

# Analysis of the Needs for Teaching Materials in Mountain Volcano Materials in Primary Schools

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**Abstract—Specific teaching materials are needed in special areas, such as teaching materials on volcanic disasters needed to be taught in areas that are often affected by catastrophic volcanic eruptions. This study answers these problems. This is a survey research in which all the data obtained in this study is data collected from the survey results of individuals in areas that are often affected by the disaster of volcanic eruptions. The data generated from the survey results are used as a basis for making teaching materials that are suitable for primary school students. The analytical method used is a vignette analysis technique where the researchers analyzed all survey results so that accurate data about the needs of the appropriate teaching material was obtained. The results showed that for disaster-prone areas of volcanic eruption required special teaching materials in the form of volcanic material teaching materials.**

## I. INTRODUCTION

Geographically Indonesia is an archipelagic country located at the confluence of four tectonic plates namely the Asian Continent and the Australian

Continent and the Indian Ocean and Pacific Oceans. Indonesia has 130 mountains that are still active and there are more than 5,000 large and small rivers whose river flows through densely populated areas and the potential for flooding, landslides and volcanic eruptions. Indonesia as a natural disaster-prone region needs to increase the capacity and awareness of the community to manage and reduce the risk of natural disasters. Efforts to improve the capacity and awareness of the community are clearly in one of the disaster management targets in the Third Medium Term Development Plan (2015-2019), namely reducing the risk of casualties, potential damage and loss through increasing and understanding public awareness and building a culture of awareness and safety in the community in dealing with disasters [1].

One of the threatening disasters is the potential for natural disasters on the slopes of Mount Merapi located in Magelang Regency, Central Java, Indonesia. The catastrophic eruption of Mount Merapi in Magelang Regency is a disaster that

periodically occurs every 5 years. The eruption of Mount Merapi in 2010 took lives and assets that were not too small. The number of victims of Merapi's death continues to increase every day. Based on data compiled by the National Disaster Management Agency (BNPB) Pusdalops as of 18 November 2010, the death toll was 275 people [2]. This condition must get serious attention from all elements not just the government in understanding the community about the attitude of disaster response, so that casualties can be minimized.

*“The mission of the U.S. Geological Survey (USGS) Volcano Hazards Program (VHP) under the Disaster Relief Act (P.L. 93-288) is to enhance public safety and reduce losses from volcanic events through effective forecasts and warnings of volcanic hazards based on the best possible scientific information”*

The Mount Merapi disaster will adversely affect the continuity of the activities of the people affected by the eruption. So there needs to be an understanding and awareness about disaster response. Community activities after the eruption of Mount Merapi are almost paralyzed, including the world of education. This condition, if it is not taken seriously, will have an impact on children who in fact are the next generation of the nation and determine the future fate of the nation. One effort that can be done to make children aware, especially elementary school students about the dangers of Merapi is the creation of learning media for disaster mitigation related to Mount Merapi. This media can be an alternative in understanding and providing knowledge about the dangers of Merapi and how disaster response behavior or overcome when the disaster comes. This media can be used as an additional supplement in elementary school learning that has relevance especially the theme of disaster. The education that is most needed by children on the slopes of Mount Merapi is knowledge about the mitigation of catastrophic volcanic eruptions. Disaster management as a series of activities both before and during and after a disaster is carried out to prevent, reduce, avoid and recover from the impacts caused by disasters. In general, the activities carried

out in disaster mitigation / mitigation are as follows: prevention, harm reduction, preparedness, emergency response, recovery (rehabilitation and reconstruction) and sustainable development that reduce disaster risk.

Therefore the most appropriate education is to provide teaching aids or media. The media that will be developed is by utilizing inventory application technology in android gadgets. This digital media disaster mitigation movement is a combination of audio media and visual media. According audio visual media is a medium that combines two elements, namely elements of sound and elements of images. This media has great benefits because it has two functions: auditive (listening) and visual (viewing) functions. So that with the development of this media is expected to facilitate in implementing disaster mitigation learning for children on the slopes of Mount Merapi.

Based on observations in the field it can be seen from the lack of adequate facilities and infrastructure for the continuation of children's education on the slopes of Mount Merapi, especially learning media for elementary school students. Even though in the midst of difficult conditions after the eruption of Mount Merapi, education for children must continue to roll in order to contribute to the intellectual life of the nation. Elementary students on the slopes of Mount Merapi, Magelang regency, need interesting and fun learning media based on audio visuals, which makes children enthusiastic in learning.

Based on the background described above, researchers are interested in conducting a study to analyze the needs of digital media for disaster mitigation movements especially for elementary students on the slopes of Mount Merapi in Magelang District. This research was made as a basic research for development research

#### Learning in elementary school

Learning activities are the core of the overall education program in schools. Primary School teaching and learning activities emphasize on the development of reading, writing and numeracy learning. The underlying assumption is that the ability to read, write and count are the three basic abilities that must first be introduced and instilled to elementary school students, so that later they can follow a more practical and real learning process [3]. One of the criteria for a good teacher in learning activities is if the teacher can recognize and understand the characteristics of his students. Characteristics of development in elementary students can also be seen in the stage of cognitive development. In this case, there are four stages of children's cognitive development, namely sensorimotor stage (age 0-2 years), pre-operational (age 2 to 7 years), concrete perational (age 7-11), and formal operations (age 11- adult). The primary school age children enter the concrete operational stage where the child can reason concretely and be able to classify

objects into different groups. Likewise according to Piagetian, that the concrete operational phase starts from around 7-11 years old, in the thought that children at that age include the use of operations, logical reasoning replaces intuitive reasoning, but in concrete situations .

