

**ANALYSIS OF NATURAL INTELLIGENCE THROUGH A SCIENTIFIC APPROACH IN  
BUSTANUL HUDA KINDERGARTEN GROUP B1 AGES 5-6 YEARS**

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**ABSTRACT**

*This research is based on the importance of developing natural intelligence from an early age so that children have knowledge about their surroundings and care for the environment. The aim of this research is to analyze natural intelligence through a scientific approach in children aged 5-6 years. The methodology used in this research is qualitative research. The subjects in this study are students in class B1, totaling 14 individuals, and the informants are teachers at TK Bustanul Huda, totaling 3 individuals, namely Mrs. NI, Mrs. IY, and Mrs. RMS. The data collection process conducted by the researcher through observation, interviews, and documentation. Then the data is analyzed using data analysis through reduction, display, and data verification. Based on the research results, it can be seen that natural intelligence in children aged 5-6 years can be developed through a scientific approach. This can be seen from the increasing natural intelligence of children during learning using a scientific approach and also based on the children's responses showing happiness during activities related to the topic 'I love plants' and the subtopic 'vegetable plants', children can focus their attention during the learning process in activities such as observing, questioning, experimenting/collecting information, reasoning, and communicating. The results of the average percentage value for each sub-topic are as follows: tomato plants 81.52%, kale plants 77.94%, spinach plants 87.50% and carrot plants 81.92%.*

*Keywords: Naturalist Intelligence; Scientific Approach; Early Childhood; Learning; Early Childhood Education.*

## **INTRODUCTION**

Early childhood education is a fundamental phase because it is during this period that children begin to develop the foundations of cognitive and emotional abilities and ways of understanding the world through direct experience. Childhood is seen as a particularly rich period that needs to be consciously optimized by educators, not allowed to pass without meaningful stimulation. In this context, the educational process is not only oriented towards delivering material, but also towards creating an environment that allows children to explore repeatedly and activate their various developmental potentials (Jamaris, 2010; Mursid, 2015).

Developing children's potential from an early age aligns with the view that learning ability is not solely determined by narrow cognitive aspects, but rather encompasses a broader capacity to face practical problems and adapt to everyday experiences. This understanding emphasizes that intelligence should be understood as a mental capacity that enables individuals to reason, plan, solve problems, and learn from experience. Conceptually, the term "intelligence" is also understood as the sharpness of thought and the perfection of intellectual development, so early education must provide space for various forms of intelligence to emerge and develop proportionally (KBBI, 2008; Lucky, 2002).

One relevant domain in early childhood learning is naturalist intelligence, which is the ability to recognize, differentiate, and classify various species of flora and fauna as well as natural phenomena encountered by individuals. Naturalist sensitivity is not only related to living things, but can also be seen in the ability to differentiate certain objects, especially for children growing up in urban environments. This intelligence is understood as part of multiple intelligences that emphasize sensitivity to the natural environment and the ability to understand and appreciate nature, including a tendency to enjoy activities such as analyzing similarities and differences, grouping, pattern recognition, and paying attention to natural details (Gardner, 2011; Jamaris, 2014).

In early childhood development, naturalist intelligence can be identified through behavioral traits evident in the child's interactions with the environment. Children with naturalist tendencies generally show an interest in plants, enjoy outdoor activities, are sensitive to natural panoramas, and are interested in observing simple natural phenomena. Strengthening this intelligence can be directed through learning strategies that provide children with opportunities to observe natural objects, discuss their surroundings, and build exploration-based learning experiences. This stimulation pattern positions nature as a concrete learning resource, allowing children to gain meaningful experiences while fostering a respect for the environment (Prawiradilaga, 2009; Yuliani Nurani, 2012).

Efforts to develop naturalist intelligence require a learning approach that encourages children to actively construct knowledge through a scientific process. The scientific approach is understood as a learning process designed to enable children to construct concepts or principles through the stages of observation, problem formulation, data collection, reasoning, drawing conclusions, and communicating findings. Within the curriculum framework, the scientific approach is also a core activity mandated in the 2013 Curriculum, emphasizing that knowledge can be obtained from various sources and does not rely on one-way explanations from educators (Hosnan, 2014; Ministry of Education and Culture of the Republic of Indonesia [Kemendikbud], 2016; Sani, 2014).

