

Preliminary Study on the Design of Forest and Land Fire Disaster Learning Media for Elementary Schools

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Abstract. The study discusses teachers' knowledge and experience using learning media for elementary schools' forest and land fire disaster mitigation. The results of this study are used as a preliminary investigation to design an Air Pollution Index Simulator (SI-ISPU). The research method used is a survey method. Respondents in this study amounted to 23 teachers in elementary schools. Data collection techniques using closed questionnaire techniques and data analysis techniques using descriptive statistics. The results showed that 39.13% of teachers still did not know the learning media that could be used to teach forest and land fire disaster mitigation. Then, 69.57% there are still many teachers who have not taught using learning media for forest and land fire disaster mitigation. The experience of teachers who have developed learning media for forest and land fire disaster mitigation is only 13.04%. Then 78.26% of teachers experienced problems developing learning media for forest and land fire disaster mitigation. Furthermore, 65.22% of teachers have difficulty teaching forest and land fire disaster mitigation. The research concludes that most teachers still experience difficulties and obstacles in developing learning media and teaching about forest and land fire mitigation in elementary schools.

1 Introduction

Students in elementary schools very much need the need for knowledge of forest and land fire disaster mitigation. Knowledge of disaster mitigation from the start will provide knowledge and experience in dealing with disasters. For this reason, natural disaster mitigation education is essential, either through public education or formal channels in

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schools. Schools are an effective and efficient way to grow and develop disaster mitigation education through learning [1].

Learning is essentially a conscious effort owned by an educator to educate his students, thus being able to direct through the interaction of students with other learning resources to achieve the educator's desired goals [2]. It can be seen more clearly that learning is an interaction between two directions, namely from an educator and a student, which occur through good and directed communication [3], which can produce a previously set target.

One of the competencies teachers in elementary schools must possess is designing, developing, and evaluating learning media [4–7]. In designing learning media, the teacher should know the learning outcomes and the material's content to be delivered to students. Teachers' use of learning media in the teaching process will facilitate interaction between teachers and students to make learning more effective and efficient. In addition, the use of learning media can: (a) improve the quality of student learning outcomes; (b) uniform delivery of subject matter; (c) foster a positive attitude of students; (d) time efficiency; (e) enable learning activities to be more flexible or can be done anytime and anywhere; and (f) the teaching and learning process becomes more attractive, clear and interactive. The benefits of learning media for teachers are learning media for teachers: (a) it is easier to focus students' attention on the material being studied; (b) it makes it easier for teachers to explain complex material; (c) the achievement of teaching and learning objectives effectively; (d) efficiency in the use of time; (e) arranging class atmosphere to be more interactive; (f) the learning methods used are more varied; and (g) encouraging students to be more active and not bored. While the benefits of learning media for students are: (a) arouse motivation, interest, and desire to learn; (b) can better understand the material presented by the teacher; (c) the learning process can be done anytime and anywhere; (d) learning is fun and easy to understand; (d) support independent learning; and (e) improve learning outcomes and quality.

It is hoped that this learning media can transfer knowledge from abstract concepts to be taught [8,9]. Therefore, the need for disaster mitigation learning media is essential. For this reason, it is necessary to develop learning media to provide information to students on the knowledge of forest and land fire disaster mitigation. One learning media developed is the Air Pollution Standard Index Simulator, abbreviated SI-ISPU, which teachers will later use to learn forest and land fire mitigation in elementary schools. Therefore, SI-ISPU, as a learning media for disaster mitigation, is expected to provide knowledge transfer about forest and land fire disaster mitigation for students in elementary schools.

This study will discuss the knowledge and experience of teachers in using learning media for forest and land fire mitigation in elementary schools. The results of this study will later be used as a preliminary investigation to design SI-ISPU as a learning media for elementary school forest and land fire mitigation. The knowledge and experience of teachers in research are; (a) knowledge of teachers about learning media that can be used to teach forest and land fire disaster mitigation; (b) the experience of teachers teaching by using learning media on materials on forest and land fire disaster mitigation; (c) teacher experience in developing learning media for forest and land fire disaster mitigation; (d) obstacles faced by teachers in developing learning media for forest and land fire disaster mitigation; and (e) obstacles faced by teachers in teaching forest and land fire disaster materials.

