



Applied Science for Early Childhood: Disaster Mitigation in Bengkulu City Kindergarten

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Abstract. This study aims to describe the application of science in the kindergarten. The form activity is disaster mitigation. This activity is located at Kindergarten IT Auladuna, Bengkulu City. The aspects studied are planning, implementation and assessment of disaster mitigation education lessons. The research method used is a qualitative method and a phenomenological approach using the Epoche procedure. The research subjects were conducted by purposive sampling, namely principals, teachers, employees, and students. Data were collected by interview, observation and documentation. Data analysis used interactive model analysis, namely data reduction, data presentation and conclusion drawing. In addition, data triangulation and method triangulation were also carried out. The result of the research is that Kindergarten IT Auladuna Bengkulu City has organized flood, fire, earthquake disaster mitigation which is integrated in related themes such as air, fire, water, recreation and the relevant environment. The implementation of this implementation is based on the syllabus in the disaster mitigation module circulated by BNPB. The outline of the mitigation is 1) introducing children about disasters 2) introducing the consequences of disasters 3) introducing actions when a disaster occurs 4) introducing preventive measures when a disaster does not occur.

Keywords: Applied Science · Early Childhood · Disaster Mitigation

1 Introduction

Indonesia is an archipelagic country or Indonesian people usually call it NKRI (Archipelagic State of the Republic of Indonesia). The territory of Indonesia which consists of the Big Island (Sumatra, Kalimantan, Java, Sulawesi, Maluku, Papua, Nusa Tenggara and Bali). Indonesia is a country with a thousand volcanoes stretching from the islands of Sumatra, Java to Bali, Nusa Tenggara, North Sulawesi and the Maluku Islands [1]. There are about 500 volcanoes, and 129 volcanoes that are still active. The existence of this volcano is caused by a large plate support zone where Indonesia is traversed by the meeting path of 3 tectonic plates, namely: the Indo-Australian Plate, the Eurasian Plate, and the Pacific Plate [2].

The island of Sumatra is located on two plates at once. In eastern Indonesia, there is a Pacific plate. So that Sumatra Island has the most frequent seismic movement potential

when compared to eastern Indonesia. The island stretches from northwest to southeast and is located in a subduction zone between two of the world's major plates.

The Sumatran subduction zone is a form of convergent plate meeting, namely the Indo-Australian plate which is subducting under the Eurasian plate at a relative speed of about 7 cm per year [3]. This subduction zone has an oblique subduction pattern with a gentle subduction angle along the west coast of Sumatra and extends to the Sunda Strait and continues to the south of the island of Java. This subduction movement affects the tectonic activity that occurs in Sumatra and several small islands around it.

Most earthquakes result from the release of energy produced by the pressure exerted by moving plates. The longer the pressure gets bigger and finally reaches a state where the pressure can no longer be held by the edge of the plate. The most severe earthquakes usually occur at compressional and translational plate boundaries. Deep focus earthquakes are most likely to occur because the lithospheric material wedged inward undergoes phase transitions at depths of more than 600 km [4].

Earthquake is a physical phenomenon characterized by the shaking of the earth with various intensities. These vibrations occur due to the sudden release of energy. Tectonic earthquakes are caused by the movement of the earth's crust. When tectonic plates bump into each other and are pushed toward the sheath, great stress is created within the crust. If the pressure in the rock is too great, the rock will crack to form a fault [4]. A shift in the fracture plane of just a few centimeters can engage millions of tons of rock and cause powerful waves of energy to rise to the surface, breaking and lifting the ground. One of the natural activities that are destructive is the process of sudden movement of the earth's crust due to the release of an accumulated energy. Tectonic earthquakes occur because of the release of energy that has been buried for a long time. Tectonic earthquakes are usually much stronger in vibration than volcanic earthquakes. This tectonic activity causes concern among the educational academic community in Bengkulu Province. So that BPNB always makes efforts to socialize to the community through the education community. Through this educational community, the reach is wider.

This socialization to the academic community is one form of disaster mitigation. Minimizing risks arising from earthquake disasters includes several things, namely actions before the incident, actions during the event and actions after the incident [5]. Mitigation socialization that has been carried out with community participants who have been affected and in schools higher than kindergarten [6, 7]. This socialization must have differentiation if applied to the level of early childhood education. So there needs to be a form of treatment adjustment so that the play experience is meaningful for children.

2 Method

The research method used in this study is a qualitative research method. These socialization activities and mitigation simulations are described in detail and analyzed so that there is a scientific explanation for each action that has been taken. A phenomenological study approach is also carried out in this study to explain scientifically the phenomena that occur in a study [8]. This phenomenological study approach uses the Epoche procedure, which is a process by which the researcher puts aside all previous experiences and understands as much as possible the experiences of the participants. The analysis

of this approach can be seen from the researchers trying to examine the implementation of disaster mitigation by highlighting important statements about the implementation of disaster mitigation for Early Childhood in Auladuna Kindergarten, Bengkulu City. Observations were also made to document the understanding of principals, teachers, and education staff.

