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The Earthquake Disaster Preparedness Instruments To Support Disaster Response Learning In Kindergartens

Chruasita Dewi Prabarini Putri E.S.[1*], Putu Aditya Antara[2], I Gede Astawan[3]

[1,2,3] Department of Primary Education, Ganesha University of Education, Singaraja, Indonesia
*Corresponding author: chruasitadewiprabariniputri98@gmail.com

Abstract

This study aims to produce a valid and reliable assessment instruments for earthquake disaster preparedness in kindergarten for group B. This type of research is a research development (Research and Development) carried out using a procedural development model. In the instrument validation stage or the design validation, the assessment was carried out by two material experts. The instrument validation in this study was calculated using the Gregory formula. The product trial stage used 30 students, and the results were calculated using the Alpha Cronbach formula. This research results from the content validity test of 1.00, which is included in the very high category, and the validity test of the resulting items is nine useful items. Test the reliability of the instrument obtained results of 0.66, including high criteria. Therefore, it can be concluded that the instrument developed has been tested for its validity and reliability so that it can be used as an accurate learning assessment tool to measure the level of earthquake disaster preparedness in kindergarten in group B.

Keywords: Assessment, Preparedness, Earthquake

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Introduction

Indonesia is an island nation that is prone to natural disasters. Various natural disasters have hit Indonesia. Natural disasters are already a part of everyday life, be it earthquakes, tsunamis, landslides, tornadoes, floods, and volcanic eruptions (Heri & Caesar, 2018; Utami & Nanda, 2018). Natural disasters can occur at any time. The proves are supported by data stating that Indonesia's territory is located in three large plaque junctions: The Eurasian, Indo-Australian, and Pacific plates that are constantly tangling and rubbing. The soil conditions at the three large plates' confluence are very unstable due to subduction zones' presence and the oceanic crust and continental crust collisions. Also, the Indonesian territory position is included in the pacific ring of fire, which is the zone of the path of a series of active volcanoes in the world that can erupt at any time and bring disaster (Indriasari, 2018; Rahma, 2018).

A natural disaster is a terrible event for everyone. Among all types of natural disasters, earthquakes are among the most devastating and horrible. Earthquakes are vibrations in the earth that occur due to the sudden release of energy collected in deformed rocks. Earthquakes can be defined as wave vine in stones or soil derived from the earth's kinetic energy. These energy sources can be derived from plate collisions, volcanic eruptions, or rock or soil avalanches (Noor, 2011; Nuraeni et al., 2020). Earthquakes with great force

can have deadly impacts. Earthquakes can destroy buildings and injure and even kill thousands of people in just seconds, who are victims not only adults but also children.

The earthquake disaster is a geological hazard that has not been precisely predicted for its arrival (Izadkhah & Hossein, 2006;Utama et al., 2019). Efforts to prevent earthquakes are very difficult and even more difficult compared to predicting earthquakes. Therefore, disaster management needs to minimize losses, both property losses and human lives caused by earthquakes. There were no prior warnings or signs of the earthquake. In this case, it can be said that the community's preparedness, especially children, must be well prepared to be ready and prepared in the face of earthquake disasters that will come at any time. With the limited time, the community is required to be quick and responsive in saving themselves. Short and unexpected time makes it important to consider safety for vulnerable people in society, such as children (Izadkhah & Hossein, 2006). Safety efforts that can be given to children can be in the form of preparedness efforts in the face of disasters. It is in line with the expenditure of disaster education mainstreaming policy into schools by the minister of education marked by the issuance of circular letter of the Minister of Education (Kemendiknas) Number 70a/MPN/SE/2010. It means that children under 18 are entitled to disaster education through official social institutions named schools. The provision of disaster risk reduction mainstreaming policy can increase community members' knowledge, level of awareness, disaster perception, and readiness in responding to future disasters (Tirtayani & Jampel, 2018).

Awareness of danger is one of the important elements that can affect the community in tackling disasters. Critical awareness determines community preparedness in earthquakes and fire hazards (Akbar, 2015). How society interprets the risk of a disaster, often regarded as an important marker, of their decision to prepare for the threat of natural disasters. Risk perception refers to the possibility that the danger will occur and the severe impact for them. While heightened risk perception can motivate people to take action for preparedness, low perception reduces adjustments in adopting disasters. School education on disasters contributes to the development of knowledge and perception of earthquake disasters but is limited to earthquake preparedness (Dewi, 2019). Disaster research conducted in developing countries found that society interprets danger based on religious culture and beliefs rather than modern knowledge. In Indonesia, the assumption that the cause of the disaster is God's punishment because human sin still applies. The perspective in theory and practice many assert that disaster knowledge in schools aimed at students' knowledge, critical awareness, and risk perception and changes attitudes to preparedness (Ningtyas & Risina, 2018).

