



Improving Hand-Eye Coordination Abilities Through Leaf-Rolling Activities at DWP 2 Bayem Kasembon Malang Kindergarten

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Abstract

Fine motor development in early childhood involves the control of small muscles, and the ability to perform more precise and detailed movements. One of the scopes is hand-eye coordination. Efforts to facilitate the development of hand-eye coordination must be carried out with appropriate activities. The problems in DWP 2 Kindergarten, Bayem, Kasembon, Malang indicate that hand-eye coordination skills have not shown completeness. One of the contributing factors is the lack of stimulus in these skills. The purpose of this study is to determine the improvement of hand-eye coordination through stringing. This study uses Class Action Research (PTK) which is implemented through four stages, namely planning, action, observation and reflection. Data analysis techniques use observation. The implementation of the study in DWP 2 Kindergarten, Kesamben, Malang, with a total of 10 students. Observation cycle I showed results of 60% less than the completeness value, cycle II showed results of 80% and has met the completeness. It can be concluded that eye-hand coordination can be improved through stringing activities.

Keywords

Hand-Eye Coordination, Stringing, PAUD



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INTRODUCTION

The age range of 0-6 years is often referred to as the "golden age" because children are in a period of high sensitivity and rapid response to stimulation. It is during this early stage of life that children actively explore, experiment, and interact directly with their surroundings to understand the world (Pebriana, 2017). Therefore, early childhood education must be designed to provide learning experiences that are rich, meaningful, and appropriate to children's developmental needs.

According to the World Health Organization (WHO), developmental disorders in early childhood, including those related to Minimal Brain Dysfunction (MBD), can affect fine motor skills. This condition is estimated to affect between 5% and 25% of children. Data from the Indonesian Ministry of Health shows that approximately 0.4 million toddlers, or 16% of the population, have developmental disorders in both fine and gross motor skills. These disorders have the potential to hinder children's ability to express creativity, make it difficult for them to communicate verbally, and even impact their intelligence levels. In addition, the 2018 report from the Indonesian Ministry of Health revealed that there were 2,280,239 toddlers, and 63.48% of 1,168,449 children aged 4–5 years in East Java Province, experiencing developmental problems in early childhood (Lutfiana, 2020). These findings indicate that developmental disorders in children are still an issue that requires serious attention in early stimulation and intervention efforts.

A child's growth and development are influenced by various factors, both internal and external. Internal factors include conditions such as chromosomal abnormalities, age, gender, race, and family background. Meanwhile, external factors can be divided into three groups: prenatal, during, and postnatal factors. (Mulqiah et al., 2017). The principle of learning in early childhood education (PAUD) is through play. Through play, children gain enjoyable experiences and significant educational benefits. Play activities can support the development of children's emotions, social skills, and physical motor skills (Humaida & Yetti, 2021). Therefore, implementing appropriate play activities that are appropriate to the child's developmental stage is an important key to optimizing their overall growth and development.

During all aspects of growth and development, early childhood requires stimulation. This stimulation is provided through a child-centered learning approach through play activities. One aspect that develops rapidly is physical motor skills. Children's physical motor development is related to movement, both gross and fine motor skills. Fine motor movements involve only certain parts of the body and are used by small muscles, such as the skill of using the fingers and wrists properly (Sumantri, 2021). Fine motor skills differ from gross motor skills, which require strength. Although they don't require strength, fine motor skills require careful hand-eye coordination.

Hand-eye coordination is a crucial aspect of fine motor development in early childhood. This coordination involves the integration of visual and hand movements in precision motor tasks, such as grasping, inserting small objects, and stringing beads. The development of this ability is directly related to a child's readiness for

academic and daily life activities such as writing, buttoning clothes, and holding writing utensils. Research shows that structured fine motor stimulation can improve small-motor coordination and manipulative skills in preschoolers. Systematically designed activities can strengthen children's motor control, visual attention, and object manipulation skills (Dapp et al., 2021).

The results of initial observations conducted on group B students at DWP Bayem 2 Kasembon Kindergarten, Malang Regency, during the activity of moving loose parts (buttons and beads) using food tongs into a bowl, it was seen that the children had difficulty coordinating finger movements when holding and lifting the loose parts. The number of students in the group was 10 children, there were 2 (20%) children who could carefully hold the tongs, take the loose parts and put them into the bowl. For 5 children, they could hold with tongs but did it repeatedly (falling), while the other 3 children when holding the tongs still used both hands to open the tongs when lifting the loose parts.

One of the causes of this condition is that children's fingers are not yet strong enough to support small muscles. Children are not given enough stimulation for fine motor development, and teachers and parents tend to immediately introduce activities without going through the stages. Children's hand-eye coordination skills are not yet well developed. Children's ability to perceive movement and simultaneously control their fingers to tie knots is still suboptimal. The aforementioned problems require solutions that can strengthen hand-eye coordination skills in fine motor activities. These activities should be fun, meaningful, and optimize children's abilities. To address these issues, previous research is needed as a reference for activities to improve hand-eye coordination learning.

