Al Qodiri: Jurnal Pendidikan, Sosial dan Keagamaan
Volume 24, Issue 2, 567-577.
e_ISSN: 2598-8735
https://al-qodiri.unikhams.ac.id/index.php/alqodiri/index

Exploration of the Application of the Project Based Learning Approach Based on Banana Tree Media in Stimulating Creativity in Early Childhood

Dessy Syofiyanti
Sekolah Tinggi Agama Islam Madinatun Najah Rengat, Riau, Indonesia

Hasnida
Universitas PTIQ Jakarta, Jakarta, Indonesia

Muh. Misbah
Universitas Indraprasta PGRI, Jakarta, Indonesia

Article Info

Article history:

Received: Feb 18, 2026
Revised: May 11, 2026
Accepted: June 02, 2026

Keywords:

Banana Tree Media; Creativity; Early Childhood Education; Natural Materials; Project-Based Learning.

Abstract

Creativity is a fundamental competency in early childhood education because it supports children's ability to generate ideas, solve problems, and express themselves through meaningful learning experiences. However, learning activities in many early childhood classrooms remain predominantly teacher-centered, limiting opportunities for children to explore, experiment, and develop original ideas. This study aimed to explore the implementation of Project-Based Learning (PjBL) utilizing banana tree media and its role in stimulating creativity among children aged 5–6 years. A qualitative descriptive approach was employed involving twelve children and one classroom teacher at TK Ceria Eduloka, Indonesia. Data were collected through classroom observations, semi-structured interviews, and documentation, and were analyzed using the interactive model of data reduction, data display, and conclusion drawing. The findings revealed that project-based activities using banana leaves, stalks, and trunks encouraged children to actively participate in exploration, decision-making, material manipulation, and creative product development. Children demonstrated creativity through fluency in generating ideas, flexibility in using materials, originality in creating products, and elaboration in refining their work. The findings further indicate that banana tree media provide contextual, multisensory, and environmentally relevant learning experiences that enhance children's engagement and creative expression. This study contributes to the growing literature on project-based and nature-based learning by highlighting the educational potential of locally available natural resources in fostering creativity. Practically, the findings offer an accessible and cost-effective strategy for implementing meaningful learning experiences in early childhood education.

To cite this article: Syofiyanti, D., Hasnida, H., & Misbah, M. (2026). Exploring project-based learning using banana tree media to stimulate creativity in early childhood education. *Al Qodiri: Jurnal Pendidikan, Sosial dan Keagamaan, 24*(2), 567–577.

INTRODUCTION

Early childhood education plays a fundamental role in shaping children's cognitive, social, emotional, and creative development during the most critical period of human growth. Contemporary educational discourse increasingly emphasizes that children should not merely acquire basic knowledge but also develop higher-order competencies that enable them to adapt to future challenges. Among these competencies, creativity has become one of the most valued skills because it supports innovation, problem solving, adaptability, and lifelong learning. Interestingly, although creativity is widely recognized as an essential educational outcome, classroom practices in many early childhood settings still prioritize uniform products and teacher-directed activities rather than open-ended exploration. This contradiction creates a significant concern because children's creative potential often emerges through experimentation, imagination, and personal expression. Educational experiences that encourage children to investigate their surroundings and construct knowledge independently are therefore increasingly recommended in early childhood programs (Nurhayati et al., 2024). Likewise, learning environments that provide meaningful opportunities for exploration can foster curiosity, confidence, and active engagement in the learning process (Wahyuni

*** Corresponding author:**
Dessy Syofiyanti, Sekolah Tinggi Agama Islam Madinatun Najah Rengat, Riau, INDONESIA
dessysyofiyanti@gmail.com

et al., 2025). Consequently, understanding effective approaches for nurturing creativity in early childhood remains an important educational priority.

Creativity in early childhood extends beyond the production of artistic works and encompasses the ability to generate ideas, explore alternatives, solve problems, and express original thoughts through various forms of activity. According to Utami and Munandar (2009), creativity involves the capacity to construct new combinations of ideas, experiences, and information in meaningful ways. In educational contexts, creative children tend to demonstrate flexibility in thinking, originality in expression, and confidence in experimenting with different approaches. These characteristics are particularly important because they contribute to the development of independent learners capable of adapting to changing situations. However, many early childhood classrooms continue to rely heavily on predetermined instructions and model-based tasks that limit children's opportunities to make decisions and explore their own ideas. As a result, children frequently focus on reproducing teacher expectations rather than engaging in authentic creative processes. Such conditions may restrict the development of creative thinking during a developmental stage when imagination and curiosity naturally flourish. Therefore, educational practices that provide children with greater autonomy and opportunities for self-expression are urgently needed.

