



Tsunami Disaster Awareness for Elementary School Communities in the South Beach Area of Kulon Progo District

ความตระหนักเกี่ยวกับภัยพิบัติสึนามิของชุมชนโรงเรียนประถม ในพื้นที่หาดใต้ของอำเภอกulonโปรโก

Yusman Wiyatmo* and Joko Sudomo

ยัสมาน วิยัทโม* และโจโค ซูโดโม

Physics Education Department, Faculty of Mathematics and Natural Sciences,
Yogyakarta States University, Indonesia
ภาควิชาการศึกษาฟิสิกส์ คณะคณิตศาสตร์และวิทยาศาสตร์ธรรมชาติ
มหาวิทยาลัยยอร์กยาการ์ตา ประเทศอินโดนีเซีย

Abstract

This research is aimed to: 1) implement the module of tsunami awareness in elementary school communities in Kulonprogo district, 2) produce the tsunami simulation video, 3) produce the video of tsunami mitigation technique, and 4) know the respons of elementary school communitis about the training of mitigation and management of tsunami dissater. The methode which is used in this research is 4D model. It is developed the instruments of tsunami simulation video, the video of mitigation and management of tsumami dissaster.The subjects of this research consist of 137 elementary school community. The data of this research consist of elementary school communities respons about the module, validation data of tsunami simulation video, and validation data of the video of mitigation and management of tsunami dissaster.The reliability of instrument is determined using the percentage of agreement (PA) from the validator. The results show: 1) the responds of elementary school communities related with module is 3.44 (very good), the PA of tsunami simulation video is 96.57% (reliable), the quality 3.45 (very good), 3) the VCD of mitigation and management of tsunami disaster has the PA of 96.06% (reliable), quality score of 3.75 (very good), 4) the responds of elementary school communities about the training of tsunami mitigation is 3.52 (very good)

Keywords: Dissasster awareness, Tsunami simulation, Tsunami mitigation

*Corresponding Author, email: yusman_wiyatmo@uny.ac.id

บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์เพื่อ 1) จัดเตรียมหลักสูตรการศึกษาที่เกี่ยวกับการสร้างความตระหนักเกี่ยวกับภัยพิบัติสึนามิในชุมชนโรงเรียนประถมในอำเภอคูลงนโปโรโก 2) สร้างวิดีโอจำลองการเกิดสึนามิ 3) สร้างวิดีโอเทคนิคการลดความเสี่ยงจากสึนามิ และ 4) เพื่อทราบถึงผลการฝึกอบรมการจัดการและการลดความเสี่ยงของภัยพิบัติสึนามิในชุมชนโรงเรียนประถม โดยใช้แบบจำลอง 4D ในการสร้างวิดีโอจำลองการเกิดสึนามิและวิดีโอการจัดการและการลดความเสี่ยงจากภัยพิบัติสึนามิ เก็บข้อมูลจากกลุ่มตัวอย่างที่ประกอบด้วยชุมชนโรงเรียนประถม 137 แห่ง โดยสำรวจความเห็นเกี่ยวกับหลักสูตรการศึกษา ความถูกต้องของข้อมูลจากวิดีโอจำลองการเกิดสึนามิและวิดีโอการจัดการและการลดความเสี่ยงจากภัยพิบัติสึนามิ และคำนวณค่าร้อยละความสอดคล้อง (PA) เพื่อวัดความน่าเชื่อถือของเครื่องมือโดยมีผลการสำรวจ ดังนี้ 1) การตอบรับของชุมชนโรงเรียนประถมมีความสัมพันธ์กับหลักสูตรการศึกษามีค่าเท่ากับ 3.44 (ดีมาก) ค่าร้อยละความสอดคล้องของวิดีโอจำลองการเกิดสึนามิเท่ากับ 96.57 (น่าเชื่อถือ) คุณภาพอยู่ในระดับ 3.45 (ดีมาก) 3) ค่าร้อยละความสอดคล้องเกี่ยวกับการจัดการและการลดความเสี่ยงจากภัยพิบัติสึนามิเท่ากับ 96.06 (น่าเชื่อถือ) คุณภาพอยู่ในระดับ 3.75 (ดีมาก) 4) การตอบรับของชุมชนโรงเรียนประถมเกี่ยวกับการอบรมเพื่อลดความเสี่ยงจากภัยสึนามิอยู่ในระดับ 3.52 (ดีมาก)

