

## ANALYSIS OF DISASTER RISK REDUCTION (DRR) LEARNING MODULES IN SCHOOL CURRICULUM IN INDONESIA

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### Abstract

*Schools need a disaster module as a special guide that is used to build student awareness in dealing with disasters. To meet the needs of students as users, this module must be able to deliver accurate and trustworthy information. This paper uses a descriptive qualitative approach with content analysis, which explains in more depth what school DRR support modules have been developed. There are four steps to this research method: i) problem conceptualization, ii) data collecting (investigation), iii) data coding, and iv) data analysis and interpretation. This study uses search engines from databases such as Google, and data from the National Secretariat, KIE Media, and Schools. This paper will discuss further i) What DRR support modules have been developed in schools? ii) how is the module compatible with disaster learning? and iii) How suitable is the module for disaster learning in schools? To support a wider spectrum of literature emerging from the search, the database was searched using the following key terms: "Modules", "Learning", "Disasters", "Schools", "DRR", "Training", "Teachers" adding "AND" and "OR". As an inclusion criterion, this discussion only considers the Learning module from the DRR aspect. A literature search was conducted from September 8 to September 21, 2022. A total of 6 modules that met the inclusion and exclusion criteria were included for further analysis. Based on the results of the analysis of data management, conclusions are obtained from the components consisting of objectives, indicators, materials, learning activities, exercises, self-reflection, summary, and references.*

**Keywords:** *Evaluation; Disaster Education; SDGs; Sustainable Cities and Communities; Quality Education.*

### 1. INTRODUCTION

Indonesia is one of the disaster-prone countries because its geographical location is between the confluence of 3 major world plates, namely the Indo-Australian Plate, the Eurasian Plate, and the Pacific Plate, also known as the Ring of Fire area. Due to this location, Indonesia often experiences disasters such as volcanic eruptions, earthquakes, landslides, and tsunamis that often occur, resulting in many casualties and property loss. This demonstrates that disasters pose a serious threat to Indonesia, necessitating action to reduce and mitigate disaster risks. Influence of climate change brought on by environmental destruction makes many casualties and loss of property complex and challenging situations. Humanitarian program interventions and development programs will continue to be significantly impacted by climate change, which will also continue to provide difficulties for creating and implementing the education sector (BNPB, 2013).

There are 80% of Indonesia's areas are at high risk of disaster, including 205 million people exposed to disaster risk 107 million of whom are school-age children. From the consideration of disaster risk and the extent of exposure, an integrated, synchronous, and synergistic effort is needed between Ministries/Institutions, the community, and the world. These efforts are intended to prevent disaster risk, strengthen the capacity of institutions and communities, reduce the impact of disasters, prepare the community, ensure an early warning system, and strengthen emergency response and recovery capabilities (IRBI, 2013). Disaster education has become a hotly discussed strategic issue to raise awareness of disaster threats and management. However, Shiwaku, et.al

(2007), said that the conditions in the field showed that many students did not understand the importance of disaster mitigation in pre-disaster. Another research conducted by Kasvia (2019), also states that many students at SMA Banda Aceh only understand the theory about mitigation but not with direct practice. Disaster mitigation so that when students face disaster events, the theories that have been learned are not maximally applied in disaster actions.

Three primary factors, including the ineffectiveness of current rules pertaining to disaster-safe schools and the low ability of instructors to teach disaster education, all affect the effectiveness of disaster education (Amri, et.al, 2017). In efforts to protect its citizens against disasters, the Government of Indonesia has enacted Law no. 24 of 2007 concerning Disaster Management, the Law clearly states that everyone has the right to education, training, and skills in disaster management, both in situations where there is no disaster or a situation where there is a potential for disaster. Through education, it is hoped that disaster risk reduction efforts can achieve broader targets and can be introduced earlier to all students, by integrating disaster risk reduction education into the school curriculum and extracurricular activities.

