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Ludo Disaster Alert Educational Game as a Disaster Preparedness Education Strategy



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Abstract

Children are one of the most vulnerable groups at risk of being affected by a disaster because they are triggered by a limited understanding of the risks around them, which results in a lack of preparedness in dealing with disasters. Disaster preparedness is needed within the scope of the education unit so that from an early age, the community, especially children. The design of educational media with games is an effective way of educating children learning about disasters. The aim was to analyze the effect of the ludo disaster alert educational game as a disaster preparedness education strategy at Setonorejo 1 Kras Elementary School. The research design used pre-experimental with one group pre-test post-test design method. The population was 20 students of Setonorejo 1 Kras Elementary School who met the inclusion criteria using a total sampling technique. The inclusion criteria were children aged 8-9 years, children who came to school during data collection and children who were willing to be examined. The data analysis used Wilcoxon. Before being given the educational game of ludo disaster alert, students were in the almost prepared category (40%), and after the educational game of ludo disaster alert there was an increase in preparedness with 55% of respondents having the very prepared category. There was a significant difference between before and after the educational game ludo disaster alert with a significance value of 0.000 ($p < 0.05$). Ludo disaster alert educational game has an effect on student disaster preparedness at Setonorejo 1 Kras Elementary School.

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INTRODUCTION

Indonesia is a country that is often hit by disasters where there are two types of disasters that often hit, namely geological and hydrometeorological disasters. The hydrometeorological flood disaster is the disaster that has caused the greatest loss to the people of Indonesia, both material and immaterial losses (Anies, 2020). Disaster is a phenomenon that occurs because the components of a trigger, threat, and vulnerability work together systematically, causing risk (Wantiyah et al., 2015). The disaster management model is known as the disaster management cycle which consists of three phases, namely the pre-disaster phase, the phase when a disaster occurs, and the post-disaster phase. Preparedness is a series of pre-disaster activities carried out to anticipate disasters through organizing and through appropriate and efficient steps (UNDP, 2012).

Disasters are a serious threat to human life, and effective risk planning often depends on the participation of communities and various groups of people (Lin *et al.*, 2013). Some education is given to the community to increase the level of community preparedness by providing disaster knowledge to change their behavior. Education and training have long been recognized as the most effective way of intervention at the level of individual knowledge and awareness of disasters and age is an important factor in learning. Many of these interventions focus on children and youth (Nazdik & Mohammadi, 2018). Indonesia is a country with various types of disasters, which of course often cause fatalities. Children are one of the most vulnerable groups affected by natural disasters. Children are vulnerable because they are still physically and mentally growing and are still dependent on adults. In the early phases of their life, children learn from those closest to them, such as parents in the family environment and educators in the school environment) so it is important to provide children's knowledge in their development (Yanti & Mukminin, 2019).

Data from the Ministry of Education and Culture states that 75% of a total of 355,270 school/madrasah buildings in Indonesia are located in areas with moderate to high risk. This risk level can increase because many school/*madrasa* buildings in Indonesia are old, lack of maintenance and not a few have been built without regard to building standards. The education system in Indonesia is the fourth largest according to the World Bank in 2014, consisting of 50 million students, 4 million teachers and 355,000 schools throughout Indonesia. An

example of an earthquake that damaged schools as happened in Bener Meriah, Central Aceh in 2013 with a magnitude of 6.1 on the Richter scale, resulted in 262 schools being damaged. One example of damaged schools, the earthquake in West Sumatra (2007 and 2009) damaged 2,800 schools, the earthquake in Tasikmalaya (2009) damaged 35 schools, the earthquake in Mentawai (2010) damaged 7 schools, and the earthquake in North Lombok (2013) damaged 30 schools (Anies, 2020) BNPB in 2019 recorded 133 educational facilities including school buildings damaged by the disaster.

Based on BPBD Kediri, Kediri Regency with risk of experiencing several natural disasters such as floods, landslides, water accidents, volcanic eruptions and tornadoes. On January 18, 2022 at 12.00 WIB, the Mojosari area, Kras District, Kediri Regency, experienced heavy rain conditions followed by a tornado which caused damage to several residential areas, and trees fell.

