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Introduction of Nature Exploration Activities through a Deep Learning Approach in Enhancing Children's Creativity at TK Aisyiyah 3

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Abstract: This study aims to examine the introduction of nature exploration activities through a deep learning approach in enhancing children's creativity at TK Aisyiyah 3. The research employs a qualitative descriptive method involving teachers and early childhood learners as participants. The learning intervention is designed through experiential and meaningful activities, where children directly interact with natural environments to stimulate curiosity, critical thinking, and creative expression. Data were collected through observation, interviews, and documentation of learning processes and children's work. The findings indicate that the implementation of deep learning-based nature exploration activities significantly improves children's creativity, as reflected in their ability to generate ideas, solve simple problems, and express themselves through various forms of activities. Among the indicators of creativity, initiative and originality emerged as the most prominent improvements, as children increasingly demonstrated spontaneous participation in activities, proposed unique ideas, and explored natural objects in diverse and imaginative ways. Furthermore, children demonstrate higher engagement, enthusiasm, and independence during the learning process. This study suggests that integrating nature exploration with a deep learning approach can create meaningful learning experiences and effectively foster creativity in early childhood education.

Keyword : Creativity, deep learning approach, early childhood education, nature exploration, meaningful learning

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Introduction

Education in early childhood plays a crucial role in preparing individuals to face the complexities of modern society. It is not only oriented toward the development of basic academic skills, but also toward fostering higher-order thinking skills, particularly creativity (Ghosh et al. 2024). Creativity is recognized as an essential competency that enables children to generate ideas, solve problems, and adapt to various situations in their environment (Kufel et al. 2023). In the context of 21st-century education, creativity becomes a fundamental aspect that must be stimulated from an early age through meaningful and engaging learning experiences.

Learning in early childhood should emphasize direct experiences that allow children to actively construct their own understanding (Kheddar, Hemis, and Himeur 2024). One of

the most relevant approaches to achieve this is through interaction with the natural environment (Iyortsuun et al. 2023). Nature exploration activities provide authentic learning opportunities where children can observe, investigate, and experiment using their senses. Such activities encourage curiosity, imagination, and the ability to think divergently (Mijwil et al. 2022). The integration of environmental exploration into learning not only enhances children's knowledge about nature but also strengthens their creativity through real and contextual experiences.

In line with this, the concept of deep learning has gained significant attention as an approach that promotes meaningful understanding rather than superficial knowledge acquisition (Soori, Arezoo, and Dastres 2023). Deep learning emphasizes active engagement, critical reflection, and the connection between prior knowledge and new experiences (Li et al. 2023). This approach enables children to understand concepts more deeply and apply them in different contexts. In early childhood education, deep learning can be implemented through "*learning by doing*," where children are directly involved in hands-on and exploratory activities that stimulate thinking and creativity (Attri et al. 2023).

However, the implementation of learning in many early childhood institutions still tends to be teacher-centered and focused on routine activities (Mousavi and Beroza 2022). Children are often directed to complete structured tasks without being given sufficient opportunities to explore, question, and express their ideas freely (Mienye and Swart 2024). This condition leads to limited development of creativity, as learning becomes less meaningful and less engaging (Ahmed et al. 2023). The lack of innovative approaches that integrate experiential and inquiry-based learning further contributes to this issue.

Previous studies have widely discussed the role of environmental-based learning in stimulating children's cognitive and social development, as well as the importance of creativity in early childhood education (Nurani, Respati, and Muharram 2025). Several studies have also explored the implementation of deep learning approaches to encourage meaningful engagement and higher-order thinking skills among learners (Setyaningsih et al. 2024). However, existing research has predominantly focused on the general effectiveness of experiential learning or environmental activities without specifically examining how nature exploration activities integrated with a deep learning approach contribute to the enhancement of creativity in early childhood settings. In particular, limited attention has been given to the implementation of this integrated approach within kindergarten contexts and its role in fostering children's creative engagement through authentic experiences. Therefore, this study seeks to address this gap by investigating the implementation of nature exploration activities through a deep learning approach at TK Aisyiyah 3. This research is important because it offers an innovative perspective on meaningful learning practices that can stimulate creativity through active interaction with the natural environment.

