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Implementation of Origami Paper Folding Activities in Developing Fine Motor Skills of Children Aged 4-5 Years at RA Asaasuttarbiyah Mande

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ABSTRACT

Fine motor development is an essential aspect of early childhood development that requires appropriate stimulation through meaningful learning activities. This study aimed to describe the implementation of origami paper-folding activities in developing the fine motor skills of children aged 4-5 years at RA Asaasuttarbiyah Mande and to identify the supporting and inhibiting factors. This study employed a qualitative descriptive approach involving one teacher and 17 Group A children. Data were collected through observation, semi-structured interviews, and documentation, and analyzed using the Miles and Huberman interactive model. The findings showed that origami paper-folding activities were implemented through systematic stages of preparation, apperception, demonstration, activity implementation, scaffolding, completion, and evaluation. Children's fine motor development was observed across four aspects: eye-hand coordination, manipulative movements, artistic skills, and hand movement control, with gradual development from pre-observation to the third observation. The supporting factors were the availability of learning media and children's enthusiasm, while the inhibiting factors were differences in children's motor abilities and difficulties in following sequential folding steps. The study provides a contextual description of origami implementation as a learning activity for stimulating fine motor development in early childhood.

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1. INTRODUCTION

Early Childhood Education (ECE) plays a fundamental role in optimizing all aspects of children's development as a foundation for their future growth. One developmental domain that requires appropriate stimulation is fine motor development, which involves the coordination of small muscles and eye-hand movements in activities requiring precision and controlled hand movements. Fine motor skills are important in supporting children's participation in various learning activities and daily tasks that require coordination between visual attention and hand movements (Anisa et al., 2021; Siregar, 2024). For children aged 4-5 years, fine motor development includes the ability to coordinate eye and hand movements, perform manipulative movements, produce simple artworks, and control hand movements. These abilities require learning experiences that provide children with opportunities to practice coordinated and controlled movements through meaningful activities.

One learning activity that can stimulate fine motor development is origami paper-folding. The activity requires children to manipulate paper, fold it according to sequential steps, align the edges, press the folds, and coordinate their visual attention with hand and finger movements. Research by (Anisa et al., 2021) found that origami activities contributed to the development of fine motor skills in children aged 4-5 years. Similarly, (Innes et al., 2023) reported improvements in the fine motor skills of children aged 4-5 years through paper-folding origami activities. More recent research has also demonstrated the potential of origami activities in stimulating children's fine motor development (Fitriyah & Jazuly, 2025; Siregar, 2024). These findings indicate that origami can provide children with meaningful opportunities to practice coordination, precision, and controlled hand movements.

Although previous studies have demonstrated the potential of origami activities in supporting children's development, several substantive aspects remain insufficiently explored. Hosotani (2025) examined origami activities primarily in relation to the development of children's creativity. The study therefore provides evidence regarding the contribution of origami to creative development, but the development of fine motor skills was not positioned as the main developmental focus. Dewanti et al. (2025) examined the use of origami media to improve fine motor skills among early childhood learners and reported an increase in children's achievement following the implementation of the learning activities. However, the study primarily emphasized changes in children's fine motor achievement rather than examining in depth how the origami activity was implemented as a complete learning process and how teacher guidance was provided according to children's needs. Adetya & Gina (2022) also investigated the development of children's fine motor skills through paper-folding origami activities and found that origami could support children's fine motor development. Nevertheless, the study focused primarily on the development of children's abilities through the activity and did not comprehensively describe the implementation process, including the preparation of activities, teacher demonstration, children's practice, forms of assistance provided by teachers, and evaluation of the learning process.

The limitations of these previous studies indicate that research on origami has predominantly emphasized its contribution to children's developmental outcomes, while the implementation of origami as an integrated learning process has received less attention. This distinction is important because the developmental benefits of origami are not determined solely by the use of origami media, but are also related to how learning activities are prepared, demonstrated, practiced, guided, and evaluated. During origami activities, children may demonstrate different levels of ability in following instructions, coordinating their eyes and

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hands, manipulating paper, controlling their hand movements, and completing folding steps. Therefore, teacher assistance and the organization of learning activities are important aspects that need to be examined to understand how origami can be implemented to stimulate children's fine motor development.

