

# Application Design of Gamikar (GAMIKAR) to Improve Understanding of Fire Mitigation Elementary School Students

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**Abstract.** This study was to determine the differences in the understanding students of fire mitigation, find out the students' responses in grade IV SDN 05 Ekok Tambai. The research method used experimental quasy experimental design. The data collection techniques used were measurement techniques using test questions, indirect communication techniques using questionnaires and documentation. The results showed that the students' understanding of fire mitigation in the experimental group is a significant difference. The results of the questionnaire on the pre-test were 24.62% for low criteria and for the post-test by 75% for high criteria. The control group students' understanding of fire mitigation in the pre-test and post-test obtained a Sig value ( $0.338 > 0.05$ ), which means that there is no significant difference. The results of the questionnaire on the pre-test were 22.95%, with low criteria. and for the post-test of 23.95% low criteria. The results of the student response questionnaire to Gamikar were obtained 100% very good criteria. Based on the results of the analysis it can be concluded that fire mitigation games can improve students' understanding of fire mitigation.

**Keywords:** Gamikar, students' understanding of fire mitigation, Elementary Schools.

## 1 Introduction

According to the data explained, [1] it can be seen that more than 2,047 disasters in 2018 to 2019 more than 98% of disasters were hydrometeorological disasters and only about 2% were geological disasters. [11] explained that the most dominant natural disasters in the Kalimantan region are forest and land fires, floods, and drought. Fire disaster on December 10, 2017 in the long house of Siut Village, Putussibau, Kapuas Hulu Regency. When the fire broke out, the community's actions were limited to responding in a panic and witnessing how intense the flames were spreading to the long house. The cause of the fire was initially caused by an electrical short circuit, due to a lack of knowledge of fire disaster risk prevention in the siut community, so that the fire that occurred could not be dealt with quickly which resulted in 19 booths and 1 stall being burned [3].

The community's lack of understanding about dealing with fires above indicates that the community needs education in dealing with an impending fire disaster. In accordance with the mandate of the preamble to the 1945 Constitution that the Republic of Indonesia is responsible

for protecting the entire Indonesian nation and all Indonesian bloodshed. This statement requires that emergency preparedness and response must be developed at every level of community groups. One of the efforts to convey disaster information is by integrating disaster material in various subjects to reduce risks when prevention and mitigation have not worked well. suggest that students are expected to have knowledge, understanding, preparedness, skills to prevent, detect and anticipate various kinds of disasters early. Teachers need to facilitate efforts to empower students on issues of disaster-prone areas by conveying disaster mitigation insights to students.

The importance of implementing disaster mitigation education in schools needs to be done from an early age, in order to provide deepening of knowledge and readiness for actions that need to be taken before an unexpected natural disaster occurs to minimize all the impacts that will occur [4]. Schools are entrusted with having a direct influence on the younger generation, to implement fire disaster mitigation in thematic learning. The increase in teachers is also followed by an increase in students' understanding after the teacher applies it to the learning. Based on the results of pre-observations carried out by researchers at 05 Ekok Tambai state elementary school, Putussibau, Kapuas Hulu regency, it was found that the phenomenon of understanding the introduction, prevention, handling and recovery of fire disasters was still very low with 20% questionnaire results obtained, this happened because the school has never received assistance education on fire disaster preparedness in schools.

Based on the description of the problem, it is necessary to make efforts to improve students' understanding of fire mitigation by using learning media. Learning media has the use of clarifying the limitations of space, time, sensory power, such as objects that are too large can be replaced with images or models, then concepts that are too broad can be visualized in the form of films/pictures [17] Griffiths [16] explained that games can involve children interactively and offer adventures, challenges, and various problems that must be resolved without real consequences. This can provide positive stimulation for children so that they can be more involved and interested in the ongoing educational process. The application of Gamikar as a companion education for learning media using the learning and play approach will help children improve brain intelligence and acquire fire mitigation knowledge. The results of Wedyawati research [14] indicate that the design of Gamikar shows that the device being developed is feasible to be given to students and is able to increase the knowledge of fire mitigation of elementary school students.