As a result, children tend to be passive participants, and their creative potential is not maximally developed. This situation highlights the need for an alternative learning approach that can actively engage children and stimulate their creativity through meaningful

experiences. Therefore, it is important to introduce nature exploration activities through a deep learning approach as an innovative strategy in early childhood education.

This approach integrates experiential learning, active participation, and meaningful engagement, allowing children to explore their environment while developing creative thinking skills. By engaging directly with nature, children are expected to build deeper understanding, enhance curiosity, and express ideas more freely. Based on the background above, the research problem of this study can be formulated as follows: How are nature exploration activities implemented through a deep learning approach in improving children's creativity at TK Aisyiyah 3? Furthermore, how does this approach facilitate children's engagement, creative expression, and active participation during the learning process? The purpose of this study is to examine the implementation of nature exploration activities through a deep learning approach in improving children's creativity at TK Aisyiyah 3. The findings of this study are expected to contribute to the development of effective and innovative learning practices that support creativity and meaningful learning in early childhood education.

Methodology

This study employed a qualitative research design aimed at exploring the implementation of nature exploration activities through a deep learning approach in enhancing children's creativity (Roosinda et al. 2021). A descriptive qualitative approach was used to obtain an in-depth understanding of learning processes, children's engagement, and creative development within natural learning contexts. This design was selected for its ability to capture rich, contextual, and holistic data related to children's experiences and interactions during the learning activities.

This study was grounded in an interpretivist research paradigm, which emphasizes understanding social phenomena through participants' experiences, meanings, and interactions within natural settings. According to John W. Creswell (2014), qualitative research is appropriate when a study seeks to explore and interpret participants' perspectives and contextual realities in depth. Similarly, Lexy J. Moleong (2017) argues that qualitative approaches are particularly suitable for examining complex social situations in their natural context. In this study, the descriptive qualitative approach was considered more appropriate than quantitative or mixed-method approaches because the research aimed to understand how nature exploration activities through a deep learning approach were implemented and experienced by children and teachers, rather than to measure causal relationships or statistically test predetermined variables. Since the focus of the study was on meaning-making, engagement, creativity processes, and contextual learning experiences, qualitative inquiry enabled the researcher to obtain deeper insights that could not be fully captured through numerical measurement alone.

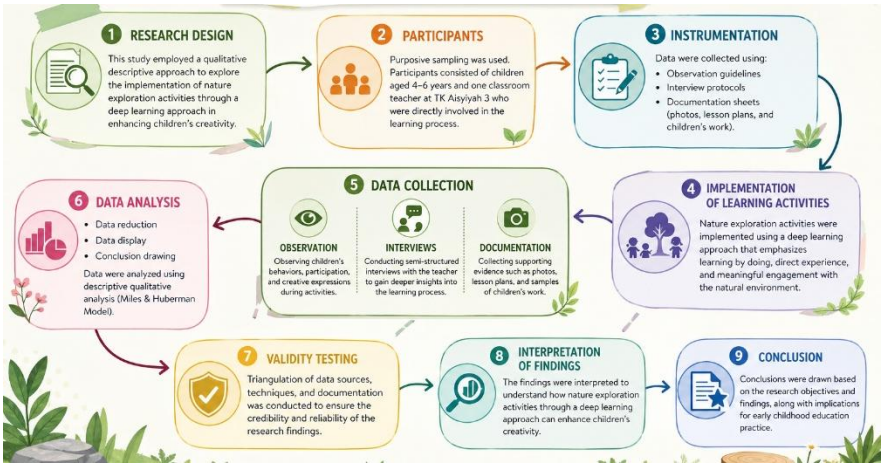

Figure 1.
Research Methodology Framework of Nature Exploration Activities through a Deep Learning Approach in Enhancing Children's Creativity at TK Aisyiyah 3

Participants

The participants of this study consisted of early childhood learners and teachers at TK Aisyiyah 3. The subjects were selected using purposive sampling technique, focusing on a class that actively implemented nature exploration-based learning activities (Rosyidah and Fijra 2021). The participants involved 20 children aged 4–6 years and one classroom teacher who was directly responsible for organizing and facilitating the learning process. The participants included a group of children aged 4–6 years and one classroom teacher who was directly involved in planning and implementing the learning process. The selection was based on the consideration that the class had characteristics relevant to the objectives of the study, particularly in applying experiential learning approaches. The inclusion criteria for participant selection included: (1) children enrolled in the selected classroom aged between 4–6 years, (2) children who regularly participated in nature exploration learning activities, and (3) a classroom teacher actively involved in planning and implementing deep learning-oriented activities. Meanwhile, the exclusion criteria included children with irregular attendance during the observation period and participants who were not directly involved in the nature exploration learning sessions.