The urgency of promoting creativity is further reinforced by contemporary educational frameworks that emphasize twenty-first-century competencies. Current educational reforms increasingly advocate the development of creativity, communication, collaboration, and critical thinking as foundational skills for future success. These competencies are particularly relevant in early childhood education because they establish the groundwork for subsequent learning experiences and personal development. Maulidah (2021) argues that the integration of 4C skills in early childhood learning is essential for preparing children to participate effectively in modern society. Within the Indonesian Merdeka Curriculum, project-oriented learning experiences are strongly encouraged because they allow children to learn through direct engagement, inquiry, and meaningful interaction with their environment (Aulina & Nurdiana, 2024). Such approaches shift the focus from passive knowledge acquisition to active knowledge construction. Moreover, children who participate in exploratory learning activities are more likely to develop confidence in expressing ideas and solving simple problems. Consequently, educational strategies that simultaneously support creativity and active participation have become increasingly important in contemporary early childhood education.

Despite the growing recognition of creativity as a key educational outcome, empirical evidence suggests that teacher-centered practices remain prevalent in many early childhood classrooms. Children are often expected to imitate predetermined examples rather than explore diverse possibilities and create original products. This tendency may result in learning experiences that appear structured and orderly but provide limited opportunities for independent thinking and innovation. Initial observations conducted at TK Ceria Eduloka revealed that although children showed interest in activities involving natural materials, many still relied heavily on teacher guidance when asked to create their own products. Similar concerns have been identified in previous studies indicating that excessive instructional control may inhibit children's confidence and willingness to experiment. In contrast, learning environments that encourage inquiry, experimentation, and active participation have been associated with greater creative engagement among young learners (Bano et al, 2024; Cremin & Chappell, 2021; Nikmah et al., 2023). These findings highlight the need for instructional approaches that balance guidance with freedom, enabling children to construct their own learning experiences. Therefore, identifying innovative pedagogical strategies that support creativity remains a significant educational challenge.

One instructional approach that has attracted considerable attention in recent years is Project Based Learning (PjBL). This approach positions learners as active participants who investigate problems, explore resources, create products, and communicate their findings through meaningful projects. Within early childhood education, project-based activities can be adapted to children's developmental characteristics and interests while promoting active engagement in the learning process (Amelia & Aisya, 2021; DongJin & Ashari, 2024; Jermstad, 2025). Previous studies consistently demonstrate the effectiveness of PjBL in supporting various aspects of child development. Nikmah et al. (2023) reported that project-based learning increased children's enthusiasm, confidence, and participation in creative activities. Similarly, Cahyaningsih and Harun

(2023) found that PjBL positively influenced critical thinking and creativity among young learners. Additional evidence suggests that project-based activities encourage children to explore ideas, collaborate with peers, and produce meaningful learning outcomes through experiential learning processes. These findings collectively indicate that PjBL provides a promising framework for fostering creativity in early childhood settings.

Beyond instructional approaches, the selection of learning media also plays a critical role in shaping children's creative experiences. Recent studies emphasize the importance of using environmental and nature-based materials because they provide authentic sensory experiences and encourage children to interact directly with real-world objects. Priantika et al. (2024) demonstrated that nature-based Project Based Learning significantly enhanced children's creative thinking abilities. Likewise, Dewi et al. (2025) reported that the integration of loose-parts materials within project activities effectively promoted creativity among children aged five to six years. Other studies have shown that natural materials can stimulate imagination, support fine motor development, and encourage collaborative interaction during learning activities (Waroka et al., 2022; Ariyanti et al., 2025; Trisnawati et al., 2025). These findings suggest that environmental resources offer substantial educational value beyond their accessibility and affordability. Furthermore, natural materials often provide diverse textures, shapes, and forms that can inspire creative exploration. Consequently, integrating nature-based media into project learning appears to be a promising strategy for enhancing children's creative development.

Although the effectiveness of Project Based Learning and nature-based materials has been widely documented, important limitations remain within the existing literature. Most previous studies have examined natural materials broadly, focusing on loose parts, clay, environmental resources, or general nature-based learning experiences (Dewi et al., 2025; Priantika et al., 2024; Trisnawati et al., 2025). Other researchers have concentrated primarily on the pedagogical benefits of PjBL without examining the specific characteristics of individual natural media used within project activities (Amelia & Aisya, 2021; Nikmah et al., 2023; Aulina & Nurdiana, 2024). Furthermore, studies investigating banana tree materials have generally focused on fine motor development rather than creativity enhancement (Waroka et al., 2022). As a result, limited empirical evidence is available regarding how banana tree media can be integrated into project-based learning and how such integration influences different dimensions of creativity among young children. This gap is particularly important because banana trees are widely available in many communities and possess unique characteristics that may support creative exploration. Therefore, a more focused investigation is needed to understand the educational potential of banana tree media within project-based learning contexts.

