



Identifying Early Childhood Science Process Skills Through Color Mixing Experimental Activities

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Abstract

Early childhood science learning must be adapted to the child's developmental stage. The science learning stage is still at the stage of recognizing and mixing colors. This research aims to determine the ability to identify science skills in early childhood through experimental activities of mixing colors at Al-Furqan Kindergarten. This research uses descriptive qualitative research. Data collection techniques using observation and documentation. The research results show that children's ability to experiment with science through color mixing activities is very good, marked by children's ability to experiment, namely by observing, classifying, comparing, measuring, communicating and concluding. This is caused by teachers involving children directly in science experiment activities, so that children are more excited and then start doing simple experiments by mixing colors. This science experiment activity through mixing colors goes through a process of preparation, implementation and evaluation. The teacher prepares what is needed for this activity and carries out the activity according to what has been planned, then evaluates what are the shortcomings for carrying out the next science experimental activity. Meanwhile, the science process skills are observing, classifying, comparing, measuring, communicating, experimenting and concluding.

Keywords: *Science Experiments, Mixing Colors, Early Childhood*



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INTRODUCTION

Early childhood learning is essentially the development of a specific curriculum which consists of a number of plans that include various learning experiences through play given to early childhood children based on their potential and developmental tasks to achieve the competencies they need (Hikam & Nursari, 2020). Interesting learning activities are very influential in increasing children's willingness to take part in learning, especially in learning science experiments. Experimental activities allow children to experience the learning process directly by carrying out simple science experiments according to the child's level of development (Maya, 2021). One way to improve early childhood development is by using innovative and creative educational

and teaching activities, as well as by making the learning process interesting and fun for young children, such as conducting science experiments (Ariyati, 2021).

A pleasant learning experience will help children record information in memory (Putro & Lestari, 2022). Apart from that, according to Piaget in Aprilliasari et al, children will gain a lot of experience through experimenting and playing with real things. to provide opportunities for children to express themselves and manipulate ideas. Learning science does not need to be too scientific, but if it is incorporated into children's daily activities, understanding science will be easier for the logic and imagination of young children to understand (Aprilliasari et al., 2020). In this way, scientific ideas will become habits and will encourage them to learn more about what they see and do around them (S. Winarti, 2017). This color mixing activity is a simple science experiment that teachers and children can do together to discover something new, whether it's different colors that children don't initially know or experimenting experiences for children.

Color is a medium that is very interesting for students to see. Creative children will enjoy coloring all the media they encounter, be it pictures or by decorating the area of the image they want to color (I Gusti Ayu Inten Anggreni, I Made Suara, 2014). Many early childhood activities are related to color. This includes coloring pictures, painting, finger painting, batik, stitching, and mixing colors in challenging ways (experimenting). According to research conducted by Fitri, children's understanding of colors can be improved by implementing exploration strategies. In the learning system, children are given the opportunity to try various things in an easy and interesting way (Fitri, 2021). This is demonstrated by the data collected, which shows that the ability to perceive color has developed little by little during pre-activity, cycle I, and cycle II.

The results of initial observations showed that early childhood science processing skills, especially in mixing colors, were still low and had weaknesses. This is indicated by children not being able to recognize and mix colors well, some children fail to understand basic lessons about mixing colors, such as stating reactions to the colors being tested, taking measurements, and recounting the results of experiments. Researchers found that this problem was caused by the activities used being less varied. Children do not have the opportunity to try experimenting on their own with new things that should stimulate children's curiosity. Only a few teachers use experimental methods in science learning. This happens because this method requires complete tools and materials, teachers must be ready to apply experimental methods in color mixing activities.

One of the most suitable approaches to science learning is experimentation. This method allows optimal learning conditions to improve students' thinking abilities and creativity through direct practical learning. Students can do things themselves, follow processes, observe things, analyze, prove and draw conclusions about a particular object, situation or process (Ma'viah, 2021). According to Hamdanaya, the experimental method allows individual students or groups to be trained to carry out the experimental process (Mutmainah et al., 2022). The introduction of science for young children is very important to improve the quality of education, especially to create children who are able to think logically, critically and creatively, which needs to be trained from an early age (Wanli & Zulminiati, 2023).

On the other hand, science is a process of discovery, not just the accumulation of facts, concepts, or principles. Students need a variety of special skills that scientists

possess to understand various phenomena during the discovery process. This special ability is science process skills (Fatimah, 2020). An important skill that needs to be introduced from an early age when studying science is science process skills (Sovia Mas Ayu*, Asmara Dewi**, 2022). Scientific processing skills allow children to process new information through real experiences (Gustiana, 2023). In a broad sense, skills include activities in the form of acting, thinking, speaking, seeing, listening, and so on, while skills in a narrow sense are usually more behavior-oriented (Evania Yafie, Drs. I Wayan Utama, M. P., & Nia Widyaningrum & S. , 2019).

