

Teaching Media Development for Aku Siap Module to Improve Fire Disaster Preparedness Skills in Early Childhood Development Research in Early Childhood Education in Dki Jakarta 2018

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Abstract:- The objectives of this research is to develop a learning model in early childhood education which could forming fire disaster preparedness and to measure the effectiveness of this model. This development research was conducted in Kampung Muka DKI Jakarta.

This study was ran by the high level of risks children becoming victims of the fire disasters. Including the risk of losing things, being burn, or even losing their lives. This development research resulted teaching module “AKU SIAP Kebakaran”. This learning model was developed using The systematic Design of Instruction (Dick, Carey & Carey, 2015) method. The model effectiveness test was performed with pre test & post test as measured by paired T test.

As expert review, it was stated that the model is suitable for early childhood preparedness learning. While the module effectiveness test stated that this model effectively improves fire preparedness skills of children in early childhood. As a recommendation, there should be standardization of fire preparedness training for early childhood and next model development of fire preparedness for children living in residential towers.

Keywords:- fire, flame, preparedness, disaster, early childhood).

I. INTRODUCTION

Behind the rapidly growing city of Jakarta, there is a risk of disaster that can happen at any time. One of the disasters that often hit big cities like Jakarta is fire disaster. Based on data from Jakarta Fire and Rescue Agency, during the year 2017 occurred 2003 fire disasters in DKI Jakarta, with electrical short circuit as the main cause. It means that every month there are 166 fire incidents an average in Jakarta.

One of the most vulnerable groups in the event of a fire is children, including early childhood. According to UU No. 20 of 2003 about the national education system, early childhood is a child aged 0-6 years. Early childhood education is an education effort aimed at children from birth up to the age of six who is done through the provision of educational stimuli to help the growth and development of physical and spiritual so that children have readiness in entering further education.

Places where children often gather are schools and homes, But the level of preparedness in both places is still low. Based on fire safety assessment in five public elementary schools (SDN) in DKI Jakarta (Lestari, Fatma 2011), The four components of fire safety (fire protection facilities, fire truck access, life-saving facilities, and fire safety building management) are unavailable and have not been implemented in all of the studied schools. Similar findings were found by Amri During FGD (Focus group discussion) with disaster activists in Jakarta. Disaster risk reduction in children has not been a priority of the government, so program sustainability can not be expected (Amri, 2016).

Based on interviews with education and fire training division of Jakarta Fire and Rescue Agency and prevention field of East Jakarta Fire and Rescue, there is no standard method how firefighters increase the preparedness of fire disaster in children. So far, the introduction of fires conducts by firefighters is to introduce the fire-fighting profession rather than to increase fire preparedness capacity. The method was devised without good planning, The training material was made only by the experience of each officers. So in addition to not effective, also makes children becomes vulnerable. Because children get lesson that is not appropriate for their age and exposed with dangerous objects.

Government of Indonesia through BNPB (National Disaster Management Agency) has launched safe school program (sekolah dan madrasah aman bencana /SMAB) based on Perka BNPB No. 04 of 2012. SMAB focuses more on the earthquake and tsunami disaster. In SMAB also has made earthquake-resistant building standards, this standard can be applied also in making fire safe building standard. Preparedness materials in SMAB are still prepared for elementary to high school level, so it takes application to apply them in early childhood education.

A learning model is needed to improve fire alert preparedness skills at an early age. Appropriate learning model with age of development. Preparedness learning for early childhood is based on disaster concepts, preparedness concept, fire concept, evacuation standard and early childhood development stage. From the existing concept, Then the model divided into three major concepts. recognizes the fire and its dangers, acting in the event of fire and fire fighter profession.

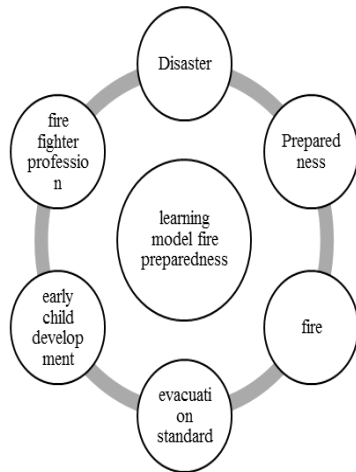


Fig 1:- Conceptual Model

According to Law Number 24 Year 2007 on Disaster Management, Disaster is events or series of events that threaten and disrupt people's lives and livelihoods caused by both natural and / or non-natural factors and human factors resulting in the occurrence of human casualties, environmental damage, property loss, and psychological impact.