Addressing this gap, the present study aims to explore the implementation of Project Based Learning based on banana tree media in stimulating creativity among children aged five to six years at TK Ceria Eduloka. Specifically, the study investigates how project activities utilizing banana leaves, stalks, and trunks are implemented and how these activities encourage children's creative expression. The study contributes theoretically by expanding the literature on Project Based Learning, creativity development, and nature-based learning within early childhood education. It also contributes practically by providing educators with an alternative model of low-cost, contextual, and environmentally relevant learning media that can be integrated into classroom projects. By examining children's experiences through observation, interviews, and documentation, the study offers a deeper understanding of how natural materials can support creative engagement in authentic educational settings. Furthermore, the findings are expected to provide evidence-based recommendations for teachers seeking innovative ways to implement child-centered learning. Ultimately, this research seeks to demonstrate that meaningful project experiences using locally available natural resources can become powerful tools for fostering creativity in early childhood education.

METHOD

Research Design

This study employed a qualitative research approach using a descriptive design to explore the implementation of Project-Based Learning (PjBL) utilizing banana tree media in stimulating

creativity among early childhood learners. A qualitative descriptive design was selected because the primary objective of the study was not to measure causal relationships or test hypotheses but to gain an in-depth understanding of how project-based activities were implemented and how children demonstrated creative behaviors throughout the learning process. This approach enabled the researchers to examine naturally occurring classroom interactions, children's responses to learning activities, and the pedagogical strategies employed by teachers within authentic educational settings. Qualitative inquiry is particularly appropriate for early childhood research because it allows researchers to capture rich descriptions of children's behaviors, expressions, and experiences that may not be adequately represented through quantitative measures. Furthermore, the design facilitated a holistic examination of the relationships among learning activities, environmental media, teacher facilitation, and children's creative engagement. Through direct observation, interviews, and documentation, the study generated contextualized insights into the educational value of banana tree media within project-based learning environments.

Research Setting and Period

The study was conducted at TK Ceria Eduloka, an early childhood education institution located in Indonesia. The school was selected because it had implemented learning activities that integrated natural materials from the surrounding environment and demonstrated openness to innovative pedagogical approaches. The research focused specifically on Group B children, whose ages ranged from five to six years. Data collection was carried out during the second semester of the 2025/2026 academic year over a period of approximately four weeks. During this period, a series of project-based learning activities utilizing banana leaves, banana stalks, and banana trunks were implemented as part of regular classroom instruction. The classroom environment provided a suitable context for observing children's interactions with natural materials, their participation in project activities, and their expressions of creativity in authentic learning situations.

Participants and Sampling Procedures

The participants consisted of twelve children enrolled in Group B and one classroom teacher who was directly responsible for planning and implementing the project-based learning activities. Participants were selected using purposive sampling because they possessed specific characteristics relevant to the objectives of the study. The inclusion criteria for children were enrollment in Group B, regular attendance during the research period, active participation in project activities, and parental permission to participate in the study. The classroom teacher was selected because of direct involvement in designing and facilitating the learning activities examined in this research. Children with prolonged absences during the implementation period were excluded from the analysis to ensure the completeness of observational data. The relatively small number of participants is consistent with qualitative research principles, which emphasize depth of understanding rather than statistical representativeness. This sampling strategy enabled the researchers to obtain detailed information regarding the implementation process and the manifestation of creativity during project-based learning activities.

Research Instruments

Data were collected using multiple qualitative instruments, including observation sheets, semi-structured interview guides, and documentation records. Observation served as the primary instrument for examining children's behaviors during project activities, particularly those related to creativity. The observation framework was developed based on commonly recognized dimensions of creativity, namely fluency, flexibility, originality, and elaboration. Fluency referred to children's ability to generate multiple ideas, flexibility reflected variations in problem-solving approaches, originality indicated the emergence of unique ideas or products, and elaboration referred to the addition of details and refinement of creative work. Semi-structured interviews were conducted with the classroom teacher to obtain information regarding instructional planning, facilitation strategies, children's responses, and perceived changes throughout the project activities. Documentation included photographs of learning activities, children's project products, field notes, and relevant classroom records. The use of multiple instruments enabled comprehensive data collection and facilitated the triangulation process.

Instrument Validity and Trustworthiness

The trustworthiness of the research instruments and findings was established through several qualitative validation procedures. Content validity of the observation and interview protocols was reviewed by two experts in early childhood education and qualitative research methodology to ensure alignment with the research objectives and theoretical framework. Suggestions provided during the review process were incorporated into the final instruments before data collection commenced. Data credibility was enhanced through prolonged engagement in the research setting and continuous observation throughout the project implementation period. Source triangulation was conducted by comparing information obtained from children's activities, teacher interviews, and documentary evidence. Method triangulation was also employed by cross-checking findings derived from observations, interviews, and documentation. To improve dependability, the researchers maintained detailed field notes and analytic memos throughout the study. Confirmability was ensured through systematic documentation of research procedures and transparent reporting of analytical decisions.