Science process skills are a person's (child's) ability to apply scientific methods in understanding, developing and presenting science. Science process skills at an early age enable children to carry out color combination experiments to process new information or knowledge (Fitrah Saputri, Kartini Marzuki, Rika Kurnia, 2023). From birth, children have the potential to become scientists and have senses that can be used to explore their world. The greater the contribution of the senses to learning, the easier it is for children to understand what is happening in the world. In this way, their science process skills will develop. Children will get new information from their senses and information (Putri & Zulminiati, 2023).

Early childhood science learning emphasizes processes rather than products. Science process skills should be taught simply to preschool children. However, playing can influence children's physical-motor, language, cognitive, social-emotional and moral-religious development. Thus, it can be concluded that playing can improve all aspects of a child's overall development (Lusia Tabun et al., 2023). So this is interesting to research because seeing children's curiosity in science experiment activities through mixing colors is felt to be able to improve children's ability to recognize and then mix colors with children involved in working on projects together. This research was carried out because of the importance of science process skills for young children. This research is entitled "Identification of Early Childhood Science Process Skills Through Color Mixing Experimental Activities" based on the explanation provided.

METHODOLOGY

This type of research is descriptive qualitative. Meanwhile, the data presentation technique is descriptive, to make it easier for researchers to describe the results of color recognition in early childhood through science experimental activities. This research was carried out at Al-Furqan Pragaan Kindergarten, Sumenep, Madura, East Java. The research subjects were group B aged 5-6 years, totaling 16 students with 2 teachers taking part in this activity. Data collection techniques use observation, interviews with school principals and teachers, and documentation. Participatory observation was carried out in this research. Researchers were also involved in the daily activities carried out by teachers and children and observed them. The data obtained when using participant observation is more detailed, more complete and can understand the level of significance of each existing behavior (Sugiyono, 2018). Meanwhile, data analysis uses analysis of the results of interviews conducted with institutions related to scientific process skills through color mixing activities.

Table 1. Science Process Skills

Science Process Skills	Indicator
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Observing	Children are able to use the five senses to obtain information about the shape of objects, characteristics of objects and other characteristics.
Classifying	Children are able to group and sort objects
Compare	Children are able to compare known quantities with unknown quantities
Measure	Children are able to measure and calculate the results of observations
Communicate	Children are able to discover and question the process of discovery
Experiment	Children are able to carry out their own experiments with the tools and materials provided
Conclude	Children are able to provide an explanation of an event that they discover

RESULTS AND DISCUSSION

Stages of Color Mixing Activities through Experimental Activities

Learning activities used in early childhood, apart from having to be interesting, must also improve children's thinking and analyzing abilities, for example science experiment activities. Teachers play an important role in becoming children's facilitators, so that children's desires and interests can be channeled well. In preparing teaching modules or color mixing activities, teachers have strategies or stages that are carried out to determine children's abilities in conducting science experiments using color mixing activities. Learning strategies that can be used in science learning include planning, implementation, and evaluation or assessment. (Zahro et al., 2019) Each of them is described below:

Planning Stage of Mixing Colors in Early Childhood Through Science Experiment Activities

At this stage, the teacher plans the activities to be carried out, both in terms of concept, safety and comfort of the activity itself. The teacher also prepares the tools and materials that will be used for the experiment and the steps involved, allocates time for implementation, and prepares observation sheets for the children. This planning begins by showing children how the process of mixing colors occurs with a science experiment video. Then the teacher will interact with the child through simple questions before starting the experimentation activity.

Implementation Stage of Mixing Colors in Early Childhood Through Science Experiment Activities

At this stage, children see the teacher experimenting with mixing colors according to plans that have been prepared previously. After the teacher has finished carrying out the experiment and explained to the children the process of the experiment, the teacher then gives the children the opportunity to carry out experiments independently with groups or individuals who cannot be separated from the teacher's supervision. Carrying out this experimental activity requires a short amount of time, because apart from the activity starting with the teacher experimenting first, followed by the children also experimenting, there is still a question and answer activity afterwards. Children are asked about why this process occurs, what colors the child sees, children can order the colors from darkest to lightest, and children can express what the child sees and experiences.

Evaluation Stage of Mixing Colors in Early Childhood Through Science Experiment Activities

This stage is carried out to review the implementation of experimental activities for mixing colors that have been carried out by children and teachers. This evaluation was also carried out to see whether this experimental activity was able to introduce colors to children and whether children's science process skills could be said to be good or vice versa. In this case it can be said to be quite good, but not as good as expected. This then becomes an evaluation for the teachers for the implementation of subsequent activities.

Early Childhood Science Process Skills Through Color Mixing Activities

Observation Skills

Observing is referred to as observing skills. Children are asked to pay close attention to the events that occur. All children's senses are expected to be involved in the observation process so that children can show the properties of an object or object. With this skill, children are able to observe what is around them. Starting from the characteristics of color, why colors change when mixed and children can pay close attention to the color changes that occur.

