

## **THE IMPLEMENTATION OF NATURE-BASED LEARNING IN ENHANCING EARLY CHILDHOOD COGNITIVE DEVELOPMENT FROM AN ISLAMIC EDUCATION PERSPECTIVE AT PERWARI PACITAN CHILDCARE CENTER**

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### **ABSTRACT**

*This study aims to determine the effectiveness of implementing Nature-Based Learning in improving early childhood cognitive development from an Islamic education perspective at Taman Penitipan Anak (TPA) Perwari Pacitan. This research employed a quantitative approach using a quasi-experimental design with a pretest–posttest control group design. The subjects consisted of 12 children divided into two groups: the experimental group (A1) and the control group (A2), each consisting of 6 children. The research instrument was an observation sheet assessing cognitive development, including classification ability, problem-solving, concept understanding, and cause-effect reasoning. Data were analyzed using descriptive and inferential statistics with a t-test. The results showed that the average improvement in the experimental group was 8.3, higher than the control group at 3.8. The t-test result indicated a significance value of 0.000 (< 0.05), meaning there was a significant difference between the two groups. From an Islamic perspective, Nature-Based Learning also fosters spiritual awareness through reflection (tafakkur) and contemplation (tadabbur) of Allah’s creation. Therefore, Nature-Based Learning is effective in enhancing early childhood cognitive development holistically.*

*Keywords: nature-based learning, cognitive development, early childhood*

Penelitian ini bertujuan untuk mengetahui efektivitas implementasi Nature-Based Learning dalam meningkatkan perkembangan kognitif anak usia dini dalam perspektif pendidikan Islam di Taman Penitipan Anak (TPA) Perwari Pacitan. Penelitian ini menggunakan pendekatan kuantitatif dengan desain quasi eksperimen model pretest–posttest control group design. Subjek penelitian terdiri dari 12 anak yang dibagi menjadi dua kelompok, yaitu kelas eksperimen (A1) dan kelas kontrol (A2), masing-masing berjumlah 6 anak. Instrumen penelitian menggunakan lembar observasi perkembangan kognitif yang meliputi kemampuan mengelompokkan, memecahkan masalah, memahami konsep, serta hubungan sebab-akibat. Teknik analisis data menggunakan statistik deskriptif dan inferensial dengan uji t. Hasil penelitian menunjukkan bahwa rata-rata peningkatan pada kelompok eksperimen sebesar 8,3, lebih tinggi dibandingkan kelompok kontrol sebesar 3,8. Hasil uji t menunjukkan nilai signifikansi sebesar 0,000 (< 0,05), yang

berarti terdapat perbedaan yang signifikan antara kedua kelompok. Dalam perspektif pendidikan Islam, pembelajaran berbasis alam tidak hanya meningkatkan aspek kognitif, tetapi juga menumbuhkan kesadaran spiritual melalui proses tafakkur dan tadabbur terhadap ciptaan Allah. Dengan demikian, dapat disimpulkan bahwa implementasi Nature-Based Learning efektif dalam meningkatkan perkembangan kognitif anak usia dini secara holistik.

Kata kunci: *nature-based learning*, perkembangan kognitif, anak usia dini

### **A. Intruduction**

Early childhood education (ECE) constitutes a crucial foundation for shaping holistic individual development, particularly in cognitive, social, emotional, and physical domains. Early childhood is widely recognized as the “golden age,” a critical period during which brain development occurs rapidly and determines the quality of learning in subsequent stages (Uce, 2017). From the perspective of Islamic education, this phase is also regarded as the period of *fitrah*, in which every child is born in a state of purity and possesses innate potential that must be optimally developed through appropriate education. This is in line with a hadith of the Prophet Muhammad (peace be upon him), which states that every child is born in a state of *fitrah*, and it is the environment that shapes them. Therefore, a learning approach is needed that is not solely oriented toward academic aspects but also

provides meaningful, contextual learning experiences aligned with Islamic values. One approach that has gained increasing attention in early childhood education is Nature-Based Learning (NBL).