#### Disaster Management Objectives

Development of the disaster management sector is an inseparable aspect of sustainable national development. In order to realize the long-term development goals of 2005-2025, the goals of disaster management in national development in the next 20 years are directed at: 1) realizing a society, cultured and civilized based on the philosophy of Pancasila, 2) realizing a competitive nation, 3) realizing a society that democratically based on law, 4) realizing Indonesia is safe, peaceful and united, 5) realizing equitable development and justice, 6) the realization of a beautiful and sustainable Indonesia.

The appropriate target is the realization of a beautiful and sustainable Indonesia. Development is carried out by taking into account and being environmentally sound including developing capabilities and implementing early detection and dissemination and dissemination of information on natural disaster threats and vulnerabilities to the community, especially early primary school age children. In addition, it is necessary to identify and equalize disaster-prone areas that are applied in planning, areas that are sensitive to disasters.

#### Media and Learning Materials

Media communication channel tools [4]. Media comes from Latin and is the plural form of the word medium which literally means intermediary, namely the intermediary of the source of the message (a source) with the recipient of the message (a receiver). In learning in universities, students not only act as communicants or recipients of messages, but students can also act as communicators or messengers. So that in learning is expected to occur two-way communication (two way traffic communication) and even multi-way traffic communication. Learning communication requires the role of the media to further increase the effectiveness of achieving goals / competencies. The learning media developed in this study are learning media that are made by utilizing inventore application technology in andriod gadgets. So that with the development of this media, students are expected to be more motivated in the learning process.

#### Benefits of Teaching Materials

The use of teaching materials for learning has a very important function in delivering learning materials. Teaching materials are an integral part of the entire learning process. This implies that teaching material is one component that does not stand alone but is interconnected with other components in order to create the expected learning situation.

The benefits of the existence of teaching materials in learning include: (1) making the concept concepts taught to be clear and abstract impressions slightly reduced, (2) Can present something or objects that are too dangerous or difficult in the learning environment, (3) Can display objects that are too large or small. For example, explain aircraft, ships, temples, bacteria, viruses.

**Disaster mitigation**

Disaster mitigation is a series of efforts to reduce disaster risk, both through physical development and awareness and capacity building to face disaster threats. Disaster mitigation is an activity that acts as an action to reduce the impact of a disaster, or efforts are made to reduce victims when a disaster occurs, both lives and property. In carrying out disaster mitigation actions, the first step that must be taken is to conduct a disaster risk assessment. So it is necessary to know the hazard, vulnerability and capacity.

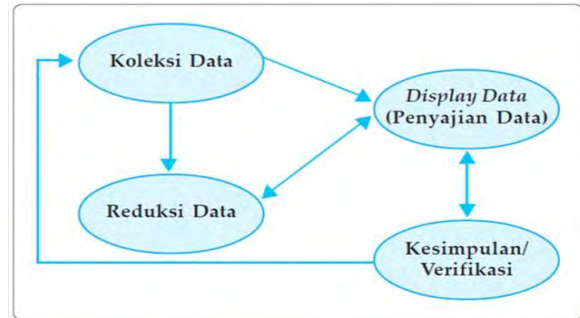
**Volcano Teaching Materials**

The volcanic disaster impacts both directly and indirectly in human life. Direct danger is the danger caused by material released directly from the eruption of volcanoes, for example lava flows, hot clouds, flare stones, lava eruptions, toxic gases, ash rain, and hot mud. The disaster-prone areas that will be directly affected by the danger include the area around the peak (crater) and develops to the slopes of Mount Merapi including in Srumbung District, Magelang Regency. Based on these conditions, it demands the attention of all parties in order to understand the community and elementary students about the mitigation of this disaster. Elementary learning requires specific teaching materials to discuss volcanoes and mitigate disaster movements, so that it will make the community and students ready when the disaster comes.