Research conducted by Bimas Saputra & Gusnimar (2023), the results of the study showed a significant increase in children's fine motor skills through coconut leaf folding activities, especially in the aspects of flexibility and speed of the fingers, as well as coordination between the eyes and hands. The increase occurred in the second cycle, children's fine motor skills increased with the percentage of hand flexibility reaching 95%, finger speed 93.3%, and eye-hand coordination also increased sharply to 93.3%. Coconut leaf folding activities are effective in stimulating the development of fine motor skills in early childhood at PAUD Al-Hidayah, and can be applied as a learning strategy to improve motor skills in children

Other research by (Oktafiani & Rakimahwati, 2023) A literature review examining various previous studies related to the use of stringing as a fine motor stimulation

strategy concluded that stringing activities have been proven to provide a positive contribution to the development of fine motor skills in early childhood. Based on the data collected, stringing activities can improve hand-eye coordination skills, strengthen control of small muscles, and increase children's accuracy and focus. This study also confirms that stringing is a learning activity that children enjoy and can be implemented in a variety of ways without high costs, making stringing suitable as a fine motor stimulation strategy in early childhood education institutions.

Research by Qudsi Mutawakil Husaini et al. (2024), concluded that stringing activities can develop fine motor skills in children with special needs after being given stringing play therapy. The results of the study showed that after the stringing activities were implemented, the fine motor skills of children with special needs experienced positive development, namely an increase in the ability of small hand muscles that are coordinated and better coordination between the eyes and hands compared to before the therapy was given. Overall, stringing was declared effective as a stimulation strategy for the fine motor development of children with special needs in the inclusive PAUD institution.

Stringing is a form of educational play that can be used to stimulate fine motor development. Children tend to be more enthusiastic about participating in activities packaged as games compared to formal instructional activities. Play-based learning is effective in developing various aspects of child development, including physical motor skills, because children learn through direct experience and fun activities, not just formal instruction (Sitorus et al., 2025). One of the advantages of stringing is its flexibility, allowing the level of difficulty to be adjusted to each child's ability. Beginners can use larger materials like straws, while more advanced children can be given smaller beads to string. This method allows teachers to provide challenges appropriate to each child's developmental stage. This approach aligns with the principle of individualized learning (Rahmadani & Citraresmi, 2025).

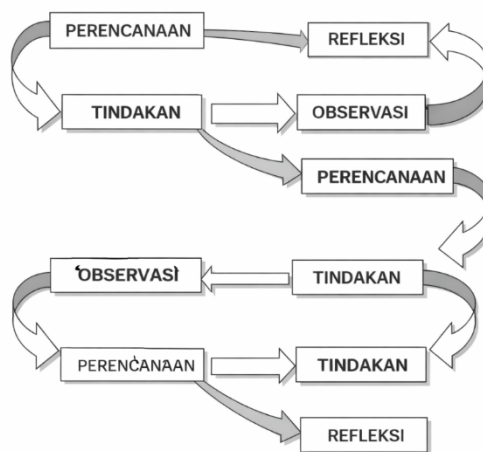
Based on previous research, it can be seen that stringing can be an alternative to stimulate fine motor development, especially hand-eye coordination. Stringing is considered a fun activity, with children engaging in activities that involve more than just following instructions. Stringing encourages children to exercise their fingers, focus on their vision, and condition the relationship between eye movement and objects. It's fun and well-liked by many children. Hand-eye coordination is a fine motor skill that involves cooperation between the eyes and hands to perform specific tasks. The indicators for hand-eye coordination in this study are: coordination between vision and hand movements, wrist flexibility and finger flexibility (Dewi &

Surani, 2018; Sumantri, 2021).

METHODS

This research was designed through classroom action research (CAR). The research design was based on the researcher's desire to improve learning conditions by enhancing hand-eye coordination skills through stringing activities for group B students at DWP Bayem Kasembon Kindergarten, Malang Regency. The PTK model used in this research is collaborative Classroom Action Research where researchers and class teachers work together to solve problems in the classroom. The research model used by the researcher is the model developed by Kemmis & McTaggart (Parnawi, 2021).

Figure 1.Kemmis & McTaggart PTK Design(Parnawi, 2021).



This research was conducted at DWP 2 Kindergarten, Bayem Kasembon, Malang. The subjects were 10 students in Group B of DWP 2 Kindergarten, Bayem Kasembon, in the 2025/2026 academic year. This classroom action research data collection technique through direct observation is used to take and assess the results of children's hand and eye coordination abilities when stringing beads, and documentation.

Table 1. Assessment indicators

Hand-Eye Coordination Indicator	Family Card (KKTP)
Coordination Between Vision and Hand Movement	Children are able to adjust hand movements to their vision, can move beads precisely to the desired position.
Wrist flexibility	The child can move the wrist flexibly and

	without difficulty to hold and direct the thread or beads.
Flexibility of the fingers	Children can use their fingers to hold and guide the beads with flexibility into the string

Source: Processed by Researchers (2026)

The obtained data results are categorized based on the established standard category techniques.(Arikunto, 2006).

