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Enhancing Fine Motor Skills in Early Childhood Through Stamping with Banana Midribs

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ABSTRACT

Penelitian ini bertujuan untuk meningkatkan keterampilan motorik halus anak usia dini melalui kegiatan mencetak menggunakan pelepah pisang di TK Amelia I Neidam, Papua. Metode yang digunakan adalah Penelitian Tindakan Kelas (PTK) dengan model siklus Kemmis dan McTaggart yang terdiri atas tiga siklus, meliputi tahap perencanaan, pelaksanaan tindakan, observasi, dan refleksi. Subjek penelitian adalah 12 anak berusia 4–5 tahun. Hasil penelitian menunjukkan bahwa pada awalnya sebagian besar anak berada pada kategori "Belum Berkembang" dan "Mulai Berkembang". Namun, setelah dilakukan intervensi melalui kegiatan mencetak menggunakan pelepah pisang, keterampilan motorik halus anak mengalami peningkatan yang signifikan dan memenuhi seluruh indikator keberhasilan. Pada siklus ketiga, sebagian besar anak telah mencapai kategori "Berkembang Sesuai Harapan" dan "Berkembang Sangat Baik". Faktor-faktor yang mendukung peningkatan ini antara lain kegiatan yang menarik, interaksi kelompok, serta bimbingan bertahap dari guru yang memungkinkan anak bekerja secara mandiri. Temuan ini menunjukkan bahwa kegiatan mencetak menggunakan pelepah pisang merupakan strategi pembelajaran yang efektif untuk meningkatkan keterampilan motorik halus anak usia dini.

This study aims to enhance fine motor skills in early childhood through stamping activities using banana midribs at Amelia I Neidam Kindergarten, Papua. The method used is Classroom Action Research (CAR) based on the Kemmis and McTaggart cycle model, consisting of three cycles with planning, action, observation, and reflection stages. The study involved 12 children aged 4–5 years. The results indicate that, initially, most children were categorized as "Not Yet Developed" and "Beginning to Develop". However, after the intervention with banana midrib stamping, the children's fine motor skills showed significant improvement meeting all indicators of success. By the third cycle, most children had reached the "Developing as Expected" and "Very Well Developed" categories. Factors contributing to this improvement include engaging activities, group interaction, and the teacher's gradual guidance, allowing children to work independently. These findings suggest that stamping with banana midribs is an effective learning strategy for improving fine motor skills in early childhood.

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INTRODUCTION

Early childhood education is a crucial foundation in individual development, especially during the growth period known as the golden age, namely children aged 0-5 years (Győrffy et al., 2020). During this phase, children experience rapid development in various aspects, including cognitive, socio-emotional, language, creativity, as well as fine and gross motor skills (Roslan et al., 2022). Therefore, early childhood education should be designed holistically and integratively to provide optimal stimulation that supports children's development (Valdés & García, 2019).

One of the essential aspects of early childhood development is motor skills (Rule & Smith, 2018). Matheis & Estabillo (2018) classifies motor skills into two categories: gross motor skills and fine motor skills. Children aged 4-5 years generally experience more dominant gross motor development; however, fine motor development also requires attention as it plays a crucial role in daily activities and academic readiness. Fine motor skills involve activities that require coordination of small muscles, such as finger and wrist movements, as well as eye-hand coordination (Osipova, 2020). Adequate stimulation in this aspect helps children build self-confidence and adapt more effectively to their learning environment (Valdés & García, 2019).

Based on observations conducted at Kindergarten Amelia I Neidam, located in Papua, Indonesia, it was found that children's fine motor skills were still relatively low. This was due to a lack of interest in learning activities, a tendency to play alone, and the minimal application of enjoyable and exploration-based learning strategies. In line with this, several studies indicate that children experiencing motor development issues in their early years tend to face motor, academic, and social difficulties later in life. These findings have implications for various stakeholders, particularly those working with young children. Early identification of motor development issues allows for timely interventions that can directly contribute to improving children's fine motor skills. Therefore, a specialized learning approach is needed to actively engage children in the learning process.