This condition is consistent with the preliminary observation conducted in Group A of RA Asaasuttarbiyah Mande involving 17 children aged 4-5 years. The observation indicated that several children still required stimulation in eye-hand coordination, manipulative movements, artistic activities, and hand movement control. These conditions indicate the need for learning activities that provide direct and meaningful opportunities for children to practice coordinated and controlled hand movements. Origami paper-folding is considered relevant to these needs because the activity involves sequential movements, manipulation of concrete materials, eye-hand coordination, and controlled use of the fingers and hands.

Based on the limitations of previous studies and the conditions identified in the research setting, a research gap remains concerning the comprehensive implementation of origami paper-folding activities as a learning process for stimulating fine motor development. Previous studies have provided evidence of the benefits of origami for children's fine motor skills and creativity, but less attention has been given to describing how the activity is implemented through the stages of preparation, implementation, teacher assistance, completion, and evaluation, as well as the supporting and inhibiting factors that influence its implementation. Therefore, this study aims to describe the implementation of origami paper-folding activities in developing the fine motor skills of children aged 4-5 years at RA Asaasuttarbiyah Mande and to identify the supporting and inhibiting factors influencing its implementation.

2. METHODS

This study employed a qualitative descriptive approach to obtain a comprehensive and contextual description of the implementation of origami paper-folding activities in developing the fine motor skills of children aged 4-5 years at RA Asaasuttarbiyah Mande. A qualitative descriptive approach was selected because the purpose of the study was to describe the learning process as it occurred naturally in the classroom, including the preparation of activities, teacher demonstrations, children's participation, teacher assistance, completion of activities, evaluation, and the supporting and inhibiting factors encountered during implementation. This approach enabled the researcher to remain close to the data and describe the phenomenon based on observations, participants' explanations, and documentation without manipulating the learning conditions.

The participants were selected purposively based on their relevance to the research objectives. The participants consisted of 17 children in Group A, aged 4-5 years, and one classroom teacher who was directly involved in planning and implementing the origami activities. The selection criteria for the children were that they were registered as Group A students at RA Asaasuttarbiyah Mande, were within the 4-5-year-old age range, and participated in the learning activities observed during the study. The classroom teacher was selected as the key informant because she was directly responsible for preparing, guiding, implementing, and evaluating the origami paper-folding activities. These criteria ensured that the participants had direct experience with the phenomenon being investigated and could provide data relevant to the research questions.

Data were collected through participatory observation, semi-structured interviews, and documentation. Participatory observation was conducted during three learning meetings involving the 17 children in Group A. The researcher observed the implementation of origami

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activities from the preparation stage through the completion and evaluation stages. The observation focused on the teacher's preparation and delivery of the activity, children's participation, eye-hand coordination, manipulative movements, artistic activities, control of hand movements, forms of teacher assistance, and children's responses during the activity. Field notes were used to record relevant events, behaviors, interactions, and changes observed throughout the learning process.

Semi-structured interviews were conducted with the Group A classroom teacher to obtain information that could complement and clarify the observation findings. The interview consisted of 15 questions covering the preparation of origami activities, selection of learning materials, implementation procedures, teacher guidance and assistance, children's responses and development, evaluation activities, and supporting and inhibiting factors. The interviews were conducted in four rounds during the research process. The semi-structured format allowed the researcher to follow the predetermined questions while also asking additional questions when clarification of particular findings was required.

Documentation was used to complement the observation and interview data. The documentation consisted primarily of photographs of the learning activities and children's work produced during the origami activities. The photographs were used to document the implementation process, children's participation, teacher assistance, and the results of the activities. Documentation was not analyzed separately but was used as supporting evidence to confirm information obtained through observation and interviews.

The data were analyzed interactively throughout the research process. First, the researcher organized and reviewed all data obtained from observation notes, interview results, and documentation. Second, data reduction was conducted by selecting, focusing, and organizing information relevant to the research questions. Irrelevant information was excluded, while data concerning the implementation stages, children's fine motor development, teacher assistance, and supporting and inhibiting factors were retained and grouped according to the research focus. Third, the reduced data were displayed in the form of descriptive narratives and supporting tables to facilitate the identification of patterns and relationships among the findings. Fourth, conclusions were drawn by interpreting the patterns identified in the displayed data and verifying them against the original observation, interview, and documentation data. The analysis was conducted iteratively, meaning that emerging findings were continuously compared with the available data to ensure that the conclusions remained consistent with the evidence.

