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Developing Children's Fine Motor Skills Through Nature-Based Eco-Art Projects Integrating Project-Based Learning and Demonstration Methods

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ABSTRACT

This study addresses the limited fine motor skills of kindergarten children, particularly in cutting along patterns and accurately attaching materials, alongside insufficiently varied learning activities. It aims to describe teacher and children's activities and examine improvements in children's fine motor development through nature-based Eco-Art projects integrating Project-Based Learning (PjBL) and demonstration methods. This classroom action research was conducted in two cycles comprising four meetings involving 11 children (6 boys and 5 girls) in Group B at Madinaturramlah Islamic Kindergarten, Banjarmasin. Data were collected through observation and documentation and analyzed using qualitative and quantitative approaches. The findings revealed progressive improvements in teacher activities (96%), children's participation (92%), and fine motor development, which achieved the "Very Well Developed" category. These findings indicate that integrating nature-based Eco-Art projects with PjBL and demonstration methods can

support children's fine motor development, particularly their cutting and pasting skills, while encouraging active participation in meaningful learning experiences.

Introduction

Fine motor development is a fundamental aspect of early childhood education, involving the coordination of small muscles, particularly in the fingers and hands, to perform precise movements. These skills support children's independence and participation in daily activities requiring hand–eye coordination (Suryadin & Wahyuningsih, 2023; Norlatifah & Novitawati, 2022; Maududi & Suriani, 2024). Cutting and pasting activities are particularly beneficial for strengthening fine motor coordination, accuracy, and finger control through meaningful, hands-on experiences (Widayati et al., 2021; Ernawati, 2023). According to Indonesia's Ministry of Education and Culture Regulation No. 137 of 2014, children aged 5–6 years are expected to demonstrate the ability to cut along patterns and accurately paste pictures.

However, preliminary observations involving 11 children in Group B at Madinaturramlah Islamic Kindergarten, Banjarmasin, revealed that only three children (27.27%) achieved the expected developmental level, while three (27.27%) were beginning to develop and five (45.46%) had not yet demonstrated the targeted skills. These difficulties were associated with limited instructional variation, excessive reliance on worksheets, and insufficient opportunities for experiential learning. Consequently, more engaging and developmentally appropriate

learning activities are needed to strengthen children's fine motor abilities.

Nature-based Eco-Art projects offer an alternative by integrating artistic creativity, environmental awareness, and direct manipulation of natural materials. Through activities involving dried leaves, corn husks, seeds, peanut shells, and tree bark, children can develop their fine motor skills while exploring natural resources creatively (Nadhifa, 2023; Citra & Wirman, 2024; Sarmita et al., 2025; Asmara & Wijayanto, 2026). Integrating these activities with Project-Based Learning (PjBL) encourages active participation, exploration, and meaningful learning experiences (Puspitasari & Baqi, 2022; Norhasan & Wahyudi, 2025). Meanwhile, demonstration methods provide explicit guidance on essential techniques, including cutting, applying glue, and arranging materials accurately (Ilmawati & Setyowati, 2023; Aulia & Aslamiah, 2025).

Previous studies have demonstrated the potential of various instructional approaches to enhance children's fine motor development. Norlatifah and Novitawati (2022) reported improvements in children's pasting skills through Explicit Instruction, drilling, and mosaic activities. Similarly, Ababilayka and Suriansyah (2023) found that combining PjBL, demonstrations, and origami supported fine motor development through folding and pasting. Niqo and Wahyudi (2024) demonstrated improvements in cutting skills through PjBL and demonstrations using

recycled materials. Ariana and Novitawati (2023) also highlighted the effectiveness of combining PjBL and Direct Instruction in mosaic activities to strengthen children's hand control. Furthermore, Aulia and Aslamiah (2025) reported that nature-based PjBL activities supported fine motor development, emphasizing the educational potential of natural materials.

More closely related studies by Yuwinda et al. (2025) examined the integration of PjBL, Direct Instruction, and natural materials in cutting and pasting activities, reporting improvements in teacher performance, children's participation, and fine motor development. Similarly, Irwan and Aulina (2025) highlighted the benefits of nature-based collage activities for developing children's cutting, tearing, pasting, and material-arrangement skills. Collectively, these findings suggest that project-based activities, appropriate instructional guidance, and concrete learning materials can support fine motor development. However, the reviewed studies have not specifically examined the integration of nature-based Eco-Art projects, PjBL, and demonstration methods within a unified instructional approach focused on cutting and pasting skills.