**II. RESEARCH METHODS**

The research method used in this research is qualitative descriptive. This research begins with the identification of elementary learning problems on the slopes of Mount Merapi. This is done to get data about the psychological impact of Merapi eruption for the community, teaching materials that will be able to provide public understanding about disaster mitigation movements, especially in the face of before, during and after the eruption of Mount Merapi. Learning disaster mitigation for elementary school children is not taboo and frightening for elementary students. The next stage is the preparation of questionnaires for the need for specific teaching materials that discuss volcanoes and their impact on human life and are equipped with a disaster mitigation movement so that it will provide students with a better understanding of elementary school when the disaster comes. Furthermore, a questionnaire was distributed about

the need for teaching learning for elementary students, especially in volcanic material. Furthermore, data compilation, data reduction, data analysis through the percentage data description of research data. The data analysis chart is as follows:



Research Results and Discussion Research result This study uses a questionnaire instrument as a data collection tool in the form of questionnaire analysis of teaching material needs. The questionnaire was distributed to teachers and students. Questionnaire for the Need for Teaching Materials for Teachers Based on a questionnaire given to elementary school teachers on the slopes of Mount Merapi, Magelang District. This questionnaire contains SD learning profiles and profiles of teaching materials for disaster mitigation movements. The learning of natural event material is integrated in the subjects of PPKn, PJOK, Indonesian Language, SBdP and Mathematics. Based on the class I teacher's book the material specifications are shown in the following picture: Based on the questionnaire needs of teaching materials given to teachers, in the learning process teachers experience difficulties in teaching natural event material because of the lack of teaching materials available in the field that are specific to volcanic material. Teachers in the learning process usually only provide information based on teacher knowledge, there is no clear reference as a reference so that in delivering the material is not maximal and students' understanding of volcanoes and disaster mitigation movements is still lacking. Teachers assume that teaching materials that are specific to the volcano become an alternative solution to better analyze the material of natural events that often occur in Srumbung District, Magelang District.

The results of the teacher questionnaire on the needs analysis of volcanic teaching materials and disaster mitigation movements for the sub-profile of learning in elementary school class I can be described as follows: (1) indicator of the content of disaster material in learning, the teacher's response stating yes 95%, not 3% and not know 2%, (2) indicators of learning constraints of disaster material, teacher's response stating yes 98%, not 1.5%, not knowing 0.5%, (3) indicators of implementation of disaster materials in fun learning,

teacher responses stating yes 10%, not 85%, don't know 5%, (4) illustration indicator of disaster material in learning, teacher's response stating yes 87%, not 7%, not knowing 6%, (5) indicators of facility support in disaster learning, the teacher's response which stated yes 10%, not 88%, did not know 2%. Recapitulation of the results of questionnaire analysis of teacher needs regarding volcanic teaching materials and disaster mitigation movements can be seen in the following table:

**Table 1. Recapitulation of Results of Teacher Needs Analysis Questionnaire Volcano Teaching Materials and Disaster Mitigation Movement**

No	Indicator	Teacher Response		
		Yes	No	Don't Know
1	Content of disaster material in learning	95%	3%	2%
2	Constraints in learning disaster material	98%	1,5%	0,5%
3	The implementation of disaster learning materials in learning that is fun	10%	85%	5%
4	Illustration of disaster material in learning	87%	7%	6%
5	Facilities support in disaster learning	10%	88%	2%

Profile of the disaster mitigation movement media that the teacher expects with specifications as follows: its form is video, can be displayed in class and can be seen clearly, can be used for a long time and is not easily damaged, it is hoped that there is music that accompanies it so that the audio visual media developed is truly correct can be used for learning, especially in class I elementary material natural events. Based on questionnaires that have been filled by elementary school teachers in Srumbung Subdistrict, Magelang District, that the profile of digital media, the expected disaster mitigation movement starts from the understanding of disasters, then equipped with examples of natural disasters, erupting with cold lava floods, wedhus gembel smoke, using varied words that match the characteristics of children so it's easy to understand, the picture is also bright but not poignant in the eyes.

### Questionnaire for the Need for Teaching Materials for Students

Based on a questionnaire given to elementary students on the slopes of Mount Merapi, Magelang Regency. This questionnaire contains SD learning profiles and profiles of volcanic teaching materials and disaster mitigation movements. Recapitulation of the results of questionnaires to analyze student needs in volcanic teaching materials and disaster mitigation movements, indicators (1) needs of SD hate learning media, students' responses which stated yes 85%, not 3%, did not know 12%, (2) indicators of learning presentation by teacher, students' responses that stated yes 18%, not 68%, did not know 14%, (3) indicators of understanding material of students' natural disasters, responses of students who stated yes 11%, not 80%, did not know 9%, (4) indicators the attractiveness of the natural disaster model that is understood by students, (4) the learning model of elementary school teachers, the responses of students stating yes 10%, not 77%, don't know 13%, Recapitulation of the results of the student needs analysis questionnaire is presented in the following table:

**Table 2. Recapitulation of Results of Student Needs Analysis Questionnaire Teaching Materials and Disaster Mitigation Movements**

Number	Indicator	Student Response		
		Yes	No	Don't Know
1	Need for SD disaster learning media	85%	3%	12%
2	Presentation of Learning by teachers	18%	68%	14%
3	Understanding of students' natural disaster material	11%	80%	9%
4	Interest in elementary school teacher learning models	10%	77%	13%

### III. CONCLUSION

Based on the results of research conducted it can be concluded that learning in elementary schools is still in dire need of specific learning materials discussing volcanoes, impacts and disaster mitigation movements, so that students will understand disaster response attitudes, especially volcanic disasters for students on the Merapi slopes in Srumbung District Magelang.

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