One of the key measures of the effectiveness of education passed down from generation to generation is the ability to mitigate disasters. Disaster Risk Reduction (DRR) education is a long-term activity and part of sustainable development. Through education, it is hoped that disaster risk reduction efforts can achieve broader targets and can be introduced earlier to all students, and ultimately contribute to individual and community preparedness for disasters. Disaster Risk Reduction and Prevention Education is designed to build a safe culture and resilient society.

Based on research data on junior high school teachers in West Java, disaster knowledge and learning methods in disaster mitigation have not been well understood by teachers, school principals, and education boards. In other words, the need for debriefing disaster materials needs to be given to school staff either through upgrading, seminars, or training, before the information is conveyed to students (Maryani, 2010).

Submission of learning about disaster can be conveyed to students, teachers, and school staff through teaching materials and has a special standard for disaster. However, not all students can be served their learning needs individually, because both the ability and character of each student in learning are different. One of the things that can accommodate the needs of students independently is individual learning using modules (Shofan et.al, 2012).

Module learning is more effective than conventional learning because with the module students can learn independently, so they can develop steps and abilities that affect learning outcomes in classes that apply learning modules. A module is a learning package related to a unit of learning material. The Directorate of Vocational High Schools said that to increase student interest in learning the modules were arranged systematically, and attractively and included objectives, achievement indicators, material content, activity methods, and evaluation (Shofan et. al 2012). In the context of this background, the primary goal of this study was to perform analysis on the Disaster Risk Reduction (DRR) learning modules in School Curriculum in Indonesia.

## **2. IMPLEMENTATION METHOD**

This paper uses a descriptive qualitative approach with content analysis which explains in more depth what DRR support modules in schools have been developed. There are four steps to this research method: i) problem conceptualization, ii) data collecting (investigation), iii) data coding, and iv) data analysis and interpretation. This study uses search engines from databases such as Google, and data from the National Secretariat, KIE Media, and Schools.

The following research questions guide the search strategy, including i) What are the DRR support modules that have been developed in schools? ii) how is the module compatible with disaster learning? and iii) How is the suitability of the module in disaster learning in schools? To support a wider spectrum of literature emerging from the search, the database was searched using the following key terms: "Modules", "Learning", "Disasters", "Schools", "DRR", "Training", "Teachers" adding "AND" and "OR". As an inclusion criterion, this discussion only considers the

Learning module from the DRR aspect. Articles that do not have full access are excluded from this book. A literature search was conducted from in August until September, 2022. A total of 6 modules that met the inclusion and exclusion criteria were included for further analysis.

### 3. RESULTS AND DISCUSSION

The search results obtained six modules, with the target users of teachers and students for junior and senior high school levels. The modules are also arranged in various forms, including training modules, learning modules, guidebooks, teaching modules, and student worksheets. The majority of modules are in natural science and geography subjects.

More details of the disaster learning module's specifications can be seen in Table 1.

**Table 1.**  
**Detail Information on the Modules**

Author (s)	Title	School Subject	Type of Hazard	User	Type of Module	Level
Andik & Mustofa, (2016)	Teacher Training Module for Professional Senior High School Geography: Disaster Mitigation and Adaptation Pedagogics: Learning Evaluation	Geography	General	Teacher	Training Module	Senior High School
Lina & Rangga, (2020)	Learning Module for Junior High School Open Science Module 10 Layers of the Earth and the Threat of Natural Disasters.	Natural Sciences	Natural Hazards	Student	Learning Module	Junior High School
Lestari, (2020)	Geography High School Learning Module: Natural Disaster Mitigation.	Geography	Natural Hazards	Student	Learning Module	Senior High School
Laila F.U. et al, (2021)	Teacher's Guide for Natural and Social Sciences Project (IPAS Project) I for Class X SMK/MAK	Natural and Social Sciences	General	Teachers	Guideline Book	Senior High School
Aryana, (2021)	Teaching Module for Fire Disaster Mitigation of IPAS Project Phase E Class X	Natural Science	Fire	Teacher	Teaching Modul	Senior High School
PMB ITB, (2007)	Teacher Training for School Preparedness Programs Against Earthquake Hazards Book 3: Student	N/A	Earthquake	Student	Student Worksheet	N/A

Author (s)	Title	School Subject	Type of Hazard	User	Type of Module	Level
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Worksheets

The results of content analysis from the evaluation of the DRR module that supports learning in schools are described in Table 2. Six modules are analyzed based on the components in the module, namely: (1) objective (2) Indicators (3) materials (4) Learning activities (5) Exercises (6) Self-reflection (6) Summary, and (7) References.