According to the UN ISDR (United Nations International Strategic for Disaster Reduction) disaster is A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.

According to Law No. 24 of 2007 on disaster management, preparedness is a series of activities undertaken to anticipate disasters through organizing and through appropriate and efficient measures. According to UNISDR preparedness is The knowledge and capacities developed by governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters.

The Federal Emergency Management Agency (FEMA) states that the basic capabilities that must be had in preparedness (FEMA, 2004)

- Get informed about hazards and emergencies that may affect you and your family.
- Develop an emergency plan.
- Collect and assemble disaster supplies kit.
- Learn where to seek shelter from all types of hazards.
- Identify the community warning systems and evacuation routes.
- Include in your plan required information from community and school plans.
- Learn what to do for specific hazards.
- Practice and maintain your plan.

The concept of fire comes from the theory of fire triangle which mentions that fire consists of three elements: Fuel, Heat and oxygen. (Soedirman, 2014)

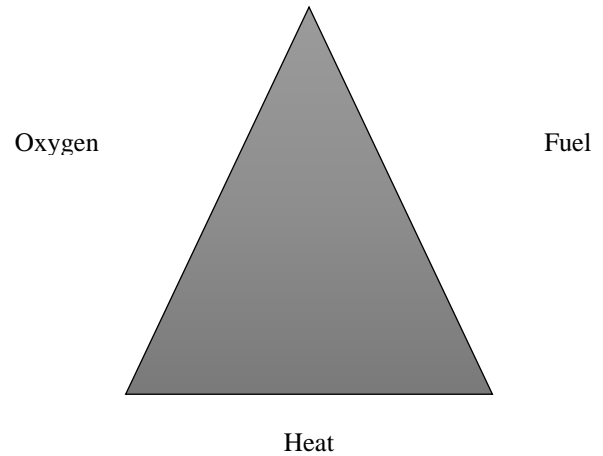


Fig 2:- Fire Triangle

The heat source is an object that produces heat, like a burning stove, candles, matches, electrical objects etc. Based on the burning material, NFPA (National Fire Protection Association) divides the fire into 4 types:

Type	Fuel
A	Class A fires are fires in ordinary combustibles such as wood, paper, cloth, rubber, and many plastics.
B	Class B fires are fires in flammable liquids such as gasoline, petroleum greases, tars, oils, oil-based paints, solvents, alcohols. Class B fires also include flammable gases such as propane and butane. Class B fires do not include fires involving cooking oils and grease.
C	Class C fires are fires involving energized electrical equipment such as computers, servers, motors, transformers, and appliances. Remove the power and the Class C fire becomes one of the other classes of fire.
D	Class D fires are fires in combustible metals such as magnesium, titanium, zirconium, sodium, lithium, and potassium.

Table 1. Fuel Type

The last element is Oxygen. The fire will light up in a room with enough oxygen. For the occurrence of fire, the three elements above must exist. Without one of these elements, the fire will not burn.

II. RESEARCH METHODOLOGY

Research and development model begins with needs analysis. The result of is used to design the model. Furthermore, the development of model using approach model of Systematic Design of Instruction (Dick, Carey & Carey, 2015).

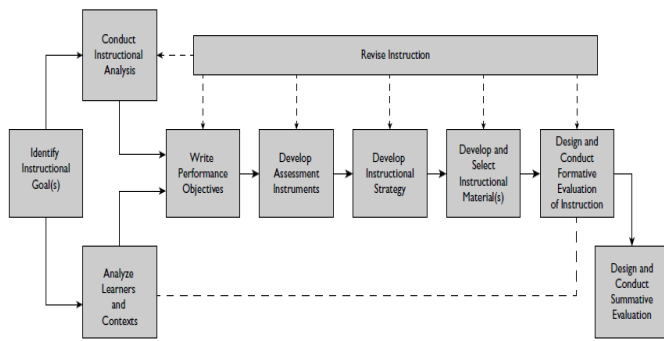


Fig 3:- Systematic Design of Instruction

The phase 1 model is then validated through a review of fire experts and module experts. Expert review results are used as revision material to model 2. Model tested by model effectiveness test with field test on 20 children of early childhood age. Field test results are evaluated for final model.

