

## **DEVELOPING NATURALIST INTELLIGENCE IN EARLY CHILDHOOD THROUGH SCIENCE EXPERIMENTS IN CHANGING WATER COLOR USING PLASTIC**

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**Abstract.** The results of this study explain in several stages (1) developing children's Naturalist intelligence through science experiments in changing the color of water using plastic (2) steps during science experiments in changing the color of water using plastic (3) children's responses to science experiments in changing color water using plastic (4) advantages and disadvantages of science experiments on changing the color of water using plastic. The research method used is descriptive analysis which includes science experiments through demonstration, experiment, question and answer, problem solving and assignment methods. Data collected through interviews and documentation techniques. This research was conducted on children at PAUD it Athaira Modern School. The results of this study are that children can develop Naturalist intelligence through science experiments in changing the color of water using plastic. It was proven that 15 students in class B were able to follow well when the experiment took place, then it was seen that children had the ability to recognize, understand, classify and classify what children saw from events in their environment related to learning that involved science experiments.

**Keywords:** Naturalist Intelligence, Early Childhood, Science.

### **INTRODUCTION**

In article 28 of the National Education System Law No. 20/2003 paragraph I, it is stated that those who are included in early childhood are children who are in the age range 0-6 years. According to a study of the PAUD science family and its implementation, in several countries PAUD is held from 0-8 years (Muhammad Fadlillah, 2014). Meanwhile, according to child education experts, it is explained that early childhood is a group of children who are in a process of growth and development that is unique, in the sense that it has a pattern of growth and development (fine and gross motor coordination), intelligence (thinking power, creativity, intelligence emotional, and spiritual intelligence), social emotional (attitudes and behavior and religion), language and special communication according to the level of growth and

development of children. Based on the uniqueness in its growth and development, early childhood is divided into three stages, namely. (1) infant birth to 1 year, (2) toddler age 1-3 years, (3) preschool age 3-6 years, (4) early elementary school period 6-8 years (Mursid, 2015).

So it can be understood that early childhood is a child between the ages of 0-6 years who has extraordinary growth and development so that various uniqueness emerges in him. At this stage, the right time to instill good values that are later expected to shape his personality. Efforts to stimulate all aspects of early childhood growth and development, namely the need to be given education at their age, namely early childhood education which is then shortened to PAUD. PAUD learning is carried out through several activities that make children happy which involve several elements, namely playing.

Early childhood education has the goal of providing a stimulus for child development, abilities, skills, or intelligence in early childhood, then this is the most appropriate time to develop all the potential that exists in children. There are several studies that say that if a child lacks touch from parents or lacks stimulus and stimulation such as visual, verbal or tactile and kinesthetic, it will have an impact on brain development, namely its development is only 20% -30% smaller than normal size according to the child's age (Hikam, F. F., & Nursari, E, 2020).

Every child born already has intelligence abilities that are indeed aa and vary from one child to another. However, the intelligence that children have is not only intelligence in the brain which we often hear about IQ (*Intelligences Quotient*) but also has other intelligences. According to Gardner, intelligence is divided into 8 types, such as verbal-linguistic, logical-mathematical, visual-special, rhythmic-musical, physical-kinesthetic, interpersonal, intrapersonal, and naturalistic, these 8 intelligences are referred to as multiple intelligences (Muhammad, Yaumi, Nurdin Ibrahim, 2013). The development of multiple intelligences aims to seek to instill early childhood readiness so that they have a strong foundation to face the challenges of the next life, this development is carried out in the learning process. Learning that emphasizes multiple intelligences is a form of effort in order to be able to provide learning experiences for children that are tailored to children's needs, learning styles, cognition, and intelligence (Mustajab, M., Baharun, H., & Iltiqiyah, L, 2020).

According to Huard Garder, Naturalist intelligence is the ability to recognize, see differences, classify, and categorize what is seen or found in nature. The core components of naturalistic intelligence are sensitivity to nature (flora, fauna, natural formations, mountains), expertise in discriminating between members of a species, recognizing the existence of other species, and mapping relationships between several species, both formally and informally. Caring for nature and even being a part of nature itself is like visiting places where animals live a lot, and being able to know the relationship between animals and nature is a high level of intelligence considering that not everyone can do it easily.