Instrumentation

The instruments used in this study were developed to support qualitative data collection, including observation guidelines, interview protocols, and documentation sheets (Soendari 2012). Observation guidelines were designed to capture children's behaviors, participation, and creative expressions during nature exploration activities. The observation instrument specifically covered several aspects, including children's level of participation in exploration activities, curiosity toward natural objects, ability to generate ideas, initiative in completing activities, problem-solving behavior, interaction with peers and teachers, and

forms of creative expression demonstrated during learning. Interview protocols were used to gather in-depth information from teachers regarding the planning, implementation, and challenges of applying the deep learning approach (Arib et al. 2024). The interview guidelines included key points such as teachers' understanding of deep learning principles, strategies for organizing nature exploration activities, methods used to stimulate creativity, challenges encountered during implementation, and teachers' perceptions of children's responses and creative development. Documentation included photos, lesson plans, and samples of children's work, which were used to strengthen and validate the findings. The documentation sheet focused on collecting evidence related to learning implementation, including activity records, children's creative products, classroom interactions, and visual documentation of children's engagement during exploration activities. All instruments were developed based on relevant theoretical frameworks and were reviewed to ensure their relevance to the research objectives.

Data Collection and Analysis

Data were collected through direct classroom observations, semi-structured interviews with teachers, and documentation of learning activities. Observations were conducted during the implementation of nature exploration activities to capture real-time interactions and children's creative responses (Nasution and Junaidi 2024). The observation process was conducted over six learning sessions within a period of four weeks to ensure a comprehensive understanding of children's participation and creativity development during nature exploration activities. During the observation process, the researcher acted as a non-participant observer, focusing on recording children's behaviors, interactions, and responses without directly intervening in the learning activities. Interviews were carried out to gain deeper insights into the teacher's perspective on the learning process and the application of deep learning principles (KO 2003). The teacher interviews were conducted twice, namely before the implementation of the learning activities to understand the planning and expectations of the deep learning approach, and after the implementation to explore reflections, challenges, and perceived outcomes related to children's creativity development. Documentation was used to support and triangulate the data obtained from observations and interviews. The documentation process included photographs of learning activities, field notes, lesson plans, and samples of children's work. All documentation materials were systematically stored in categorized digital folders and research records to maintain data organization, traceability, and validity throughout the analysis process. The data analysis was conducted using descriptive qualitative analysis techniques, which included data reduction, data display, and conclusion drawing.

The researchers organized and categorized the data based on emerging themes related to creativity, engagement, and learning processes. Triangulation techniques were applied to ensure the validity and reliability of the data by comparing information from multiple sources. The results of the analysis were then interpreted to provide a comprehensive

understanding of how nature exploration activities through a deep learning approach can enhance children's creativity.

Triangulation and Validity

To ensure the trustworthiness of the findings, this study employed triangulation techniques and qualitative validation procedures based on the criteria of credibility and dependability proposed by Lincoln and Guba (1985) Source triangulation, method triangulation, and time triangulation were applied to strengthen the consistency and credibility of the data. Source triangulation was conducted by comparing information obtained from different participants, particularly classroom teachers and children's observable behaviors during learning activities. Method triangulation was implemented through the integration of classroom observations, semi-structured interviews, and documentation analysis to examine the same phenomenon from multiple perspectives. Observational data regarding children's participation, initiative, and creative expressions were cross-checked with teachers' interview responses and supporting documentation such as lesson plans, field notes, photographs, and children's work samples. Time triangulation was conducted by collecting data across several learning sessions during the four-week observation period, allowing the researcher to compare children's responses and participation patterns over time rather than relying on a single observation event.

To enhance credibility, the researcher continuously compared and verified findings across different data sources and methods to ensure consistency in interpretation. In addition, dependability was maintained through systematic documentation of research procedures, including observation records, interview transcripts, field notes, and categorized documentation files, enabling the research process to remain transparent and traceable. Rather than emphasizing "reliability" in a quantitative sense, this study adopted the concept of trustworthiness, which is considered more appropriate for qualitative inquiry because it prioritizes contextual depth, consistency of interpretation, and authenticity of participants' experiences (Lincoln and Guba 1985).

