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Skills Profile of Fire Heat Processation Experiment at Early Children

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Abstract

The introduction of experimental learning in PAUD is still weak. Meanwhile, children's curiosity is very high. It's a shame that this golden era has just passed by. Based on the results of initial observations, it was found that TAAM As Salam PAUD children have a high curiosity, but the learning carried out is still conventional. These initial findings became the basis for research entitled Profile of Fire Heat Propagation Experimental Skills in Early Childhood. Qualitative research is used as a researcher's approach to solving problems. The research subjects were 9 children aged 5-6 years from group B, and 1 homeroom teacher from group B. Research analysis used data triangulation. The experiment was carried out involving 9 children in a fire propagation experiment, from a candle flame to heat propagation to a used drink can that was used as a cooking pot. The result of this research is the emergence of a profile of experimental skills in early childhood through experimental activities on the propagation of fire heat. The profile of experimental skills that children can develop reflects the 4C profile abilities (Creativity, Critical Thinking, Communication and Collaboration).

Keywords: Early Childhood; Experiment; Heat Propagation of Fire

INTRODUCTION

Law no. 20 of 2003 concerning the National Education System Article 1 Paragraph 1, states that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character. , as well as the skills needed by himself, society, nation and state.

Republic of Indonesia Law no. 20 of 2003 concerning the National Education System Article 1 Paragraph 14, states that early childhood education is a coaching effort aimed at children from birth to 6 years of age which is carried out through providing educational stimuli to help physical and spiritual growth and development so that children have readiness to enter further education.

To achieve these educational goals, a learning process is carried out that can change the behavior of the individual concerned and develop creativity, attitudes and behavior. The learning process will be more optimal if it is done when the child is still at an early age. This is because early childhood is the golden age, where all aspects of a child's development can develop rapidly and is an age that has great potential to train and develop various multi-intelligence potentials that children have (Afdhilla & Mahendra, 2020)

Therefore, early childhood education needs to receive serious attention from the government and society because it is the first step towards further education. Besides that, early childhood education is a huge investment for families and the nation (Hulukati & Hulukati, 2015)

In early childhood education there is learning by experiment. An experiment is a planned program to test a hypothesis by providing empirical evidence on a group of subjects. Experiments have the advantage of making students trained to use scientific methods in dealing with all problems, so that they do not easily believe in something that is not certain to be true. Experiments are also useful for proving a theory. In addition, experiments are useful for developing an exploratory attitude about science and technology, an attitude of a scientist. So experiments are very useful because they provide direct experience so they can develop a

scientific thinking attitude (Festiana, 2018).

Introduction to experimental skills should be carried out from an early age with fun activities and through habituation so that children experience the experimental process directly (Susilowati, 2016). This is done so that children not only know the results but can also understand the process of the experimental activities they carry out, because experimental skills enable children to explore various objects, both animate and inanimate (Dewi *et al*., 2019).

Apart from that, experimental skills can also train children to use their five senses to recognize various symptoms of objects and events (Dini, 2022). To support this process, teachers must prepare appropriate methods for learning, because young children need methods that can enable them to interact directly with the activities being carried out. In this case the teacher can use the experimental method (Khaeriyah *et al*., 2018).

This experimental skill tries to fulfill the goals needed by early childhood children more completely, therefore when using learning methods there is definitely a goal that can be obtained when using this method, as well as using experimental methods.

Experimental skills are children's skills in recognizing and understanding the existing knowledge and theories regarding the propagation of fire heat during cooking (Eka Maryani & Hadayat, 2016). This fire heat propagation experiment is one of the lessons that develops knowledge in early childhood (Mahyuddin *et al*., 2021). The experimental skills in this research are activity planning skills, exploration and probing activities, classification, cause-and-effect, problem solving, and initiative (Asri, 2016). Experimentation is where children are given the freedom to carry out experiments with instructions and guidance from the teacher. Trying to help students to be more actively involved in the activities given by the teacher. This means that experimental skills help students gain their own knowledge by carrying out the process and seeing the results (Rusawalsep *et al*., 2020).