The implementation of the scientific approach in early childhood is commonly known through the 5M stages: observing, asking questions, trying/gathering information, reasoning, and communicating. These stages position children as learning subjects directly involved in experiences, while teachers act as facilitators guiding the process of exploration and discovery. This approach is considered important because it fosters systematic, objective, and critical thinking habits, as well as building children's social skills and self-confidence in interacting and communicating the results of their learning experiences. Thus, the scientific approach is not interpreted as merely "learning science", but rather using the scientific process to develop competencies in attitudes, knowledge, and skills (Kurniasih, 2014; Munastiwi, 2015; Sufairoh, 2016).

Naturalist intelligence is strongly linked to the scientific approach because both require children to engage in activities that involve observing real objects, asking questions, and conducting experience-based explorations. Strengthening naturalist intelligence can be designed through activities that bring children closer to nature, for example by utilizing natural materials and presenting plants as learning resources that can be directly observed. Learning that presents concrete objects allows children to develop grouping skills, recognize differences, and understand how to care for plants through a gradual and communicative process (Hosnan, 2014; Kurniasih, 2014).

The context of this research stems from field findings that children at Bustanul Huda Kindergarten have not yet optimally developed in recognizing types of vegetable plants, grouping them by color and size, distinguishing between similar plants, and understanding how to care for them. This condition is also influenced by learning that tends to be teacher-centered, resulting in children primarily listening and completing assignments without adequate opportunities to explore the natural environment. This situation shows the need for more varied learning strategies that are oriented towards direct experience so that children's naturalist intelligence can be stimulated in a targeted manner through the scientific process (Hosnan, 2014; Jamaris, 2014).

Several previous studies have shown that naturalist intelligence can be enhanced through various learning models and methods, such as project methods, demonstrations, and the application of a scientific approach in the context of early childhood education (PAUD). However, some studies have focused on classroom action research or quantitative methods that emphasize score improvement, while studies that prioritize the learning process as the object of qualitative analysis, particularly regarding how the scientific stages in the development of naturalist intelligence, still require further research. Therefore, research is needed that more deeply examines the dynamics of children's learning processes during the 5M stages and their relationship to indicators of naturalist intelligence (Al Ma'rifah, 2023; Anjelina et al., 2019; Balqies, 2018; Sugiyono, 2017; Utami, 2016).

Based on this foundation, this study aims to analyze naturalist intelligence through a scientific approach in children aged 5–6 at Bustanul Huda Kindergarten, specifically in group B1. This research emphasizes the importance of developing naturalist intelligence from an early age so that children gain knowledge about the natural world and develop a sense of environmental responsibility. Practically, this analysis is expected to contribute to educators in designing child-centered learning, maximizing exploration, and enriching learning experiences through observation activities to communicating results, so that the stimulation of naturalist intelligence takes place more systematically and meaningfully (Jamaris, 2010; Ministry of Education and Culture, 2016; Munastiwi, 2015).

## **RESEARCH METHODS**

This research uses a qualitative approach with a descriptive character, seeking to gain in-depth understanding of phenomena through data obtained in the field, which is then systematically described based on the natural context of the research (Sugiyono, 2015; Walidin et al., 2015). This approach was chosen because the study focuses on understanding the process by which children's natural intelligence emerges through learning activities, rather than on statistically testing variable relationships. The source text explains that qualitative research is naturalistic and positions the researcher as the key instrument for obtaining relevant data, with the goal of comprehensively describing the phenomenon.

The research focuses on analyzing the natural intelligence of early childhood children as it emerges during the application of the scientific approach (5M) in learning activities. The 5M stages used include observing, asking questions, trying/gathering information, reasoning, and communicating. This serves as a framework for learning activities and a reference for observing children's behavior within the context of the theme "I Love Plants." This scientific framework is then combined with indicators of natural intelligence to assess the extent to which children demonstrate interest, sensitivity, and the ability to recognize natural objects (vegetables) throughout the learning process.