Various methods have been implemented to enhance fine motor skills in early childhood, including artistic activities (Ulfa et al., 2023). Several studies have shown that activities such as drawing, coloring, playing with clay, and printing patterns using specific media can help improve children's coordination and motor control (Basa et al., 2020; Brown, 2010; Rule & Smith, 2018; Strooband et al., 2020; Valdés & García, 2019). One alternative approach that teachers can adopt is involving children in fine motor activities using locally available materials. For example, banana midribs can be utilized as a learning medium because they are widely available, especially in tropical regions such as Papua. In Papua, banana midribs are easily found and commonly used in various daily activities. Thus, their application as a learning medium is not only contextually relevant but also provides meaningful experiences for children, as they are already familiar with the material in their everyday lives. Moreover, banana midribs have varying textures that can stimulate children's sensorimotor exploration (S. H. Rahayu et al., 2024). Research has also shown that using natural materials in learning can enhance motor skills while fostering children's sense of exploration and creativity (Alfianita et al., 2022; Laima, 2022; Wahyuningrum & Watini, 2022).

The use of banana fronds in various activities has been shown to have a positive impact on early childhood fine motor development. Activities such as printing, playing, and using banana fronds as stamping media can improve children's finger and hand skills through more controlled coordination of movements (Alfianita et al., 2022; Salama et al., 2023). In addition, this activity also trains hand muscle strength because children have to press, grip, and move the banana fronds actively (Syahutri & Mayar, 2022).

In addition, children's eye-hand coordination also develops through creative activities such as pattern printing and finger painting, which require precision in controlling hand movements in accordance with vision (N. Rahayu et al., 2024). The process of exploring shapes, colors, and textures in these activities also contributes to improving children's creativity and imagination (Dengah, 2023). Not only that, playing with banana fronds also helps children to practice concentration and patience as they need to focus on producing the desired work (Hartini, 2022). Furthermore, the various movements performed in this game strengthen the muscles of the hands which will later be useful in preparation for writing (Salama et al., 2023).

The use of banana fronds in improving children's fine motor skills can be linked to the cognitive theories of Jean Piaget and Lev Vygotsky, especially in cognitive development and early childhood learning. According to Piaget, children learn through direct experience with the environment, where the exploration of banana leaf helps the development of their cognitive schema through assimilation and accommodation in the preoperational stage (Bustomi et al., 2024; Wardana et al., 2025). Meanwhile, Vygotsky's theory emphasizes the importance of social interaction and guidance in learning, which is seen in the concept of zone of proximal development (ZPD) and scaffolding as children learn to use banana fronds with the help of teachers or peers (Kurniati, 2025; Wardani et al., 2023). Piaget's perspective that emphasizes independent exploration and Vygotsky's emphasis on social interaction can be applied to banana leaf play, both in experiential learning and in guided situations (Kusuma et al., 2022). Thus, banana fronds not only contribute to children's fine motor development, but also support their cognitive development with a constructivist approach through in-depth exploration and social interaction.

Therefore, this study focuses on the implementation of banana midrib stamping activities to improve fine motor skills in early childhood at Kindergarten Amelia I Neidam, Sarmi Regency, Papua, employing a Classroom Action Research (CAR) approach. The study was conducted in several action cycles, consisting of planning, implementation, observation, and reflection stages. Through this method, it is expected that children's fine motor skills will gradually improve, and more effective, engaging, and contextual learning strategies for early childhood education will be identified.

METHOD

This study employs a Classroom Action Research (CAR) approach, following the Kemmis and McTaggart cycle model (Altrichter et al., 2002), which consists of four key phases in each cycle: planning, action, observation, and reflection (see in Figure 1). CAR allows teachers to identify and address challenges that occur in the classroom, such as low fine motor skills or lack of student engagement in learning activities (Basa et al., 2020). Moreover, CAR also enables teachers to continuously improve and refine their teaching strategies based on

observations from each cycle. If a strategy in the first cycle proves less effective, it can be adjusted in the next cycle (Saparahayuningsih & Badeni, 2019). Therefore, CAR was chosen as it aligned with the objectives of this study, which were to improve fine motor skills in early childhood through stamping activities using banana midribs while enhancing the quality of teaching through exploratory-based activities. Some studies that also use classroom action research with the same topic can be seen in the research of Alfianita et al. (2022), Aprillya et al. (2024), Salama et al. (2023), and Saputri & Ulfah (2024).