The trustworthiness of the data was ensured through source and technique triangulation. Source triangulation was conducted by comparing information obtained from the classroom teacher with observations of the children's activities and supporting documentation. Technique triangulation was conducted by comparing findings obtained through observation, interviews, and documentation. When information obtained from different sources and techniques showed consistency, it was considered to strengthen the credibility of the findings. This process enabled the researcher to develop a more comprehensive description of the implementation of origami paper-folding activities and the factors influencing its implementation.

3. RESULT AND DISCUSSION

3.1. Implementation of Origami Paper-Folding Activities in Developing Fine Motor Skills of Children Aged 4–5 Years at RA Asaasuttarbiyah Mande

The findings obtained from observations, interviews, and documentation revealed that the implementation of origami paper-folding activities at RA Asaasuttarbiyah Mande was carried

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out through several stages, namely preparation, apperception, demonstration, activity implementation, scaffolding, completion, and evaluation. These stages were conducted systematically and were adjusted to the learning objectives and the developmental characteristics of children aged 4-5 years.

During the preparation stage, the teacher prepared the daily lesson plan, selected origami paper as the learning medium, determined the folding model according to the learning theme and children's abilities, prepared examples of the expected products, and arranged the learning environment. The preparation of the materials and learning environment enabled the children to participate in the activity with materials that were appropriate to their developmental level. The teacher also considered the level of difficulty of the folding model so that the activity could be followed by the children.

The preparation stage was followed by apperception. At this stage, the teacher introduced the learning theme through simple conversations and questions related to children's previous experiences. The teacher also showed examples of origami products to attract children's attention and encourage their interest in the activity. The apperception process helped children understand the activity they were going to undertake and prepared them to participate in the subsequent stages.

During the demonstration stage, the teacher showed the folding process step by step. Each movement was demonstrated gradually so that the children could observe the position of the paper, the direction of the fold, and the way in which the fold was pressed. The teacher repeated certain steps when children had difficulty understanding the instructions. This process was important because origami requires children to follow sequential movements while simultaneously coordinating visual attention with hand and finger movements.

In the implementation stage, the children practiced folding the origami paper by following the teacher's instructions. At the beginning of the activity, several children still experienced difficulties in coordinating their eyes and hands, manipulating the paper, and controlling their hand movements. Some children were unable to follow the folding sequence independently and required assistance from the teacher. As the activities progressed, however, the children demonstrated greater concentration and were increasingly able to follow the folding steps independently.

The teacher provided scaffolding throughout the activity. Assistance was initially provided more directly to children who experienced difficulties, particularly when positioning the paper, determining the direction of the fold, and pressing the folded part. As children became more familiar with the folding process, the teacher gradually reduced direct assistance and encouraged them to complete the activity independently. This form of assistance allowed children to continue practicing their abilities while receiving support according to their individual needs.

After the children completed their origami products, the teacher provided opportunities for them to show and present their work. The completion stage was followed by an evaluation through simple questions and conversations about the activity that had been carried out. The teacher also provided positive reinforcement and appreciation for the children's efforts. The evaluation was not limited to the final appearance of the origami product but also considered children's participation and their ability to follow the folding process.

The implementation of these stages indicates that origami paper-folding activities provided children with direct learning experiences involving the manipulation of concrete materials. The activity required children to observe, follow sequential instructions, coordinate eye and hand movements, manipulate paper, and control their finger and hand movements. Thus, the learning process provided opportunities for children to practice several components

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of fine motor development within a structured and meaningful activity. The development of children's fine motor skills during the implementation of origami paper-folding activities is presented in **Table 1**.

