

# Integrated landslide disaster education in physics subject viewed from high school students preparedness in Kulon Progo, Yogyakarta

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**Abstract.** This research aims to find out the role of integrated landslide disaster education in physics subject viewed from high school students preparedness in Kulon Progo, Yogyakarta. Method in this research is done with three steps which are survey with google form to pre-service physics teacher, observation with questionnaire about disaster preparedness to students and interviews with physics teacher. Analysis technique used to obtain data is descriptive analysis method. Results on integrated landslide disaster education in physics subject viewed from high school students preparedness in Kulon Progo, Yogyakarta is very crucial to be implemented in learning and teaching activities using integrated learning model to raise disaster preparedness and students' science knowledge. Students are still lacking preparedness knowledge because there is no simultaneous campaigns about landslide disaster preparedness in schools on disaster prone areas in Kulon Progo. Beside that, incorporating preparedness subject in school curriculum is a way to countermeasure disaster in the education sector considering Kulon Progo is one of the areas prone to landslide in Yogyakarta.

**Keywords:** *integration, landslide, physics, preparedness*

## 1. Introduction

Modern society has developed rapidly and natural disaster becomes more diverse. This happens because of the weather and social change. Geographical location is also one of the main causes of natural disasters. Areas which surface have hills or slopes and mountains can cause disasters, one of which is landslides [1]. Landslide often occurs in Indonesia especially in mountain slope and areas with high rain intensity [2]. Kulon Progo district, in Yogyakarta, is one of the areas where landslide often occurs. Provincial Disaster Mitigation Agency (BPPD) of Yogyakarta have already map landslide prone areas in Kulon Progo district as it is one of the most vulnerable areas compared to other districts. The result of the research shows that Kulon Progo district is divided into three landslide zone which are south to east zone, the landform is dominated by fluvial meanwhile central zone which is structural is formed of volcanic breccia and north zone is caused by intensive denudation process, corrosion and erosion [3].

People still lack knowledge of disaster preparedness so effort must be done to reduce costs from landslides such as properties to lives [4]-[6]. People's preparedness relating to physical and environment condition that has high risk towards disaster is very important. Indonesia needs a solution for disaster management, one of them is implementation in education sector. Indonesia's curriculum needs an



education curriculum based on local wisdom integrated with local culture and science. Knowledge and preparedness on natural disaster can be implemented by designing Standard Operating Procedure (SOP) in schools [7]-[8].

Based on integration of science's perspectives, disaster curriculum can be integrated in schools learning process that is strongly related to disaster [8]-[9]. One of them is through Physics subject that can be integrated to disaster education with learning model in accordance to the applicable curriculum. Disaster education in vulnerable area is very useful for students because they can have a clear understanding in facing disaster [10]-[11]. Knowledge about natural disaster needs to be taught to students since early stage so students can be more prepared in facing disasters. Attempts to anticipate natural disasters and its characteristics in education has not have learning model that is made specifically [12]-[13]. Although the efforts of the government have conducted counseling on disaster preparedness, not all disaster-prone schools have received it. But, to implement it, integrated learning model can be used.

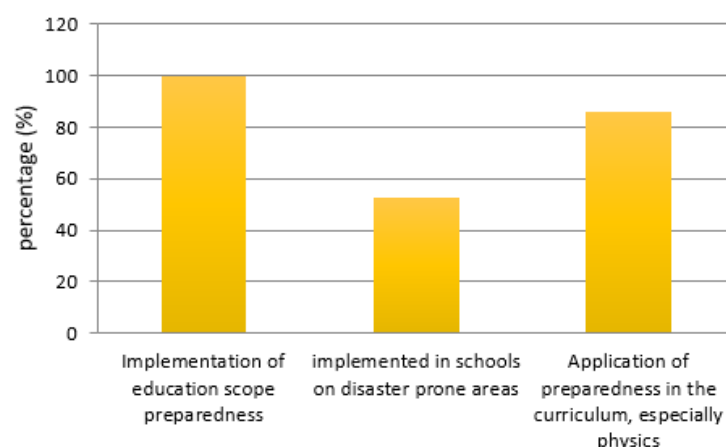
Considering that in some schools in Kulon Progo is located in landslide prone areas so integrated physics subject with landslide education is necessary. So, the aim of this research is to find out integrated landslide education in Physics role viewed from high school students' preparedness in Kulon Progo.

## 2. Research method

This research were done with three steps which are survey, observation and interviews. Survey steps was done with google form and was given to pre-service physics teacher. Next, observation step was done to choose schools in landslide prone areas in Kulon Progo district and disaster preparedness questionnaire were also distributed to high school students in chosen schools. The last step is interviews. Interviews were done to physics teacher in schools that have been observed. Observations were done in SMA N 1 Kokap, SMA N 1 Girimulyo and SMA N 1 Kalibawang. Analysis technique used to obtain data is descriptive analysis method.