Data Collection Procedures

The data collection process was conducted in several sequential stages. The first stage involved obtaining institutional permission, securing parental consent, preparing research instruments, and coordinating with the classroom teacher regarding the implementation schedule. During the second stage, the researchers conducted preliminary observations to familiarize themselves with the classroom environment and establish rapport with participants. The third stage involved the implementation of Project-Based Learning activities utilizing banana tree media. The learning process began with the introduction of banana tree materials, including leaves, stalks, and trunks, followed by guided discussions regarding their characteristics and potential uses. Children then engaged in exploratory activities, during which they examined, manipulated, and selected materials according to their interests. Subsequently, they created individual or collaborative products using the available materials through activities such as stamping, arranging patterns, threading, and collage construction. The final stage involved children presenting and explaining their creations, after which interviews with the teacher and documentation of children's products were completed. All observations were recorded systematically throughout the implementation process.

Data Analysis

Data were analyzed using the interactive qualitative analysis model proposed by Miles, Huberman, and Saldaña. The analysis process began with data reduction, in which observation records, interview transcripts, field notes, and documentation were reviewed, organized, and selected according to their relevance to the research focus. Open coding procedures were subsequently employed to identify meaningful units of information related to project implementation and indicators of creativity. Similar codes were then grouped into broader categories representing patterns of behavior, instructional practices, and creative responses. The categorized data were displayed through descriptive matrices and narrative summaries to facilitate interpretation. The final stage involved drawing conclusions and verifying emerging themes through continuous comparison across data sources. Throughout the analysis process, the researchers repeatedly revisited the data to ensure consistency, coherence, and accuracy of interpretation. The analysis focused particularly on understanding how project-based activities using banana tree media contributed to the emergence of fluency, flexibility, originality, and elaboration among participating children.

Ethical Considerations

This study adhered to established ethical principles governing educational research involving young children. Prior to data collection, permission was obtained from the school administration, and informed consent was secured from parents or guardians of participating children. Participation was voluntary, and participants were informed that they could withdraw from the study at any stage without negative consequences. To protect confidentiality, pseudonyms and identification codes were used in all research records and reports. No personally identifiable information was disclosed during data analysis or publication. Photographic documentation was used exclusively for academic purposes and was stored securely by the research team. The researchers also ensured that all learning activities remained developmentally appropriate, safe, and consistent with regular

educational practices. Throughout the study, the dignity, well-being, and rights of all participants were respected in accordance with accepted standards of educational research ethics.

RESULTS AND DISCUSSION

Implementation of Project Based Learning Using Banana Tree Media

The results of the study showed that the implementation of Project Based Learning using banana tree media took place through activities closely related to children's experiences. The teacher began the learning activities by bringing parts of a banana tree into the classroom, such as leaves, stalks, and pieces of banana trunks. Children were invited to observe the colors, shapes, textures, and functions of each part. This initial activity made children more interested because the materials used could be touched and observed directly.

At the project introduction stage, the teacher did not immediately provide examples of works that had to be imitated. Instead, the teacher asked simple questions, such as what objects could be made from banana stalks, which parts could be used for stamping, and how leaves could be arranged into certain shapes. These open-ended questions helped children begin expressing ideas. Some children mentioned wanting to create flowers, fences, boats, animals, and free-form patterns. These responses showed that children had started to become involved in a simple planning process.

The material exploration stage became the most interesting part for the children. They held the banana stalks, compared the sizes of the pieces, tried pressing banana trunks onto paper, and observed the patterns that appeared. Children also attempted to arrange leaves into certain shapes. The teacher accompanied the process by providing assistance when necessary, especially in using tools that required caution. However, children were still given the freedom to choose materials that suited their creative ideas.

The stage of creating works showed variations in children's working methods. Some children used banana stalks as stamping tools, some combined leaf pieces with colored paper, while others arranged stalks into repetitive patterns. The children's works were not entirely the same because they had different choices of materials and working methods. This activity provided opportunities for children to develop ideas without depending too much on teacher examples.

Table 1. Stages of Implementing Project Based Learning Based on Banana Tree Media

Stage	Teacher Activities	Children's Activities	Main Findings
Project Introduction	Invited children to observe parts of the banana tree and stimulated discussion through questions.	Mentioned ideas for creations and selected materials they found interesting.	Children began to confidently express initial ideas.
Material Exploration	Provided banana leaves, stalks, and trunks safely for learning activities.	Touched, compared, smelled, and experimented with the materials.	Children actively explored textures and material patterns.
Creating Works	Guided children without directing or dictating the final results.	Stamped, arranged, cut with assistance, and combined materials.	Children's creations became more varied.
Sharing Results	Gave children opportunities to explain their creations.	Described the materials, colors, shapes, and reasons for making their works.	Children became more confident in explaining their processes.

Source: Results of observations, interviews, and research documentation.

