

The Excellence of Batik Art: Exploring the Impact of Batik Jumputan on Fine Motor Skills in Early Childhood Education



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ABSTRACT: The issue of developing hand-eye coordination skills among preschool students has yet to be completely resolved. This research examines the effectiveness of *Batik Jumputan* as a teaching method to improve students' fine motor skills at the TKIT Alhamdulillah Tamantirto Kasihan Bantul, Yogyakarta. The research employed a qualitative approach, employing participant observation, in-depth interviews, and recording to gather data. The study implemented *Batik Jumputan* learning in three stages to improve fine motor skills: planning learning objectives, indicators, and materials; implementing learning activities and assessing results; and controlling and following up on learning. The *Batik Jumputan* lesson was carefully planned and designed by the instructor, laying a solid foundation for students to practice fine motor skills. Students exhibited great enthusiasm, especially when mixing colors and dipping the cloth, demonstrating a strong curiosity. Upon viewing their vibrant creations on the fabric, students appeared happy, thus indicating a strong desire to learn batik. The evaluation noted that each student managed to show fine motor development as expected, even though some students reached a very good level of development. The study revealed that learning to make *Batik Jumputan* positively affected students' fine motor skills, leading to significant improvements.

KEYWORDS: Hand-eye Coordination, Preschool Students, Fine Motor Skills, Teaching Effectiveness, Batik Jumputan

I. INTRODUCTION

Sustainable learning cannot be separated from its main foundation, which is preschool education (Alharbi & Alzahrani, 2020). This phase sets the foundation for students' cognitive, affective, and psychomotor development (Borrego-Balsalobre et al., 2021; Ismail et al., 2017). Learning experiences that support cognitive, affective, and psychomotor exploration at an early age can encourage interest in learning. Holistic early childhood education also builds intrinsic motivation, curiosity, and adaptability (Grigorescu, 2020). These perspectives provide a strong foundation for lifelong education (Kemmis, 2023; Wardani et al., 2020).

A vision of education that stipulates lifelong learning should proportionally emphasize cognitive, affective, and psychomotor development (Suryana, 2021). Early childhood education is crucial for developing students' psychomotor skills, including fine and gross motor movements. Play and exploration activities also help to improve hand-eye coordination (Fuadi, 2021). *Batik* activities can train hand-eye coordination (Johor et al., 2020; Pertiwi et al., 2022; Wang & Lee, 2022). Coordination between the two is crucial for mastering complex motor skills, such as writing, folding, and cutting, among other physical activities (Lestari, 2020; Maurer, 2023; Sistiari et al., 2020).

To perform precise and well-coordinated actions, eye-hand coordination is necessary to involve tiny nerves, particularly those in the fingers and hands (Johor et al., 2020; Nurmala et al., 2023). Students' fine motor skills are developed through these activities. They have high energy levels in early development (Ginting et al., 2021). This energy needs to be used to train their fine motor skills. Important training models require hand-eye coordination, such as sticking, folding, cutting, and *batik* (Marwan et al., 2021; Tanto & Sufyana, 2020).

Exercises that enhance eye-hand coordination substantially impact students' cognitive development (Sepehriki et al., 2023). Activities requiring hand-eye coordination often involve problem-solving, decision-making, and applying other thinking skills. Effective eye-hand coordination is necessary for various life skills and academic abilities (Jonni et al., 2020). Engaging students in eye-hand coordination exercises early on can improve their readiness for learning and fine motor development as they grow up (John & Renumol, 2022).

However, training fine motor skills, or specifically training hand-eye coordination, still deals with several problematic issues (Strooband et al., 2020). Parents who do not recognize the importance of stimulating their child's fine motor skills or lack an understanding of how to train them are depriving their child of necessary stimulation (Lansford, 2022). Fine motor skills require a diverse set of activities. If activities at home and in the neighborhood are too monotonous, children may experience boredom and

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lack motivation to practice (Lansford, 2022). Similarly, overprotective parenting or habits that prevent children from exploring, trying, or playing freely can hinder fine motor development (Kvalnes & Hansen Sandseter, 2023).