Table 1. Recapitulation of Children's Fine Motor Skill Development from Pre-Observation to Observation III

Fine Motor Skill Development				
Observed Aspect	**Pre-Observation**	**Observation I**	**Observation II**	**Observation III**
Eye-hand coordination	NYD = 10	NYD = 4	NYD = 0	NYD = 0
	BD = 7	BD = 8	BD = 5	BD = 0
	DAE = 0	DAE = 5	DAE = 10	DAE = 5
	VWD = 0	VWD = 0	VWD = 2	VWD = 12
Manipulative movements	NYD = 10	NYD = 4	NYD = 0	NYD = 0
	BD = 7	BD = 12	BD = 9	BD = 0
	DAE = 0	DAE = 1	DAE = 7	DAE = 9
	VWD = 0	VWD = 0	VWD = 1	VWD = 8
Artistic skills	NYD = 11	NYD = 3	NYD = 0	NYD = 0
	BD = 6	BD = 14	BD = 7	BD = 0
	DAE = 0	DAE = 0	DAE = 10	DAE = 7
	VWD = 0	VWD = 0	VWD = 0	VWD = 10
Hand movement control	NYD = 10	NYD = 6	NYD = 0	NYD = 0
	BD = 7	BD = 9	BD = 11	BD = 0
	DAE = 0	DAE = 2	DAE = 4	DAE = 11
	VWD = 0	VWD = 0	VWD = 2	VWD = 6

Note:
NYD : Not Yet Developed
BD : Beginning to Develop
DAE : Developed as Expected
VWD : Very Well Developed

As shown in **Table 1**, progressive development was observed across all four assessed aspects from the pre-observation stage to Observation III. In the aspect of eye-hand coordination, the number of children classified as Not Yet Developed (NYD) decreased from 10 children during pre-observation to 4 children in Observation I and reached zero in Observation II and Observation III. At the same time, the number of children classified as Very Well Developed (VWD) increased from zero during pre-observation to two children in Observation II and 12 children in Observation III.

A similar pattern was found in manipulative movements. During pre-observation, 10 children were classified as NYD and seven as Beginning to Develop (BD). By Observation III, no children remained in the NYD or BD categories, while nine children were classified as Developed as Expected (DAE) and eight as VWD. This indicates that children increasingly demonstrated the ability to manipulate the paper and perform folding movements with greater control.

In artistic skills, 11 children were initially classified as NYD and six as BD. By Observation II, the number of children classified as DAE increased to 10, while by Observation III, seven children were classified as DAE and 10 as VWD. The development observed in this aspect was

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reflected in the children's increasing ability to complete and produce origami work according to the activity instructions.

The hand movement control aspect also demonstrated progressive development. During pre-observation, 10 children were classified as NYD and seven as BD. In Observation II, four children had reached DAE and two had reached VWD. By Observation III, 11 children were classified as DAE and six as VWD, with no children remaining in the NYD or BD categories.

Overall, the observation findings indicate a gradual shift from the lower developmental categories toward DAE and VWD across the four fine motor aspects. This development was observed alongside the children's increasing familiarity with the folding procedures, repeated opportunities to practice, and the gradual reduction of direct teacher assistance. The findings suggest that the implementation of origami provided children with opportunities to repeatedly practice coordinated and controlled hand movements within a meaningful learning activity.

These findings are in line with previous research showing that origami activities can support the development of fine motor skills among young children. Anisa et al. (2021) found that origami activities contributed to the development of fine motor skills in children aged 4-5 years. Innes et al. (2023) also reported improvements in fine motor skills among children aged 4-5 years through paper-folding origami activities. More recent studies have similarly reported positive development in children's fine motor abilities through origami-based activities (Fitriyah & Jazuly, 2025; Siregar, 2024).

However, the present findings provide a different contribution by emphasizing the implementation process rather than only changes in children's developmental outcomes. The observations demonstrate how the stages of preparation, apperception, demonstration, implementation, scaffolding, completion, and evaluation were connected to children's participation and gradual development. In particular, the reduction of direct teacher assistance as children became more familiar with the folding process indicates that teacher guidance was an important component of the learning process.

3.2. Supporting and Inhibiting Factors in the Implementation of Origami Paper-Folding Activities to Develop the Fine Motor Skills of Children Aged 4-5 Years at RA Asaasuttarbiyah Mande

The findings from observations, interviews, and documentation revealed that the implementation of origami paper-folding activities in developing the fine motor skills of children aged 4-5 years at RA Asaasuttarbiyah Mande was supported by the availability of learning media and children's enthusiasm during the activities. The availability of origami paper as a learning medium enabled children to participate directly in the folding activities. The use of concrete learning media provided children with opportunities to practice hand movements and coordinate their eyes and hands while completing the folding tasks.