Result and Discussion

Development of Children's Creativity through Nature Exploration

The findings reveal that the implementation of nature exploration activities through a deep learning approach significantly enhances children's creativity. Based on observational data, children demonstrated increased originality, imagination, and flexibility in expressing ideas during learning activities. Creativity was evident when children interacted directly with natural objects such as leaves, soil, stones, and water, which stimulated spontaneous exploration and idea generation.

Field observations indicate that children actively transformed natural materials into meaningful creations. For example, several children arranged leaves and twigs into symbolic forms such as houses, animals, and imaginary objects. One observation note recorded:

"Children used leaves and small branches to create shapes based on their imagination, and each child produced different forms with unique interpretations."

This finding suggests that nature-based learning environments provide open-ended stimuli that encourage divergent thinking. According to constructivist theory, children construct knowledge through direct interaction with their environment, allowing them to generate new ideas and meanings (Kheddar, Hemis, and Himeur 2024). In this context, the deep learning approach facilitates not only knowledge acquisition but also creative exploration.

Furthermore, creativity was also reflected in children's verbal expressions. During exploration activities, children asked questions such as *"Why do leaves fall?"* and *"Why is the soil wet?"*, indicating curiosity and inquiry behavior. This aligns with the concept of deep learning, which emphasizes meaningful understanding and active engagement in the learning process (Utami, Sari, and Sugiarti 2026).

Table 1.
Indicators of Children's Creativity in Nature Exploration Activities

No	Activity Observed	Creativity Indicator	Description
1	Observing natural objects	Curiosity	Children actively ask questions and show interest in natural phenomena
2	Collecting materials	Initiative	Children independently gather leaves, stones, and other objects
3	Creating with natural materials	Originality	Children produce unique and varied creations
4	Group interaction	Communication	Children share ideas and collaborate with peers
5	Presenting findings	Confidence	Children express ideas verbally and show their work

Table 1 illustrates that children's creativity emerges through various observable behaviors during nature exploration activities. The indicators show that creativity is not limited to artistic expression but also includes curiosity, initiative, communication, and confidence.

The data indicate that the highest level of creativity is reflected in children's originality when creating objects from natural materials, as each child produced unique outcomes. Additionally, curiosity plays a foundational role, as children's questioning behavior stimulates further exploration and idea development (Mijwil et al. 2022).

These findings confirm that creativity in early childhood is multidimensional and develops through active interaction with the environment. The deep learning approach supports this process by providing meaningful and contextual learning experiences that encourage children to think, explore, and express ideas freely.

Learning Engagement in Deep Learning-Based Activities

The results also show a significant increase in children's engagement during learning activities. Children were more enthusiastic, active, and focused when participating in nature exploration compared to conventional classroom activities. Observations revealed that children were able to maintain attention for longer periods and showed persistence in completing tasks.

Figure 2. Portrait of Deep Learning Activities

One field note highlighted:

"Children showed high enthusiasm when learning was conducted outside the classroom. They moved actively, observed objects carefully, and interacted with peers during exploration."

This increased engagement can be explained by the application of the deep learning approach, particularly through experiential learning or *learning by doing*. According to experiential learning theory (Mulyono 2026), direct experience plays a crucial role in shaping understanding and engagement. When children are actively involved in meaningful activities, they are more likely to develop deeper comprehension and sustained interest.

Teacher's Role in Facilitating Deep Learning and Creativity

The teacher plays a crucial role in facilitating the success of nature exploration activities. Based on interview data, the teacher emphasized the importance of acting as a facilitator rather than a knowledge transmitter.

Figure 3.
Teacher Facilitation in Promoting Deep Learning and Student Creativity

"I do not directly tell children what to do, but I guide them by asking questions so they can think and explore on their own."

This approach reflects scaffolding, where the teacher supports children's learning while allowing them to construct their own understanding (Iyortsuun et al. 2023). The balance between guidance and autonomy is essential in fostering creativity.