## **2 Methods**

The approach used is a quantitative approach. This type of experimental research is a quasi experimental design-nonequivalent control group design. The study population was all students of grade IV SD N totaling 60 students. Sampling in this study using a saturated sampling technique according to Sugiyono saturated sampling is a sampling technique when all members of the population are used as samples. Through previous considerations and studies, the sample in this study was class IV (A) students as the Experiment group and grade IV (B) students as the control group. In this study, there are two variables, namely the independent variable in this study is the fire mitigation game (Gamikar). and the dependent variable in this study was students' understanding of fire mitigation. Data collection techniques are measurement techniques using test questions, indirect communication techniques using questionnaires and documentation techniques using documentation. The test was analyzed using SPSS 26.0 software and the questionnaire was analyzed using the percentage formula.

### 3 Result

#### 3.1 Differences in Students' Understanding of Fire Mitigation

The results of hypothesis testing using the Independent Sample Test using SPSS 26.0 Software. According to Priyatno [9] hypothesis testing criteria can be determined as follows: If Sig (2-tailed) > 0.05, then  $H_a$  is rejected, If Sig (2-tailed) < 0.05, then  $H_a$  is accepted.

**Table 1.** Difference in Understanding of Fire Mitigation by Ekok Tambai Elementary School Students

control							
Test	type of test	max	min	mean	t-count	sig (Tailed)	level of sig
	<i>Pre-test</i>	80	40	62,67	-967	0,338	0,05
	<i>Post-test</i>	80	40	66,67			
question naire	type of test	Respondents' Answers			%	criteria	
		amount		Rata-Rata			
	<i>Pre-test</i>	358		11,93	22,95%	low	
	<i>Post-test</i>	365		12,16	23,40%	low	
experimen							
Test	type of test	max	min	mean	t-count	sig (Tailed)	level of sig
	<i>Pre-test</i>	81	49	62,70	-8,762	0,000	0,05
	<i>Post-test</i>	96	62	82,23			
question naire	type of test	respondents' Answers			%	criteria	
		amount		average			
	<i>Pre-test</i>	384		12,8	24,62%	low	
	<i>Post-test</i>	1174		39,13	75%	high	

The control group in the pre-test shows that the Sig (2-tailed) value is  $0.489 > 0.05$ , then  $H_0$  is accepted and  $H_a$  is rejected, which means that in the pre-test there is no significant difference. This is confirmed by the acquisition of a questionnaire in the experimental group with higher results. with a percentage of 24.62% compared to the experimental group getting a percentage of 22.94%. the results of both groups are included in the low criteria. So it can be concluded that students in the experimental group and the control group have an understanding of fire mitigation that is not much different. The experimental group and the control group show that the Sig (2-tailed) value is  $0.000 < 0.05$ , then  $H_0$  is rejected and  $H_a$  is accepted, which means that there is a significant difference. This is reinforced by the acquisition of a questionnaire in the experimental group with higher (75%) high criteria than the control group (23.40%) with low criteria.

#### 3.2 Differences in Understanding Pre-test and Post-test Fire Mitigation.

The control group shows that the Sig (2-tailed) value is  $0.338 > 0.05$ , then  $H_0$  is accepted and  $H_a$  is rejected, which means that there is no significant difference. This is indicated by the acquisition of the questionnaire results in the pre-test, the percentage of 22.95% was obtained with low criteria and the final measurement (post-test) was higher with a percentage of 23.40% with low criteria experiment group hypothesis test results show that the value of Sig (2-tailed)  $0.000 < 0.05$ , then  $H_0$  is rejected and  $H_a$  is accepted, which means that there is a significant difference. This is evidenced by the acquisition of the results of the questionnaire on the understanding of fire mitigation of experimental students at the initial measurement (pre-test), the results obtained were 24.62% low criteria and 75% higher in the final measurement (post-test).