Some learning things that cannot be explained through lectures alone, through these experiments, young children can prove them directly. For example, proving the existence of air which is invisible but can be proven through experiments, regarding fire which is said to be dangerous but can end up being fun through experiments on the propagation of fire heat through cooking that researchers carried out, mixing basic colors which can actually produce new colors or other colors through experiments, These are some examples of early childhood experiments and many more.

Based on the results of initial observations conducted by researchers on Monday, January 8 2024 in group B at PAUD TAAM As Salam Purwakarta Cilegon. In the learning process activities for experimental skills in the propagation of fire heat in early childhood in the field of experimental skills, this has not been maximized. Because teachers more often use the method of giving assignments using Children's Worksheets (LKA) and PAUD magazines, so it doesn't attract children's interest. The lack of optimal experimental learning is also caused by learning activities that are still centered on the teacher, the concepts taught to children are still abstract, and difficult to understand because children do not do it directly and the learning methods and strategies provided are less varied.

Group B children at PAUD TAAM As Salam in general have not been able to master experimental process skills which include skills in planning activities, carrying out exploratory and probing activities, classifying objects, recognizing cause and effect, solving problems, and having initiative. This is because the use of assignment methods, both

Children's Worksheets and Early Childhood Education magazines, which are often given, are of course only able to develop one aspect of experimental skills. For example, through tracing activities, which only develops skills in problem solving but cannot yet develop other aspects of experimental process skills.

Data obtained from initial observations carried out by researchers in the January 2024 period can be concluded that the experimental process skills of group B children are still not optimal. Therefore, researchers have the idea of using experimental methods in learning to develop children's experimental process skills. It is hoped that the use of experimental methods can foster children's interest and activeness in learning, so that the teaching and learning process can provide memorable experiences for children and more optimal learning outcomes.

Therefore, researchers feel the need to conduct research on the topic Skill Profile of Fire Heat Propagation Experiments in Early Childhood to provide something new in learning at PAUD TAAM As Salam schools.

METHOD

In the research on the Experimental Skills Profile of Fire Heat Propagation in Early Childhood, researchers used descriptive qualitative methods. Qualitative research is an inquiry strategy that emphasizes the search for meaning, understanding, concepts, characteristics, symptoms, symbols and descriptions of a phenomenon, is focused and multi-method, is natural and holistic, prioritizes quality, uses several methods, and is presented narratively. In simple terms, it can be said that the aim of qualitative research is to find answers to a phenomenon or question through the systematic application of scientific procedures using a classroom action approach. (Sidiq *et al*., 2019).

In the research on the Profile of Experimental Skills on Fire Heat Propagation in Early Childhood, 9 children and one teacher, namely the homeroom teacher from group B, used data collection techniques through observation, interviews and documentation on group B children aged 5-6 years.

RESULT AND DISCUSSION

The results of the researchers' findings on the Skill Profile of Fire Heat Propagation Experiments in Early Age Children have been able to answer the existing problem formulation, namely, how to implement the skill profile of fire heat propagation experiments in early childhood and what is the reaction after conducting experimental learning on fire heat propagation for children using the experimental method. After carrying out the research stages, the researchers found that:

Implementation of the Skills Profile of Fire Heat Propagation Experiments in Early Childhood

After carrying out observation activities on children through the experimental process of spreading the heat of fire by cooking using a pan from used drink cans and a fire source from candles using a brick stove, and by paying attention to the children's activities through observing reactions from the fire heat propagation experiment, the children tried the cooking process directly. which can be cooked due to the heat propagation of the flame from the candle flame to the frying pan which was tested in the form of butter which can melt, eggs which can be cooked when exposed to the heat propagation process from the candle flame to the frying pan, water which boils when exposed to the heat propagation process from the fire.

the candle flame into the can and the children also know the reason in the experimental activity why the heat of fire spreads, and the can is also an object that can spread heat (Miladia & Muslim, 2022). The children also take the initiative to wear anti-heat gloves when carrying out the experimental activity on the propagation of the heat of fire and tell about the heat of the candle flame. can make the can hot so that the eggs and water are cooked, recounting the boiling foam that came out of the water when it was about to boil, and also an interview with the group B teacher, where the activity was designed through making RPPH, research instruments and instruments. observation, then the implementation of the experiment can be achieved in the form of the child's ability to observe experiments, trying directly to find out the cause and effect, thereby giving rise to initiative (Sundari, 2010).

