



# Development of SETS-Based Independent Curriculum Learning Module Increases Understanding of Disaster Mitigation

Mahlianurrahman<sup>1\*</sup>, Rapita Aprilia<sup>1</sup>

<sup>1</sup> Pendidikan Guru Sekolah Dasar, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Samudra, Indonesia.

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Corresponding Author:

Mahlianurrahman

[mahlianurrahman@unsam.ac.id](mailto:mahlianurrahman@unsam.ac.id)

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**Abstract:** The low understanding of disaster mitigation has an impact on the high risk that victims receive. It is necessary to have an understanding of disaster mitigation from an early age. Increasing the understanding of disaster mitigation from an early age can be improved through disaster mitigation education, especially by organizing learning innovations. The learning process for disaster mitigation needs to be facilitated by teaching modules that can improve students' understanding of disaster mitigation. This study aims to describe the increase in students' understanding of disaster mitigation through the implementation of the SETS-based independent curriculum teaching modules resulting from the development. The research model used was ADDIE's research and development (R&D) model with a *single-group pretest and posttest design*. Product trials were carried out at Public Elementary School 2 Meurandeh and data were analyzed using the N-gain test. The results of the analysis show that students' understanding of disaster mitigation has increased with an N-gain of 78.8%. Based on the results of students' understanding of disaster mitigation scores, it can be concluded that the application of the SETS-based independent curriculum teaching module can improve elementary school students' disaster mitigation.

**Keywords:** Disaster mitigation; Independent curriculum; Teaching module

## Introduction

Indonesia is a disaster-prone area (Pahleviannur, 2019) and Indonesia has experienced various types of disasters which have resulted in infrastructure damage, loss of property, and loss of life (Faturahman, 2018). The disasters that often occur in Indonesia are floods (Riza et al., 2020) which have an impact on the sustainability of community activities (Saputri & Sudarmilah, 2019). One of the causes of flood disasters is *illegal logging activities* (Prasetyo, 2019). In addition to flooding, Indonesia has experienced an earthquake and tsunami in Aceh Province on December 26, 2004 which resulted in up to 50% damage to buildings (Zaiyana & Buchori, 2014) and

is included in the mega-hazard category (Benazir et al., 2022).

Community behavior towards disaster mitigation is still low, which is one of the factors for the magnitude of the negative impact of disasters felt by the community (Idris et al., 2021). The heaviest impact of the disaster is felt by children, because children's understanding of disaster mitigation is still limited (Muhlisah & Arpin, 2021). The mentality and well-being of children will be affected due to the disaster.

Some of the efforts that can be made in disaster management are strengthening local wisdom (Puspitasari et al., 2018), preserving coastal areas to minimize the impact of the tsunami (Findayani et al.,

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2020) and organizing disaster mitigation education in elementary schools so that students have an understanding of the actions that need to be taken before and after disasters (Ghasya & Kartono, 2021).

Students can carry out disaster management if students have an understanding of disaster mitigation (Zuhdi et al., 2019). Disaster mitigation education in elementary schools can be implemented through strengthening disaster literacy (Wibowo et al., 2019), providing disaster mitigation guidebooks (Nasrullah & Reza, 2020) and applying it in learning (Qurrotaini & Nuryanto, 2020).

The facts that are happening at this time indicate that there are still teachers who have never received disaster mitigation training, so teachers have difficulty carrying out disaster risk reduction efforts in elementary schools (Bramasta & Irawan, 2020) and teachers have not delivered material in an interesting way and still use language that is difficult for students to understand. This certainly has an impact on students' low understanding of understanding disaster mitigation. Other findings show that teachers still have not implemented the SETS learning model so that it has an impact on students' low understanding of disaster mitigation.

The application of the SETS learning model is the right choice in overcoming these problems because the SETS learning model facilitates students to be ready for the future (Laila et al., 2021; Nu'man et al., 2021; Razali et al., 2018). The application of the SETS learning model is very useful in increasing student understanding (Al-Labadi & Sant, 2021; Hamzeh et al., 2019). In addition, the SETS learning model can improve achievement (Bakhtiar et al., 2020), productivity (Smith & White, 2020), and 21st century skills (Kanadlı, 2019).

The SETS learning model is very relevant to the independent curriculum because the independent curriculum provides opportunities for students to choose a learning process that suits their interests (Daga, 2021). The SETS learning process is student-centered (Ramadina, 2021), and facilitates students with a pleasant learning atmosphere (Daga, 2020; Nasution, 2022). Students are given the opportunity to work together (Mauzidati, 2020) and the SETS learning model can form independent students in thinking (Manalu et al., 2022).

