team or promoters. This activity uses the ADDIE development model (analysis, design, development, implementation, evaluation).

### KEYWORDS

Eruption, Mitigation Steps, Flash Card.

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### INTRODUCTION

Indonesia is particularly vulnerable to geological and hydroclimatological disasters due to its location between three active plates: Indo-Australian, Eurasian, and Pacific (Pahleviannur, 2019).





One of the 35 countries in the world that is considered to have a high disaster risk is Indonesia. The National Disaster Management Agency (BNPB) recorded 5,400 disaster events in 2023, which is higher than the previous year. Forest and land fires (2,051), extreme weather (1,261), floods (1,255), landslides (591), droughts (174), tidal waves and abrasion (33), earthquakes (31), and erupting volcanic eruptions (4) are details of such disasters (BNPB, 2024). Based on Law Number 24 of 2007 concerning disaster management, disaster itself defines disaster itself as a series of events that disrupt and threaten the lives and livelihoods of the community caused by natural, non-natural, or human factors, and result in human casualties, environmental damage, property losses, and psychological impacts. While natural disasters are events that occur naturally caused by natural factors such as earthquakes and erupting mountains. One of the potential natural disasters that occur in Malang Regency is an erupting mountain disaster. In 2010 Mount Bromo which erupted resulted in several districts in Malang such as Tumpang, Poncokusumo, and Jabung being affected by volcanic ash (Sutriningsih & Lasri, 2017). In addition to Mount Bromo, it is known that Mount Semeru and Mount Kelud have also erupted and caused losses and other impacts on people in Malang Regency, especially children who are still in vulnerable age.

Children are vulnerable to disasters because they do not understand the risks around them so they are less able to carry out disaster preparedness when a disaster occurs so that many disaster victims are at the age of children (Pahleviannur, 2019). If a disaster occurs, school components such as teachers, students, learning processes, facilities and infrastructure will be damaged, and millions of young people will be threatened. Therefore, disaster risk reduction priorities must be applied through knowledge, innovation, and education to build a culture of safety and resilience at all levels (Ernawati et al, 2021). Thus, children need a better understanding of disaster preparedness and the right way to communicate, namely through volcano disaster mitigation education for elementary school-aged children. With the above description in mind, the author wants to help the government build disaster-resilient schools by teaching children about disaster mitigation.

## MATERIALS AND METHODS

Volcano Eruption Disaster Mitigation Socialization Activities held at SDN 4 Tumpang, Tumpang District, Malang Regency, East Java Province, Indonesia. This socialization activity was held on Friday, May 3, 2024 at 07.00-11.00 WIB. This activity was attended by all students in grade 3 and class 4, totaling 18 students as participants, and several teachers and principals. This activity uses the ADDIE development model (analysis, design, development, implementation, evaluation). The analysis phase is carried out by identifying the needs of the Flash Card Media Mitigation of the Volcano Eruption that is in accordance with the stages of the development of children in grades 3 and 4. The design stage is in the form of a flash card design that is interesting and easily understood by children. The development phase involves the development of a flash card that contains information about the understanding, causes, impact of the volcanic disaster, as well as efforts that must be made when a volcanic disaster occurs and efforts that must be made when it has been declared safe from the volcanic disaster. The implementation phase is in the form of the use of flash cards as a learning medium for grades 3 and 4. and the evaluation stage is carried out by conducting pretest and posttest to determine the increase in children's knowledge and awareness about mitigation of volcanic disasters. Thus, this activity can help children become more prepared in dealing with the situation of the volcanic disaster and increase their understanding of the importance of disaster mitigation.



## RESULTS

### A. Implementation stage and time.

The community service was carried out in an area that was in accordance with the urgency of the service. This activity was carried out at SDN 4 Tumpang, Jalan Tunggal Ika 182, Tumpang, Tumpang District, Malang Regency, East Java Province. The location is on the slopes of Mount Bromo, which is an active volcano with the last eruption 5 years ago.



**Figure 1. Documentation with activity participants.**

The community service was carried out on The implementation stage in service activities consists of 4 stages, as follows:

1. Pre-Test Work

This pre-test question work was carried out to determine the extent of students' knowledge before being given the media of Volcano Eruption Preparedness and Response. The type of questions used is multiple choice and the time given for this pretest is 10 minutes.

2. Exposure of material to students

The purpose of this community service is to increase participants' knowledge about volcanic eruption disaster response using flashcards. The material to be presented is handling the situation when the volcano erupts. The presentation of the material will be carried out using the lecture method and interactive discussions between the speaker and the target of the service. This counseling uses flashcard media that is attractively designed. In this counseling, the target is expected to understand the concept of handling when a volcanic eruption occurs properly and correctly.

3. Post-Test Work

This post-test question work was carried out to determine the extent of students' knowledge after the presentation of the material by the presenter. The type of questions used is multiple choice, and the time given for this pretest is 10 minutes.

