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# Needs assessment: strategy of integration disaster education at elementary schools in disaster prone areas

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**ABSTRACT**

This research was conducted to analyze integration disaster education strategies in elementary schools located in disaster-prone areas. This research is qualitative research using descriptive design. This research used interview instrument in data collection. The respondents were 23 elementary school teachers in Sleman Regency, Special Region of Yogyakarta. The results found that the integration of disaster education is carried out through subjects, study tours, discussions, and simulations. Strategies implemented in the integration of disaster education with interesting learning media, disaster training, improvement of school facilities and infrastructure, updating school disaster documents, and cooperation with disaster management institutions. The integration disaster education model expected by teachers is in the form of a website that contains separate materials for teachers and students. The website is expected to contain simple material packaged in the form of pictures, videos, sounds, animations, games, quizzes and songs. Maximizing integration disaster education strategies can be done by improving the internal and external quality of schools. School support, cooperation with disaster management stakeholders, the active role of teachers, and the support of school principals' policies in preparing for integration disaster education learning is expected so that disaster education can be implemented sustainably.



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## 1. INTRODUCTION

Indonesia is a country with a high level of vulnerability to disasters and climate change [1]. Disasters that occur in Indonesia result in loss of life, infrastructure damage, losses, and health problems. Impacts also increase due to a lack of knowledge about disaster risk reduction [2]. This identifies that Indonesia is located in a disaster-prone area, so that preparedness efforts are needed. One of the preparedness efforts is in the field of disaster education.

Disaster education is important to be implemented in schools. Disaster education can be done by integrating disaster risk reduction into the school system [3]. Schools are an important part of society because

they have important maps in disaster and preparedness [4]. Disaster education is very important to increase the awareness of students and school communities in encouraging preparedness actions[5], reduce their vulnerability to disasters [6]. Disaster education is important for communities located in disaster-prone areas in order to prepare, anticipate and adapt to disasters [7]–[9]. Disaster education is also related to the resilience needed by students because students who have strong resilience can implement disaster management [10]. Disaster education has the benefit of providing knowledge to minimize the impact and damage caused by disasters [11]–[13]. Disaster education that is carried out on an ongoing basis will build awareness in dealing with disasters [14], [15]. Disaster education is implemented so that teachers have knowledge about disaster mitigation [16]. Disaster education is important to be implemented on an ongoing basis in schools to improve disaster preparedness.

Building disaster education is very important for countries that have a high risk of disaster, especially in Indonesia [17], [18]. In recent years, disaster education programs have been widely implemented because they can reduce the impact of disasters, as well as increase capacity. Several studies on disaster education identified good results in increasing capacity, thus reducing disaster risk [19]. Some studies explain that the level of preparedness is still low due to a lack of knowledge and skills on disaster hazards and impacts. Based on previous disaster data, disaster victims are identified as vulnerable groups. Most of Indonesia is at high risk of disasters, but has a high vulnerability to disasters. Therefore, capacity building must be done to anticipate the impact of disasters, which is carried out with preparedness at the school level [20].

Indonesia has been implementing disaster education for 15 years [21]. The implementation of disaster education still has several obstacles. These obstacles include the integration disaster education is still paternalistic, namely the implementation of integration disaster education still depends on local government initiatives. On the other hand, local governments have no desire to invest in disaster education [21]. Problems in the implementation of disaster education relate to not all students participate in disaster simulations, limited facilities and infrastructure, no update of fixed procedures for disaster emergency response and school disaster preparedness teams, and the integration of disaster education has not been implemented in a sustainable manner [22]. Problems in the implementation of disaster education are also expressed in research on disaster education in the Merapi Volcano Eruption Hazard Area, namely students who are in the Merapi Volcano Eruption Hazard Area have studied disaster and disaster risk reduction for years, but they are still confused about knowledge, attitudes, and actions in dealing with disaster threats. This condition is caused by the ineffective implementation of disaster risk reduction education. Facts show that many teachers (80%) still have insufficient knowledge related to disaster preparedness. This is because the disaster training attended by teachers is still very limited. Students also do not have much access to develop knowledge about natural disasters because schools cannot provide adequate reading books related to natural disasters and preparedness [23]. The problems faced by teachers in Indonesia include not being equipped with the relevant knowledge and skills to implement disaster education [24].