School as a learning home for students, it is appropriate to try to secure and protect all students from various distractions in the school, no exception to the possibility of disasters at any time in the school. The absence of Standard Operating procedures (SOP) and disaster management methods impacts improper disaster management and will affect the number of victims (Putra, 2014). Schools should also prepare their citizens to be ready in the face of disasters that can come at any time. Providing knowledge about disasters in disaster education programs is not such a difficult task. The challenge is how disaster education programs can encourage people to update information, increase risk perception levels, maintain awareness, and update appropriate preparations for future disasters. As a follow-up, it is necessary to develop various teaching and learning materials through the right instruments to assess children's ability to absorb disaster preparedness materials. Later, it will also be able to achieve the main objectives of disaster education programs. The result can make people have a culture of disaster preparedness, especially children, which they as the next generation will continue the information that has been provided.

Children or preschoolers or early childhood are a special figure where the child undergoes a rapid developmental process and is very fundamental to the next life (Dewi,

2019; Indriasari, 2018). The statement is in line with what was revealed by Antara (2018), where the children are the next generation of the priceless nation (Antara, 2018; Antara, 2019). Then, to get a high-quality of the next generation, the physical and mental must be prepared early with various stimulation forms. Then the state of stimulation can be channeled through education. Education in early childhood starts from PAUD / TK, the most basic education level in children, before heading to the elementary school education level. Early childhood education institutions are very important for the development of children. (Pancaningrum, 2017).

Education applied to early childhood should prioritize an integrated learning process because, at an early age, they have a variety of potentials that must be developed to the maximum to support their future (Antara, 2015). One of which is to hone skills in solving problems in their future lives. These potentials must be generated optimal because when children are at an early age, what they will learn impacts the development of the ability to do and learn later. Early childhood education institutions should develop their potential comprehensively through learning arranged according to what they want to teach. Such as one of them is learning about preparedness in the face of earthquake disasters. In the learning process, of course, it will never be separated from the assessment to measure the extent to which the child can master the information provided.

Assessment is a way to get various information used in determining the results of a learning process that has been implemented (Jannah & Pahlevi, 2020; Prasetya, 2012). Assessment is an activity to provide value about the quality of something, not just looking for answers to questions, but rather directed at how to answer questions and how far a process or an outcome is obtained. It can be concluded that the assessment is an effort to get information periodically, continuously, and thoroughly to meet the standards of achievement that have been set before (Salamah, 2018; Sugiyono, 2012). Assessment on learning in kindergarten serves to describe and provide information about students in each activity they do, following the standard of achievement or learning objectives that have been set before through the assessment instruments used on that day.

Learning about children's preparedness in the school environment, especially in Indonesia, is still not optimal. It is supported by research, which states that simulations on the development of children's preparedness skills to deal with disasters have not been a priority in the scope of education in early childhood. It is because children are still regarded as vulnerable, fragile, and always depend on adult help (Sari & Suciana, 2019). At the same time, early childhood can be taught about disaster preparedness through school programs tailored to the child's ability and age. Children have the power in disaster preparedness, the ability they can develop with the study of disasters, and education of adults as early as possible through the scope of early childhood education (Nuraeni et al, 2020). Therefore, the development of preparedness instruments to support earthquake response learning in kindergarten very important to teach children about disaster preparedness, especially earthquake disasters that cannot be detected and can be used to minimize life loss among early childhood. This study aimed to produce a valid and reliable earthquake disaster preparedness assessment instrument in kindergarten for group B.

Methods

The development in the R&D (Research and Development) method used in this research is the procedural model of a descriptive model (Creswell, 2010; Sugiyono, 2012). It means that it outlines the steps that must be followed to produce a product. The selection of this model is based on consideration from the point of view of clarity on each of the steps. The steps in this procedural development model include, 1) potential and problems, 2) data collection, 3) product design, 4) design validation, 5) design revision, 6) product trial, 7)

product revision, 8) product trial, 9) product revision, 10) mass product (Sugiyono, 2012; Yusuf, 2015). Of the ten steps, only seven stages are used to be used as a reference in producing and validating assessment instruments, namely step 1 to step 7. Three of them are steps 8 to step 10, are not used due to time constraints and conditions related to covid-19.