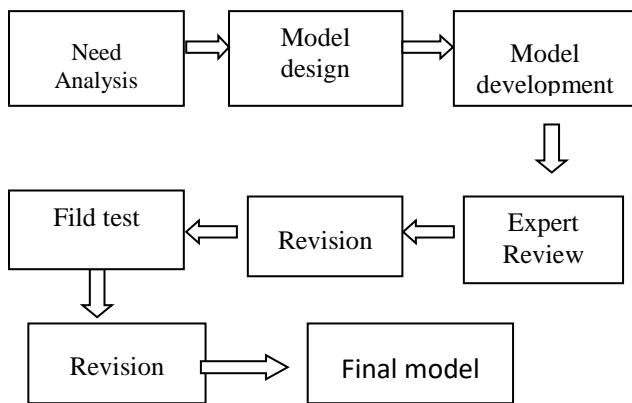


Fig 4:- Model Development

From the result of need analysis, there are three objectives of learning of fire for early childhood, there are

- The fire and its dangers
- A child's ability to act in the event of a fire
- Fire fighter profession

three general objectives were developed into the following materials : Heat, Fuel, Fire Extinguishing, Hazard Identification, Safe Place, and Evacuation. Then added material about the fire fighter profession (Tasks, Uniforms, Equipment and Contact Number). This initial model was then validated through the study of fire experts and modules experts.

III. RESULT

➤ Fire Experts Result Study

From the results of the study of fire experts, there are several inputs to model stage 1 as shown in table 4 below.

Fire Expert Input	Revision
Introduce type C from types of fire (electrical appliances)	Content of Home electrical appliances as the causes of fire is added
Reduce the content of parts of gas stove because it is not needed for early childhood	Content of parts of gas stove is eliminated.
Eliminate the content of turn off the fire by blowing it, to avoid children do it on a big fire.	Content of Blowing candle light is eliminated.
Add fire as a danger sign	Content of Fire as a danger sign is added.
Replace tools to make smoke from wood powder into coconut husk that produces more smoke and more easily obtained	Wood dust replaced by coconut husk.
Add how to recognize the smell of burning wires	Activity of children to know the smell of burning wires is added.
Add about the child to cover the nose and mouth when there is smoke	Adds explanations about covering the nose with your hands or cloth
Added to know the smell of gasoline	added the activity of children to know the smell of gasoline
Separating chapters safe place with an exit point	Adds an exit path chapter and is separate from safe places chapter
Adding safe places criteria	adding 1. go to the open spaces 2. go to the Street 3. don't go to the roof / 2nd floor 4. don't go to the bathroom
Explain the smoke character to explain why children crawl as they pass through the smoke alley	Insert the smoke character that fills the top first so that there is fresh air below
revise the face cover instead of when drop, but roll	revision of learning, cover face when roll
Use a folding mattress to soften during exercise	Use a folding mattress to soften during exercise
did not include evacuation training in the dark. because it is not suitable to be applied in densely populated areas where the house is small.	did not include evacuation training in the dark
Adding panca dharma as DAMKAR task	Adding panca dharma. but the child only remembers 3 easy-to-understand duties that are : prevent, extinguish and save
Simplify explanation of fire fighter uniforms	Just explain • Field service uniform • fire jacket • Heat-resistant clothes

Reduce the equipment on display to reduce the danger and fear of children	Only introduce standard equipment such as hoses, hydrant etc.
Eliminate ride a fire truck	Adjusted, but all students have to sit inside the fire truck.

Table 2. Fire Expert Inputs

From the results of the study of fire experts, the model was revised to be.