Table 2.Completion Criteria

Value Range	Category
85 – 100%	Very good
70 – 84%	Good
55 – 69%	Enough
40 – 54%	Not enough
0 – 39%	Very less

Source:(Arikunto, 2006)

According toArikunto (2006)The indicator of success in this research is if classically it has achieved completeness of 75.

FINDINGSAND DISCUSSION

The initial step in the CAR stage is planning. At this stage, the teacher prepares the lesson plan and stringing materials, including beads, straws, and string. Observations show significant improvements in all indicators of coordination between vision and hand movements., wrist flexibility and finger flexibility. The results of each cycle are in table 3 below:

Table 3.Results of cycles I and II

No	Study	Average Yield (%)	Category
1.	Pre-action	20	Not yet finished
2.	Cycle I	60	Not yet finished
3.	Cycle II	80	Completed

Source: Researcher data (2025)

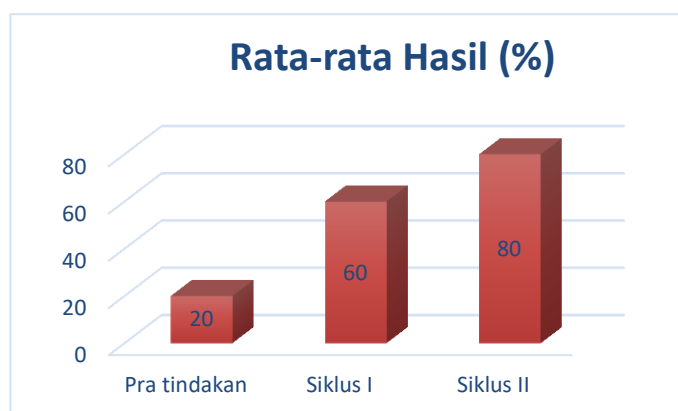
Table 4 above shows that the improvements that occurred between the pre-cycle, cycle 1, and cycle 2 indicate consistent progress at each stage of implementation. In the pre-cycle, the initial conditions still showed results that needed improvement. After the actions were implemented in cycle 1, improvements were seen but did not yet demonstrate classical completion. Then, in cycle 2, the results obtained showed even better development, reflecting the successful

implementation of the actions with a completion rate of 80%. The reflection used from cycle 1 to 2 is by adding variations of beads based on color and shape. One of the factors that increased eye and hand coordination skills in cycle II was that the activities were more interesting, with the factors being the diversity of shapes and colors of beads and straws.

Discussion

The results of improving hand and eye coordination skills can be seen in the graph below:

Figure 2.Yield/Cycle Increase Graph



The improvement of eye-hand coordination through two cycles of stringing activities showed that this activity contributed to the development of fine motor skills, especially eye-hand coordination. These results were supported by Sujiono in (Sitorus, 2016), which states that fine motor skills involve certain parts of the body and are carried out by small muscles, only requiring stability and better eye-hand coordination, which will have an impact on the emergence of children's independence in doing things that are supported by the cooperation of the eyes and hands.

Based on the data obtained in cycle I, the observation results showed that the completion of eye-hand coordination skills in group B children of DWP 2 Bayem Kasembon Kindergarten was at 60%, which still did not meet the classical completion target of 75%. Completion occurred in cycle II with a result of 80%. This classical completion does not indicate that all children have completed, there are still children who have not been able to develop eye-hand coordination skills well. This can be explained by variations in the different levels of children's abilities, as well as the presence of external factors such as a lack of focus in some children. This is in accordance with the theory that fine motor development is influenced by various factors including learning readiness, learning opportunities, practice opportunities,

good models, motivational guidance, and is carried out individually. (Dewi, R., 2023).

The actions carried out in cycles I and II through stringing were carried out systematically and continuously. The repeated activities resulted in the achievement of eye-hand coordination indicators, namely: Coordination of vision with object movement, hand flexibility and finger flexibility. These results are supported by research (Dewi & Surani, 2018) mentioned that Fine motor skills that are carried out repeatedly and are oriented towards fun activities can accelerate the development of eye-hand coordination in early childhood, because children are able to learn to coordinate eye and hand movements better through practical experience.

This study provides strong evidence that stringing activities can improve children's hand-eye coordination. It also shows that approaches involving a variety of media and engaging materials can improve children's learning outcomes in fine motor skills. Therefore, stringing activities can be used as a strategy to develop children's coordination skills at an early age. These results support the theory that fine motor skills, such as hand-eye coordination, are crucial for children's development in various aspects, including learning to write and daily activities. (Ministry of Education, Culture, Research, and Technology, 2024; Sumantri, 2021).

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CONCLUSION

Based on the research conducted, it can be concluded that hand and eye coordination skills can be improved through stringing activities using various materials. Educators can make stringing activities an alternative routine and programmed learning activity to stimulate children's fine motor development. Further researchers can develop the same research using more diverse media.

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