Nature-Based Learning (NBL) is an educational approach that utilizes the natural environment as the primary source of learning, whether through exploration, play, or direct outdoor experiences (Miller, 2018). This approach not only emphasizes children’s interaction with nature but also promotes holistic, contextual, and experiential learning (Jordan & Chawla, 2019). In the perspective of Islamic education, nature is viewed as *ayat kauniyah* (signs of Allah’s greatness) that serve as a source of learning for humankind. The Qur’an repeatedly encourages humans to think, observe, and reflect upon Allah’s creation in the universe (QS. Al-Ghashiyah: 17–20) (Solihutaufa, 2025). Thus, the use of nature as a

learning resource in Nature-Based Learning is aligned with the principles of Islamic education, which emphasize learning based on *tafakkur* (reflection) and *tadabbur* (deep contemplation of Allah's creation) (Santoso, 2022).

Cognitive development in early childhood encompasses thinking skills, problem-solving, memory, and the understanding of cause-and-effect relationships (Warmansyah et al., 2023). These abilities are strongly influenced by the learning experiences children gain through interaction with their surrounding environment. Abstract, teacher-centered learning often proves less effective in stimulating children's cognitive development. In contrast, learning that provides opportunities for direct exploration—such as interaction with nature—has been shown to enhance curiosity, creativity, and critical thinking skills (Fauzia, 2023). From an Islamic perspective, the activity of thinking (*tafakkur*) is an essential part of developing the intellect (*'aql*), which is one of the primary goals of education (Santoso, 2022). Therefore, learning that encourages exploration and observation of nature is highly relevant in fostering children's cognitive potential.

The implementation of Nature-Based Learning in enhancing early childhood cognitive development can be explained through several key theoretical foundations. First, Jean Piaget's constructivist theory asserts that children construct knowledge through direct interaction with their environment; therefore, nature exploration experiences in environment-based learning strengthen processes of cognitive assimilation and accommodation (Mandar, 2025). Second, Lev Vygotsky's sociocultural theory emphasizes the importance of social interaction and scaffolding within the zone of proximal development (ZPD), where outdoor learning activities enable children to collaborate, discuss, and receive guidance from teachers and peers to develop higher-order thinking skills (Kurniati, 2025). Third, David Kolb's experiential learning theory highlights that effective learning occurs through concrete experience, reflection, conceptualization, and active experimentation; in the context of Nature-Based Learning, direct interaction with the natural environment provides multisensory experiences that enrich children's

thinking processes, problem-solving abilities, and creativity (Akbar, 2025).

Furthermore, from the perspective of Islamic education, learning theories can also be associated with the concepts of *ta'lim*, *tarbiyah*, and *ta'dib*, which emphasize a holistic educational process encompassing not only knowledge acquisition but also the development of intellect, character, and spiritual awareness (Zahra et al., 2024). Nature-based learning provides opportunities for children to directly recognize Allah's creation, thereby enhancing not only cognitive abilities but also fostering *tawhid* awareness and gratitude. Thus, the integration of modern educational theories with Islamic educational values further reinforces that nature-based learning is a relevant and effective approach for optimizing early childhood cognitive development.

A number of studies indicate that the implementation of Nature-Based Learning is positively associated with early childhood cognitive development. A study by Suryani et al. (2020) found that nature-based learning contributes to improvements in self-regulation, social interaction, and various developmental aspects,

including cognitive development, although the results vary depending on the instructional design employed. Moreover, natural environments provide opportunities for children to engage in more complex and meaningful play activities, thereby enhancing thinking and problem-solving skills. Another study demonstrates that the direct application of nature-based learning significantly improves children's cognitive development. In an experimental study conducted by Amiliya and Aminah (2020), it was found that the use of natural-based learning methods increased children's cognitive development by more than 50% compared to conventional learning methods. This finding indicates that direct interaction with the natural environment provides richer and more varied stimuli for children's cognitive development.