Based on the results of further observations, it shows that teachers still have difficulties in compiling teaching modules on disaster mitigation materials in accordance with the characteristics of an independent curriculum which includes learning outcomes and the flow of learning objectives (Kusumawardhana et al., 2022; Nurhasanah et al., 2022). So far, teachers have implemented teaching modules provided by the government (Ardianti & Amalia, 2022).

The SETS-based independent curriculum teaching module that was developed has differences from the teaching tools that have been developed. Previously the teaching tools developed only focused on material on the human reproductive system for junior high school students (Permatasari et al., 2019), waste management and recycling (Rini et al., 2020), and carried out in biology (Qaimuddin, 2018), chemistry (Ardiansyah, 2020) and physics (Pranowo et al., 2021).

Based on several previous studies, it can be concluded that there are no teaching modules that are in accordance with the SETS-based independent curriculum and contain disaster mitigation material. The Aceh Provincial Government has also appealed to education units to deliver disaster mitigation materials to students. Aceh is a disaster-prone area and has experienced earthquakes and tsunamis, so the SETS-based independent curriculum teaching module which contains disaster mitigation material is very important to develop.

Based on this explanation, the novelty of this research is the production of SETS-based independent curriculum teaching modules by adapting the local wisdom of students in Aceh so that understanding of disaster mitigation can increase. The purpose of this study was to analyze and describe the increase in students' understanding of disaster mitigation after the teacher implemented learning using the developed SETS-based independent curriculum teaching module. The results of this study can certainly be used as a solution for teachers in solving the problem of students' low understanding of disaster mitigation and can be used as a guide for teachers in increasing students' understanding of disaster mitigation.

## Method

The research used is ADDIE research and development with the stages of a) analysis, b) design, c) development, d) implementation and e) evaluation (Robert, 2009). The procedure for developing a learning model according to the ADDIE steps as shown in Figure 1.

The research subjects conducted at the time of product implementation in this study were fourth grade students at Public Elementary School 2 Meurandeh. While the object of this study is the SETS-based independent curriculum teaching module. Determination of the sample of this study using *random sampling technique*. The data collection method used is a test and is used to determine the increase in students' understanding of disaster mitigation. Data on students' understanding of disaster mitigation was analyzed using the N-gain test.

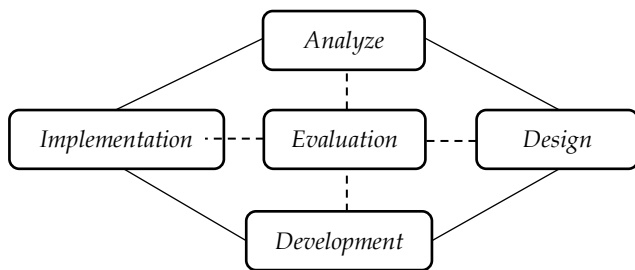


Figure 1. Learning model development procedure

## Result and Discussion

This research is to describe the increase in students' understanding of disaster mitigation through the implementation of SETS-based independent curriculum teaching modules. This teaching module is applied to fifth grade elementary school students. Prior to participating in the lesson, students are given a test to measure their initial knowledge of understanding disaster mitigation. Then after the students take part in the lesson they are given a test to measure the final knowledge related to students' understanding of disaster mitigation. The average pre-test, post-test and N-gain understanding of student disaster mitigation can be seen in the following table 1.

Table 1. Average Pretest, Final Test and N-Gain Understanding of Disaster Mitigation of Students

Component	Average Value
Pretest	29.8
Posttest	37.7
N-gain	78.8

Meanwhile, the data for the pre-test, post-test and N-gain in students' understanding of disaster mitigation are shown in the diagram in detail, which can be seen in Figure 2.