Children are one of the vulnerable groups most at risk of being affected by disasters because they are triggered by factors of limited understanding of the risks around them, which results in no preparedness in dealing with disasters (Natsir, 2018). Many school-age children become victims both during school hours and outside school hours. Disasters that occur during this productive time not only cause casualties but also damage school buildings. Knowledge about disasters and disaster risk reduction is important to be given early on to provide understanding and direction for steps that must be taken when a threat occurs in the vicinity to reduce disaster risk (Indriasari, 2017). Disaster preparedness is needed within the scope of the education unit so that from an early age, the community, especially children, can recognize and cooperate in efforts to mitigate natural disasters. Preparedness is an activity to anticipate disasters through appropriate organization in accordance with RI Law No. 24 of 2007. Disaster preparedness education can be carried out early through disaster preparedness programs in schools so that children know how to save themselves when a disaster occurs. (Rismayanthi, 2019)

Disaster preparedness education can begin with elementary school-age children because, according to (Melissa et al., 2014), for children aged 7-12 years, the world of children cannot be separated from games. Basically, elementary school-age children are in the developmental phase of concrete or real thinking, like to play, always imitate others, habits that arise as a result of the activities they often do. By playing, children not only get pleasure, but children

also learn something. The design of educational media in the form of games is an effective and efficient way of educating children about learning about self-protection in the face of disasters. This is supported by research results which state that the game method can be considered as a new approach to promoting behavior in disaster risk management in children (Moradian & Nazdik, 2019). The media needed to play and be interesting for the children's segment is board game media. Ludo game is a board game that is played by four players. This game consists of pawns, dice, and a checkered board contained therein. In this study, the ludo game was modified by providing pictures and writing or information regarding natural disaster preparedness. Based on the description above, the researcher is interested in conducting research on "Educational Game of Ludo Disaster Alert as a Disaster Preparedness Education Strategy at Setonorejo 1 Kras Elementary School".

METHODS

The research design used in this study was the Pre-Experiment using the one group pre-test post-test design method. The population in this research was 20 students at Setonorejo 1 Kras Elementary School. There were 20 school-age children taken as the sample by using the total sampling technique. The inclusion criteria in this study were children aged 8-9 years old,

children who came to school during data collection and children who were willing to be examined. Health education in this study used the ludo disaster alert game media in which there are several boxes of pictures of natural disasters and there were various questions related to disaster. The retrieval of the data used a checklist sheet for each group which was then scored. In the first meeting, respondents were measured for disaster preparedness, then the respondents were given education related to natural disasters in class.

In the next meeting, 4 groups were formed to play ludo disaster alert. The flow of the game was according to the steps for playing ludo, the respondent took turns throwing the dice and then walking according to the number of the dice that came out. If it stops at the box with a picture of a natural disaster, the respondent must answer the disaster question. The material and questions about the disaster are adjusted to the source (BNPB, 2018), with an assessment if the respondent is unable to answer then a score of 0 (zero), if the respondent is able to answer then a score of 1 (one). Respondents were categorized to be skilled if they had a range of values of 80-100 in the category of very prepared preparedness, 65-79 in the category of prepared, 55-64 in the category of almost prepared, 40-54 in the category of less prepared and 0-39 in the category not prepared. The data analysis used Wilcoxon.

RESULTS

Table 1: Characteristic of respondents at Setonorejo 1 Kras Elementary School in June 2022 (n=20)

No	Characteristic	Total	Percentage (%)
A. Data of Respondents			
1	Gender		
	Boy	9	45
	Girl	11	55
	TOTAL	20	100
2	Age		
	7 Years Old	0	0
	8 Years Old	13	65
	9 Years Old	7	35
	10 Years Old	0	0
TOTAL	20	100	
3	Grade		
	Grade 1	0	0
	Grade 2	20	100
	Grade 3	0	0
	Grade 4	0	0
	Grade 5	0	0
	Grade 6	0	0
TOTAL	20	100	

No	Characteristic	Total	Percentage (%)
A. Data of Respondents			
4	Disaster Knowledge Before		
	Done	18	90
	Not Yet	2	10
	TOTAL	20	100
5	Disaster Information		
	Nothing	2	10
	Book	1	5
	Teacher at School	2	10
	Youtube	6	30
	Social Media	6	30
	Television	3	15
	TOTAL	20	100
6	Kelas		
	Grade 1	0	0
	Grade 2	20	100
	Grade 3	0	0
	Grade 4	0	0
	Grade 5	0	0
	Grade 6	0	0
	TOTAL	20	100

Table 2: Ludo Disaster Alert Educational Game as a Disaster Preparedness Education Strategy at Setonorejo 1 Kras Elementary School in June 2022 (n=20)

No	Disaster Preparedness	Frequency		Percentage (%)	
		Before	After	Before	After
1	Not Prepared Yet	1	0	5	0
2	Less Prepared	5	0	25	0
3	Almost Prepared	8	2	40	10
4	Prepared	6	7	30	35
5	Very Prepared	0	11	0	55
	Total	20	20	100	100
Statistic Test		Wilcoxon Signed Rank Test p = 0,000 Z = -4,028			

Table 4: Wilcoxon Statistic Test of Ludo Disaster Alert Educational Game as a Disaster Preparedness Education Strategy at Setonorejo 1 Kras Elementary School in June 2022