Stimulation of Children's Creativity

Children's creativity was reflected in the way they generated ideas, selected materials, and developed their creations. Children who initially tended to wait for examples began to show confidence in trying their own patterns. Some children used banana stalks to create flower shapes, while others used pieces of banana trunks to print circular patterns. These differences in working methods indicated the emergence of varied ideas during the project process.

The indicator of fluency was seen when children were able to mention more than one idea for their creations. Children not only mentioned a single form but also began connecting the materials with other objects they recognized. The indicator of flexibility appeared when children changed the way they used the materials. For example, banana stalks were not only used for stamping but were also attached as parts of patterns. The indicator of originality emerged when children created forms

that differed from those of their peers. The indicator of elaboration was visible when children added details to their works, such as lines, additional colors, or more organized leaf arrangements.

Interviews with the teacher showed that children were more enthusiastic when the media used came from the surrounding environment. The teacher explained that banana tree materials encouraged children to ask more questions and experiment more actively. Children also became more engaged in discussions with their peers because each child had different material choices. This condition demonstrated that concrete media can help children participate in project activities more naturally.

Table 2. Findings of Children's Creativity in Project Activities

Creativity Indicator	Forms of Children's Behavior	Meaning of the Findings
Fluency	Children mentioned several ideas for creations using banana tree materials.	Children began generating many ideas.
Flexibility	Children used materials in different ways, such as stamping, attaching, and arranging.	Children were able to change their working strategies.
Originality	Children created forms that were different from the examples or their peers' works.	Children showed confidence in choosing their own ideas.
Elaboration	Children added colors, lines, and material arrangements to make their works more complete.	Children began to elaborate and refine their creations.

Source: Results of observations, interviews, and research documentation.

The Teacher's Role in Project Activities

The teacher played an important role as a facilitator. In these activities, the teacher not only provided the materials but also organized the classroom environment so that children could experiment safely. The teacher briefly demonstrated how to use the materials and then gave children opportunities to choose their own working methods. This type of guidance helped children feel unafraid of making mistakes when their creations differed from those of their peers.

The teacher also helped children develop language skills when explaining their creations. When children were not yet able to express their ideas clearly, the teacher provided guiding questions, such as which part they liked the most, why they chose certain materials, and how they created specific patterns. These questions helped children recall the working process and organize their explanations. During the sharing session, some children began to mention the materials they used and the reasons for choosing certain forms.

Documentation of the children's creations showed that children became more involved when the teacher provided guided freedom. This freedom did not mean that children were left without direction, but rather that they were given opportunities to make simple decisions. The teacher still maintained the flow of activities, ensured that materials were used safely, and assisted children who experienced technical difficulties.

Discussion

DISCUSSION

The findings indicate that the implementation of Project-Based Learning (PjBL) supported by banana tree media created a learning environment that encouraged active engagement and meaningful participation among young children. This result suggests that creativity in early childhood is not merely an individual trait but is strongly influenced by the quality of learning experiences provided in the classroom. From a constructivist perspective, children develop knowledge through direct interaction with objects and environments rather than through passive reception of information. The project activities observed in this study enabled children to investigate, manipulate, and transform natural materials into personally meaningful products, thereby facilitating active knowledge construction. These findings are consistent with previous studies demonstrating that project-based learning promotes experiential learning and child-centered participation (Amelia & Aisya, 2021; Nikmah et al., 2023; Aulina & Nurdiana, 2024). However, the present study extends this body of knowledge by showing that contextual natural resources can function not only as instructional materials but also as catalysts for creative exploration. The

implication is that creativity emerges more effectively when children are positioned as decision-makers rather than passive recipients of teacher-directed activities.

A particularly important finding concerns the role of banana tree media in enhancing children's sensory and exploratory experiences. The educational significance of this finding lies in the fact that creativity develops through interaction with diverse stimuli that invite observation, experimentation, and reinterpretation. The texture, shape, flexibility, and physical characteristics of banana leaves, stalks, and trunks provided children with multiple opportunities to explore possibilities beyond predetermined outcomes. This observation aligns with theories of experiential learning, which emphasize that knowledge is generated through direct engagement with concrete experiences. Previous studies involving natural materials and loose-parts learning similarly reported positive effects on creativity and exploration (Ariyanti et al., 2025; Dewi et al., 2025; Trisnawati et al., 2025). Nevertheless, most earlier studies treated natural materials as a broad category without examining the pedagogical potential of specific environmental resources. The present findings therefore contribute a more nuanced understanding by demonstrating how banana tree components possess unique affordances that support creative experimentation. This perspective expands current discussions regarding nature-based learning by highlighting the educational value embedded in locally available ecological resources.