This problematic problem also occurs in schools. Some teachers may lack adequate understanding and training in developing students' fine motor skills (Cameron et al., 2012; Stevenson & Just, 2014; Wiguna, 2021). Teachers may find it difficult to provide the right stimulus due to this condition or even fail to recognize the importance of fine motor skill development at this point in the student's development. During the online learning process, for example, three indicators of motor ability show suboptimal development: the ability to draw according to ideas, fold into meaningful shapes, and cut patterns (Fida Etrika Nugraha, 2017).

Schools without adequate facilities and equipment for developing students' fine motor skills can be an obstacle (Draper et al., 2012; Raharjo & Yulianto, 2020). Students need access to tools and toys to help them practice and develop fine motor skills. Students also need adequate time and opportunities to practice their fine motor skills. A curriculum that demands too much can hinder the growth of fine motor skills due to a lack of practice time (Martínez-Bello et al., 2021).

The incidence of fine motor disorders in preschool children varies across countries. In the United States, the rate ranges from 12-16%, while in Thailand it reaches 24%, and in Argentina it is 22%. In Indonesia, the incidence ranges from 13%-18% (Catur Utami et al., 2023). The Ministry of Health of the Republic of Indonesia conducted a child development evaluation in 30 provinces in 2013 and found that 45.12% of infants had impaired development. Meanwhile, in West Java, 30% of children were found to be developmentally delayed, and 80% of these delays were triggered by insufficient stimulation (Puspita & Umar, 2020).

The stimulation provided in the home environment to 18-month-old children showed a positive correlation with changes in fine motor skills from 2 to 4 years of age, regardless of the family's level of socioeconomic resources. These correlations were explained by two-year-old toddlers' physical development, food safety standards, and motor abilities. On the other hand, after adjusting for all prior family characteristics, such as physical growth measurements, the degree of food security, and motor abilities at age 2, stimulation at age 2 was also positively correlated with motor skills at age 4 (Armstrong-Carter et al., 2021).

Several researchers have written studies on training fine motor skills through *batik* activities. At TKIT Baitul Izzah, Bengkulu City, *Batik Basurek* mosaics are used for early childhood creativity learning, starting from the strategy process of choosing simple drawing patterns, introducing materials, and how to use tools to produce art creativity in the form of *Batik Basurek* mosaics. Activities that train students' hand and eye movements contribute greatly to children's fine motor skills training (Özkan & Kale, 2023; Taverna et al., 2020).

Research has shown that developing eye-hand coordination through activities such as collage is essential for fine motor skills and creativity (Muslimah et al., 2020; Wandí & Mayar, 2019). Studies have revealed that teachers in early childhood development (ECD) regard fine motor stimulation as a key factor in preparing children for school. ECD teachers must thoroughly understand how to provide appropriate fine motor stimulation to their students, which requires good hand-eye coordination. This comprehension is critical in creating effective learning programs that aid the development of students in this aspect (Rumara et al., 2023). Research on the effect of paint application on children's hand-eye coordination through coloring activities was conducted at TK Negeri Pembina with 30 children in each group. The results showed that the children in the experimental group had higher average fine motor skills (83.25) than the control group (76). Statistical analysis showed that applying paint significantly affected children's fine motor skills and supported the study findings (Oktavia et al., 2019).

Batik Jumputan learning is important in training eye and hand coordination (Damayanti et al., 2023). This activity involves a series of activities, such as wrapping marbles with cloth, tying them with rubber, and applying dye to the cloth. During the process, students must coordinate eye and hand movements precisely. *Batik Jumputan* activities stimulate fine motor development, strengthen finger muscles, and improve eye control over movement. Stimulating the eyes and hands to practice coordinated movements has holistically supported children's cognitive and motor abilities (Cornejo et al., 2021; de Waal, 2019).