Discussion

The findings of this study indicate that the integration of nature exploration activities with a deep learning approach is not merely effective at a practical level, but also reflects a fundamental shift in how learning is conceptualized in early childhood education. Rather than positioning children as passive recipients of knowledge, this approach situates them as active meaning-makers who construct understanding through direct interaction with their environment (Soori, Arezoo, and Dastres 2023). This paradigm shift aligns with contemporary perspectives in education that emphasize learner agency and experiential engagement as the foundation of meaningful learning.

From a theoretical standpoint, the results can be interpreted through the lens of constructivist learning theory, which posits that knowledge is constructed through active engagement with the environment rather than transmitted from teacher to learner (Ghosh et al. 2024). The natural environment, in this context, functions not only as a learning medium but as a dynamic epistemic space where children negotiate meaning, test ideas, and refine their understanding (Mundiri and Hamimah 2022). Unlike abstract classroom instruction,

nature-based activities provide concrete stimuli that bridge the gap between experience and cognition, enabling deeper conceptual development.

More importantly, the findings reveal that creativity emerges as a byproduct of meaningful engagement rather than as an isolated instructional goal. This challenges traditional assumptions that creativity must be explicitly "*taught*" through structured activities (Sharifani and Amini 2023). Instead, the study demonstrates that when children are placed in open-ended, exploratory environments, creativity develops organically through processes of inquiry, experimentation, and interpretation (Talaei Khoei, Ould Slimane, and Kaabouch 2023). This supports the argument that creativity is inherently tied to context, autonomy, and opportunity, rather than rigid instructional design. These findings are consistent with previous studies highlighting the positive role of experiential and environmental learning in fostering creativity among young children. For example, research by Mundiri and Hamimah (2022) found that children who were actively involved in contextual and exploratory learning activities demonstrated higher levels of curiosity, imagination, and creative engagement compared to those exposed to teacher-centered instruction. Similarly, the findings align with Rompeng and Nuangchalerm (2026), who reported that place-based and nature-oriented education enhances children's participation and supports holistic development through authentic experiences. However, this study extends prior research by specifically integrating the deep learning approach into nature exploration activities, emphasizing not only environmental interaction but also meaningful reflection and active meaning-making as mechanisms for enhancing creativity. In this sense, the present findings differ from studies that primarily emphasize environmental exposure alone, as creativity in this study emerged through the combination of experiential engagement and pedagogical mediation.

In relation to deep learning theory, the results suggest that meaningful learning occurs when children are able to connect prior experiences with new encounters in authentic contexts (Mousavi and Beroza 2022). The deep learning approach facilitates this by emphasizing reflection, interaction, and application (Bungsu and Jayawardana 2025). Children in this study were not simply engaging in activities; they were interpreting experiences, asking questions, and constructing personal meaning (Lestari and Rahmadani 2024). This indicates that deep learning in early childhood is less about cognitive complexity in a formal sense and more about the depth of engagement and relevance of experience.

Furthermore, the strong relationship between engagement and creativity observed in this study highlights the role of intrinsic motivation in learning. Drawing from self-determination theory, children's active participation can be understood as a result of fulfilled psychological needs autonomy, competence, and relatedness (Li et al. 2023). The nature exploration activities provided autonomy through freedom of exploration, competence through successful interaction with the environment, and relatedness through social interaction with peers and teachers (Rahmaniah et al. 2023). These conditions create an

optimal environment for creativity to flourish, suggesting that motivation is not an external driver but an embedded outcome of well-designed learning experiences.

Another critical dimension emerging from this study is the role of the teacher as a pedagogical mediator. The findings indicate that effective facilitation does not rely on direct instruction but on the ability to create conditions that provoke thinking and exploration (Apriyani, Muqodas, and Nikawanti 2025). This aligns with the concept of scaffolding within the Zone of Proximal Development, where the teacher's role is to extend children's thinking without constraining their autonomy (Jayawardana 2025). However, this also implies that implementing deep learning approaches requires a high level of pedagogical sensitivity and adaptability, as teachers must balance structure with flexibility.

Additionally, the use of natural environments as a learning context introduces an ecological dimension to early childhood education. Nature is not only a setting for learning but also a source of unpredictability and complexity that stimulates cognitive and creative processes (Zhang et al. 2023). This supports ecological and place-based education perspectives, which argue that learning grounded in real-world environments enhances relevance, engagement, and holistic development (Rompeng and Nuangchalerm 2026). The findings suggest that exposure to natural settings enables children to experience variability, uncertainty, and discovery conditions that are essential for creative thinking but often absent in structured classroom environments.