This is in line with research entitled Experimental Study of Flame Temperature Distribution of Side Burner Type Bioethanol Stoves with Varying Firewall Diameters regarding the heat temperature of the flame so that it can help the cooking process to become cooked in the experiment with the results of this research showing a picture of the flame temperature distribution which the researchers carried out using reactions in the form of words from children who say it is great can change when they see it, changes in the process of butter becoming melted, raw eggs becoming hot and children being amazed when they see the foam of boiling water

Children's reactions after learning about the heat propagation of fire experiments.

After conducting observations on children with cooking activities using used tin pans and candle fires and brick stoves, and equipped with planning from the Daily Learning Program Plan as well as providing observation instruments, interview instruments and documentation of research activities, the researcher concluded that the research activities This is able to show how children react after the experiment, namely that children become increasingly enthusiastic about the learning process at school because it is packaged in a fun way and children can easily understand the subject matter. This is in accordance with research on the Application of Experimental Methods to Improve Science Learning Outcomes for Grade VI Elementary School that experiments can improve children's learning outcomes as one of the children's reactions to experiments. (Khalida & Astawan, 2021).

From the observation activities, interviews which were equipped with documentation of the Daily Learning Program Plan and photos of research activities, in the initial observations the formulation of implementation problems and children's reactions to Undeveloped (BB) experimental skills were seen during the cooking experiment process and the change in eggs to cooked, water becomes boiling, the butter turns melted, the child's reactions and responses are still confused and normal. However, when the experimental activity was repeated again, the children had begun to develop (MB) with the emergence of reactions and responses from those who said it was great, it could change and continue to develop according to expectations (BSH) when something else appeared when they said it was really exciting, the water could be there. The foam indicates a response and observation process from the child and, even better, it increases to Very Well Developed (BSB) when the children take the initiative to use a cloth when holding their frying pan. Changes in ability have been seen after research on the propagation of fire heat through this experiment.

In this discussion, it will be explained in detail what activities were carried out by children, teachers and researchers in the research activity Profile of Experimental Skills on Fire Heat Propagation in Early Childhood using observation, interviews and documentation, the explanation is as follows:

Data Reduction

Profile of Fire Heat Propagation Experimental Skills in Early Childhood Group B Age 5-6 Years

Table 1. Transcript of Observation Results

Activities	Name of children								
	nf	z	b	d	r	k	m	sh	y
Children are able to observe a reaction from a fire heat propagation experiment	SB	SH	SH	SH	SB	SB	SB	SB	SH
Children are able to try the objects they are trying out	SB	SH	SB	SB	SH	SH	SH	SH	SB
Children are able to understand the reasons for the fire heat propagation experimental activity	SB	SB	SB	SB	SB	SB	SB	SB	SB
Children are able to take the initiative in carrying out experimental activities on the heat propagation of fire	B	SH	SH	SB	B	B	B	B	SB
Children are able to retell the fire heat propagation experiment that has been carried out	SB	SH	SH	SH	SB	SB	SB	SB	SH

In observing the Skills Profile of Fire Heat Propagation Experiments in Early Childhood with the activity of cooking water and eggs using a frying pan from used drink cans. By using tools and materials, namely water, eggs, butter, used drink cans, candles, gas lighters, bricks (stove).