Disaster Preparedness	Ranks	Wilcoxon Signed Rank Test		
		N	Mean Rank	Sum of Ranks
Preparedness before	<i>Negative Rank</i>	0 ^a	0	0
Preparedness after	<i>Positive Rank</i>	20 ^b	10,50	210,00
	<i>Ties</i>	0 ^c	0	0
TOTAL		20		
Test Statistics				
Preparedness after – Preparedness before				
Z		-4,028 ^b		
Asymp. Sig. (2-tailed)		.000		

DISCUSSIONS

Disaster Alert Before and After Ludo Game Media Disaster Preparedness at Setonorejo 1 Kras Elementary School in June 2022

Based on the results of disaster preparedness research on school students as many as 20 respondents. Before providing education with the ludo disaster game, most of the respondents were included in the almost prepared category (40%), while after the disaster ludo game, it was found that more than 50% of the respondents were in the very prepared category (55%).

The study of the level of preparedness of the school community used a framework developed by LIPI in collaboration with UNESCO/ISDR in 2006. There were five parameters used in assessing the level of preparedness of the community in disaster preparedness, namely knowledge and attitudes about disaster risk, policies and guidelines, emergency response plans, disaster warning system and resource mobilization (LIPI-UNESCO/ISDR, 2006) (Faqih & Ferianto, 2021). The aim of disaster preparedness is to prevent absolute threats such as earthquakes and volcanic eruptions. However, there are many ways or actions that can be taken to reduce the possibility of a threat or reduce the consequences of a threat.

The next goal is to reduce community vulnerability. If the community has prepared themselves, it will be easier to carry out rescue actions when a disaster occurs. Good preparation will help the community to take appropriate and timely actions. Communities that have been hit by a disaster can prepare themselves by carrying out preparedness such as making evacuation plans, rescue and receiving disaster preparedness training. Preparedness also functions to reduce the consequences of a threat; people need to have preparations so they can act quickly in the event of a disaster. How to give natural disaster warnings, signs of natural disasters, and how to save yourself needs to be understood as an effort to provide disaster preparedness education.

The preparedness of teachers and students is obtained through various training, workshops or lectures as well as the provision of preparedness materials in schools that can be accessed by all components of the school community. It is also urgently needed to prepare and improve the capacity of disaster preparedness groups, including disaster warning groups, first aid groups, evacuation and rescue groups and logistics groups needed by the school community. Individuals and households, government, and the school community are the main

stakeholders who are spearheading efforts to increase disaster preparedness in the community. The results of this study are in line with the results of (Indriasari, 2017) to determine the effect of earthquake disaster preparedness training on the preparedness of elementary school children in dealing with disasters showing that after being given treatment there is an increase in disaster preparedness. Before being given disaster preparedness health education with the ludo disaster game, most of the respondents were in the almost prepared category (40%).

This is evidenced by the fact that respondents still did not answer correctly regarding policy indicators and guidelines and resource mobilization. Respondents revealed that they had only heard of disasters, but had never experienced pleasant disaster management and simulation before. This was also shown by the results of the respondents not all answering that they obtained information from the school, the majority got disaster information from YouTube and social media. Respondents after the intervention in the form of a disaster alert ludo game showed 55% had preparedness. In principle, respondents were quite capable of answering questions related to their knowledge and attitudes about disaster risk, emergency response plans, and disaster warning systems. Questions about natural disaster games include cases of volcanic eruptions, floods, tsunamis, earthquakes, and tornadoes. Respondents were able to distinguish between natural disasters and non-natural disasters, signs of natural disasters, causes of natural disasters, contact people and places for disaster emergency response, what were important items that need to be carried during a disaster, characteristics of safe shelters/evacuations. In addition, respondents could explain what media were for a disaster warning system, how to respond to an appropriate disaster.

Ludo Educational Game as a Strategy for Disaster Preparedness Education at Setonorejo 1 Kras Elementary School

For disaster preparedness at Setonorejo 1 Kras Elementary School it was known that 55% of respondents' preparedness had increased to very prepared, 35% of respondents were in the prepared category and 10% were in the almost prepared category. All respondents had positive/increased changes related to disaster preparedness as (Indriasari, 2017) indicated by an increase in the disaster preparedness score, with a p value of $0.000 < 0.05$.

Children are one of the vulnerable groups most at risk of being affected by disasters because they are

triggered by factors of limited understanding of the risks around them, which results in no preparedness in dealing with disasters (Indriasari, 2017). Preparedness efforts are given through game media because according to Melissa *et al.*, (2014), in children aged 7-12 years, the world of children cannot be separated from games. By playing, children not only get pleasure, but children also learn something. The design of educational media in the games is an effective and efficient way of educating children about learning about self-protection in the face of an earthquake disaster. Based on the results of research by (Catedrilla *et al.*, 2021), preparedness is a powerful weapon for mitigating disaster risk. Through game development it becomes important in disseminating information to the public to increase awareness in disasters and increase preparedness during disasters. Preparedness efforts to make it easier for children to understand disaster risk reduction require methods and techniques that can make children interested. The technique or method put forward is by playing.