No	Goals	Content
1.	Knowledge of Fire and it's dangers	The child recognizes the surrounding heat source
		Children classify combustible substances
		The child knows the danger of fire
		The child recognizes the danger sign by Recognizing the smell of gas, gasoline and smoke.
		The child notifies an adult if it smells of gas and smoke
2.	A child's ability to act in the event of a fire	The child knows two points out of the room during an emergency
		The child has the ability to pass through a hallway or a smoky room
		The child knows the safe place around him
		The child is able to make the line during the evacuation process
		The child is able to do "Stop, drop & roll" when his clothes are burned
3.	Fire fighter profession	The child knows the fire fighter uniform
		The child knows the fire fighter job
		The child knows the phone number of the fire department
		Children recognize fire truck

Table 3. Aku siap”model

Application of phase 2 model is then divided into 4 time, that is

1. Fire and its danger
2. Danger sign
3. Evacuation
4. Profession of firefighter

A. Module Expert Result Study

To validate the module, the module is reviewed by module experts. From the results of the study were obtained suggestions as follows.

Module expert input	Revision
Changing the module format from lesson plan to narrative form	Module changed to narrative form
Adding conclusions from each chapter	Adding conclusions from each chapter
Replace the module Cover image into an image that shows practicing rescue	New cover
Eliminates the colors in the table	The colors on the table are removed
Add info graphics and images	Add info graphics and images in each chapter
Clarify the evacuation plan and Add an explanation on the evacuation plan	Clarify the evacuation plan and Add an explanation on the evacuation plan

Table 4. Module expert

➤ Field Test Results

Field tests were conducted at Raudathul Atfal Uswatun Hasanah Kampung Muka and Taman Sari fire station. From result of observation of learning got result

Lesson	Notes	Revision
Lesson 1	Conditions are dangerous when children are curious and urged forward As a demonstration with fire	It takes two teachers, one to guide the activity. And a companion teacher who prepared the equipment and made sure the children were safe
		Prior to the class, a hazard area is defined. Eg box-shaped around the demonstration place. Children may not enter dangerous areas. Need a real splash line, aka line made with duct tape or other barrier.
	Teachers have difficulty explaining such terms as <ul style="list-style-type: none"> • Heat source • Fuel • Oxygen (described as air) 	Comparison Number of children and teachers 20: 2.
	Some teachers still have the wrong perception on LPG and fire so that teachers do not dare use it in class	Add explanation to the module training for teachers about fire
		Additional lesson on LPG gas as additional knowledge for teachers
		In the demonstration, the teacher does not need to turn on or open the gas. Gas only as props only.
Materi 2	Teacher does	To introduce the smell of gas,

	not introduce the smell of gas for not daring	do not directly use the stove. But can by first entering the gas into the bottle. The child can learn to smell from the bottle.
	The child does not have enough time to do the orientation of the room because the outgoing path is directly explained by the teacher.	The teacher invites the child to orient the room. Ask them to find a way out that they think can be passed
Materi 3	When the child queues the practice, the children with the final queue are busy mimicking the movements of their friends, but forget what it is doing.	Teacher continues to explain why stop, drop and roll as well as why ducked down the passage through the smoke
	Children are waiting too long for practice	Two exercises can be paralleled with two teachers
	When the command protects the eyes, some children remember it by closing the eyes	Using the word cover face to protect the face (including the eyes) and demonstrate it.
	The child does not understand why crawling while passing through the smoke	Teacher explains repeatedly why it is necessary to crawl in the smoke. Teachers can relate the experience of smelling the stifling smoke in the previous material
	Firefighters are still difficult to change the pattern of learning	Need to make lesson plan to be more in the application
	The content of the "Pampi" video used for education is inappropriate for early childhood	not using video pampi
Materi 4	When	It takes a list of simple

	explanation of fire extinguishers tools, instructors have difficulty in explaining in a language that is easily understood by children	explanations to explain the name and function of the tool.
	Some fire extinguishers are dangerous objects that can make a child wound	Prior to the class, a hazard area is defined. Eg box-shaped around the demonstration place. Children may not enter dangerous areas. Need a real splash line, aka line made with duct tape or other barrier
	Children are curious to touch fire extinguishers	Dividing tools into devices that can be touched and not touched. Tools that can be touched like a) Clothes b) Nozzle c) Hose d) Flashlight e) Small axe Tools that can not be touched a) Chainsaw b) Big axe c) concrete cutting tools d) And other dangerous tools
	The game follows the rules that the damkar instructor made is not appropriate for early childhood	It takes a game list with instructions for the use of officers.
	Yell-yel used is difficult to understand by the child	It takes a yell-yel guide for the officers.
	For DKI Jakarta and several major cities, other than no 113, emergency calls including fire department are used no 112.	Children introduced one of them, for Jakarta 112.