2 Theoretical Framework

2.1 Disaster Mitigation Education

According to Law Number 24 of 2007 [10] concerning Disaster Management, the classification of disasters consists of natural, non-natural, and social disasters. Natural

disasters are caused by events or a series of events, the leading cause of nature. Examples of natural disasters include earthquakes, tsunamis, volcanic eruptions, floods, droughts, hurricanes, and landslides. Non-natural disasters are disasters caused by non-natural events, namely technological failures, failed modernization, epidemics, and disease outbreaks. At the same time, social disasters result in events or series of events caused by humans, including social conflicts between groups or communities and terror[11].

Disaster management, in general, can be broken down into before a disaster occurs, during a disaster, and after a disaster occurs[12]. Mitigation before a disaster can be done through prevention, mitigation, and preparedness activities. Meanwhile, the response during a disaster consists of the initial stage, emergency stage, consolidation, final stage, and rehabilitation. Finally, post-disaster management can be done through reconstruction and development[11][13].

For this reason, disaster mitigation education is needed to deal with disasters before a disaster occurs, which is expected to provide knowledge and understanding and take appropriate actions during and after a disaster. Therefore, the main objectives of disaster mitigation education for students are: (a) providing information to students about correct knowledge about disasters; (b) providing a systematic understanding of protection; (c) equipping students through practical training to protect and respond to disasters appropriately and quickly[14].

Disaster mitigation education needs to be implemented into learning[14]. For example, **Table 1** below shows that the following is one of the disaster mitigation competency designs applied in learning.

Table 1. Design of Basic Competencies in Learning and Development of SI-ISPU Learning Media for Students in Elementary Schools

Basic competencies	Description
Able to identify threats before, during, and after forest and land fire disasters.	These essential competencies can be developed into learning outcomes, namely: (a) explaining the symptoms and causes of forest and land fires; (b) explaining the activities or activities before, during, and after the forest and land fire disaster; and (c) simulate activities before, during and after the forest and land fire disaster[15].

2.2 Disaster Mitigation Learning Media

One way to achieve basic competence in identifying threats before, during, and after a forest and land fire disaster is to use media in the learning process. Learning media is a component of learning resources or physical vehicles containing instructional materials in the learner's environment to stimulate students to learn. Learning media as learning resources are components of the instructional system and messages, people, background techniques, and equipment. The primary function of learning media is as a teaching aid that also influences the conditions and learning environment. The use of learning media at the learning achievement orientation stage dramatically helps the effectiveness of the learning process and the delivery of learning message content [16–19].

The need for disaster mitigation learning media is very much needed[16][19][20]. For this reason, it is necessary to develop learning media to grow students' knowledge and understanding of forest and land fire disaster mitigation. One learning media that will be developed is SI-ISPU which teachers will use to provide knowledge of forest and land fire mitigation in elementary schools. SI-ISPU, as a learning media for disaster mitigation, is expected to provide knowledge transfer about forest and land fire disaster mitigation for students in elementary schools. One of the efforts that can be made in increasing awareness and ability to deal with disasters needed to reduce the level of vulnerability to disaster risk, especially for children of school age, can be done by providing stimulation through the media in learning. Therefore, knowledge transfer through the SI-ISPU learning media is expected

to provide elementary school students with better knowledge and understanding of forest and land fire disaster mitigation. Designing the SI-ISPU learning media for forest and land fires for elementary schools can be seen in the research framework, as shown in **Fig. 1**.

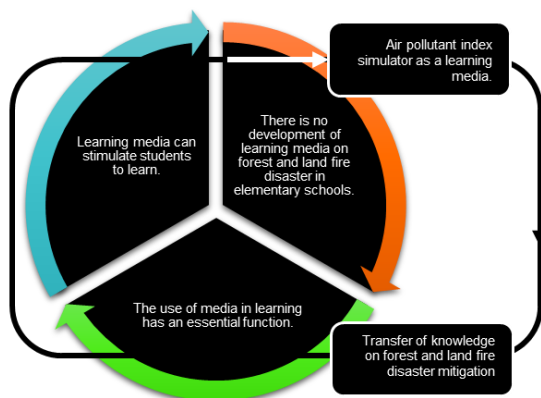


Fig. 1. Framework for developing SI-ISPU as a learning media for forest and land fire disaster mitigation for elementary schools.