**Table 2.** Differences in Understanding Pre-test and Post-test Fire Mitigation

Test	Pretest						
	group	Max	Min	Mean	T-count	Sig (Tailed)	Level Of Sig
	experiment	81	49	62,70	0,696	0,489	0,05
control	80	40	62,67				
questionnaire	group	Respondents' Answers			%	criteria	
		amount	average				
	experiment	384	12,8		24,62%	low	
	control	358	11,93		22,95%	low	
Posttest							
Test	group	Max	Min	Mean	T-count	Sig( Tailed)	Level Of Sig
	experiment	96	62	82,23	7,365	0,000	0,05
	control	80	40	66,67			
questionnaire	group	Respondents' Answers			%	criteria	
		amount	average				
	experiment	1174	39,13		75%	high	
	control	365	12,16		23,40%	low	

### 3.3 Student Responses to Fire Mitigation Games (Gamikar)

The questionnaire was developed by paying attention to the indicators in the Gamikar design. From the results of the questionnaire analysis, it turns out that the application of Gamikar received a very good response. The acquisition score is 100% which is at very high criteria. For more details, see table 3.

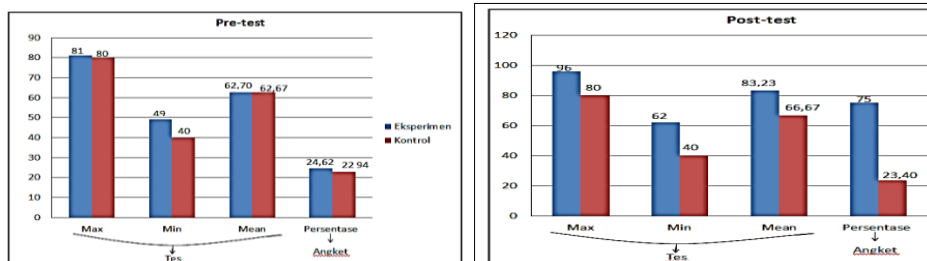
**Table 3.** Score of student response questionnaire against gamikar

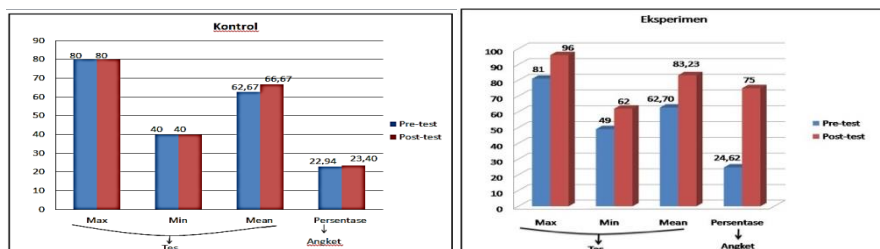
Number of question items	score	total	average	%
10	30	30	1	100%
amount	300	30	30	100%

The results of the student response questionnaire in the experimental group with the number of respondents as many as 30 students after applying Gamikar obtained an average of 30 with a percentage of 100% very good criteria. it means that all students respond positively to the application of the percentage of 100% of the criteria very well.

## 4 Discussion

### 4.1 Differences in Understanding of Fire Mitigation by Elementary School Students.

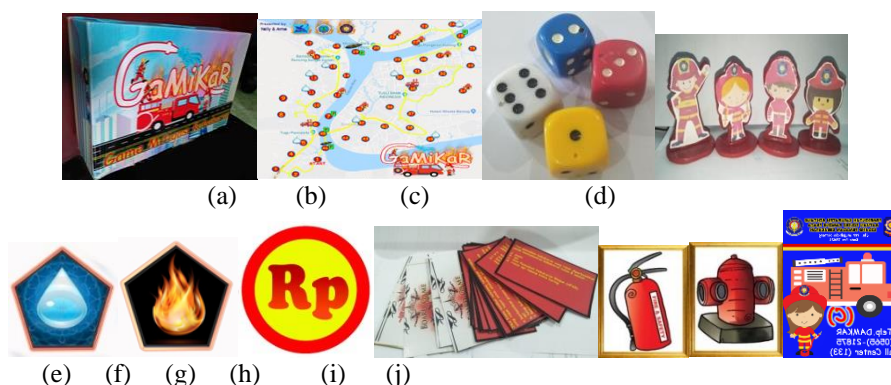




**Figure 1.** differences in students' understanding of fire mitigation in the pre-test of the experiment group and the control group.

