

Research Article

Disaster Literacy Inventory at Earth and Space Sciences (ESS) Lectures as Education in the Post-Covid-19 Pandemic

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Abstract.

This study aimed to analyze the level of disaster literacy in students after ESS lectures during COVID-19 and post-pandemic. The research subjects were fourth-semester students. The research method uses research and development which refers to the development steps of Borg & Gall. The findings of this study are that disaster literacy is a disaster mitigation effort so that students know information about disasters so that they have an awareness of the potential for disasters and can prepare themselves to deal with disasters. Because disasters cannot be stopped, disaster literacy is expected to minimize the risks caused by training in disaster mitigation skills. ESS lectures are one of the lessons that can integrate mitigation and adaptation from a natural phenomenon in educating disaster literacy in the community in the future. The post-Covid-19 pandemic has had many impacts on the world of education, especially in preparing creative teachers by preparing various forms of learning media to online, and offline learning methods and can even be combined into both, called blended learning or hybrid learning.

Keywords: disaster literacy inventory, Earth and Space Sciences (ESS), post-Covid 19

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1. INTRODUCTION

Disaster literacy is a new concept that has become increasingly important in disaster science in recent years. It is a term related to building the preparedness capacity of people to implement responses to face disasters in today's modern society. In the world of education, literacy is an important means for students to recognize, understand, and apply the knowledge they have acquired in learning. Literacy is one of the 21st-century skills which is a strategic issue in the world of education [1–3]. People with adequate levels of disaster literacy can take responsibility for their health, as well as the health of their families and communities [4]. In other words, the scope of disaster literacy is to make the community resilient to disasters by developing preparedness and mitigation knowledge along with the capabilities needed for disaster response and basic skills and behavior in dealing with disasters. This concept provides a good starting point for individuals and communities to take action toward disaster reduction and mitigation.

In the world, natural events often occur such as earthquakes, tsunamis, flash floods, hurricanes, and so on. The study of natural phenomena, including disasters, is a part of physical science. Physics is an interesting science because physics studies how the world works. Physicists try to observe natural phenomena and try to find patterns and principles of these natural phenomena through Earth and Space sciences [5]. Earth and Space Sciences (ESS) is one of the lecture programs held at universities that has a role in providing several competencies, one of which is debriefing on disaster literacy. There are at least 12 disaster threats which are grouped into geological disasters (earthquakes, tsunamis, volcanoes, land movements/landslides), hydrometeorological disasters (floods, flash floods, droughts, extreme weather, extreme waves, forest, and land fires), and natural disasters. anthropogenic (epidemic disease outbreaks and technological failures-industrial accidents) [6]. Information literacy is the ability to recognize information needs and when information is needed, identify and locate the information needed, evaluate information critically, organize and integrate information into existing knowledge, and utilize and communicate it effectively, legally, and ethically [7–9].

The COVID-19 disaster came with its arrogance whose duration of time will never end. No one expert can determine with certainty when this disaster will pass and when conditions in all countries will return to their original condition [10]. This year 2020 will be quite a tough year for the Indonesian people and all nations in any part of the world. Based on BNPB data in 2020, Aceh Province experienced an increase in the occurrence of disasters. In the same period (January-August) in 2020, the number of disaster events reached 641 times, while in 2021 there were only 465 events. This disaster occurred

by causing a domino effect on all lines of human life in the world. The practice of science learning that can contain Disaster Risk Reduction (DRR) aims to establish the relationship between knowledge structures needed for behavioral practice in disaster mitigation [11]. Literacy is one of the abilities that is believed to be a basic indicator of competent learners with disasters. The role of physical education program students will have implications for the need and dissemination of disaster education nationally and internationally.

Previous research generally examines the characteristics of disasters and knowledge of disaster management methods. While the current disaster management approach emphasizes the prevention and minimization of the impact/risk of disasters, one of them is knowing the identification of disaster symptoms. Knowledge of local disaster symptoms is important in community preparedness [12] the effectiveness of integrated natural science textbooks on disaster mitigation [13]. STEM-based learning in improving disaster literacy [14, 15]. For example, the lack of knowledge of the people of Aceh and Simelue on the meaning of the phenomenon of receding seawater before the 2006 earthquake and tsunami, is one proof that the lack of knowledge about natural phenomena that are markers of the earthquake causes a high risk of disaster impacts.