3 Methodology

The research method used is a quantitative approach with a survey method. Respondents in this study amounted to 23 teachers in elementary schools from several elementary schools. Respondents consist of principals and teachers in elementary schools with teaching experience consisting of (a) >25 years totaling one person; (b) 20-25 years totaling one respondent; (c) 10-15 years totaling eight respondents; (d) 5-10 years totaling six respondents; and (e) 1-5 years totaling seven respondents. The data collected in this study is the experience of teachers using learning media for forest and land fire disaster mitigation in elementary schools. The research instrument used was a questionnaire containing: (a) teacher knowledge about learning media that can be used to teach forest and land fire disaster mitigation; (b) the experience of teachers teaching by using learning media on materials on forest and land fire disaster mitigation; (c) teacher experience in developing learning media for forest and land fire disaster mitigation; (d) obstacles faced by teachers in developing learning media for forest and land fire disaster mitigation; and (e) the obstacles faced by teachers in teaching forest and land fire disaster mitigation. The data collection technique in this study used a closed questionnaire technique. Data analysis techniques are used to perform research data processing using descriptive statistics.

4 Results and Discussion

The results of the study on the knowledge and experience of teachers in elementary schools in using learning media for forest and land fire disaster mitigation which were used as preliminary investigations in designing ISPU as learning media, obtained information: (a) knowledge of teachers about learning media that can be used to teach forest and land fire disaster mitigation; (b) the experience of teachers teaching by using learning media on materials on forest and land fire disaster mitigation; (c) teacher experience in developing learning media for forest and land fire disaster mitigation; (d) obstacles faced by teachers in

developing learning media for forest and land fire disaster mitigation; and (e) obstacles faced by teachers in teaching forest and land fire disaster materials. can be seen in **Table 2**.

Table 2. Knowledge and Experience of Teachers in Using Learning Media for Forest and Land Fire Disaster Mitigation for Elementary Schools

Aspect	Respondent's Answer	Amount	Total
Knowledge of teachers about learning media that can be used to teach forest and land fire disaster mitigation	No	9	23
	Yes	14	
The experience of teachers teaching by using learning media on materials on forest and land fire disaster mitigation	Never	16	23
	Ever been	7	
Teacher experience in developing learning media for forest and land fire disaster mitigation	Never	20	23
	Ever been	3	
Obstacles faced by teachers in developing learning media for forest and land fire disaster mitigation	Having difficulties	18	23
	No difficulties	5	
Obstacles faced by teachers in teaching forest and land fire disaster materials	Having difficulties	15	23
	No difficulties	8	

Table 2 provides information that teachers' knowledge of learning media can be used to teach forest and land fire disaster mitigation, those who answered "yes" were 14 respondents, and those who answered "no" were only nine. The experience of teachers teaching using learning media on materials about forest and land fire disaster mitigation, those who answered "ever been" obtained seven respondents, and those who answered "never" obtained 16 respondents. The experience of teachers in developing learning media for forest and land fire mitigation who answered "never" consisted of 20 respondents, and three answered "ever been" Obstacles faced by teachers in developing learning media for the forest and land fire disaster mitigation obtained 18 respondents who answered "having difficulties" and five respondents who answered "no difficulties." Then the obstacles faced by teachers in teaching forest and land fire disaster materials, who answered "having difficulties," were 15 respondents, and eight answered "no difficulties."

Analysis of research data on the knowledge and experience of teachers in elementary schools in using learning media for forest and land fire disaster mitigation, which was used as a preliminary investigation to design SI-ISPU as learning media for forest and land fires for elementary schools, obtained information as shown in **Fig. 2**.

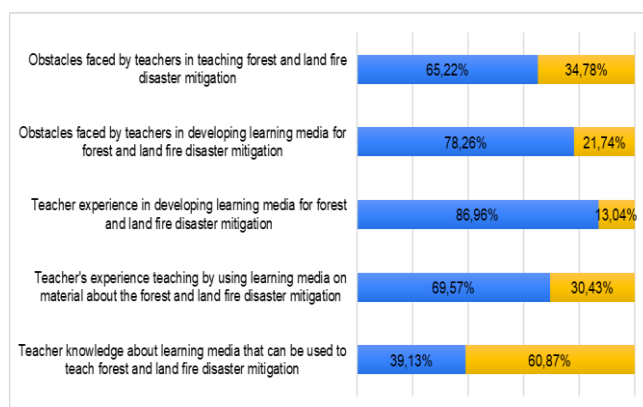


Fig. 2. Teacher's experience using learning media for forest and land fire disaster mitigation in elementary school.