Participants

This study was conducted at Kindergarten Amelia I Neidam, Papua province, Indonesia, with 12 children aged 4-5 years as participants, consisting of 5 girls and 7 boys.

Research Procedure

The research was conducted in three cycles, each of which was conducted over three sessions in the current week. Each cycle consisted of the following stages (Altrichter et al., 2002):

1. **Planning**: Developing the Daily Learning Plan, preparing learning media (banana midribs), and setting up research instruments (observation sheets, documentation, and field notes).
2. **Action**: The teacher implemented learning activities by engaging children in stamping activities using banana midribs, encouraging active participation in creating patterns with various colors.
3. **Observation**: The researcher and teacher observed the children's fine motor skills development, particularly in coordinating hand, finger, and eye movements during the stamping activity.
4. **Reflection**: Evaluation was conducted based on observation results, which served as the foundation for improving the teaching strategy in the next cycle.

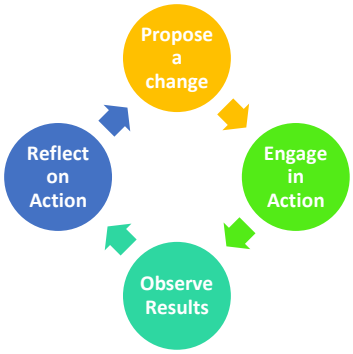

Figure 1. Phase of basic CAR cycle

Instruments and Data Collection Techniques

The data collection techniques used in this study included observation sheets, field notes, and documentation. Observation sheets were used to assess children's fine motor skills development based on predefined indicators, while field notes recorded children's responses and participation throughout the activity. Documentation, in the form of photos or videos, served as evidence of the study implementation. The instruments used in this study included an observation sheet for assessing developmental achievements and field notes, which

focused on three sub-indicators: (1) eye-hand coordination, (2) creating various shapes using banana midribs, and (3) stamping using banana midribs (Matheis & Estabillo, 2018). The assessment criteria for children's fine motor skills were based on Ministry of National Education Regulation No. 58 of 2009, categorized as follows in Table 1.

Table 1. Guidelines for assessing fine motor skills through stamping activities

Category	Score	Percentage (%)	Description
Not Yet Developed (D0)	0-4	0-25	The child has not yet demonstrated fine motor skills and requires full guidance.
Beginning to Develop (D1)	5-8	26-50	The child has started showing fine motor skills but still needs teacher assistance.
Developing as Expected (D2)	9-12	51-75	The child can perform activities with minimal guidance.
Very Well Developed (D3)	13-16	76-100	The child can independently complete stamping activities without assistance.

Analysis Technique

The data collected were analyzed using a descriptive quantitative approach, measuring the number of children who improved their fine motor skills in each cycle. To determine the percentage of classical ability (CA) in a cycle, the formula used is:

$$CA = \left(\frac{Total\ number\ of\ research\ subjects}{Number\ of\ children\ who\ showed\ improvement} \right) \times 100\%$$

Additionally, a descriptive qualitative analysis was conducted to interpret changes in children's behavior and participation in learning activities.

RESULTS

Pre-Action Condition

Before implementing stamping activities using banana midribs, observations at Kindergarten Amelia I Neidam revealed that children's fine motor skills were still underdeveloped. Several issues were identified, including difficulties in completing tasks within the given time, lack of neatness in their artwork, and low confidence in displaying their work. Additionally, children had limited exposure to stamping activities using natural materials, which initially caused confusion. Based on initial assessments, 50% of children were categorized as Not Yet Developed (D0), and the remaining 50% were in the Beginning to Develop (D1) category. No children had reached the Developing as Expected (D2) or Very Well Developed (D3) levels, highlighting the need for an engaging learning intervention. Figure 2 shows the results of fine motoric participants before intervention. The blue bars represent the scores, while the red line indicates the percentage. The children are coded (F for female, M for male) to maintain anonymity.