Another significant finding is the emergence of children's autonomy during project activities. The observed increase in children's willingness to make choices, modify materials, and develop original products suggests that creativity is closely associated with opportunities for self-directed action. Self-determination theory proposes that autonomy functions as a fundamental psychological need that enhances intrinsic motivation and engagement. Within the project activities, children were encouraged to select materials, determine construction methods, and explain the rationale behind their creations. Such opportunities likely strengthened their sense of ownership over the learning process, which in turn stimulated creative expression. These findings correspond with the conclusions of Nikmah et al. (2023), Priantika et al. (2024), and Dewi et al. (2025), who reported that project-based learning increases children's confidence and active participation. However, this study provides additional evidence that autonomy is not merely an outcome of project-based learning but may represent one of the mechanisms through which creativity develops. Consequently, the study contributes conceptually by suggesting a stronger causal relationship between learner autonomy and creative behavior in early childhood contexts.

The analysis of creativity indicators further revealed that project activities stimulated fluency, flexibility, originality, and elaboration simultaneously rather than independently. This finding is theoretically important because creativity is often conceptualized as a multidimensional construct involving interconnected cognitive processes. Children generated multiple ideas, experimented with alternative uses of materials, produced unique products, and refined their creations through additional details. Such patterns support contemporary theories of creativity that emphasize the interaction between divergent thinking and contextual learning experiences. Similar outcomes have been reported in studies investigating project-based learning and creative thinking among young learners (Palapessy et al., 2023; Pangestika et al., 2025; Yuliantina & Yuliati, 2023). Nevertheless, the current findings suggest that the development of these creativity dimensions occurs most effectively when children encounter open-ended materials that do not prescribe a single solution pathway. This interpretation expands previous research by demonstrating that material characteristics and instructional design interact to influence the manifestation of creative thinking. Therefore, creativity should be understood not only as an internal cognitive capacity but also as a product of supportive environmental conditions.

The findings also highlight the critical role of teachers as facilitators rather than directors of learning. While the children enjoyed considerable freedom during project implementation, teacher guidance remained essential in structuring experiences, maintaining safety, and extending children's thinking through purposeful questioning. This observation supports sociocultural theories that view learning as a socially mediated process in which adults scaffold children's development within their zone of proximal development. Rather than transmitting knowledge directly, the teacher created opportunities for inquiry while encouraging reflection and communication. Similar patterns have been identified by Handayani and Sinaga (2022), who emphasized that critical and creative thinking develop more effectively when teachers provide challenging yet supportive learning environments.

However, the present study demonstrates that facilitation becomes particularly important when children interact with unstructured natural materials, which require greater flexibility and adaptive guidance than conventional classroom resources. This finding suggests that the effectiveness of project-based learning depends not only on the learning model itself but also on the pedagogical competence of teachers in managing open-ended learning experiences.

An additional contribution of this study concerns the social dimension of creativity. The project activities encouraged children to observe peers' work, exchange ideas, discuss materials, and adapt strategies based on shared experiences. These interactions indicate that creativity develops through collaborative processes as well as individual exploration. Sociocultural perspectives argue that creative thinking is shaped through participation in social practices where ideas are negotiated, refined, and reconstructed. The findings support previous studies showing that project-based learning contributes to social development and collaborative learning among young children (Ananda et al., 2021; Lesyani et al., 2024). Nevertheless, this study suggests that collaboration does not diminish originality; instead, interaction with peers may stimulate new perspectives that enrich individual creative expression. Such an interpretation challenges traditional assumptions that creativity is solely an individual phenomenon. Consequently, the study reinforces contemporary views that regard creativity as both a personal and socially situated process.

From a broader educational perspective, the findings provide empirical support for the implementation of the Merdeka Curriculum in early childhood education. The curriculum emphasizes meaningful learning, learner agency, contextual experiences, and project-oriented activities, all of which were evident throughout the implementation process. The success of banana tree-based projects illustrates how local environmental resources can be integrated into curriculum implementation without requiring expensive educational materials. This finding is consistent with previous studies reporting positive outcomes of project-based learning within the Merdeka Curriculum framework (Aulina & Nurdiana, 2024; Rasmani et al., 2023; Sari et al., 2023). However, the present study adds a contextual dimension by demonstrating that curriculum innovation can emerge from local ecological knowledge rather than relying exclusively on externally developed educational resources. This perspective contributes to ongoing international discussions regarding sustainability, contextualized learning, and culturally responsive education. Accordingly, the study offers practical implications for educators seeking cost-effective and environmentally relevant approaches to fostering creativity.

Despite its contributions, the findings should be interpreted within the context of several limitations. The study involved a relatively small number of participants from a single institution, which limits the transferability of findings to other educational contexts. Furthermore, the qualitative design focused on understanding processes rather than measuring the magnitude of creativity development. Alternative explanations may also exist, including the novelty effect of using unfamiliar materials or the influence of teacher enthusiasm during project implementation. Nevertheless, the triangulation of observations, interviews, and documentation strengthens confidence in the credibility of the findings. More importantly, the study fills a gap in the literature by demonstrating how a specific natural resource—banana tree media—can function as a pedagogical tool within project-based learning environments. By positioning local environmental materials as active contributors to creativity development, the research extends existing theoretical discussions on nature-based learning and offers a new perspective within the global literature on early childhood creativity. Future research employing longitudinal or experimental designs may further examine the mechanisms through which contextual natural resources influence creative development over time.