The research was conducted at Bustanul Huda Kindergarten, specifically for Group B1 children aged 5–6 years, located in Ukui Dua Village, Ukui District, Pelalawan Regency. This location was chosen because it met the research data requirements, namely the implementation of plant-themed learning that allows for the observation of natural intelligence through scientific activities. The research period was stated to take place in the even semester of the 2024/2025 academic year, so data collection was conducted according to the learning schedule for that period.

The research subjects were Group B1 children (a total of 14 children), and the research informants involved three teachers directly involved in the classroom learning process: the class teacher and the assistant teacher. Informants were selected purposively, taking into account the informants' experience, knowledge, and proximity to the research problem, as well as their readiness to provide the required data. Furthermore, the data collection process emphasized a good working relationship with the informants, including maintaining the comfort and confidentiality of the data provided.

The main research instrument was an observation sheet compiled based on indicators of natural intelligence within the context of a scientific approach. This sheet included aspects of children's behavior at each stage of the 5Ms, such as the ability to identify plant parts, ask questions, explore objects, draw simple conclusions, and communicate observations. To facilitate interpretation of achievement, the assessment used the developmental categories BM (Not Yet Emerging), MSK (Starting to Be Visible), MSB (Starting to Develop), and MK (Consistently Emerging), allowing observation data to be summarized and compared consistently across activities.

Data collection techniques used observation, interviews, and documentation. Observations were conducted directly in the classroom to capture the emergence of children's natural intelligence during scientific activities. The type of observation used was participant observation (the researcher was involved in the informant's daily life). The results were recorded in field notes containing routine/temporal events, interactions, and interpretations relevant to the research focus. Interviews were conducted through direct questions and answers with teachers, then systematically summarized, starting with identity, context, problem identification, data description, unitization, and emerging themes. Documentation was used as supporting data, including curriculum documents, lesson plans, learning programs, learning media, and other relevant documents available at Bustanul Huda Kindergarten.

An interview guide was developed to gather detailed information on how teachers facilitated each stage of the 5M program and how children's responses were observed within the context of natural intelligence. For example, questions focused on aspects children needed to observe when observing plants, the types of questions children might raise after observations, the variety of explorations children could undertake, the reasoning skills they developed, and how children communicated their learning outcomes. This structured guide helped ensure that interview data remained aligned with observational indicators, allowing it to be used to corroborate findings from the teacher's perspective as the primary informant.

Data analysis was conducted inductively, namely by examining detailed and specific data first before formulating more general conclusions (Hardani et al., 2020). The source text explains that the analysis follows the interactive model of Miles and Huberman (in Hardani, 2020), which includes data collection, data reduction, data display, and conclusion drawing. Data reduction was carried out by selecting data relevant to the research objectives. Data display was carried out by organizing the data into meaningful written form and/or a thematic matrix. Conclusions were then drawn based on the interrelationships between findings verified during the analysis process.

Data validity was maintained through several strategies. Regarding credibility, the source text emphasized efforts such as extended observation, increased diligence, and triangulation (sources, techniques, and time) to ensure sufficient depth and certainty of the data obtained. Furthermore, dependability was ensured through an audit of the research process by an independent supervisor/auditor to assess process consistency and data credibility. Meanwhile, confirmability is maintained by providing reports to relevant parties (e.g., the principal) to read, confirm, and provide input to ensure the appropriateness between the research process and the reported results, while strengthening the objectivity of the findings.

## **RESULTS AND DISCUSSION**

This study involved Group B1 students aged 5–6 years and teacher informants at Bustanul Huda Kindergarten, using data collection techniques including observation, interviews, and documentation. All collected data was then organized through stages of reduction, display, and verification to ensure the findings accurately represented the phenomenon under study. Within a qualitative research framework, this process is commonly used to organize field data so that patterns and trends in findings can be systematically interpreted without losing their context (Fadli, 2021; Sugiyono, 2024). The following research results present a description of the learning implementation and children's natural intelligence achievements as demonstrated through the scientific approach during a series of learning activities with the theme "I Love Plants" and the subtheme "Vegetable Plants."