Addressing this gap, the present study integrates nature-based Eco-Art projects with PjBL and demonstration methods to provide structured, creative, and environmentally meaningful learning experiences. Its novelty lies in combining these three instructional

components to support children's fine motor development through cutting and pasting activities using natural materials. Accordingly, this study aims to describe teacher activities, examine children's participation, and analyze improvements in fine motor development among Group B children at Madinaturramlah Islamic Kindergarten, Banjarmasin.

Methods

This study employed a Classroom Action Research (CAR) design to improve children's fine motor skills, particularly cutting and pasting, through nature-based Eco-Art projects integrating Project-Based Learning (PjBL) and demonstration methods. The research followed four recurring stages: planning, action implementation, observation, and reflection (Pahleviannur et al., 2022; Permata & Rakhmawati, 2022). It was conducted at Madinaturramlah Islamic Kindergarten, Banjarmasin, involving 11 Group B children, comprising six boys and five girls. The intervention consisted of two cycles conducted over four meetings, with two meetings in each cycle.

During the planning stage, the researcher prepared instructional materials, observation instruments, and natural resources, including peanut shells, corn husks, dried banana leaves, seeds, and tree bark. The implementation stage incorporated PjBL activities in which teachers introduced project objectives, demonstrated cutting and pasting techniques, and guided children in creating Eco-Art products. Children

participated directly in cutting along patterns, applying glue, and arranging natural materials. Observations were conducted throughout the learning activities, while reflections after each meeting informed instructional improvements in subsequent sessions.

Data were collected through observation and documentation. Structured observation sheets assessed three components: teacher activities, children's participation, and fine motor development. Teacher performance was evaluated based on instructional delivery, demonstrations, guidance, and reflection. Children's activities were assessed through engagement, responsiveness, independence, and project completion, while fine motor development was evaluated through their ability to cut along patterns and paste materials accurately. Documentation, including photographs and children's completed Eco-Art projects, provided supporting evidence of the learning process.

Data were analyzed using qualitative descriptive and quantitative percentage analyses. Qualitative analysis examined instructional implementation, classroom interactions, and improvements across cycles, while quantitative analysis measured changes in teacher activities, children's participation, and fine motor development. The findings were compared across meetings and cycles to evaluate intervention outcomes. The study established an achievement threshold of 82%–100% for teacher activities (Very Good), children's participation (All Children Active), and fine motor development (Very Well

Developed).

Result and Discussions

This classroom action research was conducted over four meetings to examine the development of children's fine motor skills through nature-based Eco-Art projects integrating Project-Based Learning (PjBL) and demonstration methods. The findings focused on three indicators: teacher activities, children's participation, and fine motor development.

Table 1. Teacher Activity Across Four Meetings

Meeting	Percentage	Category
1	63%	Fairly Good
2	71%	Good
3	88%	Very Good
4	96%	Very Good

Teacher activities improved consistently from 63% in the first meeting to 96% in the fourth, exceeding the established success indicator. This improvement reflected the teacher's continuous instructional adjustments through reflection, particularly in delivering demonstrations, facilitating children's independence, providing guidance, and evaluating learning activities. These findings are consistent with Salsabila and Novitawati (2021), who emphasized the importance of effective instructional practices in supporting children's learning participation.

Table 2. Children's Participation Across Four Meetings

Meeting	Percentage	Category
1	46%	Few Children Active
2	61%	Few Children Active
3	74%	Most Children Active
4	92%	All Children Active

Figure 1. Children's Activities



Children's participation increased from 46% to 92% across the four meetings. Initially, several children demonstrated limited engagement, particularly in responding to instructions and independently completing cutting and pasting activities. However, their participation gradually improved as they became more familiar with project procedures and received appropriate instructional support. By the fourth meeting, children's activities had achieved the established success criterion.