Table 5. Field Observation Notes

To test the effectiveness of the model, pretest and posttest are performed on the children whose outcome is

No	Name	Pre test	Post Test
1.	Nadira	38	52
2.	Wifi	28	51
3.	Wulan	28	49
4.	Ramzi	40	49
5.	Rafasya	29	45
6.	Ikhsan	34	51
7.	Betrand	35	52
8.	Syamil	40	50
9.	Firza	37	55
10.	Zio	36	55
11.	Aida	33	49
12.	Aulia	34	40
13.	Atika	32	46
14.	Hilmiza	26	41
15.	Ilham	37	47
16.	Bagas	38	47
17.	Azam	34	47
18.	Devin	43	48
19.	Adi	36	52
20.	Aini	28	52

Table 6. Pre Test & posttest RA Uswatun Hasanah

Before a different test (t-test), the normality test is used to ensure that the pre test and post test data are normally distributed. From the normality test using Kolmogorov Smirnov method in SPSS, obtained a level of pretest and post test significance of each of 0.200. This value is greater than 0.05, then it can be concluded if the data is normally distributed.

Paired t-test was performed to test for the mean differences in the paired samples, using the following hypothesis.

H1: there is no relationship between pre-test and post-test.

H0: there is a relationship between pre-test and post-test

The terms of acceptance are,

If the value of $t_{count} < t_{table}$ then H0 rejected and H1 accepted.

if the value of $t_{count} > t_{table}$ 0.05 then H0 is accepted and H1 is rejected. result of test t test using SPSS, get result

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Pre test & Post Test	20	,269	,251

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre Test	34,3000	20	4,65776	1,04151
	Post Test	48,9000	20	3,97227	,88823

Paired Samples Test									
		Paired Differences				95% Confidence Interval of the Difference	t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean					
Pair 1	Pre test post test	14,6000	5,2455	1,17294	17,05499	12,14501	12,447	19	,000

The correlation value between pre-test variable with post-test of 0.269 means having a strong and positive relationship. In other words, the treatment performed gives a visible impact of a strong and positive relationship between the pre-test value and the post-test value.

This can be known from the average value on the pre-test of 34.3 and increased to 48.9 on post-test after getting treatment. Sig value of T test of 0.000 means significant at level 0.001, so that the value of t_{count} is 12,447 > of t_{table} at the 0.05 and df (19) confidence level of 2.093 means t_{count} is far from the rejection area, so H0 is accepted and H1 is rejected or it is stated that there is a relationship between pre test and post test, indicating a significant role in treats done to RA Uswatun Hanah's children. Field test results are then revised and made into final models.

IV. CONCLUSION

From the results of the study, obtained

1. In general, preparedness to fire in early childhood is still low. In addition to the lack of information, there is also no clear standard in fire preparedness. It is expected that this module can help teachers, firefighters, parents and disaster activists in teaching fire preparedness in early childhood.
2. Skills needed by early childhood is the ability to avoid fire and dangers
3. there are three objectives of learning of fire for early childhood, there are the fire and its dangers ; A child's ability to act in the event of a fire; and Fire fighter profession
4. After a module and fire expert review and effectiveness test at RA Uswatun Hasanah, this module is effective in improving fire alert preparedness skills in early childhood

V. RECOMMENDATION

From the results of this study, here are some recommendations

1. Schools need to have standardized procedures for dealing with disasters in schools, schools can take the standard of learning in the “aku siap kebakaran“ modules
2. To be responsive, it needs repetitive rehearsal exercises. Especially for teachers as commanders in the event of an emergency at school
3. Schools should provide equipment to prevent fire such as light fire extinguishers, evacuation routes, emergency stairs etc.
4. Most of the fire problems that the child faces are at home. To improve the preparedness at home, it takes a guide that can be used by parents at home.
5. it takes public awareness in preventing fires, including rebuke when there is a child playing the fire.
6. Because some Indonesian children live in tall buildings, It takes extra material about fires in high buildings such as smoke alarms, evacuation in the dark etc

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