People who have naturalistic intelligence have an interest in the outside world or the animal world and this interest begins to appear at an early age, namely when a child is 4-5 years old. children who have naturalist intelligence children like activities related to the surrounding environment such as liking animals by caring for them, liking plants, showing interest in preserving the environment, they also have an extraordinary interest in subjects such as biology, zoology (zoology), science plants (botany), soil science (geology), weather science (meteorology, astronomy (astronomy), and paleontology (Muhammad et al., 2013).

Learning carried out in early childhood education institutions is the basis for further education of children who have challenges and various kinds of problems in every development. Early childhood learning is an opening window to the world for every child. So that the learning carried out must be in accordance with the characteristics of the child, the

times, as well as current developments in science, technology and art. The learning must be adapted to the needs and developments community development in the global era which characterizes the need to instill the ability to think creatively among students who are introduced from early childhood. Learning at the early childhood level prioritizes the learning process that is focused on all aspects that exist in early childhood. Learning that prioritizes children is to provide many opportunities for children to learn on their own experience. Then learning in early childhood is not only to stimulate children's development but also with the intelligence that every child has (H.E Mulyasa, 2017).

Program implementation activities in kindergarten are basically learning that is modified with the characteristics of early childhood. In kindergarten learning it is hoped that an educator will have the ability to guide children in learning. The activities presented include: providing a conducive environment both indoors and outdoors, activities, guiding children and providing guidance on handling problems experienced by children and providing proper guidance (Anita Yus, 2011). Based on several observations that have been carried out that children have a tendency to be less free in carrying out several activities because parents have more practical ways to make children able to play such as giving *gadgets*. Parents, in particular, put forward intelligence that focuses on the brain, but many other intelligences do not develop. In addition to this, limited facilities and infrastructure also influence the development of children's intelligence, especially naturalist intelligence which is not stimulated properly. In general, educators focus more on children entering the elementary school level, namely, reading, writing, and arithmetic. Then it makes children care less and do not know the environment around them well such as living things (humans, animals and plants).

Science is literally defined as the study of events that occur in nature. Science for early childhood is science whose goal is to show children and how to understand science from a child's point of view. Science is important for early childhood because science learning can invite children to think critically, children do not easily accept or reject something, make children rich in inspiration, creative and full of initiative and can foster a logical mindset in children (Ahmad Izzuddin, 2019). Then science can also be interpreted as a science that examines the causes and effects that arise from a situation that is happening in the environment. The way to develop naturalist intelligence in early childhood is by carrying out several scientific activities, one of which is learning science to observe color changes in water using plastic. Science learning that will be applied to children is science that focuses on giving direct and real experiences to children. Explaining that learning to observe color changes in water using plastic, namely knowledge that learns about making science experiments in studying natural science..the scope of science learning to observe color changes in water using plastic for kindergarten is to observe color changes in water using plastic, namely introducing to children the concept of science in the form of colored pictures is then wrapped in plastic so that what comes out is a plain picture on the plastic part. The learning activity of observing color changes in water using plastic has an important role as a relationship between how the brain works and information obtained factually to achieve a meaningful experience in understanding a concept. The activity of observing color changes in water using plastic This study focuses more on experiments using water, colored images, markers, and plastic. The media used is one of the stimuli to attract children's curiosity to know and recognize them, the more sensitive the child is to the environment, the greater the naturalist intelligence in early childhood (Rohmatius Naini & Shinta Larasaty, 2018).

So it can be concluded that early childhood naturalist intelligence can be seen when children are able to distinguish natural objects with their characteristics such as being able to

distinguish between stones and pebbles, cats and dogs, and distinguish flowers from plants in general, from this explanation, early childhood should be sitting on kindergarten benches aged 5-6 years already have naturalist intelligence in accordance with their indicators and characteristics. Based on the explanation above, it is very necessary to carry out research on developing naturalist intelligence in early childhood through science experiments in changing the color of water using plastic.