Schools should have the initiative in implementing integration disaster education to become independent schools in its implementation. The integration disaster education requires a strategy so that it can be implemented optimally and can increase students' knowledge and skills in dealing with disasters. Integration isaster education strategies can be implemented in various ways that can be done by teachers in learning. Based on this background, this study aims to analyze needs assessment about strategy of integration disaster education at elementary schools in disaster prone areas. Research question:

- How is the implementation of integration disaster education in disaster prone area elementary schools?
- What is the ideal integration disaster education strategy expected by teachers?

## 2. METHOD

### 2.1. Research design

This research is a qualitative approach that allows researchers to study something in a natural setting and interpret phenomena related to meaning [25]. This research is a qualitative study using a descriptive design. This research describes the implementation and integration strategies of disaster education in elementary schools located in disaster-prone areas. Qualitative research in this study is used to analyze and interpret data obtained from interviews. The interviews conducted were related to integration disaster education strategies in disaster prone area elementary schools, and design of integration disaster education in elementary schools that are ideally expected by teachers.

### 2.2. Setting and participants

This research was conducted in elementary schools in Sleman Regency, Special Region of Yogyakarta, Indonesia from January to June 2022. Elementary schools in Sleman Regency were chosen as the research location by considering that many schools are located in disaster prone areas, especially

Volcanic eruption disaster prone areas. Participants in this study were selected using random sampling and snowball methods. The participants consisted of teachers from 23 elementary schools located in the volcano eruption hazard area.

### 2.3. Data collection tools

This research uses indepth interviews to collect data. The data collection tools consist of 6 (six) indicators that are important in the integration of disaster education. Indicators in the data collecting tools are: i) implementation of integration disaster education, ii) things that need to be improved in the implementation of integration disaster education, iii) the need for a integration disaster education model, iv) expectations for what kind of integration disaster education model, v) the integration disaster education model needs to be presented in the form of a website, and vi) expected content on the integration disaster education model in the form of a website.

### 2.4. Data analysis

The interview data was made in the form of interview transcripts. Codes R1, R2, ..., R23 were then used for each research respondent. The data obtained was followed by content analysis of the transcripts. Content analysis is used to determine the concepts and relationships that explain the research data. The data in this study will be categorized in codes, themes, definitions made with codes and themes, and findings that are analyzed and interpreted. The consistency of the research data is determined from the indicators and themes obtained from the analysis results. Transferability of research is obtained from the research process, respondents, data collection tools, and data collection methods are described in more detail and detail. Research credibility is carried out by directly presenting the results of the research and supported by the opinions of each respondent as reinforcement of the research results.

Data analysis in this study used the data analysis model [26], namely: i) data reduction, ii) data presentation, and iii) conclusion drawing. Data reduction is carried out to sort and select the main things, important data, look for patterns, and discard anything unnecessary in the data, so as to create a clear picture in the process of study and analysis of integration disaster education strategies. The next stage is data presentation. The reduced data is presented in data that is easy to understand. Data presentation is done in the form of brief descriptions, tables, pie charts, diagrams and graphs. Furthermore, conclusion drawing is carried out. Conclusions in this study will be followed by evidence obtained during the data collection process. The data obtained to describe the implementation strategy of integration disaster education in elementary schools in disaster-prone areas.

## 3. RESULTS

### 3.1. Implementation of the integration disaster education in elementary schools in disaster-prone areas

The interview results indicate that there are teachers who have implemented integration disaster education, and there are also some teachers who have not implemented integration disaster education. Integration disaster education strategies are implemented in different ways between one teacher and another. The first indicator, namely the implementation of integration disaster education, identifies that most teachers have implemented integration disaster education in thematic learning ($n = 8$), science/social/civics subjects ($n = 5$), discussions with students ($n = 2$), simulations ($n = 2$), and study tours ($n = 1$). The results also prove that there are still teachers who have not implemented integration disaster education ($n = 5$). The results showed that teachers who have implemented the integration disaster education through various subjects, can be through thematic/science/social/civics subjects lessons, discussions, simulations, and tourism studies. Integration disaster education iactivities are carried out by teachers varying between 2 to 3 times a semester.

> "*...in thematic."* **(R8)**, "*The integration of disaster education is carried out by inviting students to visit Merapi*" **(R14).** "*Teachers integrate disaster education in the curriculum, through science, social studies and Pancasila and Civic Education materials. Lectures and group discussions.*" (**R4, R5, R18, R20, R21, R22)** "*...with lecture, simulation and video methods.*" **(R23)**

There are some teachers who have not integrated disaster education. Teachers have not been able to implement integration because learning time is limited, teachers focus on core basic competencies, school facilities related to disasters are incomplete, disaster education is forgotten because of busy school activities, and there is limited capacity building for teachers.