CONCLUSION

This study confirms that Project-Based Learning (PjBL) utilizing banana tree media can effectively stimulate creativity among children aged 5–6 years. The findings indicate that children became more actively involved in exploring materials, generating ideas, making decisions, and presenting their creations throughout the learning process. Creativity was reflected in the development of fluency, flexibility, originality, and elaboration, demonstrating that project-based activities supported multiple dimensions of creative thinking simultaneously. The use of banana leaves, stalks, and trunks provided authentic and multisensory learning experiences that encouraged

experimentation and creative expression. These results support constructivist perspectives that emphasize learning through direct interaction with meaningful environmental resources. The findings also highlight the importance of teacher facilitation in creating a balance between guidance and child autonomy during project activities. Furthermore, the study suggests that locally available natural materials can serve as effective educational resources without requiring expensive learning media. From a theoretical standpoint, the research extends current understanding of how contextual environmental materials can enhance creativity within project-based learning environments. Practically, the findings offer an alternative strategy for early childhood educators seeking to implement meaningful, affordable, and environmentally relevant learning experiences. Although limited to a single educational setting, this study provides valuable evidence that integrating natural resources into project-based learning can enrich creativity development in early childhood education.

AUTHOR CONTRIBUTIONS STATEMENT

DS conceptualized the study, designed the research framework, conducted data collection, performed data analysis, and prepared the original manuscript draft. **H** contributed to the development of the theoretical framework, supervised the research process, validated the findings, and critically reviewed and revised the manuscript. **MM** participated in data interpretation, contributed to methodological refinement, reviewed the manuscript for intellectual content, and assisted in the final editing process.

REFERENCES

Amelia, N., & Aisya, N. (2021). Model pembelajaran berbasis proyek (Project Based Learning) dan penerapannya pada anak usia dini di TKIT Al-Farabi. *Buhuts Al-Athfal: Jurnal Pendidikan dan Anak Usia Dini, 1*(2), 181–199. https://doi.org/10.24952/alathfal.v1i2.3912

Ananda, F. S., Rusdiyani, I., & Khosiah, S. (2021). Pengaruh metode pembelajaran proyek terhadap kemampuan sosial anak usia 5–6 tahun. *JPP PAUD FKIP Untirta, 8*(2), 135–144.

Ariyanti, N. L. A., Durrotunnisa, D., & Fitriana, F. (2025). Pengembangan kreativitas anak usia dini melalui kegiatan berbasis menggunakan bahan alam. *Murhum: Jurnal Pendidikan Anak Usia Dini, 6*(1), 740–754. https://doi.org/10.37985/murhum.v6i1.1302

Aulina, C. N., & Nurdiana, A. A. (2024). Penerapan Project Based Learning dalam implementasi Kurikulum Merdeka di taman kanak-kanak. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 8*(5), 1137–1150. https://doi.org/10.31004/obsesi.v8i5.6058

Bano, S., Atif, K., & Mehdi, S. A. (2024). Systematic review: Potential effectiveness of educational robotics for 21st century skills development in young learners. *Education and information technologies, 29*(9), 11135-11153. https://doi.org/10.1007/s10639-023-12233-2

Cremin, T., & Chappell, K. (2021). Creative pedagogies: A systematic review. *Research Papers in Education, 36*(3), 299-331. https://doi.org/10.1080/02671522.2019.167775z

Dewi, N. K., Larassati, F. C., Rahma, H. A., Khatimah, H., Maharani, I. W., & Putri K., K. A. (2025). Penerapan Project Based Learning untuk meningkatkan kreativitas peserta didik kelompok B1 di TK Desa Gentan. *Indonesian Journal of Early Childhood: Jurnal Dunia Anak Usia Dini, 7*(1), 182–193. https://doi.org/10.35473/ijec.v7i1.2877

DongJin, S., & Ashari, Z. B. M. (2024). Project-based learning in early science education: A systematic review. *International Journal of Academic Research in Progressive Education and Development, 13*(2), 706–721. https://doi.org/10.6007/IJARPED/v13-i2/21365

Handayani, A., & Sinaga, S. I. (2022). Penerapan model Project Based Learning dalam meningkatkan kemampuan berpikir kritis anak usia dini. *PAUD Lectura: Jurnal Pendidikan Anak Usia Dini, 6*(1), 146–154. https://doi.org/10.31849/paud-lectura.v6i1.10670

Jermstad, L. K. (2025). Building history: Project-based pedagogy for cultural heritage in early childhood education. *Journal of Early Childhood Education Research, 14*(2), 1–23. https://doi.org/10.58955/jecer.156299