Cycle 1

Planning Stage

The researcher collaborated with teachers to design learning activities, including determining themes, sub-themes, and learning indicators. A Daily Learning Plan (RKH) was prepared, along with the necessary learning resources, media, documentation tools, and observation sheets.

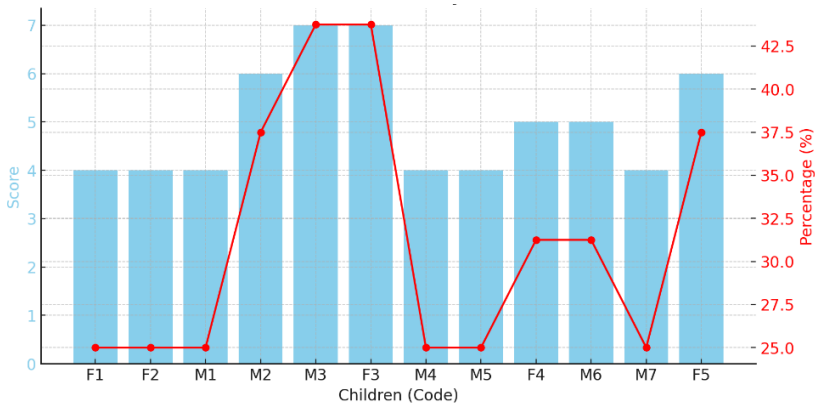

Figure 2. The graph displays the fine motor skills pre-cycle results

Implementation Stage

The teacher introduced banana midrib stamping media and demonstrated the activity. Before starting, children were asked about the media, colors, and patterns they observed. Some children actively responded, identifying the shapes and colors.

Observation Results

Observations showed that fine motor skills development was evident through banana midrib stamping activities. In the first cycle's first meeting, five children were categorized as Not Yet Developed (D0), and three children were in the Beginning to Develop (D1) category. This was indicated by their ability to elaborate on printing concepts, improve hand-eye coordination, and execute stamping with their own ideas. The first cycle results showed that three children reached the Beginning to Develop (D1) category, while five remained in Not Yet Developed (D0).

Reflection

Based on observations, teachers adjusted to improve learning in Cycle II. The teacher evaluated the learning process and planned new strategies, including assisting children more actively during the stamping process to enhance their fine motor skills.

Results of Cycle 1

In the first cycle, the teacher introduced stamping activities using banana midribs and demonstrated the proper technique. Children participated individually, following guided instructions. However, many still struggled with coordination and control. The results showed that five children (62.5%) remained in the Not Yet Developed (D0) category, while three children (37.5%) showed some progress and moved to the Beginning to Develop (D1) category. Common challenges included lack of focus, confusion with the technique, and difficulty coordinating eye-hand movements. The teacher reflected on the need for more structured guidance and motivation to enhance children's engagement.

Cycle II

Planning Stage

Planning for Cycle II was improved based on Cycle I's reflections. This included RKH preparation, research instruments, documentation tools, and enhanced banana midrib stamping techniques.

Implementation Stage

Unlike Cycle I, in Cycle II, the teacher minimized direct instructions and allowed children more independence in executing stamping tasks.

Observation Results

The second cycle observations showed a significant improvement in fine motor skills. Five children advanced to the Beginning to Develop (D1) category, and three children reached the Developing as Expected (D2) category. This indicated a one-level improvement from Cycle I.

Reflection

Children showed increased enthusiasm and engagement during the stamping activity. Their fine motor skills improved significantly, meeting the established success indicators. This prompted further refinement in Cycle III.

Results of Cycle II

Adjustments were made in the second cycle by introducing group activities, allowing children to collaborate and learn from their peers. More verbal encouragement and motivation were provided, and the teacher offered additional hands-on guidance. As a result, five children (62.5%) advanced to the Beginning to Develop (D1) category, while three children (37.5%) progressed to the Developing as Expected (D2) category. Children showed increased confidence, improved eye-hand coordination, and greater ability to create clear shapes using the banana midrib stamps.