"*.... Has not yet implemented the integration of disaster education.*" **(R2, R6, R10, R15)**, "*Disaster education is forgotten because of the busyness of school.* "**(R3)**,"*... Media must be equipped*". ***(R5)***, "*..... Tools lack updates, books are lacking.*" ***(R7)***, "*...Socialization, and disaster training needed.*" ***(R10)***, "*Facilities need to be updated because they are not always used.*" ***(R14)***

The second indicator of strategies to improve learning integration disaster education can be implemented with attractive disaster learning media in the form of websites/videos ($n = 9$), disaster education training for elementary school teachers/school residents/student guardians ($n = 5$), improving school facilities supporting disaster education ($n = 3$), disaster tourism studies ($n = 2$), support from the education office ($n = 2$), updating school disaster documents ($n = 1$), and school cooperation with disaster management institutions (1). The results also identified that some teachers did not answer ($n = 3$).

"*Strategies for integrating disaster education can be done with disaster education media, disaster posters, and disaster training for elementary school teachers.*" ***(R1)***, "*Media in disaster explanation. With media. Video media to make it clearer. Web-based.*" ***(R1, (R2)***, "*...increase cooperation with disaster management institutions.*" ***(R4)***
"*Media must be equipped, mandatory visits to disaster museums for example the Mount Merapi Museum.*" ***(R5)***, "*Teacher capacity building, infrastructure, updating school disaster documents, periodic socialization*" ***(R17)***

The analysis proves that 56% have integrated education in subjects with various methods, and carried out 1-3 times in one semester. Meanwhile, 44% of teachers have not implemented the integration of disaster education. The strategies expected by teachers include 61% explaining that 61% of teachers need disaster education media that is packaged attractively in the form of video media and packaged using a website.

### 3.2. Ideal disaster education integration model expected by teachers

Elementary schools in disaster-prone areas need the integration disaster education model. The disaster education integration model that many teachers choose is the online the integration disaster education model using a website. The results discussed that there is no integration disaster education model ($n = 23$). Teachers said that they need an integration disaster education model ($n = 9$), and really need a integration disaster education model ($n = 14$). Teachers revealed that the need for disaster education considering the importance of integration disaster education model, among others: school community needs skills about disaster management ($n = 11$), disaster education should be taught from an early age ($n = 1$), students need knowledge about what to do when a disaster occurs and not panic ($n = 4$), and schools located in Indonesia, especially in Sleman Regency which is a disaster-prone area ($n = 10$).

"*There is no disaster education integration model yet*." **(R2, R3, R4, R5, R6, ... R23)**, "*... Very necessary. We need a model for integrating disaster education in the form of videos with disasters in the school area*". **(R3)**, "*It is very necessary to integrate disaster education models.*" **(R5)**, "*There is a need for an integrated model of disaster education because we live in an area close to Merapi.*" ***(R12)***

The needs of integration disaster education models expected by teachers include online interactive disaster education integration models (websites, videos, animations, games, and electronic books,) ($n = 15$), teacher/student training models ($n = 4$), disaster books ($n = 3$), disaster posters ($n = 2$), and disaster simulations ($n = 2$). Teachers expressed a need ($n = 12$), and a great need ($n = 13$) for an integration disaster education model in the form of a website. The reasons why teachers choose the integration disaster education model in the form of a website are that the website is easy to disseminate to all school members (n=6), the website follows the times ($n = 2$), the website can be used in learning ($n = 2$), the website contains various information and applications such as games, videos, and technical guidelines ($n = 2$), the website is easy to access ($n = 4$), the website makes it easier for teachers in the learning process ($n = 8$), the website attracts students' interest in learning ($n = 2$), and the teacher did not answer ($n = 1$).

"*Online media is very relevant to use today. Interesting about online learning is that students can see pictures, and students can actively apply themselves*." **(R3)**, "*The website for teachers is easy to understand, use, clear, and can be applied in learning, and used by students as well. Website for elementary students with interesting videos, interactive media, interesting animations, applicative*." **(R4)**, "*The required disaster education integration model that is interesting and interactive*." **(R18,**

**R20, R22, R23)**, "*The integration disaster education needs to be made in the form of a website so that later it can be disseminated to all school members*." **(R1)**, "*If there is a disaster education integration model in the form of a website, it would be great. If it can be a booming platform*." **(R11)**, "*It is very necessary to integrate disaster education in the form of online (website) because now everything is online and about technology*." **(R20, R22)**

The realization of the integration disaster education model website requires interesting content. The content expected by teachers in the education integration model website is that the website has material in the form of simple material, images, videos, sounds, animations, games, quizzes, songs ($n = 13$), separate website content for teachers and students ($n = 11$), and the website can be used to discuss teachers and students about disasters ($n = 2$).