a. The first activity of the children was being able to observe a reaction from the fire heat propagation experiment which had shown their abilities and development, namely 5 children were in the Very Well Developed (BSB) stage and 4 children were still below that, namely Developing According to Expectations (BSH), these results could be achieved because of the learning object. real and concrete.
b. The activities of the two children were able to try the objects that were tested to obtain better developmental results, namely 4 children developed very well (BSB) and 5 children achieved Developing According to Expectations (BSH), these results can be achieved because the children use all their five senses so that they are optimal his understanding.
c. The three children's activities were able to find out the reasons for the fire heat propagation experimental activity with average results for 9 children, namely Developing

Sangan Good (BSB). These results could be achieved because the experiment was carried out in groups so that fellow friends complemented each other when understanding it.

d. The activities of the four children were able to provide the initiative in carrying out fire heat propagation activities with the achievement of Starting to Develop (MB) in 5 children and 3 children Developing According to Expectations (BSH) and 1 child Developing Very Well (BSB), these results were achieved because the children tried directly, feel directly so that there is coordination of all the senses that gives rise to the initiative.
e. The fifth activity is that children are able to retell the fire heat propagation experiment that was carried out with the achievement of 4 children developing according to expectations and 5 children developing very well (BSB), these results can be achieved because children do it and try it directly and of course they will be able to explain it fluently. or retell it.

Profile of Fire Heat Propagation Experimental Skills in Early Childhood

Table 2. Transcript of Interview Results

Indicators	Questions	Answers
Implementation Experiment	1. What steps have you taken to stimulate children's experimental skills so that the implementation of experiments is achieved?	1. There is an experimental activity at the end of the peak theme
	2. What kind of learning habits are included in daily teaching and learning so that children are focused on experimental skills?	2. By relating and telling each theme to nature
	3. Is there a special schedule for learning science experiment skills so that implementing experiments is easy to achieve?	3. There is no specific schedule for knowledge of science experiments
	4. Does the support of parents and school principals really influence the implementation of experiments with children?	4. The support from the principal is good but the support from the parents is lacking
	5. Does implementing the experiment require large amounts of funding?	5. For experimental learning, the funds are greater
Media experiment	1. Is it difficult to provide experimental materials?	1. It's a bit difficult to find the ingredients in several shops
	2. Are the materials and tools or experimental media expensive?	2. Experimental materials are affordable but sometimes the equipment is a bit expensive
	3. Does any media or	

Indicators	Questions	Answers
	experimental material contain elements of danger to children? 4. Are there limitations to experimental media in early childhood experimental skills? 5. Is it necessary to wear personal protective equipment during experiments?	3. Not all of them are dangerous, but experiments require ready assistance 4. PAUD experiments do not use dangerous chemicals 5. Children usually wear aprons and gloves during experiments, worried about getting hurt and dirty
Constrain experiment	1. Does the child feel afraid when doing the experiment? 2. Does this experiment have harmful effects on children? 3. Do you need more teacher help during the experiment? 4. Can experiments be done in class? 5. Can children passively participate in experiments?	1. There were some children who were shocked when the experiment reacted 2. Sometimes someone gets hurt, but it's only a small wound 3. Accompanying teachers during experiments are usually added 4. Yes, but less freedom 5. Passive children will start commenting when the experimenter reacts
Inner child's abilities experiment	1. Are children able to easily understand the theme through the experimental process? 2. With experiments, is the child's interest in learning high? 3. What intelligence emerged during the experimental process? 4. Are children able to present the results of their experiments? 5. Does all children's curiosity arise?	1. Children understand easily and quickly because they are involved in the process 2. After the experiment, usually the next day you will be enthusiastic about going to school 3. The average intelligence comes overall 4. Children fluently tell what happened during the experiment 5. All the children were busy asking what this was, what that was and everything about the experiment

In the research interview for the Experimental Skills Profile of Fire Heat Propagation in Early Childhood, it was conducted with the group B class teacher, namely Mrs. IK. With the following interview results:

Experiment implementation indicators

The interview answers from these indicators are that there are experimental activities at the end of the culminating theme, linking and telling each theme to nature, there is no special schedule for knowledge of science experiments, the support from the principal is good but there is not enough support from the parents, for experimental learning the funds are indeed greater.