Cycle III

Planning Stage

Planning for Cycle III was executed efficiently, focusing on RKH preparation, research instruments, documentation tools, and independent stamping activities.

Implementation Stage

In Cycle III emphasized independent learning, with minimal teacher intervention.

Observation Results

Observations in Cycle III indicated a substantial improvement in children's fine motor skills. Four children reached the Very Well Developed (D3) category, while four others were in the Developing as Expected (D2) category. Children demonstrated improved concept creation, color variation, eye-hand coordination, and wrist control.

Reflection

Children exhibited high enthusiasm and engagement in using banana midrib stamping media. Their fine motor skills improved significantly, meeting all successful indicators. As a result, no further intervention was required beyond Cycle III.

Overall Findings

The banana midrib stamping activity proved highly effective in enhancing fine motor skills among early childhood learners. The data demonstrated steady skill improvement

across three cycles, with children progressing from Not Yet Developed (D0) to Very Well Developed (D3). Contributing factors included: (1) Engaging hands-on activities that increased participation and enthusiasm; (2) Peer interaction and group-based learning facilitated skill acquisition; and (3) Reduced teacher intervention, fostering independence and confidence. The following graph illustrates the progression of children's fine motor skills over the three cycles in Figure 3.

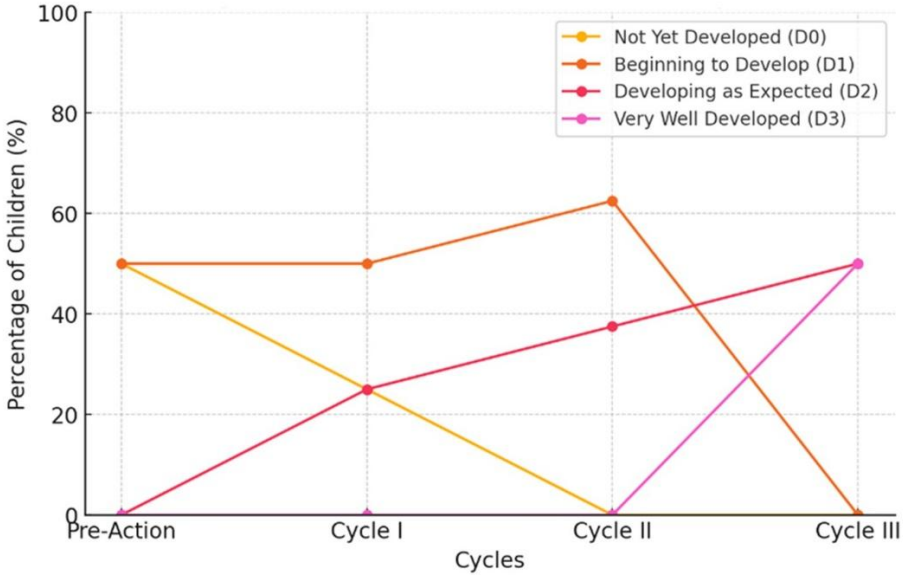

Figure 3. The progression of children's fine motor skill development over the different cycles.

DISCUSSION

The fine motor skills of children aged 5–6 years at Kindergarten Amelia I Neidam, Sarmi Regency, were categorized as very low before any intervention was implemented. This low level of fine motor skills was evident in the children's lack of engagement and focus during learning activities. When the teacher asked questions, most children did not respond. Instead, they were often engaged in unrelated activities, such as playing, talking with peers, or distracting others, which hindered their ability to concentrate. If left unaddressed, this issue could negatively impact their overall learning process. To address this challenge, the teacher introduced an intervention using banana sheath printing to enhance fine motor skills while also improving concentration and interest in learning.

During the first cycle, children appeared confused and unfocused during the printing activity, as it was unfamiliar to them. Many students continued to talk to their peers, engage in unrelated activities, or play on their own rather than focusing on the task. The results of Cycle I showed that only a few children achieved the "Beginning to Develop" (D1) category, while the majority remained in the "Not Yet Developed" (D0) category. Despite this, a slight improvement in fine motor skills was observed, indicating that the activity had potential but had not yet reached the expected targets. The results from Cycle I provided a basis for reflection and evaluation, helping the teacher refine the approach for the next cycle. The teacher's role remained crucial in guiding children toward independent skill development.