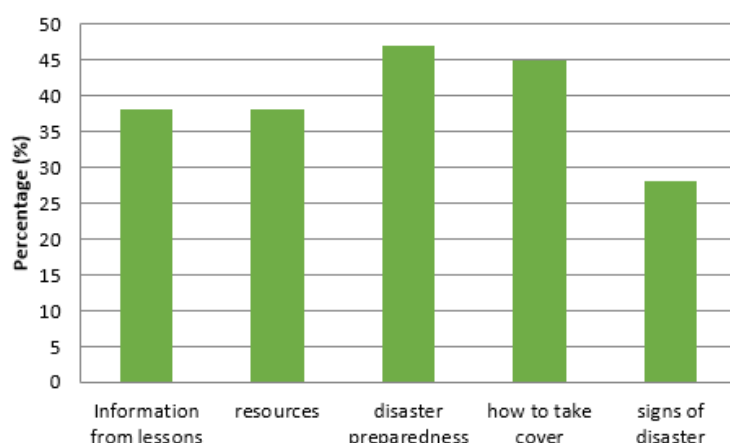
## 3. Results and Discussion

Research about preparedness on landslide disaster is necessary for the community. Landslide preparedness is necessary by society. For example, mapping landslide areas, if buildings are located in high vulnerable areas, buildings can be moved from that area since the beginning before a landslide occurs. Research conducted before is by observing results from soil's physical classification, can predict range of central soil mass and landslide speed so it can be used as landslide preparedness attempt in disaster prone areas [6]-[14]. Landslide disaster preparedness attempt is not only done in society sector, but also in education sector.



**Figure 1.** Survey result from 21 pre-service teachers.

Survey results from 21 pre-service teachers on the second question is dominant. From the result of the survey, it can be concluded that landslide disaster education needs to be implemented in schools on disaster prone areas. (52.4% answered yes). This result is lower than the results from the first question, where everyone agrees (100%) that disaster education especially landslide needs to be implemented in school. Attempts from teachers to educate students on landslide disaster education can be implemented since early stage by giving students information about the latest issues and facts about landslides. Introduction about landslide disaster education, disaster risks, causative factors and how to countermeasure disaster to raise students' preparedness towards landslide disaster in disaster prone areas especially in schools and their residential areas. Simulations and campaigns relating to landslide disaster can also be done [7].



**Figure 2.** Questionnaire results from students about landslide preparedness.

Students' questionnaire result on landslide disaster preparedness: 28% answered that they have already know signs when landslide will occur. But, those students' answers are lower compared to answers from the third question. Overall, from students' questionnaire results about landslide preparedness, students still have little knowledge about landslide preparedness because it still has not reached 50% so disaster education needs to be put in learning process in disaster prone schools. Learning process to accomplish objectives from landslide disaster education integrated into the learning curriculum especially Physics must use suitable and appropriate learning model. One of them is integrated learning model which integrate several subjects that comes from various science [12]. Integrated learning with local potential is a learning process which utilize a region's potential as a learning source [15]. Implementation on this learning model is suitable because it integrate landslide disaster education and physics according to the needs in disaster prone schools. This learning model can increase knowledge as well as preparedness on students towards disaster. Instilled values in the daily life on local wisdom can be linked to physics integrated learning based on disaster [16]. Kulon Progo's location is prone to landslide disaster so disaster countermeasure is really needed. One of them is through physics learning integrated with landslide disaster countermeasure. According to survey result on suitable physics material which are Newton law or effort and energy. Results from a research conducted mentions that disaster countermeasure is really necessary. One of them is through physics learning integrated with disaster countermeasure by relating Newton's law of motion [17] or about Newton's law of motion on an inclined plane [16].

After survey and observation were done, the next step is the interview. Interview was done to three physics teacher in SMA N 1 Kokap, SMA N 1 Girimulyo and SMA N 1 Kalibawang. Interview results from those three schools can be read below:

X : Is integrated disaster education in physics subjects has been implemented in your school?  
And is it already included in the school's curriculum?

- A : SMA N 1 Girimulyo have not yet have integrated landslide disaster education in their physics subject because of limited learning time, but landslide disaster education integrated with education is being worked on .
- B : SMA N 1 Kalibawang have not yet have disaster preparedness in school but disaster education have already been tested to be integrated to physics subject material in class X and is applied by direct observation in surrounding environment and for integration to particular material relating to landslide disasters have not yet been incorporated into school curriculum even though many students live high intensity disaster prone areas
- C : SMA N 1 Kokap have already have preparedness education and disaster alert school (SSB) has been formed. Two days trainings have been done to anticipate landslides and a team to execute campaign about landslide countermeasure to public as well as students, but integrated education to physics subject and school's curriculum have not been done yet so SMAN 1 Kokap plan to include landslide disaster education into school's curriculum

Through survey results, observation and interviews relating to integrated disaster education in physics subjects is really necessary to be applied in schools in landslide prone areas through learning in schools especially in physics subject with integrated learning model that aims to raise preparedness and science knowledge that is no longer unfamiliar to students in their daily lives. Considering that, including it to the school's curriculum is a way to countermeasure disaster in education sector.

#### 4. Conclusion

Concluding from research on to integrated landslide disaster education in physics subject viewed from highschool students' in Kulon Progo Yogyakarta is really necessary to be implemented in teaching and learning activities using integrated learning model to raise disaster preparedness and students' science knowledge. Students' still lack preparedness because there is no simultaneous campaigns about landslide disaster preparedness in schools on disaster prone areas in Kulon Progo. Besides that, incorporating preparedness subject in school curriculum is a way to countermeasure disaster in the education sector considering Kulon Progo is one of the areas prone to landslide in Yogyakarta.

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