The data taken in this study relates to the implementation of socialization and disaster mitigation simulations for early childhood. Document analysis is carried out on learning activities, learning resources, teaching materials, themes in the curriculum, learning methods and RPPH that have been and will be applied in learning. Data were collected by means of interviews and document analysis. Informants in the study were principals, group A teachers, group B teachers, and education staff.

Document analysis is carried out on learning tools/instruments related to the implementation of disaster mitigation such as RPPH, Assessment Instruments, Learning Methods, Teaching Materials, Teaching Aids related to disaster mitigation (Eruption of Mount Merapi, earthquakes, floods, and fires).

Observation activities in this study were carried out inside and outside the class A-3 Kindergarten IT hall by observing the activities of teachers and children in the learning process. Observations were made using observation guidelines to obtain the desired data and any information found was then recorded in the form of field notes. Observations were made in August with the following details: August 15, 2019 learning about flood disaster mitigation (motion and song “the sound of rain”, the game to avoid water), August 19, 2019 learning about fire disaster mitigation (simulation of fires, watching videos about fires), August 25, 2019 learning earthquake disaster mitigation (earthquake simulation, singing the song “watch for the earthquake”), August 30, 2019 learning about volcanic eruption disaster mitigation (experimenting volcanoes erupting, reading story books about Volcanoes).

The data validity test technique in this study used the triangulation method. Triangulation is a combination of various methods used to examine different points of view and perspectives [9, 10]. Triangulation includes four things (method triangulation, inter-researcher triangulation, data source triangulation, and theory triangulation). This study uses triangulation of data sources. The data analysis technique was carried out using

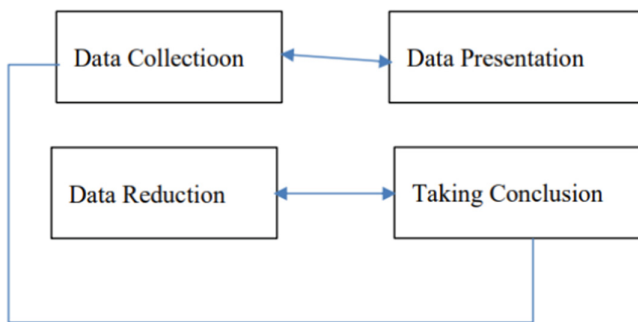


Fig. 1. Interactive Model [8]

an interactive model. The data that has been obtained is classified into several categories, analyzing important data, compiling or presenting data that are in accordance with the research problem in the report, and making conclusions so that they are easy to understand. The interactive model is shown in Fig. 1.

3 Result and Discussion

Before the socialization activities and mitigation simulations are carried out, the initial conditioning of the class is carried out to prepare for the implementation of the activities. This is done so that activities can run smoothly without any obstacles caused by the absence of facilities for disaster mitigation simulations. Auladuna Kindergarten in Bengkulu City in teaching and learning activities using the center method. There are 8 classes of centers used, namely: natural materials center, beam center, music and exercise center, preparation center, role playing center, creative arts center, imtaq and kemuhadiyah center, and preparation center with the centers that will be included on that day. In addition, before entering the class, the children of Auladuna Kindergarten Bengkulu City held a morning apple which was filled with habituation activities such as mentioning Asmaul Husna, names of letters, singing songs, memorizing prayers and short letters in the AL-Qur'an. The habituation activity in the morning apple is repeated every 1 month to increase children's knowledge about Islam.

After the initial conditioning is completed, the stage after the learning design is made is the implementation of learning. The implementation of learning can be carried out effectively and efficiently if the teacher is guided by the daily lesson plan that has been made. The following is a discussion of the implementation of disaster mitigation education lessons based on the types of disasters that are integrated into themes and centers. Learning at Auladuna Kindergarten there are 5 activities, namely: initial activities, opening, core activities, rest, and final activities. These activities become a series of learning that has been arranged in accordance with the school curriculum.

The implementation of disaster mitigation education for early childhood is very important because at this age the impact is highest. Disaster mitigation education is integrated into themes related to types of disasters, such as: natural environment themes for earthquake disasters, recreation themes for volcanic eruptions, water, fire and air themes for fire and flood disasters. This is in accordance with the module "Friendly with Disasters" which contains disaster mitigation education which is introduced to children according to the type of disaster, the consequences of disasters and actions when a disaster occurs and is integrated into learning based on related themes.

The syllabus used for socialization contains an introduction to the types of disasters, the consequences of disasters and actions when a disaster occurs which will later be integrated according to related themes. A total of four materials are provided in this education, namely: introducing children to disasters, introducing children to the consequences of disasters, introducing children to actions when a disaster occurs, and introducing children to preventive measures when a disaster does not occur.