From these answers, researchers can conclude that the implementation of the experiment at the TAAM As Salam PAUD school has begun to be implemented in learning, although it is not yet optimal due to external factors.

Experimental Media Indicators

The interview answers from these indicators are that the materials have to be searched in several shops, it's rather difficult, the experimental materials are affordable but sometimes the equipment is a bit expensive, not all of them are dangerous, but for experiments you need ready assistance, early childhood experiments do not use materials. dangerous chemicals, children usually wear aprons and gloves during experiments, worried about getting hurt and dirty.

From these answers, the researcher can conclude that experimental media indicators are not easy to obtain unless only simple experimental materials are easy and the same goes for the experimental equipment.

Experimental Constraint Indicator

The interview answers from these indicators are that there are some children who are shocked when the experiment reacts, sometimes there are those who are injured but only minor injuries, the accompanying teacher during the experiment is usually added, the experimenter can be in class but there is less freedom, and passive children will start to comment when the experimenter reacts .

From these answers, researchers can conclude that there are indications of experimental obstacles, but they can still be handled, and the obstacles are only small scale and carry little risk.

Indicators of children's abilities in experiments

Interview answers from indicators of children's abilities in experiments are that children understand easily and quickly because they are involved in the process, after the experiment they are usually enthusiastic about going to school the next day, their overall intelligence average is out, children fluently tell stories about what happened during the experiment, all children are busy asking what is this what is that and everything about the experiment. From these answers, researchers can conclude that experimental activities can help aspects of children's ability to understand subject matter.

Table 3. Transcript of Documentation Results

Document	Information	
	Yes	No
School Profile	✓	
Studen Profile	✓	
RPPH	✓	
Evaluation	✓	
Photo of research activities	✓	

Table 3 explained the transcript of research results obtained by observation, interviews and documentation; the explanation is:

Observation

In observing the Skills Profile of Fire Heat Propagation Experiments in Early Childhood with the activity of cooking water and eggs using a frying pan from used drink cans. By using tools and materials, namely water, eggs, butter, used drink cans, candles, gas lighters, bricks (stove).

The first activity of children was being able to observe a reaction from the fire heat propagation experiment which had shown progress, namely 5 out of 9 children were able to develop very well (BSB) after carrying out the activity of cooking raw eggs to become cooked, butter could melt, water could boil through the heat propagation of fire. candle into a tin pan, and there was a child who did not show a reaction when the experimental change process occurred, the child only observed a lot and the child's character spoke little, but when asked by the teacher he understood the process. These results are in line with research that has been conducted with the title The Influence of the Jigsaw Type Cooperative Learning Model with Experimental Methods in the Laboratory and Demonstrations on Learning Achievement in terms of Students' Scientific Attitudes on the Main Material of Reaction Rates for Class XI Science Semester 1 of SMA Negeri 1 Tawangsari Tahu. The results of his research show that experiments require observation, and through these observations it can improve children's abilities.

The second activity of the children was that they were able to try out the objects that were being tried out and obtained better developmental results, namely 5 out of 9 children achieved Developing According to Expectations (BSH) after trying to directly put the beaten egg into a hot frying pan that had been filled with butter that had melted due to exposure to the heat of the pan. keep turning the egg over so it doesn't burn until the egg is cooked and the child has not been able to try it because he is still afraid of being splashed with hot melted butter. These results are in line with research that has been carried out by Kuslambang *et al*. (2019) that experiments must be conducted by trial examiners and the results will be visible because of the direct trial examiners.

The activities of the three children were able to find out the reasons for the experimental activity of spreading the heat of fire with the same results for 9 children, namely Developing Sangan Good (BSB) by observing the process of liquid eggs changing into shape, the water which was previously normal then changed to show the presence of a little small foam. and

over time the foam becomes more numerous and larger, followed by a boiling process due to the causal process of the heat of the pan being exposed to the heat propagation of the flame from the candle flame. And children who have not achieved this because they still do not understand when the process of change occurs. These results relate to research (Fauziyah & Hasibuan, 2020) that an experiment requires cause and effect/reasons with the research results showing that the use of the Experimental Method has a significant influence on the ability to recognize cause and effect when applied in early childhood learning, especially in group B children aged 5-6 years.