The implementation of the development model steps in this study is as follows, in the first step of potential and problems, which begins with an analysis of the needs which is done to see an overview of the conditions in the field related to the learning process on earthquake disaster preparedness in kindergarten. Then researchers analyze problems related to assessment instruments used to measure students' readiness for earthquake disasters in schools. The second step is data collection. After the potential and problems can be shown factually and up to date. It is necessary to collect various information that can be used as material for product planning to be made, which is expected to solve it. At this stage, the data collected are interviews, observations, RPPH, RPPM, and PROSEM class B at TK Diponegoro, Singaraja, Buleleng, Bali.

The third step is product design. After the information collection step, the next is developing assessment instruments on earthquake disaster preparedness, obtained from sources that refer to the materials used. Namely based on disaster preparedness parameters in KPBI (Indonesian Disaster Education Consortium), indicators obtained from the PMR curriculum, and BNPB preparedness training standards. In the fourth step of design validation, this step is used to assess whether the product design can develop the previous instrument or not. This validation is rational because this validation is still based on thinking that has not been applied in the field. This validation is done with the help of material experts. Material experts aim to test the feasibility in terms of the material in the assessment instrument that wants to be developed, including the material's conformity with the curriculum used at the kindergarten level (content standards). The material expert test chosen is a competent person in PAUD, consisting of two Undiksha's lecturers.

Next step five is design revision; After material experts validate the product design, the instrument's weakness can be known. These weaknesses are then corrected to produce even better products. If the changes made to create the new product are large and fundamental, a second formative evaluation needs to be made. However, if the difference is not too big and not essential, the new product is ready to be used as an instrument that can assess students' level of preparedness. Step six product trials, Instruments that have been completed, then tested in learning activities. This trial is intended to obtain information on whether this instrument can help in measuring the extent of students' preparedness for earthquake disasters or not. This test is certainly done when the instrument developed or made is close to perfect after going through stages 1-5. The field test used about 30 students. Then the last step is the seventh step of product revision. After the instrument is tested through questions/tasks will be obtained results and validated, the advantages and disadvantages of the assessment instrument on earthquake disaster preparedness compiled. After learning the advantages and disadvantages, the researchers will immediately repair the instrument.

Results and Discussion

Results

This study's initial product development results were instruments of earthquake disaster preparedness to support kindergartens' disaster response learning. The earthquake disaster preparedness instrument's development consists of three stages: (1) test the construct's validity. Experts carry out the test of the validity of the construct to determine the instrument's feasibility theoretically. The construct validity test in this study used two

material experts. The scoring of the two validators will be analyzed using the Gregory formula. The result is 1, which means it indicates very high criteria.

Furthermore, the 2nd stage of the empirical validity test. A practical validity test or item validity test is conducted to determine the validity of the item. Later, it will result in a decision if there is an invalid item, it will be discarded, and useful items will be used. Based on the trial that has been conducted with the number of test participants, N= 30 and signification level 5% obtained r_{tabel} = 0.361, getting the results of the number of valid instruments is nine items (100%). After the validity test is done, the 3rd stage of product reliability test is done, then performed reliability test on the instrument. Reliability tests are conducted to determine instrument answers' consistency because a good instrument is an instrument with a consistent response. Reliability tests are conducted using nine useful items. Reliability tested using the Cronbach Alpha formula. The result of the reliability test is 0.66. It means the instrument's reliability level is high because the value of the reliability coefficient obtained is greater than 0.60. From the explanation of the assessment results, the assessment results will be presented in Table 1, 2, and 3.

Table 1. Validity test results of preparedness assessment instruments in the face of earthquake disasters

Instrument Number	**Judges Assessment Result Instrumen**			
	Expert Judges I		Expert Judges II	
	Irrelevant	Relevant	Irrelevant	Relevant
1.	-	√	-	√
2.	-	√	-	√
3.	-	√	-	√
4.	-	√	-	√
5.	-	√	-	√
6.	-	√	-	√
7.	-	√	-	√
8.	-	√	-	√
9.	-	√	-	√

Table 2. Item Validity Results

No	**Instrument Number**	**r table**	**r calculate**	**Description**
1	1	0,361	0,70013	Valid
2	2	0,361	0,66266	Valid
3	3	0,361	0,53020	Valid
4	4	0,361	0,50128	Valid
5	5	0,361	0,46305	Valid
6	6	0,361	0,46875	Valid
7	7	0,361	0,49521	Valid
8	8	0,361	0,49538	Valid
9	9	0,361	0,36784	Valid
Number of Valid Instrument				9
Percentage of Valid Instrument				100%

Table 3. Comments and Suggestions of Judges on earthquake disaster preparedness instruments

Judges I	Judges II
Create more specific indicators to make them easier to understand.	Create more specific knowledge of what you want to value on this instrument to be used and understood easily.