This study aims to explore the implementation of *Batik Jumputan* learning to train students' fine motor skills at TKIT Alhamdulillah Tamantirto Kasihan Bantul, Yogyakarta. This research study differs from previous studies even though it discusses the same topic. This study found new things, namely that students can coordinate their eyes and hands precisely in specific tasks, such as tying marbles with rubber, being patient when applying color to the fabric, and displaying a painstaking attitude. TKIT Alhamdulillah Tamantirto Kasihan Bantul, Yogyakarta students train their fine motor skills by learning *Batik Jumputan*. Thus, students' fine motor skills are reciprocal when using *Batik Jumputan* techniques to train coordination between hands and eyes.

II. METHODE

This descriptive qualitative research approach aims to explore the implementation of *Batik Batik Jumputan* learning to train students' fine motor skills at TKIT Alhamdulillah Tamantirto Kasihan Bantul, Yogyakarta. The data sources were five (5) teachers and sixteen (16) B5 students of TKIT Alhamdulillah. Data collection techniques used in-depth interviews with the teachers. The participatory observation technique was applied during *Batik Jumputan* learning to train coordination between the eyes and hands in students. A

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documentation technique was used to record written data and *Batik Jumputan* learning activities at TKIT Alhamdulillah. The following is the interview table for TKIT Alhamdulillah teachers:

Table 1. Teacher's Interview Instrument of TKIT Alhamdulillah

No.	Management Functions	Learning Component	Interview	Item
1.	Planning	Learning design plan: Objectives Indicators Materials	What is the learning objective of <i>Batik Jumputan</i> ? What are the learning indicators of <i>Batik Jumputan</i> ? How does the teacher plan the materials for <i>Batik Jumputan</i> learning to train students' hand-eye cooperation?	3
2.	Implementation	Learning process: Learning activities Learning outcomes	How do teachers guide students before carrying out <i>Batik Jumputan</i> activities? How do teachers guide students during <i>Batik Jumputan</i> learning? How does the teacher reflect with the students after learning <i>Batik Jumputan</i> ?	3
3.	Evaluation	Evaluation and follow-up	How is the hand-eye coordination ability after students learn to make <i>Batik Jumputan</i> ? How does the teacher evaluate <i>Batik Jumputan</i> 's learning? How does the teacher follow up on <i>Batik Jumputan</i> 's learning?	3

This research describes the planning, implementation, and evaluation of *Batik Jumputan* learning to train students' fine motor skills at TKIT Alhamdulillah. The research question is: How is *Batik Jumputan* learning implemented to train students' fine motor skills at TKIT Alhamdulillah Tamantirto Kasihan Bantul, Yogyakarta? The data analysis includes collecting, presenting, summarizing, verifying, and drawing conclusions (Miles, Matthew B., A. Michael Huberman., 2014). Furthermore, data validity was checked through triangulation of techniques and data sources (Bryman, 2004).

III. RESULTS

Preschool education is fundamental to forming the foundation of students' development. Teaching *Batik Jumputan* can be an effective model to stimulate creativity while developing students' fine motor skills. Learning at TKIT Alhamdulillah uses a center approach. Students switch classes or move according to the center schedule. The *Batik Jumputan* activity is carried out in the art and creativity center.

Planning *Batik Jumputan* learning to train eye and hand coordination begins with formulating learning objectives. The learning objectives of *Batik Jumputan* at TKIT Alhamdulillah are to train fine motor skills, instill patience and painstakingness, and stimulate students' creativity and imagination. Teachers assess the learning objectives' relevance to preschool students' needs. The *Batik* learning model is the basis for stimulating fine motor skills according to students' developmental needs.

These learning objectives serve as multiple indicators for assessing learning progress. The indicators of learning how to make *Batik Jumputan* at TKIT Alhamdulillah are that the students can: (1) Coordinate hands and eyes; (2) Inserting marbles into the fabric and tie them; (3) Colors are in line with their interests; (4) Removing rubber and marble; (5) Drying the cloth using clothespins.