## **RESEARERCH METHOD**

In this study, the method used is descriptive method, namely as a problem solving procedure that is investigated by describing or describing the state of the subject or object of research (a person, institution, community, and others). Using this method, the researcher intends to describe the phenomena that occur related to children's naturalist intelligence about Science Experiments in Changing Water Color Using Plastic in 5-6 year old children at PAUD it Athaira Modern Scholl Banjarbaru. Furthermore, the researcher used a qualitative approach which produced descriptive data, namely written data or interviews and observed behavior of the people who were the research subjects (Arifin Zainal, 2014).

Subjects in this study included teachers, school principals, parents and children aged 5-6 years in group B, totaling 15 people, consisting of 5 boys and ten girls. Group B teachers were the main informants in obtaining data. In this study, researchers used several data collection techniques, including: observation, demonstration, experiment, question and answer, problem solving and assignment.

## **RESULTS AND ANALYSIS**

This research was conducted at PAUD It Athaira Modern School Jalan Karet Indah No. 17 North Loktabat Banjarbaru. This research was conducted in the Odd Semester of 2022-2023. What media are used by the teacher when developing naturalist intelligence in science experiments in changing the color of water using plastic in early childhood aged 5-6 years at PAUD it Athaira Modern School Banjarbaru. The media used by the teacher in the activity of developing natural intelligence in children with science experiments changing the color of water using plastic in early childhood aged 5-6 years at Paud It Athaira Modern School Banjarbaru, namely clear or transparent plastic bags are useful for inserting pictorial media. Then the paper is drawn by the child, various colored pencils are used for children to draw and color, black markers for drawing on clear or transparent plastic bags. The last is a transparent glass to put water in and put the picture that has been put in a plastic bag. Not all of the media was bought by the teacher, there were also what the children used to drink in the form of plastic cups which the teacher collected from time to time which were useful for learning media.

Teaching naturalist intelligence to children through science experiments, namely through experimental activities, namely by observing pictures wrapped in transparent plastic bags, if not put in a transparent plastic cup filled with water then it will still be in color, but when the child puts it in a transparent plastic cup filled with water then the color will be blocked by plastic, meaning there is no color. Besides that, with naturalist intelligence activities, children can also distinguish colors when drawing.

### **1.1 Steps for Implementing Natural Intelligence Activity Learning in the Science Experiment on Water Color Change Using Plastic Bags in Early Childhood Children Aged 5-6 Years at PAUD it Athaira Modern School Banjarbaru.**

Steps for Implementing Naturalist Intelligence Learning Activities in Science Experiments in Changing the Color of Water Using Plastic, that is, before the teacher starts learning activities to develop naturalist intelligence, the teacher first prepares the RKH (Daily Activity Plan), the RKH contains matters related to the theme, discussion, and learning activities related to themes that are closely related to naturalist intelligence, preparing conducive, clean and comfortable rooms, materials/media that will be used by the teacher. Providing refreshments to children through small games or gymnastics with songs, just stimulating children to move their motors. Conversation greets children and questions and answers according to the theme.

In naturalist intelligence activities there are other methods that support this activity, for example at the beginning of learning that has been mentioned above, such as the conversation method first in introducing objects and their characteristics, conversing to explore children's knowledge, training children to express what is known and know. children's understanding of the activities to be carried out, for example introducing children to various colors. Then the method of giving assignments both individually and in groups so that children understand more and hone children's abilities more, giving assignments like this is coloring, filling out worksheets in magazines and others so that in addition to honing children's knowledge skills, they also hone motor, cognitive, and other abilities. helps the development of other aspects as well. Everything is planned to be one package in the RKH according to the theme.