The learning took place at Bustanul Huda Kindergarten, located on Jl. Lintas Timur Simpang Barito, Pangkalan Kerinci District, Pelalawan Regency, Riau. The research activities were designed in four meetings with different subtopics, namely tomatoes (Monday, May 19, 2025), kale (Tuesday, May 20, 2025), spinach (Wednesday, May 21, 2025), and carrots (Thursday, May 22, 2025). The learning structure follows a scientific approach that positions children as subjects who interact directly with

learning objects through a series of observing, asking questions, trying/gathering information, reasoning, and communicating. This pattern is in line with learning principles that emphasize direct experience and active student involvement in building understanding (Lestari, 2020; Marjuki, 2020).

In the observation phase, children were directed to observe real-life plant objects according to the subtopics of each session. Observation activities included observing tomatoes, kale, spinach, and carrots, vegetables that can be identified by their visible physical characteristics. Quantitatively, the average achievement in the observation phase varied between sessions: tomatoes reached 85.63%, kale 66.75%, spinach 87.50%, and carrots 94.23%. This data indicates that children's observation tends to be strongest when the learning object provides visual stimuli and concrete experiences that are easily recognized (e.g., carrots and carrots), while observation achievement for kale was lower than in other sessions. These findings reinforce the belief that science learning for early childhood is more effective when children are given the opportunity to directly observe real objects and attributes that can be distinguished through the five senses (Putri, 2019).

The questioning phase demonstrated the emergence of children's curiosity, expressed through questions related to the condition, characteristics, and benefits of plants. In the tomato activity, children asked questions such as the reasons for the small size of the fruit, the differences in color, and the aroma of tomatoes. During the kale encounter, children's questions ranged from object recognition ("What is kale?") to growth characteristics ("Why can kale grow in water?"). After observing spinach, children's questions also appeared to relate to the condition of the leaves and their interest in consuming spinach. Accordingly, the average scores for the questioning step were 75.02% (tomatoes), 70.84% (kangkung), 87.50% (spinach), and 74.99% (carrots). These findings indicate that children's opportunities to ask questions develop when teachers provide observation-based dialogue, which conceptually contributes to strengthening naturalist intelligence through curiosity about the environment and natural objects (Saripudin, 2017).

During the experimenting/information-gathering stage, children engaged in exploratory activities and/or obtained additional information from learning resources. The series of activities included exploring tomatoes and practicing planting/care practices, exploring kale and planting methods, making playdough using boiled spinach water (green and red spinach), and watching a video about carrots. On average, the achievement of this step was considered high: tomatoes 90.40%, kale 81.25%, spinach 75.00%, and carrots 78.86%. Furthermore, informants' statements also confirmed that children were able to explore objects (for example, harvesting ripe tomatoes) and showed enthusiasm during exploration activities. Pedagogically, "trying" activities that combine motor skills, exploration, and media utilization can support early childhood understanding of science concepts while fostering interest in natural phenomena (Safira & Ifadah, 2020; Putri, 2019).

The reasoning stage demonstrates how children connect observations and information obtained to draw conclusions or explain simple relationships related to plant objects. Percentage-wise, the reasoning stage showed achievement of 76.94% (tomatoes), 94.98% (kangkung), 97.92% (spinach), and 86.53% (carrots). Informants explained that at the reasoning stage, children began to think critically, for example, by paying attention to details of plant parts (leaves, flowers, fruit, stems) and asking simple cause-and-effect questions about the growth process. In the context of learning development, strengthening children's reasoning skills can be done through direct observation and simple experiments such as planting or comparing the conditions of thriving and less thriving plants to provide a basis for linking growth factors. Learning models that provide space for information processing such as this align with the scientific approach orientation, which emphasizes thinking activities based on real-life experiences (Afif et al., 2022; Marjuki, 2020).