**Table 2.**  
**Analysis Module Component**

Author (s)	Objective	Indicator	Contents of the Material	Learning Activities	Exercise	Self-Reflection	Summary	References
Andik & Mustofa, 2016)	x	x	x	x	x	x	x	x
Lina & Rangga, 2020)		x	x	x	x	x	x	x
Lestari, 2020)	x	x	x	x	x	x	x	x
Laila F.U. et al, 2021)	x		x	x	x	x		x
Aryana, 2021)	x		x	x	x	x		x
PMB ITB, (2007)	x		x	x	x			x

*1. Objective*

Based on the data obtained from the results of the content analysis of the DRR learning module regarding the existence, of the 6 modules, 5 modules have learning objectives in them, and 1 module that does not have the stated learning objectives only has core competencies and basic competencies. The learning objectives are so that learning with modules can be understood well. Based on interviews conducted with teachers, each learning module must have a purpose it and be adjusted to basic learning competency standards to achieve learning targets and coverage materials.

*2. Indicator*

Based on the data obtained from the results of the content analysis of the DRR learning module regarding the indicators of the 6 modules, 3 modules state the learning indicators in it, while the other 3 modules do not apply the learning indicators. There is an opinion that suggests that indicators and objectives of learning are the same two things that are expected for the achievement of the learning process of students (Utami, 2010). Based on interviews with teachers, achievement indicators are made targets from student learning outcomes.

*3. Contents of the Material*

Based on the data obtained from the results of the content analysis of the DRR learning module regarding the existence of the material from the 6 modules, there are 6 DRR support modules in schools that contain material in the form of materials on disaster and how to deal with

disasters. And preparedness and its integration with learning materials that are packaged according to the target. There is 1 module that contains a little material only as background material in it, this is because the module is focused on LKS, which is a module that only contains material about exercises that are not included in it. Based on interviews with teachers, each learning module in it is followed by material. If there is a module without material, then the module is incomplete because the purpose of making the module is to make the student's independent learning process more intensive. However, some modules do not have special material because the modules are made separately, usually, the module is held by the teacher.

#### 4. *Activities*

Based on the data obtained from the results of content analysis from the DRR learning module about the existence of learning activities in 6 modules, all modules contain learning activities in them. Based on interviews with teachers in a module, learning activities are carried out in the form of practice questions and instructions for using the module independently, this is to make it easier for students to understand the learning module.

#### 5. *Exercise*

Based on the data obtained from the results of the content analysis of the DRR learning module about the existence of exercises in 6 modules, all modules which there are exercises to test the understanding of the material in the module. Based on interviews with teachers, the exercises contained in the module are by the material and objectives of the learning, and the exercises are not given an answer key, this is done to see further the students' abilities in learning.

#### 6. *Self-reflection*

Based on the data obtained from the results of the content analysis of the DRR learning module regarding the existence of self-reflection in the 6 modules, 4 modules have self-reflection in it, and the 2 modules do not have self-reflection. Based on interviews with teachers, self-reflection was conducted by students and teachers to measure the success of students or teachers in studying the module, and whether it facilitates or evaluates learning from the module used.

#### 7. *Summary*

Based on the data obtained from the results of the content analysis of the DRR learning module regarding the summary of the 6 modules, 3 modules contain summaries in them. Interviews conducted with the summary teacher are short material that is summarized to make it easier for students to read briefly from the material in the content of the module. This is necessary to make it easier for students to understand the material briefly.