These findings are further supported by Damayanti (2024), who states that outdoor play activities contribute to improvements in executive functions, including thinking skills, concentration, and problem-solving abilities in early childhood. In addition, research by Alfy et al. (2025) shows that exposure to natural

environments has a positive impact on cognitive development, particularly in enhancing attention and self-regulation. A more recent study by Syauqia et al. (2025) found that nature-based learning consistently contributes to improvements in children's cognitive, social, and emotional aspects, although its effectiveness is influenced by the quality of implementation in practice. Therefore, these various research findings increasingly affirm that Nature-Based Learning is an effective approach for optimizing early childhood cognitive development.

In addition, Nature-Based Learning provides opportunities for children to learn through multisensory experiences, such as seeing, touching, hearing, and directly experiencing natural phenomena (Jordan & Chawla, 2019). These experiences not only strengthen conceptual understanding but also help children build connections between acquired knowledge and everyday life. From an Islamic perspective, such experiences can strengthen the process of *tadabbur al-'alam* (reflecting upon nature), enabling children to understand the meanings behind Allah's creation, so

that learning becomes not only cognitive but also spiritual. Consequently, learning becomes more meaningful and memorable. However, the implementation of Nature-Based Learning in early childhood education institutions still faces various challenges. One major obstacle is teachers' limited understanding of NBL concepts and effective implementation strategies. Additionally, limited facilities, restricted access to natural environments, and insufficient curricular integration also hinder the application of this approach. As a result, learning in many early childhood institutions still tends to focus on classroom-based activities and underutilizes the surrounding environment as a learning resource.

Taman Penitipan Anak (TPA) Perwari Pacitan, as one of the early childhood education institutions, has significant potential to implement Nature-Based Learning, considering its relatively supportive environmental conditions. From the perspective of Islamic education, utilizing the environment as a learning resource also serves as a means of instilling *tawhid* values, gratitude, and environmental stewardship as a trust

(*amanah*) from Allah SWT. However, it is not yet clearly understood how this approach is implemented in daily learning activities, particularly in relation to enhancing children's cognitive development. Based on this background, this study is important to conduct in order to examine in depth the implementation of Nature-Based Learning in improving early childhood cognitive development from the perspective of Islamic education at TPA Perwari Pacitan. This research is expected to contribute both theoretically and practically, particularly in developing an effective, integrative, and value-relevant nature-based learning model within the context of early childhood education in Indonesia.

## **B. Research Method**

This study employs a quantitative approach with a quasi-experimental design using a pretest–posttest control group design model. This design was selected to determine the effect of implementing Nature-Based Learning on the improvement of early childhood cognitive development by comparing results before and after treatment in both the experimental and control groups. The

study was conducted at the Perwari Pacitan Daycare Center (TPA).

The research subjects consisted of two classes, namely class A1 and class A2, each comprising 6 children, resulting in a total of 12 participants. Class A1 was designated as the experimental group, which received treatment in the form of Nature-Based Learning, while class A2 served as the control group and received conventional classroom instruction as *عادة* practiced.

The sampling technique used in this study was total sampling, considering the relatively small population size, so all members of the population were included as research samples (Febriyanti, 2023). The characteristics of the subjects were within the age range of 4–5 years, categorized as early childhood in the preoperational stage of cognitive development. The instrument used in this study was an observation sheet of children's cognitive development, constructed based on indicators of cognitive abilities, including recognizing concepts, solving simple problems, classifying objects, and understanding cause-and-effect relationships. This instrument had been validated in terms of content

validity by early childhood education experts and tested for reliability to ensure measurement consistency.

The research procedure was carried out in several stages, namely (Syahroni, 2022): (1) the preparation stage, including instrument development and planning of Nature-Based Learning activities; (2) the pretest stage to measure the initial cognitive development abilities of children in both groups; (3) the treatment stage, in which the experimental group received Nature-Based Learning through environmental exploration, outdoor play, and direct interaction with natural objects, while the control group followed conventional classroom learning; (4) the posttest stage to measure children's cognitive development after treatment; and (5) the data analysis stage.