The communication stage reinforces evidence that children not only understand objects personally but are also able to retell their learning outcomes to friends in simple language. In the assessment instrument, communication skills are characterized by, among other things, the child's ability to convey plant characteristics, habitat, care methods, or recount the work created during the activity. The average achievement of the communication stage was 75.02% (tomatoes), 76.87% (kangkung), 90.62% (spinach), and 75.01% (carrots). Informants also stated that children can retell what they learned using simple sentences, both during the observation process and during exploration. In practice, strengthening communication in early childhood is often effective when children are encouraged to share experiences and present the results of their activities, because language develops along with social engagement in the learning process (Lestari, 2020).

Based on the summary of the average percentage results per subtopic, this study shows that the entire learning series fell into the "very good" category, with overall average scores: tomatoes

81.52%, kale 77.94%, spinach 87.50%, and carrots 81.92%. Specifically, the percentage table illustrates that spinach achieved the highest average, particularly in the reasoning (97.92%) and communicating (90.62%) steps, while kale achieved the lowest overall score despite its high reasoning achievement (94.98%). The differences in achievement across these subtopics indicate that the characteristics of the objects, the form of the activity, and the intensity of exploration can influence the display of children's naturalistic intelligence at each scientific step. Conceptually, this finding aligns with research demonstrating a positive relationship between the application of a scientific approach and the strengthening of naturalistic intelligence in children aged 5–6 years (Mubarok, 2018), particularly when the designed activities provide space for observation, simple classification, and awareness of natural objects.

In addition to the percentage, the research results are also supported by the distribution of achievement categories using four categories, namely BM (Not Yet Appeared), MSK (Small Partial Appearance), MSB (Most Appearance), and MK (Emergence Completely). At the tomato meeting (May 19, 2025), for example, children who reached MK in the step of trying/gathering information were 10 out of 13 children, while at the step of observing 7 children were at MK. At the kale meeting (May 20, 2025), the reasoning step showed MK dominance (10 out of 12 children), while observing and asking still showed a distribution in BM and MSK. At the spinach meeting (May 21, 2025), the reasoning step reached MK in 11 out of 12 children and the communicating step reached MK in 9 out of 12 children. At the carrot meeting (May 22, 2025), the observing and trying steps showed MK in 8 and 7 out of 12 children, respectively, with the reasoning step MK in 10 out of 12 children. This pattern indicates that the most consistent "MK" achievement occurs at the experimenting and reasoning stage, when children are directly involved in activities and process the information they receive.

These quantitative findings are supported by qualitative notes on children's responses during learning. Observations show that children are able to name the vegetables they observe, recognize their physical characteristics, and demonstrate focus on the learning process. In the context of tomatoes, for example, children's questions about fruit size and color changes demonstrate attention to detail and a tendency to compare variations within the same object. With kale, children also demonstrate the ability to differentiate types and inquire about cultivation aspects (e.g., harvest time). Meanwhile, with carrots, children demonstrate interest through questions about the causes of leaf color and enthusiasm for watching videos because they help them understand the growth process more clearly. From the perspective of developing natural intelligence, this series of responses represents children's engagement with natural objects through observation, curiosity, and the ability to process contextual information (Irawati, 2021; Saripudin, 2017).

## **CONCLUSIONS**

Based on research findings, the application of a scientific approach through a series of activities of observing, asking, trying/gathering information, reasoning, and communicating has been proven to support the development of natural intelligence in children aged 5-6 years at Bustanul Huda Kindergarten, which is shown by the children's more active, focused, and enthusiastic involvement when participating in real object-based learning activities on the topic "I Love Plants" with the subtopic of vegetable plants. Overall, these results indicate that scientific activities are able to increase children's natural intelligence, because children not only observe directly, but are also encouraged to ask questions, explore, and solve simple problems based on direct learning experiences. This strengthening is also reflected in the achievement of average scores per sub-topic which are in the very good category, namely tomatoes 81.52%, kale 77.94%, spinach 87.50%, and carrots 81.92%. Thus, learning that places children at the center of activity through the presentation of concrete media and direct experience can be an effective strategy for fostering children's sensitivity to the environment, strengthening their connection with nature, and building the foundation of scientific skills from an early age.

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