คำสำคัญ : ความตระหนักเกี่ยวกับภัยพิบัติ การจำลองการเกิดสึนามิ การลดความเสี่ยงของภัยพิบัติสึนามิ

Introduction

Tsunami is the tidal/high waves of sea water. The height of tsunami wave which have occurred in Indonesian was 26 meter (Istiyanto & Pramono 2003). Tsunami is not caused by wind. Tsunami is occurred in beach. Tsunami rarely happen but it is very dangerous. Tsunami is a tidal waves caused by the vertical deformation in the sea ground is occurred immediately that cause displacement of surface of sea water. Tsunami does not feel in the deep sea and in the other hands the effects of tsunami is felt in the beach. Tsunami can happen in any times, in rainy season or dry season, in noon or night, and the morning or evening.

Tsunami is area of “ring of fire” in Pacific Ocean, the volcanoes area which have length of 32,000 km (Figure 1). Since 1819, it has occurred tsunami more than 40 times in Hawai archipelago. In Indonesian, tsunami is often occurred in certain area, for example in the east beach of Sumatera, the south beach of Java, and Nusa Tenggara. Indonesian has an ocean with area of 5.8 million km are, the length of the beach line of 81,000 km, the number of archipelago of 17,508. There are 17 global tectonics plates in the world which potentially to cause the earth quake. Three of the global tectonics plates are in Indonesian (Saptono, 2005). The plates are the movement of Indo-Australia with Eurasia, the movement of Indo-Australia with Pacific and the movement of Pacific and Philippines.

Earth quakes was caused by the movement of plates in the earth. The locations are in the ocean 100-150 km from Sumatera beach, south of Java, south of Nusa Tenggara, Maluku, and in the north of Papua beach. The collision of Eurasia plate and Indo-Australian plate will potentially cause tsunami in the west beach of Sumatera, south of Java, and Nusa Tenggara. The map of tsunami troubled in Indonesian is shown in Figure 2, which noted with the red line.

Based on the geographical position, the south area of Kulon Progo district located in the area beach of south of Java. Kulon Progo district is risk from tsunami disaster. Hence the communities need knowledge and skills about tsunami disaster awareness and tsunami mitigation. It hopes the communities have a readiness if tsunami occurred.

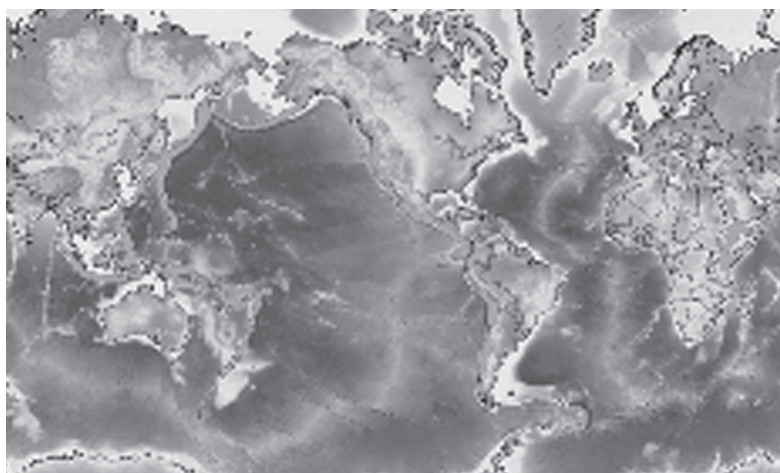


Figure 1 Ring of fire

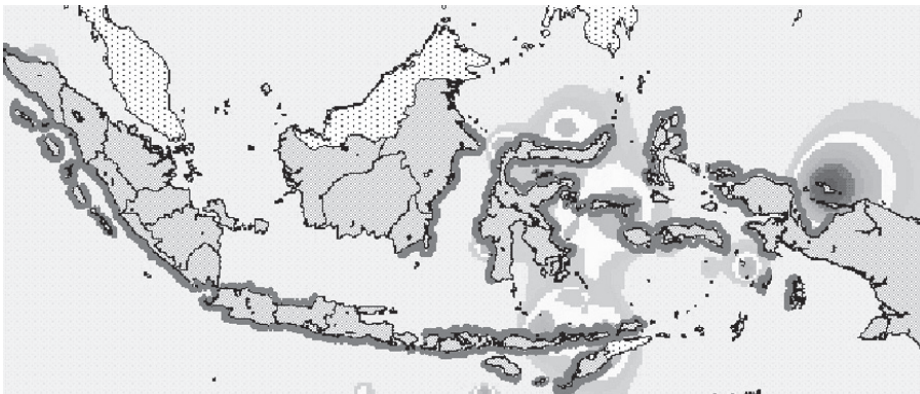


Figure 2 The red lines in the map show the tsunami troubled area in Indonesia

The strategic step which can be done is developing of the module of tsunami readiness and giving a training of tsunami mitigation in elementary school in Kulon Progo district. If tsunami occurred at study time in school, it is needed an exact action to protect students from tsunami risk. Furthermore, students in elementary school have a high risk of tsunami disaster.