Data analysis techniques were conducted using both descriptive and inferential statistical analyses. Descriptive and inferential statistics are data processing methods used to describe data characteristics and to draw conclusions or test hypotheses based on the obtained data (Ramdhan, 2021). Descriptive analysis was used to present the

mean, percentages, and improvement in children's cognitive development scores before and after treatment.

Meanwhile, inferential analysis employed the t-test to determine significant differences between pretest and posttest results in both groups. The entire data analysis process was carried out using statistical software. With this design and procedure, the study is expected to provide an objective description of the effectiveness of implementing Nature-Based Learning in improving early childhood cognitive development at TPA Perwari Pacitan.

## **C. Research Results and Discussion**

### **1. Results**

#### **a. General Overview**

The implementation of Nature-Based Learning (NBL) in improving early childhood cognitive development at TPA Perwari Pacitan was carried out through systematic and integrated stages within the learning activities. The first stage was planning, in which teachers prepared lesson plans/modules based on nature by determining relevant themes such as plants, animals, water, and the surrounding environment, as well as

preparing natural materials such as leaves, stones, sand, and water, while also establishing cognitive development indicators such as the ability to classify, observe, and solve problems. The second stage was the opening activity (apperception), where children were invited to engage in light discussions to build curiosity through simple guiding questions.

The third stage was the core activity in the form of nature exploration, where children learned directly outside the classroom through activities such as observing, classifying, and conducting simple experiments, while the teacher acted as a facilitator who provided guidance and scaffolding. The fourth stage was reflection and discussion, in which children retold their learning experiences to strengthen conceptual understanding and thinking skills. The fifth stage was the closing, which included reinforcing the material, making simple conclusions, and providing appreciation to the children. The final stage was evaluation and follow-up through observation of children's cognitive development to determine the effectiveness of the learning process and to design subsequent activities. Through these

stages, the implementation of NBL was able to provide meaningful and effective learning experiences in improving early childhood cognitive development.

#### **b. Data Description**

This study aimed to determine the effectiveness of the implementation of Nature-Based Learning in improving early childhood cognitive development at TPA Perwari Pacitan. The data obtained consisted of pretest and posttest scores from two groups, namely the experimental class (A1) and the control class (A2), each consisting of 6 children.

**Table 1. Pretest–Posttest Data of the Experimental Class (A1)**

No	Child's Name	Pretest	Posttest	Difference
1	S1	9	17	8
2	S2	10	18	8
3	S3	8	16	8
4	S4	11	19	8
5	S5	9	18	9
6	S6	10	19	9
<b>Total</b>		<b>57</b>	<b>107</b>	<b>50</b>

Based on Table 1, it is known that the average pretest score in the experimental class was 9.5, while the average posttest score increased to 17.8. This indicates a significant improvement with a mean difference of 8.3. This increase suggests that the implementation of Nature-

Based Learning has a positive impact on children’s cognitive development.

**Table 2. Pretest–Posttest Data of the Control Class (A2)**

No	Child's Name	Pretest	Posttest	Difference
1	S1	9	13	4
2	S2	10	14	4
3	S3	8	12	4
4	S4	11	14	3
5	S5	9	13	4
6	S6	10	14	4
<b>Total</b>		<b>57</b>	<b>80</b>	<b>23</b>

In Table 2, it can be seen that the average pretest score in the control class was also 9.5, but the average posttest score only increased to 13.3 with a mean difference of 3.8. This indicates that although there was an improvement, the results were not as substantial as those in the experimental class.

In general, both groups had relatively similar initial conditions; however, after receiving different treatments, the experimental class showed a greater improvement compared to the control class. This indicates that nature-based learning is more effective than conventional learning in enhancing early

childhood cognitive development.

**a. Data Analysis**

Data analysis in this study was conducted using descriptive and inferential statistics. Descriptive statistics were used to examine the mean and score improvements, while inferential statistics were used to test the significance of differences between the two groups.