Discussion

Based on the description and report of the research results described, the development of assessment instruments through several stages as follows, potential steps and problems that discuss needs analysis. The need analysis was conducted to see an overview of the field's conditions related to the learning process on earthquake disaster preparedness in kindergarten. Then researchers analyzed the problem. Analysis of this need is done by observation. Observations on this study were conducted at Diponegoro Kindergarten, Buleleng Subdistrict, Bali. The process is to analyze the literature related to the assessment instruments used to measure students' level of preparedness in earthquake disasters in schools. It is done with interviews with teachers and principals who know the problems or obstacles faced in earthquake disaster preparedness assessment instruments. The findings obtained at this stage are a lack of material about earthquake disaster preparedness. Therefore, the instruments used in measuring it are still not optimal. Therefore, this research was prepared to provide solutions to existing problems. After recognizing the situation, this research continued in the second stage.

The second stage is the collection and processing of data. At this stage, researchers collect various information about materials related to earthquake disaster preparedness in schools. It is intended to make product planning earthquake disaster preparedness instruments for children. This planned product is adapted to the materials used in kindergarten. Then, later this instrument can be used and can overcome existing problems related to earthquake disaster preparedness. After planning, the material's design for instrument items has been drawn and followed current learning. Then the research is continued in the third stage. The third stage is product design. In this stage, the information and the big picture of the product have been collected according to what is needed. The researchers continued adjusting the items obtained from various sources used in this study because it is enough. The articles are adapted to the learning in kindergarten. Later can be used in learning in the classroom, and the results will be following the expected goals. The resources used in preparing items include disaster preparedness parameters in KPBI (Indonesian Disaster Education Consortium), PMR curriculum, and BNPB preparedness training standards. At this stage, researchers also held discussions with Preschool Teacher Education lecturers that are intended so that the instruments that are prepared can be precisely targeted.

This study's results are supported by research which shows that the disaster preparedness instrument used in his research can measure the level of student preparedness for disasters that occur (Utami & Nanda, 2018). The instrument used in his research emphasizes aspects of knowledge and attitude in tests developed and seen from Bloom's cognitive, Affective, and psychomotor theory. The results obtained in this study owned by Utami and Nanda showed 85%. The number of 28 students out of 30 students studied has a good level of knowledge and attitude in disaster management. Other research that supports this research, shows that the questionnaire used in his study can measure citizens' preparedness in facing the earthquake disasters in Lempuing area of Bengkulu city. The questionnaire used in his research was compiled based on Bloom's theory of behavior, distinguished into three regions: knowledge, attitudes, and actions. The results obtained in the

study owned by Utama, Delfina, and Saleha showed that as many as 66% of residents are not ready in the face of earthquake disasters (Utama, et al., 2018).

This study's limitation is implementing a wider trial involving the control group (pretest-posttest control group design) has not been implemented because of the emergency related to the pandemic covid-19. Then, the author is only limited to producing products that are worth using. Therefore, this study's product trials have not provided information about the product's effectiveness and efficiency optimally.

Conclusion

Based on the research results on the development of earthquake disaster preparedness instruments, the results were obtained that the instruments developed were put into the category of valid and reliable or feasible to use. It is indicated by the results of expert validation tests that include the suitability of the contents on the indicators used, and obtained the validity of 1 on each instrument and are on very high criteria. The earthquake disaster preparedness instrument's reliability results developed in the high category or describe learners' ability. The result obtained after the calculation of reliability analysis, the instrument in the trial showed a result of 0.66. Thus, it can be reliable because the value of the reliability coefficient obtained is greater than 0.60. In this study, the authors gave recommendations. The recommendations provided are as follows. 1) for teachers who want to develop learning materials or instruments on earthquake disaster preparedness, then this research can be used as a reference. 2) the headmaster should facilitate children's preparedness skills to be better trained and learn about disasters, especially earthquakes. 3) other researchers can use this development research to reference or compare the problems that exist specifically to develop earthquake disaster preparedness instruments. This research can be continued at the implementation stage by carrying out experimental research.

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