From the results of observations that have been made by researchers, it can be seen the steps in natural intelligence activities in the Science Experiment activities in Changing the Color of Water Using Plastic are as follows: 1) The teacher makes a RKH (Daily Activity Plan) related to these naturalist intelligence activities, especially learning activities about naturalist intelligence are always inserted at the beginning of the core activity and further applied to this activity . 2) Before starting the activity, the teacher makes the class atmosphere fun by conversing, to develop children's naturalist intelligence. 3) the teacher introduces what media/tools will be used during the activity, and the teacher explains the stages of the experimental activities that will be carried out by the child, before the child does the teacher demonstrates the experimental activity before the child does it. The teacher also gives the opportunity for the child to ask what the child does not understand and does not understand. 4) the teacher demonstrates color changing experimental activities in water using plastic bags while conversing or explaining to children. 5) the children carry out experiments that have been taught by the teacher, such as drawing and coloring first on paper, then the children experiment by inserting the image into a transparent plastic container and putting it into a transparent glass filled with water. This is where the child will observe the color change that is put in a glass of water.

The benefits of this science learning experiment are that children will use their cognition to solve problems, mathematics when they are carrying out science activities where children observe, predict, investigate, test about the experiments being carried out. Children's ability to observe color changes creates new ideas that are continuously honed from an early age. the activity of observing color changes is a complicated trait, namely a child is able to create spontaneously because the child already has an element of scientific ability. Children's scientific abilities will develop according to the child's creative potential. Children's scientific abilities will arise when doing color change learning activities. With learning activities

changing colors will provide a good and fun experience, then it will have a positive impact on children's development.

From the results of observations made by researchers, the media used by teachers in learning activities to develop naturalist intelligence in science experiments on changing the color of water using plastic bags are transparent empty glasses, colored pictures, water, markers and transparent plastic bags, so from the visible results the child can develop their natural intelligence by proving that the fifteen children can understand the color changes in the water, classify or be able to distinguish colors when drawing, and the children feel happy, learning does not feel boring, due to experiments or experiments what children do together. In this experiment the children each practiced it in turn.

### **1.2 Strengths and weaknesses Implementation of Natrulis Intelligence Activity Learning in the Science Experiment on Water Color Change Using Plastic Bags in Early Childhood Ages 5-6 Years at PAUD it Athaira Modern School Banjarbaru.**

Choosing to use the experimental learning method in learning because there are so many advantages of the experimental method that can be used to improve children's learning outcomes. If we look in general, experimental methods or early childhood science experiments in developing naturalists can arouse children's curiosity, arouse children's scientific attitudes and foster groups and individuals, then in terms of implementation they have advantages including, children can learn through direct experience, enrich experience with things that are objective and realistic, learning outcomes will last a long time.

Based on the results of observations, when the experimental process was carried out the children believed more in the truth or conclusions based on their own experiments rather than just accepting the teacher's words. Then the child avoids verbalism. Color change experiments in water using plastic have proven effective and can increase children's scientific knowledge in seeing the color changes from those without plastic that are placed on the table to the different pictures that are placed in the water. Experimenting with changing colors in water using plastic can increase children's imaginations which in turn can increase children's knowledge, and are able to increase focus and group collaboration.

The drawbacks of carrying out learning activities for developing naturalist intelligence are color changing science experiment activities using plastic bags is the lack of requiring special teacher skills, if the teacher is not unskilled then the activities carried out are less effective, then it takes a long time because besides the teacher demonstrating first, the child also involved individually trying, demanding precision and patience and each experiment does not always give the expected results, because it allows there are certain factors that are beyond the reach of ability or control. Then there are not so many supporting media/playing materials.

## **CONCLUSION**

Based on research conducted at PAUD Athaira Modern Scholl Banjarbaru, conclusions can be drawn from the results of observations, interviews, documentation and field notes. The following conclusions can be drawn: 1) the steps in naturalist intelligence activities science experiments changing the color of water using plastic bags, namely the first the teacher prepares the RKH (Daily Activity Plan), the teacher prepares a conducive, clean room, and media/tools/experimental materials to be used by children. 2) The media used by the teacher in the experimental activities are transparent empty glasses, water, plastic bags, black markers, drawing paper and colored pencils. 3) The teacher demonstrates the experiment while conversing with the children, then the children take turns doing the experiment. 4) While the

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supporting factors for this naturalist intelligence activity include being able to observe directly what is in the environment around the school, media which are very simple, systematic and attract children's attention more quickly to understand and are clever, especially in maintaining a pleasant environment when applied to children, because it is in accordance with the principle of the child.

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