"*……It can be accessed by teachers and students*." **(R13)**, "*The website is made separately for teachers and students. The website for students is made more attractive in terms of content color, appearance, and easy use. Like a game. The website for teachers is expected to be easy to use, and clear. Can be in the form of writing / video. Website content about types of disasters, the process of disasters, the possibility of disasters, how to overcome, what to do when a disaster occurs, efforts to love the environment*." **(R4, R7, R8)**

The results of the analysis identified that (100%) of respondents said that there was no integration disaster education model. Teachers need (39%) and really need (61%) a disaster education integration model. The integration disaster education model expected by teachers is an online interactive disaster integration model that is attractively packaged so that it is not boring in learning (74%), student training, posters and books (26%). The integration disaster education model is important to be presented in the form of a website because the website can be applied easily, can be disseminated easily, and can be applied in learning (52%), the website follows the development of the online digital era and helps teachers in the learning process (44%). The content expected by teachers is separate between content for students and teachers. Content for students is more about material delivered through interactive videos and quizzes that can be answered by students, disaster education games, and students can access easily via cellphone or laptop. Content for teachers can be with written and video material about disaster management, as well as more detail from lesson planning to evaluation (91%), and content can facilitate communication and share practices between teachers in various regions in Indonesia (9%).

## 4. DISCUSSION

### 4.1. Strategy of integration disaster education

Teachers implement integration disaster education strategies in different ways. Some teachers explained that they have not implemented disaster education integration. Teachers have not integrated disaster education due to a lack of teacher knowledge about disaster, no training for teachers, time constraints, lack of media, budget and infrastructure. This is in accordance with the opinion of [23] about the problems of disaster education integration include: i) teachers' lack of capacity in teaching disaster education. The facts show that 80% of teachers still have insufficient knowledge about disaster. This is due to the limited disaster training for teachers, ii) the lack of effectiveness of disaster education integration because the learning media used are limited to books and pictures, iii) the limited ability of students, and iv) the lack of facilities that support the integration of disaster education, such as libraries that do not provide books on disaster, so students cannot access knowledge about disasters. A national curriculum on disaster integration education can be developed to encourage knowledge retention [27]. The existing problems require the formulation of strategies so that disaster education can be implemented in a sustainable manner.

The strategies implemented by teachers in implementing integration disaster education include integrating through thematic subjects, civics/social/science, teacher/student training, study tours, discussions and simulations. Disaster education is expected to not only be theoretical but can provide experience to students in finding solutions to disaster management problems [28], [29]. The interview results prove that the strategy to improve integration disaster education learning can be implemented by using interesting learning media in the form of a website. The use of websites in disaster learning has benefits [30] increase students' interest in learning, ease of use, and influence students' attitudes in learning. The use of the website is also recommended in disaster education to increase preparedness in the implementation of disaster education programs for teachers and students [31]. The strategy of integrating disaster education using the website can be used as an alternative innovation because currently teachers and students are familiar with the use of the website, and will make students active in learning so that it can improve learning outcomes.

Disaster training for school members is also a strategy in disaster education integration. Disaster education training for teachers can increase disaster knowledge that will later be taught to students. Training and drills are conducted to improve disaster preparedness [32]. Disaster training is important to implement to produce effective disaster management in schools [33]. Disaster training can help teachers know their responsibilities after a disaster and prepare teachers for disaster emergencies [34].

Disaster tourism studies can be implemented so that students learn directly about disasters. Students can learn contextually about the school/home environment that has disaster risks and how to implement disaster management. In addition, simulation can also be a strategy in the integration of disaster education. Simulations make students have skills about actions that must be carried out in the event of a disaster. Disaster simulation will also increase students' preparedness in facing disasters. Disaster training is one of the learning methods that can be used to achieve effective preparedness [35], training will increase knowledge and skills in disaster preparedness [32], and increasing preparedness can be carried out by simulation because it will train students in real conditions when a disaster occurs [36]. Local governments can work with schools to increase preparedness through teacher capacity building with professional teacher development [23].

The physical aspects of the school can support the implementation of disaster education by improving school facilities. The school can cooperate with external parties to complete the physical aspects. During the procurement process of physical aspects in collaboration with external parties, the quality of physical equipment must be considered in accordance with the guidelines. For example, maps and directions of evacuation routes. Schools receiving physical aspect assistance must also have a commitment to maintaining equipment so that it can still be used in disaster emergencies [37].