Mitigation consist of all actions which conducted before the disaster occurred. The actions before disaster occurred consist of readiness actions and minimize of risk disaster in long term (Lubis & Sulaiman, 2008). Disaster management is the activity which conducted before and after disaster to control disaster risk and give work pattern for helping persons or communities which troubled with disaster to eschew, reduce, and recover from the impact of disaster.

The objective of this research are: 1) to implement the module of tsunami awareness in elementary school communities in Kulonprogo district, 2) to produce the tsunami simulation video, 3) to produce the video of tsunami mitigation technique, and 4) to know the respons of elementary school communitis about the training of mitigation and management of tsunami dissater.

Method

The method of this research is 4D model. It would be developed instrument which consist of VCD of tsunami simulation, VCD of tsunami mitigation technique, and the prosedure of tsunami mitigation training. In the define step, it was studied the need of the elementary school communities in the south beach area of Kulon



Progo district about tsunami disaster, tsunami simulation media, management of tsunami disaster, and the technique of the mitigation training of tsunami disaster. In the second step: *design*, it was made the plan of design of the tsunami simulation media, tsunami mitigation media, and the scenario of the mitigation technique of tsunami, also determine the procedure of tsunami training. In the third step: *develop*, it was developed the initial product which consist of the VCD of tsunami simulation, the VCD of tsunami mitigation, and the procedure of tsunami training. In this step, it is also conducted validation of the instrument by expert and practision. Based on the validation results, the instruments are revised according to the sugestion from the validator. Furthermore, it is conducted the instrument tryout in the elementary school communities in several elementary school which trubled with tsunami disaster. By this manner, it is known the efectivity of the product. Based on this step, then product is revised again to get the valid instrument.

Finally, in the last step: *deseminate*, the product was implemented in elementary school communities in the south beach area in Kulon Progo district. Then, the product was multiplied for be desemenated to elementary school communities in the south beach area in Kulon Progo district.

Data of this research are obtained as follows: 1) data about the efectivity of module, VCD of tsunami simulation, and tsunami mitigation are obtained using quastionare, 2) validation data about VCD of tsunami simulation and tsunami mitigation are obtained using quastionare which are given to the expert and practision, and 3) data about the reponds of responden related the tsunami training are also obtained using quastionare.

Then data about the effectifness of module, VCD of tsunami simulation, and tsunami mitigation are analyzed by determining the average score of the responden's responds to determine the quality of the product.

Validation data related with VCD of tsunami simulation and tsunami mitigation are analyzed using percentage of agreement from Borich to describe the reliability of the intrument. Furthermore, data related with reponden's responds about the tsunami training are analyzed by determining the average score to describe the efectivity of the tsunami training. In the Figure 3.