In the second cycle, the teacher allowed children greater autonomy in the printing activity. Instead of providing constant direction, the teacher focused on motivating students and fostering enthusiasm. At this stage, the teacher's role shifted toward encouraging creativity, assisting children in combining colors, guiding hand control and coordination, and supporting independent printing ideas. As a result, children's fine motor skills significantly improved, as reflected in the number of children meeting the proficiency criteria. Five children advanced to the "Beginning to Develop" (D1) category, while three reached the "Developing as Expected" (D2) category. The highest scores increased compared to the previous cycle, while the lowest scores also showed improvement. This demonstrated meaningful progress toward achieving the learning objectives.

By the third cycle, children were expected to complete the printing activity independently, with minimal teacher assistance. The teacher primarily provided motivation and encouragement, allowing students to develop and express their creative ideas on their own. The children demonstrated improved color exploration skills, better hand coordination, enhanced wrist movement control, and refined finger dexterity, all of which are essential components of fine motor development.

The results of Cycle III showed further progress, with eight children reaching higher proficiency levels four in the "Very Well Developed" (D3) category and four in the "Developing as Expected" (D2) category. These results confirmed that the intervention had positively influenced children's fine motor skills and enabled them to perform tasks with greater independence.

At the beginning of the activity, the teacher introduced and explained the concept of banana sheath printing to the children. This explanation included an overview of the function of banana sheaths and how they could be used as a learning medium. The teacher actively involved children in the learning process, which helped develop their creativity, early motor skills, and self-confidence. While students were encouraged to explore alternative creative activities, they were also reminded to complete their tasks, reinforcing their ability to follow instructions and maintain focus (Rule & Smith, 2018; Valdés & García, 2019). This structured yet flexible approach helped children develop discipline while fostering a love for learning (Roslan et al., 2022).

Following the intervention, the fine motor skills of children aged 5–6 years at Kindergarten Amelia I Neidam showed a significant improvement. Children who initially struggled with fine motor skills gradually demonstrated progress throughout the intervention. They became more engaged, enthusiastic, and independent in completing the banana sheath printing activity (Strooband et al., 2020). Over time, their interest in the learning material increased, and they became more skilled in handling materials, controlling their hand movements, and creatively combining colors (Osipova, 2020). In line with this, the findings support the theory that continuous practice enhances fine motor skills (Alfianita et al., 2022; Laima, 2022; Rahayu et al., 2024; Wahyuningrum & Watini, 2022). Therefore, the banana sheath printing activity proved to be an effective method for improving the fine motor development of young children. This study highlights the importance of hands-on, creative learning experiences in early childhood education, as they not only develop essential skills but also encourage children's independence and self-expression.

CONCLUSION

This study demonstrates that stamping activities using banana midribs effectively enhance fine motor skills in early childhood. Initially, many children struggled with hand-eye coordination, precision, and confidence in exploring colors and patterns. Through three cycles of classroom action research, there was a gradual improvement in children's fine motor skills, as evidenced by better hand coordination, improved finger and wrist control, and increased confidence in completing stamping tasks independently. This intervention highlights that an exploratory learning approach using natural materials can significantly support children's motor skill development. Therefore, stamping with banana midribs can be recommended as an innovative and contextual learning strategy in early childhood education.

LIMITATIONS AND FUTURE RESEARCH

This study was limited to a small sample of 12 children from a single kindergarten in Papua, Indonesia, which may affect the generalizability of the findings. Additionally, the intervention focused primarily on fine motor skills, without an in-depth examination of other potential benefits, such as cognitive or socio-emotional development. Future research could explore the long-term impact of stamping activities on various aspects of child development, including creativity, problem-solving abilities, and early writing skills. Expanding the study to different educational settings and age groups would also provide a broader understanding of its effectiveness.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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