Before the implementation of the Gamikar, the students' understanding of fire mitigation in the experimental group and the control group students did not have a significant difference. After the understanding of fire mitigation was applied, the experimental group students and the control group students had a significant difference. This increase was due to the use of disaster mitigation games (Gamikar). In this game students are directly involved in the fire mitigation educational game so that students have new knowledge about preparedness and preparedness.

Gamikar is a medium designed as an educational tool to increase students' understanding of fire disaster mitigation. The set of contents in a game box is a) cover b) game board, c) pawns, d) dice, e) water pin, f) fire pin, g) coins, h) question card and i) fire extinguisher card.



**Figure 2.** The set of contents in a game Gamikar

Broadly speaking, the Gamikar game is a maximum of 4 players. Each player is entitled to 2 water pins, 2 APARs, 2 Hydrants, and 2 Call Cards 113. The game starts from the START square. Each player has the opportunity to visit the water and fire routes. the player with the most fire pins is the winner. The results of the pre-test and post-test of the control class did not have a significant difference, while the experimental class, the class that received the salt treatment had a significant difference. The difference in increasing understanding of fire mitigation in the control group is in the low category while the experimental group is in the high category. [15] conducted the same research and concluded that there was a high difference between students' understanding of fire disaster mitigation before playing gamikar and after. Teacher professional ones do not appear instant but rather shaped through a series of educational processes long, both before and after becoming a teacher [7].

## 4.2 Student Responses to Fire Mitigation Games (Gamikar)

The results of the questionnaire scores after being analyzed showed that the students enjoyed playing the game, while participating in the game process they felt very enthusiastic. Learning that begins with games is able to stimulate learning for the participants [17]. Students respond positively to games because it is very useful for increasing understanding of fire mitigation. This is proven by the acquisition of a percentage of 100% of all students who stated that gamikar was very useful for understanding fire mitigation for students and 0% of students said it was not useful. Then the gamikar can be used to improve students' understanding of fire mitigation. [14] conducted the same research and concluded that the game of gamikar was in great demand by students with the acquisition of an interest questionnaire score on the indicators of attractiveness, material and language of 100. [12] argued that the disaster mitigation learning model had been responded positively by student elementary school, but it is necessary to develop more specific disaster education so that in this research fire disasters are caused by nature and humans. Gamikar game can be a fire mitigation educational game that gives a sensation, students seem to be a firefighter and are required to be able to understand and understand. [2] conducted the same research and concluded that board games are useful for gaining scientific knowledge of natural disasters.

## 5 Conclusion

There is no difference for the pre-test in the experimental group and the control group, this can be seen from the results of hypothesis testing for the experimental group and the control group, the results are Sig (2-tailed) 0.489, then  $H_0$  is accepted and  $H_a$  is rejected. This is reinforced by the acquisition of the experimental group questionnaire results obtained by a percentage of 24.62% and 22.94% for the control group. There is a difference for the post-test in the experimental group and the control group, this can be seen from the results of the hypothesis test for the experimental group and the control group, the results are Sig (2-tailed)  $0.000 < 0.05$ , then  $H_0$  is rejected and  $H_a$  is accepted. This is reinforced by the acquisition of the experimental group questionnaire results obtained by a percentage of 75% and 23.40% for the control group.

There is no difference for the pre-test and post-test in the control group, this can be seen from the results of hypothesis testing for and for the control group, the results are Sig Sig (2-tailed)  $0.338 > 0.05$ , then  $H_0$  is accepted and  $H_a$  rejected. This is reinforced by the acquisition of questionnaire results of 22.94% for the pre-test and 23.40% for the post-test. There is a difference for the pre-test and post-test in the experimental group, this can be seen from the results of the hypothesis test for the experimental group and it is obtained that Sig (2-tailed)  $0.000 < 0.05$ , then  $H_0$  is rejected and  $H_a$  is accepted. This is reinforced by the acquisition of questionnaire results of 24.62% for the pre-test and 75% for the post-test. All students respond positively and are very happy with the use of Gamikar, this can be seen from the analysis of the student response questionnaire regarding the application of Gamikar with the criteria "yes", "no", then the results of the analysis obtained the answer "yes" with a total percentage of 100% and 0% of students answered no.

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