#### 8. *References*

Based on the data obtained from the content analysis of the DRR learning module, there is a summary of 6 modules, all modules contain references. From the results of interviews with teachers that the module has a bibliography that is by DRR material so that the presence of references will better support the validity of the material in the module.

Disaster education requires comprehensive handling so that the main objectives of disaster management are achieved without compromising the main objectives of learning (Sakurai et al., 2017; Sakurai et al., 2018). It is required that disaster education be taught in schools at all levels, from elementary to higher education. Learning provides adequate provisions for students to face the future with various challenges, including disaster problems. Each student's disaster preparedness character will grow more and more culturally entrenched as they acquire the knowledge, attitudes, and abilities related to disasters (Oktari, 2017; Oktari et al., 2020).

Disaster education is education that integrates disaster materials into formal education so that students can play a role in building the knowledge, skills, and attitudes needed to prepare for and cope with disasters, as well as help students and the community return to normal life after a disaster occurs (Kagawa & Selby, 2012). The effectiveness of this disaster education for students provides its value if it is carried out in accordance with the area where the student lives. Case studies on the handling of the earthquake in Aceh, for example, emphasize how disaster education can strengthen resilience and preparedness. This effort is directed at developing a conceptual collaboration model

between communities and schools in dealing with disasters (Oktari et al., 2015; Oktari et al., 2018). Researches have demonstrated that the incorporation of DRR into formal education could be an effective way to reduce disaster risk (UNISDR, 2015).

Other case studies such as those conducted in China apply the DRR curriculum in maple geography by linking spatial concepts and topography of Chinese regions in reducing the vulnerability of infrastructure damage both in skills and actions (Gong et al., 2021). Other case studies also include Fiji is notable for the development of a range of highly innovative student-centered approaches to DRR that seek to integrate students' own experiences into learning (although the ideas developed have not been taken to scale). It also offers an example of DRR curriculum development complemented by a 'special event' approach. It is also noteworthy, too, in the conscious efforts currently being made to salvage and revive indigenous knowledge and practices with regard to hazards and to embed these practices and knowledge in learning (Selby & Kagawa, 2015).

Another case study in Japan conducted disaster training to form disaster response attitudes during disasters. Disaster training conducted by the Japanese people is part of the cultivation of disaster mitigation education, which is preparing the community to be ready before, during, and after a disaster. One of the successes of cultivating disaster mitigation education can be seen from the events of The Miracle Kamaishi, where students practice directly what they have practiced for years and good cooperation with various agencies. With the continuous cultivation of disaster education, it is hoped that it can create an attitude of people who respond to disasters, especially in Japan a country that is often hit by disasters (Widiadari, 2021).

Case studies in New Zealand offer national multi-media (print and electronic forms) as an approach to DRR for primary and secondary schools (students aged 7 to 12 years). Resources are initiatives of the Ministry of Civil, Defence and Emergency Management that are embraced by but not proactively strengthened by the Ministry of Education. It is particularly interesting in the multi-Hazard Approach, the comprehensive nature of the programs developed and the diverse use of learning and teaching approaches. It also provides some important insights into what is needed to strengthen and therefore systematize DRR delivery through the National Curriculum (Selby & Kagawa, 2015).

The integration of DRR into the school curriculum may be the best way to ensure that DRRE in schools can be sustained (Nurudin, 2019). Infusing DRR across the curriculum involves determining the key DRR-related knowledge, skills, and attitudes that students need to acquire and identifying the potential of each subject to carry and deliver those learning needs (Selby et al., 2014). DRR can be integrated as a stand-alone subject of its own, or it can be introduced within a carrier subject such as geography, civic education, and geology, and it can also be mainstreamed in different subject matter (Shaw et al., 2014). In the context of DRR, education is a critical driver because it conveys the essential fundamentals for risk-conscious and risk-mitigating actions among the population. Those responsible for education and research in the field of disaster education can be served to improve the level of education (Torani et al., 2019).