Based on the explanation above, the purpose of this paper is to collect information to be educated about the importance of understanding disaster literacy for university students in order to be able to minimize the occurrence of disasters, and post-disaster through the world of education which is currently a source of educational knowledge. So that it answers the challenge of how disaster education programs can encourage people to update information, risk perceptions, maintain awareness and prepare for future disasters.

2. RESEARCH METHOD

This research is a research and development that refers to the development step of Borg&Gall [15]. This research method is only limited to a preliminary study (concept) which includes three initial steps, namely: (1) initial data and information collection, in this step, among others, determining the basic data on disasters that have occurred in Aceh since 2019-2020, so that the data becomes a reference in disaster education in the ESS (2) planning lecture program, what is meant in this step is integrating disaster literacy in ESS lectures through the development of program lesson Plans, modules, Student Worksheets through Disaster Risk Reduction (DRR) education. and (3) development of initial products, and development of learning media based on digital content of earth

and space phenomena that include disasters that occur. The target of the research is 4th-semester students of the physics education study program in Aceh Province. The subject of this research is the study of disaster literacy for the post-pandemic period in universities. The following are the stages of this research in Figure 1.

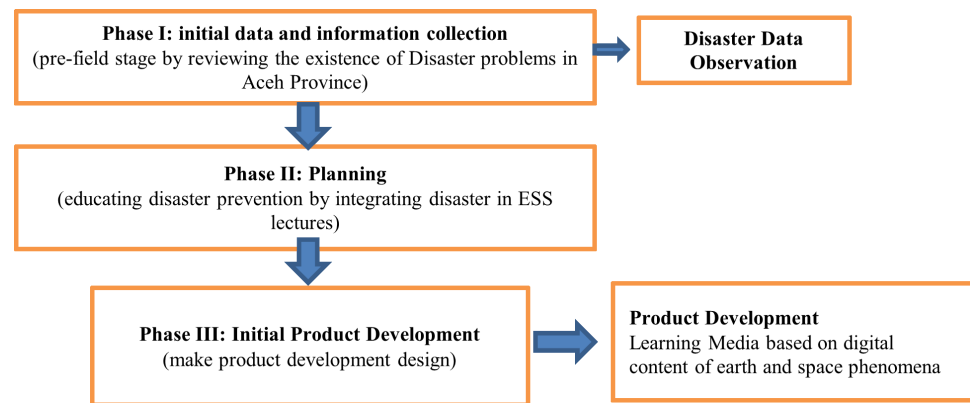


Figure 1: Brog & Gall research development stages.

3. RESULTS AND DISCUSSION

This research and development begin with the collection of initial data and information. The initial data and information collection stage is a pre-field stage by reviewing the existing problems. Based on Indonesian conditions, it can be seen that there are three classes of disaster vulnerability levels, namely high, medium, and low vulnerable classes. The disaster-prone index in Indonesia is the result of a calculation between the hazard (hazard) and the capacity value in a certain area.

Based on Law no. 24 of 2007 has been set by the Indonesian government on disaster management which emphasizes that disaster management is not only focused on the response stage. However, it covers the stages before a disaster occurs and after a disaster occurs. And it is stated that everyone has the right to get education and training services, socialization, and skills in dealing with disasters in any situation. As in the Presidential Regulation of the Republic of Indonesia, Number 17 of 2018 concerning the Implementation of Disaster Management in Certain Circumstances, the definition of a disaster is an event that poses a threat and disrupts people's daily lives due to natural or human factors that cause casualties, damage to the surrounding environment, loss of property, impacts the psychology of society. Natural disasters are events caused by nature such as earthquakes, volcanic eruptions, landslides, floods, droughts, tsunamis, hurricanes, and others.