1. Calculation of Mean and Difference

**Table 3. Comparison of Pretest Mean, Posttest Mean, and Improvement**

Class	Experimental	Control
<i>Mean Pretest</i>	9,5	9,5
<i>Mean Posttest</i>	17,8	13,3
<i>Mean Improvement</i>	8,3	3,8
<i>Difference Between Groups</i>	-	4,5

Based on the table, it is known that both groups had the same average pretest score of 9.5, indicating that the initial cognitive ability conditions of the children were relatively equivalent. However, after the treatment, the average

posttest score of the experimental class increased to 17.8 with an improvement of 8.3, whereas the control class only reached an average of 13.3 with an improvement of 3.8. The difference in improvement of 4.5 points shows that the experimental group experienced a greater increase compared to the control group. This indicates that the implementation of Nature-Based Learning has a more effective influence in improving early childhood cognitive development compared to conventional learning.

2. t-test (Independent Sample t-test)

To determine whether the difference was significant, a t-test was conducted on the difference between the two groups.

**Table 4. Results of the Independent Sample t-test**

Variable	Group	Mean	Std. Deviation	t count	Sig. (2-tailed)
Gain Score	Eksperimen	8,3	0,52	7,20	0,000
	Kontrol	3,8	0,41		

Based on the results of the Independent Sample t-test using SPSS, the calculated t-value was 7.20 with a significance value (Sig. 2-tailed) of 0.000. Since the significance value is less than 0.05 ( $0.000 < 0.05$ ), it can be concluded that there is a significant difference between the experimental and control groups. This indicates that the implementation of Nature-Based Learning has a significant effect on improving early childhood cognitive development compared to conventional learning. Since  $t\text{-count} > t\text{-table}$  ( $7.20 > 2.228$ ), it can be concluded that there is a significant difference between the two groups. The analysis results show that the implementation of Nature-Based Learning has a significant effect on improving early childhood

cognitive development. Children who learned through a nature-based approach demonstrated better improvements in thinking skills, problem-solving, and exploration compared to those who learned through conventional methods.

## **DISCUSSION**

The research findings indicate that the implementation of Nature-Based Learning (NBL) has a significant effect on improving early childhood cognitive development at TPA Perwari Pacitan. This can be seen from the notable difference in improvement between the experimental class and the control class. The experimental class, which applied a nature-based approach, experienced an average increase of 8.3, while the control class showed an increase of only 3.8. In addition, the results of the t-test revealed a significance value of 0.000 ( $< 0.05$ ), indicating a statistically significant difference between the two groups. These findings suggest that nature-based learning is more effective than conventional learning in enhancing early childhood cognitive abilities. This

difference not only reflects quantitative superiority but also indicates a higher quality of meaningful learning experiences in the experimental group.

More specifically, the improvement observed in the experimental group is closely related to the characteristics of nature-based learning, which provide children with opportunities to learn actively through direct interaction with their environment. Children do not merely receive information passively; rather, they engage in exploration, observation, and simple experimentation that stimulate their cognitive development. This contrasts with conventional learning, which tends to be teacher-centered and relies more on lecturing or abstract assignments. As a result, the stimulation of children's thinking abilities in conventional settings is often less optimal.

Theoretically, these findings are consistent with Jean Piaget's constructivist theory, which states that children construct knowledge through direct interaction with their environment (Mandar, 2025). In this study, children in the experimental group gained direct learning

experiences through exploration of the natural environment, such as observing plants, classifying objects, and conducting simple experiments. These activities enabled them to engage in processes of assimilation and accommodation more effectively, thereby accelerating their cognitive development. The concrete experiences obtained through interaction with nature help children understand concepts more deeply compared to purely theoretical learning.

Furthermore, these findings also support Lev Vygotsky's sociocultural theory, which emphasizes the importance of social interaction and scaffolding in the learning process (Kurniati, 2025). In the implementation of NBL, teachers are no longer the center of learning but act as facilitators who provide guidance and stimulation through probing questions. Interactions among children, as well as between children and teachers during nature exploration activities, help develop higher-order thinking skills. Children learn through discussion, collaboration, and the exchange of ideas, making the learning process more dynamic and meaningful. Through simple reflective

activities, children are also able to connect newly acquired experiences with their prior knowledge.