Teachers have carefully designed *Batik* learning indicators to attain their desired learning objectives. The emphasis on the ability to coordinate hands and eyes indicates a deep understanding of the importance of developing fine motor skills at this stage of development. Placing marbles into the fabric and securing them in place promotes the development of hand-eye coordination and nerve function. Choices give color according to student interests, practice creative expression, and development of student identity. The activity of removing rubber and marbles involves coordinating the fingers of the hands. Drying cloth with clasps is not only about fine motor but also introduces the concepts of process, sequence, and responsibility. Overall, learning indicators create an immersive and meaningful holistic learning experience for students.

Before beginning the *Batik Jumputan* lesson, the teacher prepares the necessary materials to ensure a fun experience for the students. Equipment and materials for learning *Batik Jumputan* are adjusted to the learning objectives and indicators. Teachers undergo the following stages when designing equipment and materials: (1) Identify equipment and material needs. The teacher identifies the equipment and materials needed in batik-making activities, such as Mori cloth, dyes, marbles, rubber, trays, ropes, clasps, tissues, and water; (2) Provide equipment and materials. Master provided identified equipment and materials, including Mori cloth, dyes, marbles, rubber, trays, ropes, clasps, tissues, and water. All materials are arranged and grouped in small groups

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for easy distribution to students; (3) Divide study groups. The students have been split into groups of three to five children to facilitate cooperation and collaboration in *Batik*-making activities.

Table 2. *Batik Jumputan* Learning Plan

No.	Learning Components	Description
1.	Objectives	The purpose of learning <i>Batik Jumputan</i> at TKIT Alhamdulillah is to train fine motor skills, instill patience and diligence, and stimulate students' creativity and imagination.
2.	Indicators	Students can: Coordinate hands and eyes Inserting marbles into the fabric and tying them Colors are in line with students' interests Removing rubber and marble Drying the cloth using clothespins
3.	Materials	The teacher arranges the materials needed for learning in stages: Identifying equipment and materials Providing equipment and materials Dividing the study group

Teachers carefully plan and prepare all equipment and materials needed for *Batik Jumputan* learning. By identifying the needs of tools and materials, providing materials, dividing students into learning groups, and planning learning activities, teachers create a solid foundation to engage students in *Batik* activities to train students' fine motor skills.

Before the *Batik Jumputan* activity at TKIT Alhamdulillah begins, the teacher conditions the students through apperception activities. Students are invited to sit in a circle and then pray together. The teacher also asked how the students were feeling that day. The apperception topic is that the teacher conveys information about *Batik Jumputan* activities. The equipment and materials used to make *Batik* are also conveyed. No less important in the apperception activity is that the teacher agrees on the game's rules with students. This agreement applies during the *Batik* activity.

The apperception activities carried out by teachers at TKIT Alhamdulillah before learning *Batik Jumputan* reflect the right approach in early childhood education. Engaging students in an interactive atmosphere and conveying information in a friendly way can stimulate their interest and attention. Explaining how to make *Batik* provides knowledge and sparks creativity and curiosity. After apperception, the teacher invites students to their respective groups. The teacher guides the students in learning *Batik Jumputan* step by step. The steps are:

- (1) Accompanying and supervising. The teacher was proactive in assisting students, especially those who were struggling. Additionally, the teacher supervised all students to ensure their safety and comfort during the *Batik Jumputan* activity.
- (2) Guiding according to different levels of difficulty. The teacher provides direct assistance individually and in groups, which is adjusted to the challenges of each student's difficulty. This approach demonstrates the practice of differentiation, which focuses on meeting the unique needs of each student.
- (3) Providing reinforcement and direction. Teachers actively provide direction and reinforcement, assistance, and guidance. This treatment demonstrates that teachers provide physical and psychological assistance to enhance students' fine motor skills.



Figure 1: (a) Students tying marbles in the fabric; (b) Students pouring colors on the fabric

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Figure 3: A student shows his work

After the students have completed all stages of learning *Batik Jumputan*, the teacher reflects on the lesson. The teacher invites discussion and asks open-ended questions. The teacher asks: Do the students like the *Batik Jumputan* activity? Did they do it happily? How did they manage to complete the steps of *Batik Jumputan*? What difficulties did they experience when making *Batik Jumputan*? This question is important to identify any obstacles or difficulties students may encounter while doing the *batik* activity.