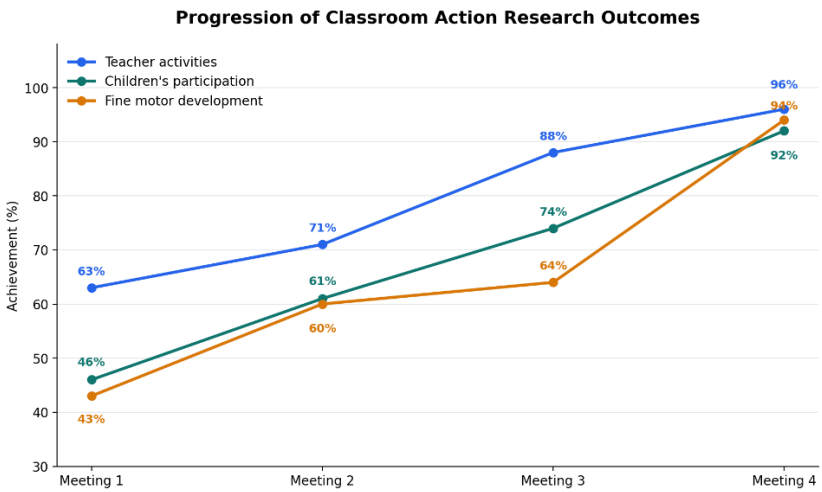
Table 3. Children's Fine Motor Development Across Four Meetings

Meeting	Percentage	Category
1	43%	Not Yet Developed

2	60%	Beginning to Develop
3	64%	Developing as Expected
4	94%	Very Well Developed

Children's fine motor development improved progressively from 43% in the first meeting to 94% in the fourth. Improvements were observed in their ability to cut along patterns, apply glue appropriately, arrange natural materials, and complete Eco-Art projects with greater independence. Supporting information from the classroom teacher indicated that direct demonstrations helped children understand activity procedures and become more confident in completing their projects.

Figure 2. Progression of Teacher Activities, Children's Participation, and Fine Motor Development Across Four Meetings.



Discussion

The findings demonstrate consistent improvements in teacher

activities, children's participation, and fine motor development following the implementation of nature-based Eco-Art projects. The improvement in teacher performance suggests that systematic reflection, instructional guidance, and appropriate learning materials contributed to more effective classroom implementation. This supports previous findings emphasizing teachers' roles in facilitating meaningful early childhood learning experiences (Fatimah et al., 2021; Yusida et al., 2023; Novitawati et al., 2022).

The increase in children's participation from 46% to 92% indicates that project-based activities encouraged greater engagement and independence. Through direct interaction with natural materials, children actively explored, manipulated, and assembled objects into creative products. This finding aligns with Norlatifah and Novitawati (2022), who reported that structured learning activities and teacher facilitation supported children's engagement and fine motor development.

Similarly, the improvement in fine motor development from 43% to 94% suggests that repeated cutting and pasting activities provided opportunities to strengthen hand–eye coordination, finger control, and movement accuracy. These results support Ernawati (2023), who highlighted the contribution of cutting and pasting activities to fine motor development. Furthermore, using natural materials offered concrete sensory experiences that encouraged children to manipulate

objects of different shapes, sizes, and textures, consistent with findings by Nadila (2022) and Aulia and Aslamiah (2025).

The integration of PjBL and demonstration methods also played an important instructional role. Demonstrations enabled children to observe appropriate techniques, while project-based activities provided opportunities to apply these skills independently. This finding corresponds with Niqo and Wahyudi (2024), who demonstrated the potential of combining PjBL and demonstrations to support children's cutting skills. However, the present study differs by incorporating nature-based Eco-Art activities that integrate cutting and pasting within a unified creative project.

Overall, the findings suggest that integrating Eco-Art, PjBL, and demonstration methods offers a promising instructional approach for developing children's fine motor skills. The observed improvements highlight the potential benefits of combining structured teacher guidance, active participation, and meaningful manipulation of natural materials. Nevertheless, given the small sample and classroom action research design, the findings should be interpreted within the specific educational context rather than generalized to broader populations.

Conclusion

This study concludes that integrating nature-based Eco-Art projects with Project-Based Learning (PjBL) and demonstration methods effectively supported children's fine motor development, particularly

their cutting and pasting skills. The implementation resulted in improvements in teacher activities (96%), children's participation (92%), and fine motor development (94%), with all indicators achieving the established success criteria. These findings highlight the potential of combining structured instructional guidance, hands-on experiences, and natural materials to create engaging and meaningful early childhood learning activities.

Practically, teachers are encouraged to incorporate nature-based Eco-Art projects into classroom activities to strengthen children's fine motor coordination, creativity, and independence. Future research should involve larger samples, diverse educational settings, and longer intervention periods to examine the sustainability of developmental improvements. Comparative studies are also recommended to investigate the effectiveness of Eco-Art projects alongside other instructional approaches.

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