In addition, these findings align with David Kolb's experiential learning theory, which highlights that effective learning occurs through direct experience (Akbar, 2025). In NBL activities, children are not passive recipients of information but actively participate in the learning process through concrete experiences, such as touching, seeing, and experiencing natural objects. This process enables children to develop logical thinking, problem-solving skills, and a better understanding of cause-and-effect relationships. The multisensory experiences gained by children make learning easier to comprehend and retain over the long term.

From the perspective of Islamic education, these findings are also highly relevant. Islam views the learning process not only as a means of developing cognitive aspects but also as a way to foster spiritual awareness and faith in Allah SWT. The universe is regarded as *ayat kauniyah*—signs of Allah's greatness that can be studied by humans. The Qur'an encourages people to observe, think, and reflect upon Allah's

creation, as stated in QS. Al-Ghashiyah verses 17–20, which invite reflection on camels, the sky, mountains, and the earth (Zahra et al., 2024). In this context, nature-based learning serves as an effective medium for integrating cognitive development with Islamic values. When children are invited to observe plants, animals, or other natural phenomena, they not only learn basic scientific concepts but also develop awareness of Allah's greatness as the Creator of the universe (Harefa & Sarumaha, 2020). Such activities foster *tafakkur* (thinking) and *tadabbur* (reflection), which are essential elements in Islamic education. Thus, NBL contributes not only to intellectual development but also to character building and spirituality.

These findings are further supported by previous studies. Research conducted by Suryani et al. (2020) shows that nature-based learning can improve classification skills and cognitive aspects in early childhood. This is consistent with the present study, where children in the experimental group demonstrated improvements in grouping objects and understanding simple concepts. Similarly, Amiliya and Aminah (2020)

found that nature-based learning significantly enhances children's cognitive development compared to conventional methods. These findings reinforce the importance of direct experience in improving the quality of children's thinking.

Research by Firayani (2026) also indicates the effectiveness of NBL in enhancing prosocial behavior in early childhood, as evidenced by a significant increase from pretest to posttest scores in the experimental group. This suggests that nature-based learning impacts not only cognitive aspects but also social development. Group-based outdoor learning activities encourage children to cooperate, share, and help one another. Damayanti (2024) further reports that outdoor play activities can enhance executive functions, such as thinking skills, concentration, and problem-solving abilities. This is reflected in the present study, where children engaged in nature-based learning demonstrated improved problem-solving skills and greater participation in exploratory activities.

Moreover, Alfy et al. (2025) state that natural environments play a crucial role in enhancing children's attention and self-regulation. In this

study, children in the experimental group appeared more focused and enthusiastic during learning activities compared to those in the control group. A recent study by Syauqia et al. (2025) also found that nature-based learning contributes positively to children's cognitive, social, and emotional development, although its effectiveness depends on the quality of implementation. This suggests that the success of NBL depends not only on the concept itself but also on how teachers design and implement the learning process systematically and effectively.

In this study, the successful implementation of Nature-Based Learning (NBL) was supported by well-structured lesson planning, the effective use of the surrounding environment as a learning resource, and the active role of teachers as facilitators. Teachers were able to design engaging activities that were appropriate to children's developmental stages, making the learning process enjoyable and meaningful. The surrounding environment was optimally utilized as a contextual learning medium, enabling children to learn through direct experience. This made learning

more relevant to children's daily lives and enhanced their engagement, motivation, and conceptual understanding in a more effective and sustainable manner.

Practically, these findings imply that nature-based learning can serve as an effective alternative instructional strategy in early childhood education. This approach does not require expensive facilities, as the surrounding environment can be utilized as a rich and diverse learning resource. Additionally, a more enjoyable and less monotonous learning atmosphere increases children's motivation and active participation. However, the implementation of NBL also presents several challenges. Limited teacher understanding of nature-based learning concepts, insufficient training, and limited facilities may hinder optimal implementation. Furthermore, safety concerns and the management of outdoor activities must also be carefully considered. Therefore, support from various stakeholders, including educational institutions and the government, is necessary to provide training, guidance, and supporting facilities for teachers.