The preparation of the RPPH is in accordance with the syllabus which contains an introduction to the types of disasters, the consequences of disasters and actions when a disaster occurs which will later be integrated according to the center and related themes.

This is in accordance with the syllabus contained in the “Friendly with Disasters” module which contains 4 materials, namely: introducing children to disasters, introducing children to the consequences of disasters, introducing children to actions when a disaster occurs, and introducing children to disaster management preventive measures in the event of a disaster.

Regarding disaster mitigation education, the teacher identifies learning materials that are in accordance with the disaster mitigation learning syllabus for early childhood which contains an introduction to the types of disasters, the consequences of disasters and actions when a disaster occurs which will later be integrated according to the centers and related themes. Any material that is suitable is integrated with existing themes, then adjusted to the existing centers.

The learning resources used in disaster mitigation education lessons are mostly from teachers and others from books, songs and teaching aids for the volcanic eruption experiment. This is in accordance with the syllabus contained in the “Friendly with Disasters” module about introducing children to disasters through songs, props or related books.

The learning methods used in disaster mitigation education are: question and answer, storytelling, role playing, hands-on practice, coloring and drawing, and field trips. This is in accordance with the learning methods contained in the “Friendly with Disasters” module, namely storytelling, hands-on practice, coloring and drawing and field trips.

The teaching materials used by teachers at Auladuna Kindergarten this semester are learning about flood disaster mitigation, the eruption of Mount Merapi, earthquakes, and fires. In the teaching materials used there are methods that can be used in learning mitigation education in the classroom. This is in accordance with the teaching materials contained in the “Friendly with Disasters” module which contains disaster mitigation education according to the type of disaster and there are methods such as storytelling, hands-on practice, coloring/drawing and field trips.

Time allocation is needed in every learning process. Because disaster mitigation education is integrated into themes related to Auladuna Kindergarten, the time allocation for the delivery of disaster mitigation materials is divided into 2 weeks, the first week for the introduction of the disaster itself and the second week for the introduction of disaster mitigation actions. Disaster mitigation education lessons for the 2019/2020 school year are divided into 4 types of disasters, namely: floods, fires, earthquakes, and the eruption of Mount Merapi.

The implementation of disaster mitigation education cannot be separated from the role of parents and school committees. Parents and school committees play an important role in providing facilities that support educational learning. The environment around children is very important in supporting disaster risk reduction [11–13].

Educational learning activities for flood disaster mitigation delivered to children are delivered in the form of songs, namely: talking about flooding and its bad effects, motion activities and the song “the sound of rain” these activities are in accordance with the material “Friendly with Disasters” (Bachtiar, et al., 2011) which contains disaster mitigation education according to the type of disaster and there are methods such as storytelling, hands-on practice, coloring/drawing and field-trips.

In addition, there is also an “avoid water” game that requires children to take disaster mitigation actions to avoid the flow of water. Actions taken when there is a flood are to save yourself by avoiding the flow of water and saving valuables at home.

There are several fire disaster mitigation educational activities that are delivered to children, namely: watching videos about fires, talking about fires and the dangers of fire, drawing burning houses. These activities are in accordance with the teaching materials contained in the “Friendly with Disasters” module which contains disaster mitigation education according to the type of disaster and there are methods such as storytelling, hands-on practice, coloring/drawing and field-trips.

In addition, there is also a fire disaster mitigation simulation in the classroom that teaches children to take disaster mitigation actions to avoid fire and immediately report to the nearest adult. This is in accordance with Nurwulandari’s opinion about preventing fire disasters by avoiding fire and immediately saving oneself [14].

There are several earthquake disaster mitigation educational activities that are delivered to children, namely: talking about earthquakes and the dangers of earthquakes, singing the song “earthquake alert” these activities are in accordance with the teaching materials contained in the “Friendly with Disasters” module which contains about disaster mitigation education according to the type of disaster there are methods such as direct practice storytelling, coloring/drawing and field trips. In addition, there is also an earthquake disaster mitigation simulation in the classroom that teaches children to take disaster mitigation actions when an earthquake occurs. Children are asked to immediately save themselves to a safe place from the ruins of the building. Activities for volcanic disaster mitigation are delivery to children, namely: talking about the eruption of Mount Merapi and its dangers, reading story books about volcanic eruptions, and direct practice of volcanic eruptions.

4 Conclusion

Planning for the implementation of disaster mitigation education based on the types of disaster threats found in Bengkulu Province. There were 4 materials delivered in the 2019/2020 academic year, namely education on disaster mitigation of floods, earthquakes, fires and volcanic eruptions. The disaster mitigation education materials are integrated into related themes and centers, for example, flood and fire disaster mitigation education is integrated into water, fire and air themes, earthquake disaster mitigation education is integrated into the natural environment theme, and education on disaster mitigation of the eruption of Mount Merapi is integrated into the theme of recreation of the sub-theme of the mountain. The implementation of this activity is documented in the RPPH.

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