Indonesia's region is a disaster-prone area, so there must be an effort to minimize the impact of casualties at a young age. The effort taken is to create disaster mitigation learning programs into the curriculum. Through disaster mitigation, curriculum can increase student knowledge about the level of awareness and perception of disaster risk and readiness in responding to disasters that occur. (Putra et al., 2021). Disaster mitigation education emphasizes changes in students' actions, behavior and psychomotor. This is in line with the implementation of behavioristic theory which is the basis for the formation of disaster mitigation behaviors (Putrayasa et al., 2013). The disaster mitigation training program is a special program in providing disaster mitigation skills training. This training is targeted at elementary school students aged 6-12 years or at the operational stage (Matt Jarvis. 2011). In this stage, the child is mature enough to use logical thinking so direct practice activities are very appropriate. The disaster mitigation training program unites and

integrates information, perceptions and knowledge that has been learned in the learning process into practical activities (Sanjaya, 2010.) The Indonesian government gives special autonomy to schools in Indonesia to handle disaster problems and create a separate disaster curriculum but problems occur when schools do not have financing to support in running disaster school programs in implementing the disaster curriculum (Selby and Kagawa, 2015). At this time the school has run a new curriculum, namely the independent curriculum. The independent curriculum provides flexibility for educators to create a more quality learning environment for students, this curriculum consists of three learning processes, namely intracurricular (learning), co-curricular (Pancasila student profile project) and, extracurricular. The objectives and characteristics of this curriculum are the formation of character characteristics of this curriculum, namely the development of soft skills and character focus on essential materials, more flexible learning, and the formation of Pancasila lesson profile projects (Kemendikbud, 2022). From the purpose of this curriculum, it is possible to develop a disaster curriculum in the independent curriculum. By considering the problems in previous years due to lack of costs and we can also apply more varied learning such as in Japan, New Zealand, and several other countries. This disaster approach is expected to be implemented in the learning process in the co-curricular field (Pancasila student profile project) where later teachers can be more creative in implementing disaster learning projects.

Pancasila student project profile (P5) activities in the cocurricular that provide opportunities for students to extract knowledge, develop skills, and strengthen the six dimensions of P5. Study important themes or issues such as sustainable lifestyle, tolerance, mental health, culture, entrepreneurship, technology, and democratic life. Take concrete actions as respondents to these issues in accordance with student learning stages (Kemendikbud, 2022). This activity is considered very suitable in implementing and developing the disaster curriculum in the independent curriculum, of course, by incorporating disaster knowledge in studying disaster-related issues and information as well as disaster skills and disaster action can be realized in the learning process in schools by packaging more interesting and creative and innovative learning between educators and students.

#### **4. CONCLUSION**

Based on the results of the analysis of data management, conclusions are obtained from the components consisting of objectives, indicators, materials, learning activities, exercises, self-reflection, summary, and references. Of the 6 DRR support modules in schools, they have been integrated with learning and disaster materials, but there are only 2 modules that already have complete components. And the other 4 modules still lack components from the 4 modules. All modules contain pictures to make it easier for students to understand the material visually. As for the results of interviews with teachers in integrating disaster material in learning, not all materials and subjects can be integrated, only certain lessons that have disaster content such as learning geography, physics, science, and technology. Not all teachers in their learning make disaster-integrated modules, some teachers are still very unfamiliar with disaster-integrated learning modules so it is hoped that there will be special training in making disaster-based learning modules in each subject. According to other teachers, in the learning process, the module is only used as a learning medium, not in field practice processes such as simulations. Disaster simulation is only carried out if there is cooperation from parties from the government who carry out disaster simulation activities. A main challenge for DRR curriculum integration efforts in Indonesia is to translate the comprehensive national strategy into something manifestly concrete at the local level and to ensure school-level implementation. The lack of coordination among concerned agencies from the national down to the local levels. It highlights the importance of renewed government commitment in advocating further DRR integration into school education and also the capacity building of district governments as the actual service providers.

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