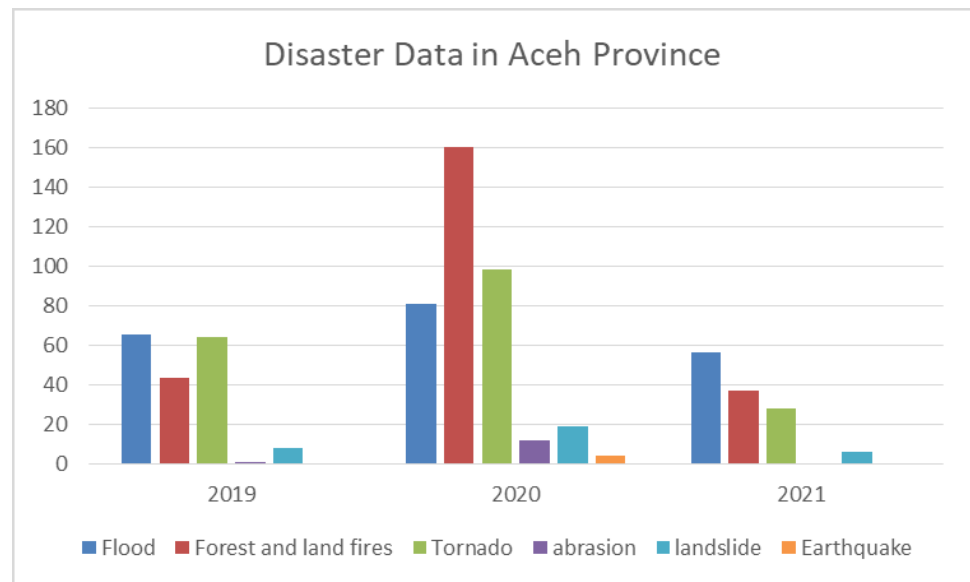


Figure 2: Disaster data.

Apart from being based on geography, demography, topography, and climate, disasters can occur due to geological factors. The province of Aceh is in the path of subduction from the confluence of the Asian and Australian plates and is at the end of the great Sumatran fault that divides the island of Sumatra from Aceh to the Sunda Strait called the Semangko Fault. The Aceh region in the middle is an active fault zone that includes the districts of Aceh Besar, Pidie, Pidie Jaya, Central Aceh, Gayo Lues, Southeast Aceh, West Aceh, Nagan Raya, Southwest Aceh, and South Aceh. Considering the condition of Aceh having a high disaster risk index, it is necessary to increase the understanding of disaster that must be given to the people of Aceh through lectures at universities. Understanding of disaster, in this case, is given in the form of disaster literacy which is one of the disaster mitigation efforts, this is in line with Brown's research [15].

The next stage after analyzing the potential and problems is the planning stage, as for what can be done in improving disaster literacy in the post-pandemic period, namely: Disaster prevention education is one of the focuses in ESS lectures, which is to make students understand the warning signs of disasters and know the steps taken to reduce risk and prevent disasters. One way to educate disaster prevention is by:

3.1. Integrated in ESS lectures

The world of education has the power to direct people's mindsets. In a disaster situation like this, learning is a source of public trust. One of the lessons that can be used as a

source of trust is ESS learning in universities. Through ESS learning, students observe symptoms or events that arise in an existing phenomenon and explain the various factors that cause this phenomenon. The study of this course includes: the concept of the universe, the solar system, the earth and its structure, the lithosphere, the hydrosphere, the atmosphere, climatology and its elements, meteorology, climatological tools, space flight, natural disaster mitigation, the study of Qur'anic verses related to Earth and space are interpreted with the discipline of physics, as well as a practicum on concepts that allow the availability of tools that are adapted to the subject matter of study.

ESS lectures are one of the effective means to reduce disaster risk by studying courses that study natural phenomena. Through lectures, disaster education can encourage people to update information, increase the level of risk perception, maintain awareness, and make and update appropriate preparations for future disasters. In line with the philosophy that underlies disaster mitigation education is the philosophy of reconstructionism, the philosophy of constructivism views students' direct experiences as the key to success, disaster education is changing paradigms and behavior related to disasters, humans construct knowledge through interactions with objects, phenomena, experiences and the environment [16].

Integrating it into the learning implementation plan which begins with the mapping of learning achievement competencies, next is the preparation of lecture program lesson Plans, modules, Student Worksheets, and assessment sheets. In addition to the learning tools that have been mentioned, learning media will also help in improving disaster literacy after the post-pandemic. Learning media that can be integrated during the pandemic and post-pandemic period is in the form of digital media with the development of digital content for earth and space natural phenomena.