### B. Description of Respondent Characteristics



**Tabel 1. Characteristics of Respondents by Age and Gender**

Variabel	Frequency	Percentage (%)
<b>Age</b>		
8-10 years old	18	100
<b>Total</b>	18	100
<b>Gander</b>		
Woman	10	55,56
Man	8	44,44
<b>Total</b>	18	100

Respondents are students who come from the same educational environment, namely SDN Tumpang, in this socialization activity consisting of 18 students with an age range of 8-10 years. At the age of 8-10 years old is a developmental stage where children begin to be able to understand more complex concepts and show better cognitive abilities to receive new information. Of the 18 students, there were 10 female students (55.56%) and 8 male students (44.44%). The following is a more detailed description of the respondents' characteristics.

**C. Analysis of students' level of knowledge of Volcano Eruption Preparedness and response**

Ramli, in Soehatman said that managing disasters cannot be done impromptu but must be planned with good management before a disaster occurs (Ramli, 2010). Disaster management is a series of efforts to establish development policies related to prevention, emergency response, and rehabilitation. Socialization of volcanic eruption disaster mitigation management through flashcard media is carried out with the aim of providing an understanding for students of the importance of disaster mitigation. In line with the service carried out by Arisanti and Nugroho, socialization activities to communities in disaster-prone areas can provide an understanding of the importance of disaster knowledge (Arisanti & Nugroho, 2018).

**Tabel 2. Pre test and Post test result analysis**

Variabel	n	Min	Max	Mean	SD	Wilcoxon Signed Rank Test	p-value
Pre-test	18	4	7	5,83	0,786	-2,996	0,003
Post-test	18	5	9	6,72	1,018		

The pre-test was held before the socialization began to measure students' initial knowledge of disaster management. Of the 18 subjects observed the pre-test results showed that the average initial knowledge of students was 5.83 and after socialization the average post-test score increased to 6.72. Wilcoxon Signed Ranks Test was used to analyze the improvement of students' knowledge. The result of this test showed a p-value of 0.003. In the context of statistical hypothesis testing, this result shows that the p-value is <0.001 which means that the null hypothesis (H0) is rejected. In other words, there was a significant increase in knowledge after students received socialization. Increased understanding can occur due to the provision of education during disaster mitigation socialization (Kurniawan et al., 2017).





## DISCUSSION

The product of image media development regarding volcanic eruption disaster mitigation, shows a very good level of feasibility. The media developed has met the criteria of supporting the material, in accordance with the level of thinking of students and easy to use (Sundayana, 2018).

Based on the results of the analysis of the average student score, there was an increase in the average score from 5.83 to 6.72, indicating that the use of flashcards was effective in improving students' understanding of disaster management. This increase is not only statistically significant, but also shows the real impact of the intervention. This result also in line with the results of research by (Sari et al., 2019) regarding the use of graphic media in improving student disaster preparedness.

The use of flashcards as learning media provides interesting and clear visualizations, making it easier for students to understand important concepts in disaster management. This visual medium also helps maintain students' interest and attention, which is an important factor in effective learning, especially for children in the age range of 8-10 years. This is also in accordance with the function of visual media as attracting children's attention/attention to concentrate on the content of the material (Levie & Lentz in Kustandi & Darmawan, 2020).

In conducting disaster socialization activities at SDN 4 Tumpang, it is important to recognize that several barriers occurred during the event. In the midst of the implementation process, it is necessary to have an in-depth understanding of these obstacles and the ability to provide appropriate solutions. One aspect that requires attention is the children's level of understanding of the material presented, which appears to be suboptimal. To overcome this, more interactive and fun learning approaches can be applied, such as using visual media, videos, or hands-on simulations that involve children's active participation. Visual media is a way of presenting learning materials using teaching media tools that can demonstrate these materials (Musyadad, 2019).

In addition, time constraints were also a concern as the event was held on Friday, so it had to finish early to allow time for Friday prayers. To avoid being rushed, rescheduling activities can be an effective solution. For example, starting the event earlier or allocating more time for the important parts of disaster socialization.

Then the last one is unfavorable environmental conditions, especially since the activities are carried out outdoors or on the school grounds. To improve the conduciveness, practical steps can be taken, such as providing semi-enclosed classrooms or rooms so that children can focus on the material presented without being distracted by the surrounding environment. In supporting a conducive learning process, facilities and infrastructure are very vital and must exist (Supardi, 2003, 207).

## CONCLUSIONS

Until now, there are still many children who do not understand disaster preparedness, this can result in children becoming vulnerable to the impacts of disasters. Therefore, education regarding disaster mitigation is needed. By holding socialization on volcanic eruption disaster mitigation at SDN 4 Tumpang, Tumpang District, Malang Regency, the level of student's understanding of preparedness for volcanic eruption disasters can be determined. This can be seen from the pre-post test instrument that we created, where student's knowledge regarding preparedness for volcanic eruptions has increased. Further socialization activities can be increased using demonstration media regarding the process of a volcanic eruption considering that the target group is elementary school children whose sensory systems are working, such as vision, hearing, touch, taste, smell, etc. This can attract more student's attention to listen to the speaker's explanation.





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### Conflict of Interest

The service team stated that there were no internal conflicts regarding personal or financial issues. So that the service activities carried out on May 3 2023 at SD 004 Tumpang can run well and in accordance with the rounddown. As well as providing partners with a good impression and new knowledge regarding volcanic eruption disaster management.

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