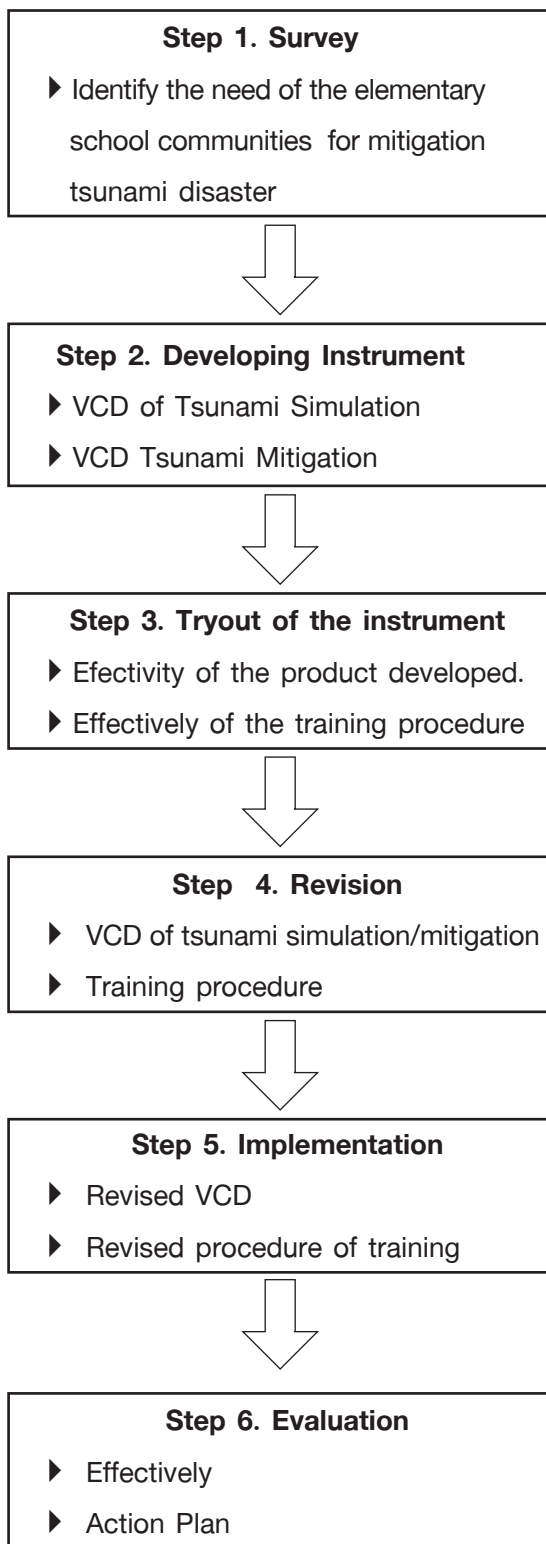


Figure 3 The Research Step



Results and Discussion

1. Responds of Elementary School Communities Related With Module

Responds of the elementary school communities is viewed from 10 aspects as follow: cover, substance, systematics, figure, graph, diagram, photograph, performance, grammatical, font size, and the advantages of the module. The average score of the elementary school communities related with the module is 3.44 (very good). The facts show that the module developed could be implemented to the tsunami training. It is according to the suggestion of Kemenristek (2012), that module developed should be consist of the communities's need for evacuation activity. The activities are the mobilization of people to the safe area of tsunami disaster, regularly tsunami training to get the reflect to eschew from tsunami, making of the evacuation plan and evacuation track, and also making a special building for eschewing. Using the efficient and effective of evacuation procedure, the number of victims can be reduced.

2. The Media of Tsunami Simulation Video

The quality of VCD of tsunami simulation developed is viewed from 12 aspects which consist of the performance of the introduction part, the interest of the introduction part, the font size, the kind of font used, duration of each part, back sound, the quality of picture performance, lighting and video contrast, the quality of the narrator's voice, systematics of content, background setting, animation, and graphics effect. The results show that percentage of agreement PA is 92,85% (reliable), and the average score of quality 3.45 (very good). The VCD of tsunami simulation developed is fulfilled the requirement used in tsunami training. It is according to the requirement of the reliable instrument from Borich (Trianto, 2009) the reliable instrument if it has $PA > 75\%$.

Furthermore, the results of the validation of tsunami simulation which viewed from several aspects that consist of: playing program, parts, text efficiency, and the flexibility of content are reliable with PA of 100%. The average score quality is 3.5 (very good). Based on content aspects which consist of: the meaning of tsunami, tsunami mechanism, geological and geographical study related with Kulon Progo district viewed from the impact from tsunami disaster, it was obtained the VCD of



tsunami simulation is reliable (PA = 96.4 %), and the average score of quality products is 3.4 (very good). If it is viewed from language aspect which consist of 5 aspects: grammatical, effective sentences, word choice, simple sentences, and the fluency of the narrator, it obtained PA of 97.1 (reliable) and the average score of quality product of 3.54 (very good).

3. VCD of Tsunami Mitigation

The quality of VCD of tsunami mitigation developed is viewed from 12 aspects which consist of the performance of the introduction part, the interest of the introduction part, the font size, the kind of font used, duration of each part, back sound, the quality of picture performance, lighting and video contrast, the quality of narrator's voice, systematics of content, background setting, animation and graphics effect. The results show that percentage of agreement PA is 94.04% (reliable), and the average score of quality 3.60 (very good). The VCD of tsunami mitigation developed is fulfilled the requirement used in tsunami training. It is according to the requirement of the reliable instrument from Borich (Trianto, 2009) the reliable instrument if it has $PA > 75\%$.