Updating school disaster documents is needed so that school community members are aware of disaster management updates that have been implemented. Schools are expected to establish cooperation with disaster management stakeholders. This is done so that schools have a strong network in disaster management. School cooperation in disaster management can be done with the education office, national agency for disaster management (BPBD), nongovernmental organization (NGOs), mass media, and the community [22]. Disaster risk reduction and preparedness enhancement can be implemented by improving community access to information on safe and unsafe areas. Schools located in unsafe locations should ensure that there are safe gathering points and shelters near the school area. Planning for safe evacuation locations and routes should be communicated to the community in order to reduce the impact of disasters, especially casualties [38]. Hazard maps are also very important in disaster risk reduction [39].

Evaluation of disaster education programs is also needed in order to get feedback in the process of formulating long-term disaster preparedness strategies [40]. Disaster education is highly expected to be owned by teachers in elementary schools. The reason is that teachers can transfer their disaster knowledge so that students have a good knowledge of disaster education, mitigation, and preparedness in the face of disasters [18]. Disaster education evaluation should be carried out in the long term [41]. The implementation of disaster education is expected to be carried out on an ongoing basis so that students have a culture of disaster preparedness so as to reduce the impact caused when a disaster occurs.

### 4.2. Ideal disaster education integration model expected by teachers

The results prove that there is no integration disaster education model. Teachers need a model of integration disaster education because the benefits of integration disaster education include School people need knowledge and skills about disaster management, disaster education must be taught early. Student response is very important in disaster education. Disaster education must still be taught to students, considering that disasters do not know when they will occur and how much impact they will have. So that what can be implemented is disaster education so that students have preparedness for disasters that can occur in the future [42]. Students understand what to do when a disaster occurs and do not panic, Indonesia is in a disaster-prone area, and schools are also in disaster-prone areas [3]. Schools that implement disaster education integration will increase knowledge about disaster risk and preparedness.

The most expected integration disaster education model by teachers is an online interactive integration disaster education model (website, video, animation, games, and electronic books). The selection of the website is because the website is easy to disseminate to all school members, the website follows the times, the website can be used in learning, the website contains various information and applications: games, videos, and technical guidelines, the website is easy to access, and the website attracts students' interest in learning. Integrating disaster education with online websites has several benefits [43]: i) improve student achievement and motivation to learn; ii) the material in the online website will be more easily remembered by students; iii) test students' understanding of disaster; and iv) students can synthesize skills and information from previously learned materials;

The content in the integration disaster education website expected by teachers is in the form of a simple website that can be accessed for learning in the form of simple material and in the form of images, videos, animations, games, quizzes and songs. The expected content is separate between teacher and student

content. Teacher content can contain more complete disaster material accompanied by disaster management books and journals, while the student website is made as simple as possible with image, sound, animation, game and video content that can attract students' interest in learning disaster education integration. The website is also expected to be used for online teacher and student discussions about disaster.

## 5. CONCLUSION

Disaster education can be implemented in schools by integrating disaster education. Over the past few years, many elementary schools in Indonesia have implemented the integration of disaster education. The implementation of integration disaster education still has several obstacles both from an internal and external perspective. Constraints in the implementation of disaster education require strategies so that the integration disaster education can be implemented optimally and increase preparedness. The integration disaster education has been implemented by some teachers. Some teachers also identified that they have not implemented disaster education integration. This is due to several things including the absence of disaster training for teachers, the lack of facilities and infrastructure to support the integration of disaster education. The research results describe that there is no integration disaster education model. The integration disaster education model expected by teachers is in the form of an online website. The expected content in the integration disaster education website includes separate content between teachers and students, made simple and easily accessible, equipped with images, videos, games, sounds, and songs, and can be used as a means of communication and discussion between teachers and students about the implementation of integration disaster education.

Recommendations for the integration disaster education can be implemented optimally, namely by maximizing the internal and external potential that exists in schools. Internal potential can be implemented by increasing teachers' knowledge and skills about disaster education, updating disaster education materials, designing disaster education integration that is carried out continuously, making interesting media, completing facilities and infrastructure, and preparing a disaster education integration website. The disaster education integration website can be used in learning, so that learning can be carried out interestingly and make students active in learning. Maximizing external potential can be done by schools cooperating with disaster management stakeholders, such as the education office, local disaster management agency, and the community.

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