Lesyani, Z., Budiyarti, E., & Priyanti, N. (2024). Implementation of Project-Based Learning model in stimulating language development of early childhood. *Journal of Childhood Development, 4*(2). https://doi.org/10.25217/jcd.v4i2.4692

Maulidah, E. (2021). Keterampilan 4C dalam pembelajaran untuk anak usia dini. *Childhood Education: Jurnal Pendidikan Anak Usia Dini, 2*(1), 52–68. https://doi.org/10.53515/cji.2021.2.1.52-68

Nikmah, A., Shofwan, I., & Loretha, A. F. (2023). Implementasi metode Project Based Learning untuk kreativitas pada anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 7*(4), 4857–4870. https://doi.org/10.31004/obsesi.v7i4.4999

Nurhayati, N., Latif, M., & Anwar, K. (2024). The influence of organizational culture, career expectations, and leadership beliefs on achievement motivation in integrated Islamic primary schools. *Dinasti International Journal of Education Management and Social Science, 5*(5), 1150–1168. https://doi.org/10.31933/dijemss.v5i5

Nurhayati, N., & Rosadi, K. I. (2022). Determinasi manajemen pendidikan Islam: Sistem pendidikan, pengelolaan pendidikan dan tenaga pendidikan Islam. *Jurnal Manajemen Pendidikan dan Ilmu Sosial, 3*(1), 451–464. https://doi.org/10.38035/jmpis.v3i1

Palapessy, X., Ningrum, M. A., Adhe, K. R., & Widayanti, M. D. (2023). Analisis Project Based Learning (PjBL) untuk kemampuan berpikir kreatif anak usia 5–6 tahun. *PENDIPA Journal of Science Education, 7*(3), 431–438. https://doi.org/10.33369/pendipa.7.3.431-438

Pangestika, M. P., Sa'ida, N., Suweleh, W., & Wahono, W. (2025). Pengaruh Project Based Learning berbasis eksplorasi terhadap kemampuan kreativitas anak usia 5–6 tahun di TK Aisyiyah 39 Surabaya. *Inteligensi: Jurnal Ilmu Pendidikan, 7*(2). https://doi.org/10.33366/ilg.v7i2.6152

Priantika, D., Hasanah, H., & Pradana, P. H. (2024). Pengaruh model pembelajaran Project Based Learning berbasis alam terhadap creative thinking anak usia dini. *Murhum: Jurnal Pendidikan Anak Usia Dini, 5*(1), 558–571. https://doi.org/10.37985/murhum.v5i1.605

Putri, S. U., & Taqiudin, A. A. (2021). STEAM-PBL: Strategi pengembangan kemampuan memecahkan masalah anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 6*(2), 856–867. https://doi.org/10.31004/obsesi.v6i2.1270

Rasmani, U. E. E., Wahyuningsih, S., Winarji, B., Jumiatmoko, J., Zuhro, N. S., Fitrianingtyas, A., Agustina, P., & Widyastuti, Y. K. W. (2023). Manajemen pembelajaran proyek pada implementasi Kurikulum Merdeka di lembaga PAUD. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 7*(3), 3159–3168. https://doi.org/10.31004/obsesi.v7i3.4633

Sari, A. M., Suryana, D., Bentri, A., & Ridwan, R. (2023). Efektivitas model Project Based Learning (PjBL) dalam implementasi Kurikulum Merdeka di taman kanak-kanak. *Jurnal Basicedu, 7*(1), 432–440. https://doi.org/10.31004/basicedu.v7i1.4390

Trisnawati, R. D., Bayu, G. W., & Asril, M. (2025). Project-Based Learning berbantukan media tanah liat untuk mengembangkan kreativitas dan keterampilan motorik halus anak usia dini. *Murhum: Jurnal Pendidikan Anak Usia Dini, 6*(2), 918–931. https://doi.org/10.37985/murhum.v6i2.1607

Utami, M., & Munandar, S. C. U. (2009). *Pengembangan kreativitas anak berbakat*. Rineka Cipta.

Wahyuni, S., Susanti, S., Darfin, S. A., & Rimadani, N. (2025). Aspek-aspek kunci dalam perkembangan anak pada masa usia dini. *Jurnal Pendidikan Anak Usia Dini, 1*(1), 1–12.

Waroka, L., Darmiyanti, A., & Riana, N. (2022). Kegiatan meronce pelepah pisang untuk menstimulus motorik halus anak usia dini. *Edukids, 19*(1), 41–50. https://doi.org/10.17509/edukids.v19i1.37601

Yuliantina, I., & Yuliati, D. A. T. (2023). Model pembelajaran berbasis projek dalam meningkatkan kreativitas anak usia dini. *JIIP: Jurnal Ilmiah Ilmu Pendidikan, 6*(11), 9143–9148. https://doi.org/10.54371/jiip.v6i11.2934