Based on the data for the Aceh Province, disaster risk cannot be avoided, so Education in Indonesia, especially in Aceh Province, must include disaster literacy in lecture programs at universities. because students must be able to implement the results of learning outcomes into the surrounding environment. Disaster literacy in question is disaster mitigation carried out in universities. Mitigation is an effort made to reduce or even eliminate losses and victims due to natural disasters. So in other words, mitigation is preparation before a disaster occurs. Adapted from the conceptual framework of disaster literacy According to consist of [17].

Disaster literacy education in education must always be available for all students, prospective teachers, and teachers throughout Indonesia so that it can be integrated into their respective learning. Because natural disasters cannot be predicted when they will occur and when they will end. We as humans can only prepare ourselves to face it

TABLE 1: Disaster literacy conceptual framework.

Aspect	Indicator
Antecedent	
Personal experience	Identity
Natural disaster incident	Experiencing a large earthquake (M>7SR) Experiencing a flood disaster Experiencing a landslide Tornado
Knowledge	Known disaster-prone areas in Aceh
	Information needed to survive natural disasters
	Natural disaster prediction
	Disaster preparedness knowledge
	Disaster impact knowledge
	Response knowledge
Attitude	Prevention awareness
	Prevention value
	Sense of responsibility prevention
Skills	Action preparedness
	Response behavior

to minimize the impact. Through Disaster Risk Reduction (DRR) education. The concept of DRR solutions is adapted to the cycle of disaster, pre-disaster, during a disaster, and post-disaster as can be seen in the figure.



Figure 3: DRR concept cycle [18].

The final stage after analyzing the potential and problems is the initial product development stage, as for what can be done in improving disaster literacy in the post-pandemic period, namely: The use of technology in learning during the pandemic and post-pandemic.

In the world of education, of course, it is clear that the influence of the internet will be because basically education cannot be separated from technological developments, one of which is currently developing its online learning whereby learning online students can easily seek knowledge according to their needs and no longer depend on others. a formal education curriculum whose class implementation has been structured under the specified time so that students inevitably have to follow the things that have been determined. Online learning makes them feel freer to learn by what our government is echoing today.

The media has the power to direct people's mindsets. In a disaster situation like today, the source of public trust is mostly obtained from the media. Media is a place to learn for the community about many things and disaster events that have occurred. Submission of good and systematic information to the public is an important thing to do so that the public can truly understand the conditions that occur. This is in line with the results of the study. Submission of material on social change and literacy for the COVID-19 disaster mitigation [19].

The use of digital content will become an inseparable part of today's education world because the education era has been transformed to become technology literate. the use of technology in learning such as multimedia helps solve verbalism (oral) problems by providing videos, animated images, etc. in the learning process. Preparedness is a form of disaster alert response carried out in the pre-disaster period. Preparedness exists in situations where there is no disaster and a natural disaster is occurring. Disaster preparedness includes forecasting and decision-making in various forms of prevention.

The above efforts can be a form of disaster mitigation and the introduction of Covid-19 for students to know the dangers of the spread of Covid-19. On the other hand, teachers also need to adapt to the Covid-19 phenomenon and adjust learning activities according to health protocols. In addition, the government also recommends that Covid-19 material must be conveyed in implicit learning, therefore it is necessary to have media that can make it easier to carry out learning during this Covid-19 Pandemic. This is also in line with the research results. Project-based online learning systems provide many opportunities to access teaching materials by learning citizens. Many platforms and online media can be accessed via the internet by teachers and students [19–21].

4. CONCLUSION

Disaster literacy is a disaster mitigation effort so that students know information about disasters so that they have awareness of the potential for disasters and can prepare themselves in dealing with disasters. Because disasters cannot be stopped, through disaster literacy, is expected to minimize the risks caused by training disaster mitigation skills. ESS lectures are one of the lessons that can integrate mitigation and adaptation from a natural phenomenon in educating disaster literacy in the community in the future. The post-Covid-19 pandemic has had many impacts in the world of education, especially in preparing creative teachers by preparing various forms of learning media to online, and offline learning methods and can even be combined into both, called blended learning or hybrid learning.

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