Students were enthusiastic when responding to the question-and-answer session. The majority of students felt happy participating in the *Batik Jumputan* activity. The stage of *Batik* that students liked the most was when they mixed the colors and dipped the cloth into the dye. Students did not do this stage just once or twice. There was a high curiosity when their hands gave color. Their curiosity was answered when students untied the dried cloth. Their faces showed a sense of joy and happiness to see the colorful work on their fabrics.

The following are the results of the observation and assessment of *Batik Jumputan's* learning of TKIT Alhamdulillah students. The indicators or aspects observed consist of A = Coordinate hands and eyes; B = Inserting marbles into the fabric and tying them; C = Colors are in line with students' interests; D = Removing rubber and marbles; E = Drying the cloth using clothespins. The assessment criteria are 1 = Not yet developing; 2 = Starting to develop; 3 = Developing as expected; 4 = Developing very well.

Table 3. Learning Results of *Batik Jumputan* to Train Students' Fine Motor Development B5 TKIT Alhamdulillah Tamantirto Kasihan Bantul DIY

No.	Name	Indicators				
		A	B	C	D	E
1.	Vania	3	3	4	3	3
2.	Putra	3	4	3	4	3
3.	Wira	4	3	4	3	3
4.	Alfa	3	3	3	3	4
5.	Zuhdi	3	3	4	4	3
6.	Rachman	4	4	3	3	4
7.	Fadya	4	3	3	3	4
8.	Tirta	3	3	3	4	4
9.	Rafif	4	4	3	3	3
10.	Arif	3	3	3	3	3
11.	Faiz	4	3	4	3	4
12.	Zahra	3	3	3	4	4
13.	Fauzi	3	3	3	4	3
14.	Candra	4	4	3	4	3
15.	Aprilia	3	3	4	3	4
16.	Saputra	4	3	3	3	3
	Average	3,4	3,2	3,3	3,3	3,4

Table 3 shows that all students made expected progress on each learning indicator. It is worth noting that certain students may excel in specific indicators, demonstrating exceptional development in those areas. This suggests that the fine motor skill development of

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the kids is progressing as predicted. Learning the technique of *Batik Jumputan* has a positive effect on fine motor development. This development allows all students to reach the expected level of fine motor skills.

The evaluation results indicate that teaching *Batik Jumputan* at TKIT Alhamdulillah positively impacts children's fine motor skills. Nonetheless, certain areas warrant assessment to enhance the efficacy of the learning process. A more in-depth analysis is required to determine the factors contributing to differences in skill levels among students. This could aid educators in devising tailored approaches to assist those who may encounter difficulties. Evaluation of learning demonstrates that providing feedback to students can enhance their learning experience. Students may sometimes require additional support or alternative learning strategies if they progress slower. To improve children's fine motor skills, involving parents in the supervision and enhancement is recommended.

IV. DISCUSSION

Learning *batik* to stimulate coordination between eyes and hands is a fundamental step (Fatmala & Hartati, 2020) because, at this age, students are actively developing a close relationship between vision and hand movements (Shunhaji & Fadiyah, 2020). Careful planning in early childhood learning activities reflects the application of the principles of developmental psychology (Yuniarni, 2022). Identifying the need for tools and materials shows that teachers understand the sensory stimulation needed to develop children's eye and hand coordination (Tanto & Sufyana, 2020). The division of students into small groups creates a social environment that supports interaction and cooperation in line with early childhood social-emotional development (Nurhasanudi & Santika, 2021).

Setting up environmental conditions before early childhood learning activities is significant as it can provide a positive initial stimulus. A safe, organized, and comfortable environment helps students focus on learning without distractions (Gaol et al., 2023). This will support students' active participation in learning activities. A pleasant environment also stimulates students' interest and curiosity (Batubara et al., 2020). It provides an efficient and exciting learning environment. Creating game rules with students clarifies expected actions, creates structure in the activity, and supports the development of social skills. This approach aligns with constructivism and experiential learning principles, where students learn actively through interaction with the environment and others (Tarnopolsky & Kozhushko, 2020). Apperception creates a solid foundation for effective and memorable learning (Saputra et al., 2020).