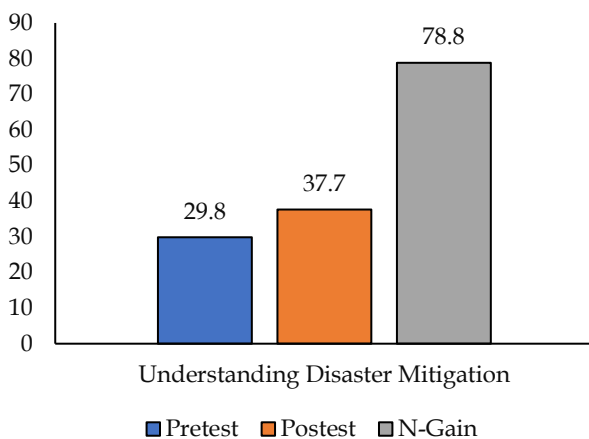


Figure 2. Pre-test, post-test and n-gain results

Based on the results of the N-gain analysis, it shows that there is an increase in students' understanding of disaster mitigation with a score of 78.8% and there is a change in scores that are higher in the posttest, which is 37.75%, while the pretest is only 29.8%. Based on the results of the N-gain test analysis, it shows that the implementation of the SETS-based independent curriculum teaching module has increased students' understanding of disaster mitigation.

Learning in elementary schools is expected to provide meaningful experiences to students so that students can solve problems encountered in everyday life. The learning process is associated with issues that occur in students' daily lives which are integrated into the learning process, so that students get meaningful learning experiences. This meaningful experience can be obtained through the application of appropriate learning and in favor of students. Learning that produces meaningful experiences can be obtained through the implementation of SETS-based independent curriculum teaching modules. SETS learning needs to be included in the curriculum and other documents that regulate education (Fernandes, 2014).

Referring to the research data, it shows that there is an increase in students' understanding of disaster mitigation after the SETS-based independent curriculum teaching module is applied in learning. It can be seen that there is a difference in the results of the N-gain score between the experimental class and the control class. Students' understanding of disaster mitigation is important knowledge for students who live in disaster-prone areas.

Not a few people who are in trouble after being hit by a disaster. Preparedness is very important to have so that the negative impacts of disasters can be avoided. Understanding of disaster mitigation is very important to have (Achmad, 2020). Indonesia is a disaster-prone area or a ring of fire area, therefore it is very important that disaster mitigation material is delivered in learning (Rifai, 2018). However, the problems that are happening at this time are that there is still learning that is not optimal in increasing students' understanding of disaster mitigation (Nurchahyo & Winanti, 2021). Therefore, it is very important to apply the SETS-based independent curriculum teaching module in increasing students' understanding of disaster mitigation.

The results of learning using the SETS-based independent curriculum teaching module show that students are very enthusiastic about participating in each stage of the learning process. Delivery of disaster mitigation materials through the SETS-based independent curriculum teaching module has benefited students and students can take appropriate actions before and after a disaster occurs.

Increased student understanding due to the learning stages contained in the SETS-based independent curriculum teaching modules provide opportunities for students to identify social problems, identify potential solutions, identify knowledge for problem solving, decision making, and socialize or present decision results (Pimvichai et al., 2019).

The teaching modules that are applied are linked to local local wisdom in accordance with the daily lives of students. Local wisdom can be integrated into co-curricular, intra-curricular and extra-curricular activities (Tohri et al., 2022). Learning related to the problems of everyday life makes students want to take action in solving problems and being responsible for the problems they face (Lester et al., 2006). The development of SETS learning that contains cultural content is very important to do (Calado et al., 2018). Learning that integrates with local wisdom makes students enthusiastic, enjoys participating in learning (Nurdiansah et al., 2021) and can improve student learning outcomes (Fisher, 2020).

The implementation of the SETS-based independent curriculum teaching module provides opportunities for students to work together in groups and students have the opportunity to design products as a tool in solving problems. With group learning, students' social skills increase (Zahara & Atun, 2018) and make students responsible for social problems (Cleofas, 2021).

Students are facilitated in finding various solutions in solving problems that occur in the midst of society. Students' scientific knowledge of social processes increases so that students' understanding increases automatically. Based on this explanation, SETS-based teaching tools can improve students' understanding of identifying and dealing with disasters (Rusilowati et al., 2012) and are effectively applied in learning (Salawane et al., 2020).

## Conclusion

Referring to the results of the initial and final tests on understanding disaster mitigation, it shows that students' understanding of disaster mitigation has increased. Based on the results of this study, teachers can apply the SETS-based independent curriculum teaching module to increase understanding of disaster mitigation and apply it to students with different characteristics and learning styles. Referring to the results of the research, it is expected that teachers can implement SETS-based independent curriculum teaching module learning so that all students have an understanding of disaster mitigation and are evenly distributed among all students.

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## Author Contributions

Mahlianurrahman contributed in writing the results, discussion, methodology and data analysis. Rapita Aprilia has the role of reviewing and editing.

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## Conflicts of Interest

The author states that in writing this article there is no conflict of interest.

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