Fig. 2 is data on the knowledge and experience of teachers in using learning media for forest and land fire mitigation in elementary schools. Information obtained that 39.13% of teachers still do not know the learning media that can be used to teach forest and land fire disaster mitigation, and 60.87% of teachers already know learning media that can be used to teach forest and land fire disaster mitigation. For this reason, it is necessary to implement mitigation education through programs inside and outside the classroom, which are carried out with several approaches, strategies, methods, and the use of learning media, techniques, and tactics [21]. However, in implementing classroom learning, only 30.43% of teachers who teach using instructional media use materials on forest and land fire disaster mitigation, while 69.57% of teachers still do not use instructional media. Furthermore, the experience of teachers, Therefore, innovation [22][23] and teacher skills are needed in planning, designing, and packaging learning, learning resources, and media [18][19] regarding forest and land fire disaster mitigation, so that creative teachers are expected to be able to produce learning maximum [17][24]. Success in carrying out the learning process will have an impact on increasing knowledge [25–27], attitudes, ethics[28], and the preparedness of students in dealing with forest and land fire disasters[26].

Based on research data, information is obtained that there is still a lack of teachers who develop learning media for land forest fire disasters because 78.26% of teachers experience obstacles in developing forest and land fire disaster mitigation learning media, while those who do not experience difficulties in developing are 21.74%. So, it impacts 65.22% of teachers having difficulty teaching forest and land fire disaster mitigation, while 34.78% have no difficulty. Therefore, it takes competence[29], motivation, and commitment of teachers[5][29] to carry out roles and tasks well so that it is expected to affect teacher performance [5][29][30]. Therefore, the most excellent competence, motivation, and commitment of teachers are expected to reduce the difficulties and obstacles of teachers in developing learning media and packaging learning[17][20][31] on materials on forest and land fire disaster mitigation in elementary schools[32].

Based on an initial search about the experience of teachers using learning media for forest and land fire disaster materials in elementary schools. It is necessary to develop learning media as an air pollution index simulator (SI-ISPU) (see **Fig. 3**) as a diorama of the environment affected by forest and land fire disasters. **Fig. 4** shows air quality indicators in forest and land fire disasters.

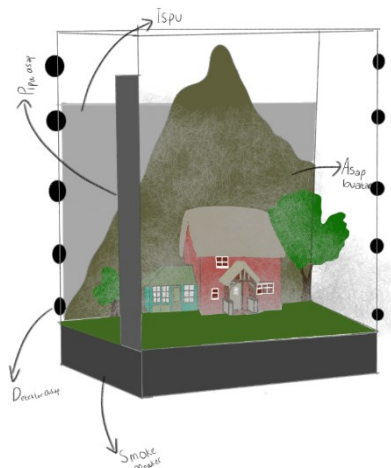


Fig. 3. Design of environmental dioramas affected by forest and land fire disasters.

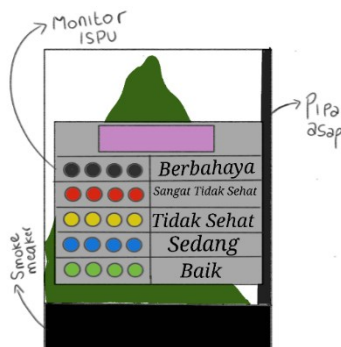


Fig. 4. Design and build air quality indicators in forest and land fire disasters.

5 Conclusion

The research concludes that most teachers still experience difficulties and obstacles in developing learning media and teaching elementary schools about forest and land fire disaster mitigation. Therefore, it is necessary to design SI-ISPU as a learning media to assist teachers in overcoming difficulties and obstacles in teaching about forest and land fire disaster mitigation in elementary schools and is expected to assist in the transfer of knowledge about forest fire disaster mitigation and land for students in elementary schools.

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