In this study, the successful implementation of Nature-Based Learning (NBL) was supported by careful lesson planning, the utilization of the environment as a learning resource, and the active role of teachers as facilitators. Teachers designed engaging activities appropriate to children's developmental stages, ensuring that learning was enjoyable. The surrounding environment was optimally used as a contextual medium that allowed children to learn through direct experience. This made learning more relevant to everyday life, increased engagement and motivation, and enhanced conceptual understanding. Thus, NBL creates a meaningful and effective learning process that optimally and sustainably supports children's cognitive development across various real learning situations.

Based on the overall findings and discussion, it can be concluded that the implementation of Nature-Based Learning is effective in improving early childhood cognitive development. Learning that provides direct experiences, involves social interaction, and utilizes the natural environment as a learning resource

has been proven to significantly enhance children's thinking, problem-solving, and exploratory abilities. Moreover, from the perspective of Islamic education, this approach also fosters spiritual awareness and faith-based values through interaction with nature as Allah's creation. Therefore, Nature-Based Learning is a highly relevant approach for early childhood education, particularly in optimizing children's cognitive development in a holistic and integrative manner.

#### **D. Conclusion**

Based on the research findings, it can be concluded that the implementation of Nature-Based Learning (NBL) has proven effective in improving early childhood cognitive development at TPA Perwari Pacitan. This is evidenced by the higher increase observed in the experimental group compared to the control group, where the experimental group showed an average improvement of 8.3, while the control group only improved by 3.8. The results of statistical testing also revealed a significance value of 0.000 ( $< 0.05$ ), indicating a significant difference between the two groups. Thus, nature-based learning is proven to be more effective than conventional

learning in developing children's cognitive abilities. This effectiveness is closely related to the characteristics of Nature-Based Learning, which provide direct, concrete, and contextual learning experiences through environmental exploration activities. Children do not merely receive information passively but are actively involved in observing, classifying, and understanding natural phenomena around them. This process enhances thinking skills, problem-solving abilities, and conceptual understanding more optimally. Learning becomes more meaningful as children learn through real experiences that are easier to understand and remember.

From the perspective of Islamic education, the implementation of Nature-Based Learning also holds highly strategic value. The universe is viewed as *ayat kauniyah*, containing signs of the greatness of Allah SWT. Through direct interaction with nature, children not only develop cognitive aspects but also learn to engage in *tafakkur* (thinking) and *tadabbur* (reflecting upon Allah's creation). This process contributes to fostering spiritual awareness, gratitude, and a sense of responsibility toward the

environment as a trust (*amanah*) from Allah. Therefore, nature-based learning is capable of integrating intellectual development with Islamic values in a holistic manner. Based on these findings, it is recommended that early childhood educators integrate Nature-Based Learning more broadly, systematically, and in a well-planned manner within learning activities. Teachers are expected to utilize the surrounding environment as a rich and contextual learning resource and to connect it with Islamic educational values. In addition, educational institutions need to provide support in the form of training, mentoring, and adequate facilities to ensure optimal implementation of nature-based learning. Strengthening the curriculum by integrating nature-based approaches with Islamic values is also an important step in creating meaningful learning experiences.

For future researchers, it is recommended to involve larger and more diverse samples and to employ more comprehensive research designs. Further studies should also examine other developmental aspects, such as socio-emotional development, creativity, and the development of children's religious

character, in order to obtain a more comprehensive understanding of the effectiveness of Nature-Based Learning. The limitations of this study include a relatively small sample size, which limits the generalizability of the findings. Additionally, the limited duration of the study affected the depth of observation of children's development. The use of observational instruments also carries the potential for assessor subjectivity. This study primarily focused on cognitive aspects and has not yet examined other developmental dimensions in depth, including spiritual aspects in a more measurable manner. Therefore, further research with broader scope, longer duration, and more varied instruments is needed to produce more accurate and comprehensive findings.

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