Classifying Skills

The basic processing skill known as classification is used to select various event objects based on their specific characteristics, so that the events in question can produce groups or groups of similar types. This skill can be done by children. This is proven by children being able to group objects from smallest to largest and being able to sort colors from darkest to lightest.

Comparing Skills

In this skill, children are quite good at comparing. Children are able to compare the number of previous colors and the new colors produced after the color mixing experiment process. Teachers always give positive affirmations to children, whether children are able to make comparisons and whether the results are satisfactory or not. Comparing is the process of examining objects and events to see whether they have similarities and differences. Typically, this involves careful measurements, calculations, and observations.

Measuring Skills

At this stage of the process, researchers see that children are quite good at measuring. It is proven that almost all children can measure well. This can be seen when children are able to compare the sizes of glasses used when experimenting. Children are also able to calculate the results of their observations such as how many

glasses are used, how many colors there are and children can measure the amount of water according to the teacher's instructions. Measuring skills in science lessons in kindergarten can help children understand the concepts of number, distance and size (Idamayanti, 2023).

Communication Skills

Another basic processing skill that children can have is communication. Communicating activities not only allow children to talk about what they learn, but also allow children to ask educators about what they learn. These two types of activities are categorized as communication processes, and this process is very important because children begin to understand how knowledge is built from their own experiences. In this process, 14 out of 16 children were seen interacting with each other to communicate what they would do. Children discuss what colors they will use first and then ask the teacher what they didn't know before. Children also work together in preparing the tools and materials that will be used for experiments, with each having their own tasks.

Experimentation Skills

Trial or experimentation is a process that children must learn to understand concepts or master basic concepts. Not only how activities are carried out, but also how the activities occur (Khaeriyah, Saripudin, A., & Kartiyawati, R., 2018). Controlling one or more manipulated variables and conditions is part of experimentation in the scientific process. Educators are expected to be skilled in encouraging children to reflect on what they do and the results they get. In this activity, children are able to experiment with mixing colors well. This is proven by children who carry out experiments independently or accompanied by teachers. The children prepared tools and materials together and it seemed they were enthusiastic about carrying out experiments and observing each experimental process from start to finish carefully. Children will occasionally ask the teacher what they see. Like when colors start to mix and then a new color appears, the child will ask why that happened and the teacher can answer the child's questions well.

Inferencing Skills

Children will only apply and summarize their skills informally. Inferring is the ability to provide an explanation of data based on the child's initial knowledge and experience. Meanwhile, early childhood application skills cannot yet be categorized into formal analysis because their ability to understand abstract things is very limited. In this case, the child's inferencing skills already look very good. This is proven by the child being able to provide an explanation to the teacher regarding an event he discovered. The child conveys the changes that occur during the experiment. This is enough to prove that the child's inferential skills are very good.

At the seven stages of science process skills, children's abilities can be said to be very good. This can be seen from several research results that researchers have outlined above clearly and in detail. This research presents novelty in identifying science process skills in early childhood through experimental activities of mixing colors, which have not been discussed in depth in early childhood education. The focus of this research on experimental stages such as planning, implementation and evaluation, which are specifically designed to improve children's critical and analytical thinking skills, is a significant new approach. This research also emphasizes how

teachers can facilitate experimental activities of mixing colors to develop children's basic science skills, such as observing, classifying, comparing, measuring, communicating, experimenting and concluding skills. The active participation of children in each stage of the experiment and the emphasis on cognitive development are important innovations in the studies carried out.

In addition, this research makes a real contribution to early childhood education (PAUD) by offering practical guidance for educators in designing science activities that are appropriate to children's cognitive development. The color mixing activity module resulting from this research can be adopted as an innovative learning model in PAUD, helping teachers develop science process skills systematically. This research also emphasizes the importance of the teacher's role as a facilitator, where the teacher not only delivers material, but also encourages children to be actively involved, solve problems and discuss, thereby improving children's social and communication skills. In the aspect of developing science skills, this research provides a deeper understanding of how basic science skills in early childhood can be developed through simple experiments. This becomes the basis for the wider application of science activities in PAUD, which so far have often been limited to play activities without structured experimental guidance. The results of this research can also contribute to the development of a PAUD curriculum that is more oriented towards developing critical and analytical thinking skills through simple scientific experimental activities, preparing children for the challenges of higher education.

CONCLUSION

Based on the experimental activity of mixing colors in introducing science concepts to children at Al-Furqan Kindergarten Sumenep Madura which has been successfully carried out, it can be concluded that there are several stages in identifying early childhood science process skills through experimental activities of mixing colors including the preparation stage, implementation stage and stage evaluation. Of the three stages, the teacher really thinks carefully in terms of concepts, tools and materials to be used as well as evaluations that must be carried out considering that this activity is to identify children's science process skills. Then from the seven science process skills, namely observing, classifying, comparing, measuring, communicating, experimenting and concluding, get good results. This is proven by children who are able to complete or carry out a series of science process skills in accordance with expectations. This happens because children can experiment with mixing colors and follow the teacher's directions well.

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