However, it is important to critically note that the effectiveness of this approach is context-dependent. Factors such as teacher competence, learning design, and environmental accessibility play significant roles in determining outcomes (Tesalonika Lasut 2023). Without proper facilitation, nature-based activities may remain superficial and fail to achieve deep learning objectives (Kufel et al. 2023). Therefore, the success of this approach should not be attributed solely to the use of nature, but to the integration of pedagogical strategies that promote reflection, inquiry, and meaning-making. Despite these contributions, this study has several limitations that should be acknowledged. First, the research was conducted within a single early childhood institution, namely TK Aisyiyah 3, which may limit the generalizability of the findings to broader educational contexts with different institutional characteristics. Second, the study employed a qualitative descriptive approach with a relatively limited number of participants, meaning that the findings are context-specific and should be interpreted cautiously. Third, variations in teacher competence, environmental accessibility, and classroom conditions may influence the effectiveness of implementing nature exploration activities through a deep learning approach. Additionally, the study primarily focused on observing creativity through behavioral indicators during learning activities and did not employ standardized measurements to assess long-term creative development. Therefore, future studies are encouraged to involve broader research settings, mixed-method approaches, and longitudinal designs to provide more comprehensive evidence regarding the effectiveness and sustainability of this learning approach.

In a broader educational context, the findings of this study contribute to the ongoing discourse on transforming early childhood education toward more holistic and learner-centered approaches (Taye 2023). The integration of nature exploration and deep learning offers a viable alternative to conventional practices that often prioritize structured outcomes over meaningful processes (Mienye and Swart 2024). It suggests that fostering creativity requires not additional content, but a reorientation of learning environments and pedagogical practices toward experience, interaction, and reflection.

In conclusion, this study demonstrates that creativity in early childhood is best understood as an emergent property of meaningful, engaging, and context-rich learning experiences. The combination of nature exploration and deep learning not only enhances creativity but also redefines the role of learning itself as a dynamic, participatory, and transformative process.

Conclusion

This study was conducted to examine how the introduction of nature exploration activities through a deep learning approach can enhance children's creativity in early childhood education. The findings demonstrate that the integration of experiential, nature-based learning with deep learning principles creates a meaningful learning environment that supports the development of creativity in a holistic manner. Through direct interaction with natural elements, children are able to actively construct knowledge, explore ideas, and express themselves in diverse and original ways. The research further indicates that creativity development is closely linked to the quality of children's engagement in learning processes. When learning is designed to be meaningful, contextual, and participatory, children show higher levels of curiosity, initiative, and confidence in expressing ideas. This confirms that creativity is not merely an outcome of instructional activities, but emerges from learning experiences that allow autonomy, exploration, and interaction with the environment. In addition, the study highlights the importance of the teacher's role as a facilitator who supports and guides children's learning without limiting their freedom to explore. The successful implementation of the deep learning approach depends on the teacher's ability to create a balanced learning environment that integrates structure and flexibility. Overall, this study concludes that the application of nature exploration activities through a deep learning approach is an effective strategy for enhancing children's creativity. It provides a meaningful contribution to early childhood education by emphasizing the importance of experiential learning, environmental interaction, and learner-centered pedagogy in fostering creative development.

Based on these findings, several practical recommendations can be proposed for early childhood education practitioners, particularly teachers and school principals. Teachers are encouraged to design learning activities that incorporate regular nature exploration as part of classroom practice, while emphasizing active participation, inquiry, and reflection rather than relying solely on structured and teacher-centered instruction. School principals are

recommended to support the implementation of nature-based and deep learning-oriented pedagogies by providing adequate learning facilities, professional development opportunities, and flexible curriculum support that enables teachers to create meaningful experiential learning environments.

For future research, it is recommended that studies be conducted in broader educational settings involving diverse institutional contexts and larger participant groups to enhance the generalizability of findings. Future researchers may also employ mixed-method or longitudinal approaches to examine the long-term impact of nature exploration activities on different dimensions of creativity and child development. In addition, comparative studies exploring variations in teacher facilitation strategies or environmental contexts may provide deeper insights into the factors influencing the effectiveness of deep learning approaches in early childhood education.

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