Games as a medium that enhances children's cognitive development. Games allow children to practice the competencies and skills needed in a relaxed and fun way. Learning media in the form of games, children can understand disaster mitigation through learning while playing. Games can be used to train children's motor development and increase understanding and increase children's responses in disaster risk reduction efforts (Heru *et al.*, 2014). According to (Melissa *et al.*, 2014), an interesting and necessary media for the children's segment is board game media. Boardgames can not only help provide children with information but can also be used as tutorials for children and direct practice regarding actions children can take when a disaster occurs. The purpose of board games is as a game tool that also functions as an effective learning medium. This is because through board games children will not be bored and do not feel they are learning because they feel they are playing. The board game board has a concept using a blend of themes and calculations. Board games for children usually put more emphasis on interaction between players and easy rules. Board games that are often found are ludo, chess, checkers, checkers, etc.

Ludo game is a board game that is played by four players. In the Ludo game the players have to set a strategy to compete in running the four pawns using the dice value to reach the goal to win the game. Ludo is a complex game and has various strategic aspects to play. The special areas on the Ludo board are usually colored yellow, green, red and blue. Each

player gets four pawns according to the color chosen. The Ludo board is square in shape with the path following a clockwise direction, in the middle there is a colored column which is the player's "house" column, at the end of the colored column there is a triangular column, that is the finish of this game. Ludo is a German board game in the form of Cross and Circle game, similar to the Indian game Pachisi, the American game Parcheesi and the English game Ludo. This traditional game uses a board and can be played by two to four people. Each player will compete to be the fastest from the base to the center of the board which is the game's final goal (Marhadi, 2019). Games can create fun conditions for children, and ludo game techniques can be developed to assist children's mastery of developmental aspects, especially in knowledge and ability development materials (Schmitt *et al.*, 2018).

The class is divided into four groups, and there are representatives. Each player takes turns rolling the dice and proceeds based on the number that appears on the dice. When stopping at a certain number, the player must answer the questions asked about the disaster. Players can answer with the help of their groupmates. The game continues until the player reaches the finish line. In this study, respondents were given education with the media game ludo on disaster alert which contained pictures, material or information related to earthquake disasters. The results of this study indicated that all respondents had positive changes/increases in their disaster preparedness which was indicated by an increase in the disaster preparedness score. This shows that children who are in elementary school are also effectively given material about disasters and how to protect themselves in the face of disasters in order to increase preparedness in the event of a disaster while at school or elsewhere. After being given the ludo disaster alert game, there was an increase in preparedness in dealing with disasters with the result that 55% had the very prepared category, and 35% of the respondents had the prepared category. This research shows that the provision of education by giving a game will make it easy for children to accept the material given because usually the provision of education is more often given by lecture and question and answer methods which make children quickly get bored listening to the material provided. The results of this research are also supported by the results of Kusumawati, (2018) and Rismayanthi, (2019). The results of the analysis with the Wilcoxon test obtained $p\text{-value} = 0.000 < \alpha (0.05)$ and showed that there was an effect of providing education with the ludo

disaster preparedness game on the preparedness of elementary school children in dealing with natural disasters as a strategy for disaster preparedness education at Setonorejo 1 Kras Elementary School, Kediri Regency.

CONCLUSIONS

School-age students' disaster preparedness before the educational game of ludo disaster alert was carried out, showed that most of them had the almost prepared category of preparedness. After the ludo disaster alert educational game was carried out, it increased to a very prepared category. The educational game of ludo disaster alert had an effect on increasing school-age students' disaster preparedness as a disaster education strategy at Setonorejo 1 Kras Elementary School.

SUGGESTION

Healthcare professionals are expected to pay more attention to issues faced by adolescents, specifically stress and the reproductive system, to prevent problems that may cause disruptions in the reproductive system. Additionally, it is recommended to provide health education on the reproductive system as early as possible to prevent and avoid factors that can affect the occurrence of disruptions in the reproductive system. Respondents are encouraged to increase their knowledge about factors disrupting the menstrual cycle and improve their understanding of stress management to prevent stress-related issues. The findings of this study can be utilized as a reference and provide valuable insights for further research endeavors in developing a deeper understanding of the topic.

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CONFLICTS OF INTEREST

The authors declares that there are no conflicts of interest in this research.

AUTHOR CONTRIBUTIONS

The research team was divided into two people, where Fidiana and Vitaria played a role in data collection, data analysis, research results, and discussions.

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