The activities of the four children were able to provide the initiative in carrying out fire heat propagation activities with the achievement of 5 out of 9 children having started to develop (MB) with the activity of providing ideas that emerged spontaneously when unexpected events occurred during the experimental process, for example the spotlight from the heat of the stove fire felt on their faces. then they said spontaneously on their initiative to add cardboard next to the stove, while the children who were not yet able to do so didn't say anything just watched. These results are in line with this fire experimental research which can find new things/initiatives and solve problems with the results of the research, namely through the experimental method children are invited to play and explore, discover and utilize objects close to them, so that learning becomes more meaningful.

The fifth activity is that children are able to retell the fire heat propagation experiment that has been carried out with the achievement of 5 out of 9 Very Well Developed (BSB) children by taking turns appearing in front of the class about the experimental process that has been carried out, and children who have not been able to tell it because of their courage in appearing. still lacking in expressing something. These results are in line with research Septiyani & Kurniah (2017) that experiments can generate imagination and tell stories with the results of research, namely showing that there is a significant influence on speaking ability.

Interview

In the research interview for the Experimental Skills Profile of Fire Heat Propagation in Early Childhood, it was conducted with the group B class teacher, namely Mrs. IK, with the results of the interview as follows:

Experiment implementation indicators

From the results of the interview transcript, the researcher can conclude that the implementation of the experiment at the PAUD TAAM As Salam school has begun to be implemented in learning, although it is not yet optimal due to external factors. These results are related to the research of that there are several factors that must be overcome. in achieving experimental implementation (Fauziah *et al*., 2022).

Experimental Media Indicators

As a result of the interview transcript of experimental media indicators, the researcher can conclude that experimental media indicators are not easy to obtain except that only simple experimental materials are easy and the same goes for the experimental equipment. This is related to Ika Candra Destiyanti's research that media can also facilitate experiments even though they are difficult (Destiyanti, 2024).

From these answers the researcher can conclude that the experimental obstacle indicators do exist but can still be handled and the obstacles are only small scale and pose little risk.

Indicators of children's abilities in experiments

The results of the interview transcripts on indicators of children's abilities in experiments, researchers can conclude that children understand easily and quickly because they participate directly in the process. This is related to Hani Putri and Rizka Harfiani's research that experiments can improve children's abilities (Putri & Harfiani, 2024.

From the narrative explanation of the research results above with the fire heat propagation experiment through cooking activities using used tin frying pans and the fire source from candles and a stove in the form of a brick stove, the researcher can conclude that through this experiment it is possible to realize how to implement the Fire Heat Propagation Experiment Skills Profile. in Early Childhood and can also show how children react after learning about the fire heat propagation experiment.

CONCLUSION

The research carried out was able to determine the implementation stages of the Experimental Skills Profile of Fire Heat Propagation in Early Childhood at Taam As Salam PAUD, where the implementation stages were carried out by testing cooking experiments with used tin pans whose fire source was candles assisted by a brick stove, and also based on research instruments in the form of observation instruments and interview instruments, continuing with transcripts of observation results and transcripts of interview results that have been carried out by researchers and accompanied by research documentation. Children's reactions and responses to the Skill Profile of Fire Heat Propagation Experiments in Early Childhood. The research carried out has been able to show how children react and respond to learning using this experimental method. The child's ability level in terms of reacting and responding to experiments is able to continue to increase slowly from Not Yet Developing (BB) to Starting to Develop (MB) increasing with the ability to Develop According to Expectations (BSH) until it reaches the Developing Very Well (BSB) level. These reactions can make children who were initially passive become active in interacting. And these reactions arise because of the direct observation process by the child and also the direct trial process carried out in experimental activities.

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