Setting up environmental conditions before early childhood learning activities is significant, as a customized environment can catalyze effective learning experiences (Angela, 2011; Arnone et al., 2011; Davis, 2009). Children in the early years are highly responsive to visual, auditory, and sensory stimuli, so the appropriate organization of space, cleanliness, and availability of learning tools can stimulate their active engagement.

A well-structured environment also creates a feeling of safety and comfort, providing a stable foundation for learning (Mäkelä & Leinonen, 2021). Teachers can create a supportive atmosphere to encourage children's cognitive, social, and motor development. Facilitating preschoolers' exploration supports their development as it is an important tool for cognitive, social, and motor development (Adolph & Hoch, 2020; Johnstone et al., 2022). As students explore the world around them, they possess a natural drive for exploration. Students can develop cognitive skills such as observation, analysis, and problem-solving by allowing them to explore the environment, materials, and activities appropriate to their developmental stage. In addition, the exploration process also builds social skills, such as sharing, communicating, and collaborating with peers (Ansari & Khan, 2020).

The teacher's approach in guiding students during *Batik* learning is to apply pedagogical principles and show an understanding of the phase of students' fine motor needs. Teachers effectively present learning experiences stimulating students' fine motor development by providing assistance and guidance. The differentiation approach shows sensitivity to students' diverse ability levels (Mumpuniarti et al., 2020). The direction and reinforcement strengthen direct interaction with students. The post-learning *Batik* reflection conducted by the teacher exhibits high professionalism and provides excellent support for students' fine motor skills development. Engaging students through the discussion process and paying attention to their experiences is a step that shows teachers' concern for students' psychosocial aspects (Angkur, 2022). This method strengthens teacher-student relationships and allows teachers to customize teaching to individual needs.

Post-learning reflection is a means of evaluation and an avenue for continuously developing fine motor skills and other developmental aspects. It indicates that the effectiveness of *Batik Jumputan* learning supports educational value in the context of students' fine motor development. Through *Batik* activities, students not only train their eye-hand coordination but also gain stimulation of imagination and creativity, which are learning experiences that provide an important foundation for their fine motor development (Deni, 2021). Participating in activities that involve hand-eye coordination, like *batik making*, is essential to stimulating and developing skill abilities in students. The process entails utilizing the nerves in the fingers and palms to coordinate movements. It is crucial to consider students' varying levels of development while choosing appropriate learning methods (Hanifah et al., 2020). Therefore, teachers must understand the needs and abilities of students when using learning methods.

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Teachers' evaluations found it important to detail the differentiation methods applied and how these strategies affected student learning outcomes. Ensuring each student gets the support they need is key to delivering meaningful learning (Wali et al., 2023). Encouraging parents to understand the value of fine motor skill development in the classroom can improve the learning process at home and in the classroom (Firdaus, 2021). It is essential to continuously assess and update learning tactics in response to evaluation findings (Hamza et al., 2020). This will encourage teachers to continuously improve the quality of learning according to student's needs. Optimizing *Batik Jumputan* learning activities can improve results.

V. CONCLUSIONS

The teaching of *Batik Jumputan* positively impacts the development of students' hand-eye coordination and fine motor skills. Teaching approaches that pay attention to the principles of developmental psychology, setting the learning environment before activities, and differentiation in supporting student needs effectively support learning. A well-structured environment and teacher support in providing guidance and post-learning reflection also contribute to developing fine motor skills.

This research is limited to a specific context. The results of this research need to be further developed in a broader context, for researchers who will research similar topics can expand the scope of research by considering variations in contextual factors. In addition, a valuable research focus can be a deepening understanding of the impact of *Batik Jumputan* teaching on students' psychosocial aspects and long-term effects.

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