Furthermore, the results of the validation of tsunami simulation which viewed from several aspects that consist of: playing program, parts, text efficiency, the flexibility of content are reliable with PA of 100%. The average score quality is 3.75 (very good). Based on the content aspects which consist of the cause of tsunami, initial phenomena before tsunami occurred, actions conducted before tsunami occurred, actions when tsunami occurred, actions when eschewing from tsunami, safe area, and action conducted in the safe area, the VCD of tsunami mitigation is reliable with PA of 95.51% and the average score of quality of the product of 3.86 (very good). If it is viewed from language aspect which consist of 5 aspects: grammatical, effective sentences, word choice, simple sentences, and the fluency of the narrator, it obtained PA of 94.28 (reliable) and the average score of quality product of 3.8 (very good).



4. The Training of Tsunami Mitigation

The tsunami mitigation training was held in SDN 1 Lendah in Kulon Progo district. The procedure of the tsunami training as follow: the first activity was eschewing when earth quakes happen when students participate in learning and teaching process in class room. The teacher explains about the manner for eschewing under the table. The teacher gives an example of eschewing under the table and followed by all students. Furthermore, after the earth quakes finished, students were trained to go out from under the table, and stand up on the left and on the right side of the table. Each student protect his head or her head using his or her bag. Then the teacher give an instruction to the students which stand up near the door to go out from class room carefully followed by others students. The destination of the safe area in school is field. When students go out from class room to the yard's school, their bags are carried and used to protect their head as shown in Figure 4.

The second activity, after all the students were in the field, all of class teachers report the number of students evacuated to the head master. Furthermore, the head master try to calm down of students, giving instruction to reach safe area by running follow the evacuation track to the high area as shown in Figure 5.

Furthermore, the activity was to be continued with evacuation and mitigation from tsunami disaster. In this activity, the head master guided the tsunami evacuation helped by class teacher. In this activity all of the elementary communities school run following the evacuation track go to the save area. The evacuation is started by class I and to be continued by class II, III, IV, V, until VI. The evacuation process is conducted carefully and the controlling from the teacher and head master is needed. After all elementary school communities reach the safe area, the head master sugests the teacher and students for waiting until the condition is stable and conducive.

The tsunami mitigation training is followed by 137 persons that consist of head master: 6 persons, teacher: 25 persons, security: 10 persons, and student: 96 persons. All of members of training participate with enthusiasm. All members of training follow the activity joyfully. The matter of training can be trained to all member school communities. Head master give a positive responds related this activity.



Figure 4 Evacuation from class room to field's school



Figure 5 Head Master gives instruction about tsunami mitigation

This activity also gets a positive responds from all members of training. They believe that the training is useful for preparing the readiness from tsunami disaster. Hence, the activity should be disseminated to others communities to reduce the risk from tsunami disaster.

Furthermore, in the last activity, all elementary school communities are given the quistionare related with responds of the member's training. The questions in the quistionare consist of: the advantage of tsunami training, the content of matter, the method of training, and the duration of training. In Table 1 is presented the responds of the elementary school communities related with the tsunami training.



Table 1 Respondent's responds related with tsunami training

No	Aspects	Responds	
		Score	Interpretation
1	The advantages of tsunami training	3.80	Very useful
2	The systematics of tsunami training	3.60	Very good
3	The content of matter	3.20	Good
4	The method of training	3.80	Very good
5	The duration of training	3.20	Enough
Average		3.52	Very good

The average score of the responden's responds is 3.52 (very good). The facts show that the members of training give a positive responds. The activities before tsunami occurred consist of the readiness and reduction risk from tsunami disaster in long term Disaster management consist of the activity before and after disaster occurred which planned for controlling disaster's risk according the opinion of Lubis (2008).

Conclusions

Based on the results, it can be concluded that:

1. The responds of the elementary school communities in the south beach of Kulon Progo district related with module developed is 3.44 (very good).
2. The VCD of tsunami simulation has PA of 96.57 (reliable) and the average score of quality product of 3.45 (very good).
3. The VCD of tsunami mitigation has PA of 96.06 % (reliable) and the average score of the quality product of 3.75 (very good).
4. Respond of the elementary school communities related with the tsunami training are positive with average score 3.52 (very good).

Suggestion

1. In order to the result of the tsunami training can give a positive impact to the elementary school communities, after the training finished, the school should conduct the same training by its self and continously.
2. It should be conducted monitoring and evaluation about the continuity of the tsunami training program.



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