Children's enthusiasm was another supporting factor observed during the implementation of the activities. The children showed interest in participating in the origami activities and were willing to follow the teacher's instructions and practice the folding steps. Their active participation helped create a positive learning atmosphere and provided opportunities for children to repeatedly practice the movements involved in paper folding. This finding is consistent with previous research showing that origami activities can provide opportunities for children aged 4–5 years to develop fine motor skills through direct involvement in paper-folding activities (Anisa et al., 2021; Innes et al., 2023).

Despite these supporting factors, the implementation of origami paper-folding activities also encountered several inhibiting factors. The first was differences in the children's fine motor abilities. Each child demonstrated a different level of ability in coordinating eye and

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hand movements, manipulating the paper, and controlling hand movements. Some children were able to follow the activity with relatively little assistance, whereas others required more guidance from the teacher. These differences affected the pace at which children completed the folding activities.

The second inhibiting factor was children's difficulty in following the sequential steps of paper folding. Some children experienced difficulty understanding and imitating the folding movements demonstrated by the teacher, particularly when several folding steps had to be completed in sequence. Children who had difficulty with one step tended to experience further difficulties when proceeding to the next step. Consequently, the teacher needed to repeat the demonstration and provide assistance to children who had not yet been able to follow the folding sequence independently.

The teacher responded to these difficulties by adjusting the learning process according to the children's individual abilities. The teacher repeated the folding demonstrations, provided assistance when children encountered difficulties, and gave children sufficient opportunities to practice the movements. This gradual assistance enabled children to participate in the activities according to their respective abilities. The findings are in line with recent research indicating that origami activities can support the development of fine motor skills in early childhood, although children may demonstrate different levels of development during the activity (Anisa et al., 2021; Fitriyah & Jazuly, 2025).

Overall, the findings indicate that the implementation of origami paper-folding activities at RA Asaasuttarbiyah Mande was supported primarily by the availability of appropriate learning media and children's enthusiasm to participate in the activities. At the same time, differences in children's fine motor abilities and difficulties in following sequential folding steps presented challenges during implementation. These findings suggest that the implementation of origami activities requires learning media that can be directly used by children as well as instructional adjustments that accommodate differences in children's abilities and their level of mastery of the folding sequence.

3.3. Discussion of the Implementation of Origami Paper-Folding Activities in Fine Motor Development

The findings of this study indicate that the implementation of origami paper-folding activities provided children aged 4-5 years with direct learning experiences involving various aspects of fine motor development. The learning activities were conducted through several stages, including preparation, apperception, demonstration, implementation, scaffolding, completion, and evaluation. Through these stages, children were given opportunities to coordinate their eyes and hands, manipulate paper, control hand movements, and produce simple artistic products. The results of the observations showed that these abilities developed gradually throughout the learning sessions.

The development observed from the pre-observation stage to Observation III indicates that children became increasingly capable of participating in the folding activities. In the initial stage, several children experienced difficulties in coordinating eye and hand movements, manipulating the paper, producing artistic work, and controlling their hand movements. Following repeated participation in the origami activities, the number of children who reached the Developed as Expected and Very Well Developed categories increased, while children in the Not Yet Developed category decreased and eventually reached zero in Observation III across all observed aspects. This finding indicates that repeated practice through structured paper-folding activities provided children with opportunities to become familiar with the movements and procedures involved in origami.

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This finding is consistent with Ga & Machmud (2022), who reported improvements in children's fine motor skills through color paper-folding activities. Their findings demonstrate that paper-folding activities can provide children with opportunities to practice controlled hand movements and develop fine motor abilities. Similarly, Innes et al. (2023), who specifically examined children aged 4-5 years, found improvements in fine motor skills following the implementation of origami paper-folding activities. More recent research by Azahra (2025) also reported improvements in children's fine motor skills through origami activities. These findings are consistent with the present study, particularly in demonstrating that paper-folding activities provide direct opportunities for children to practice precision, coordination, and controlled hand movements.

The development of fine motor skills observed in this study is also relevant to the broader understanding of fine motor development in early childhood. Strooband et al. (2023) emphasized the importance of assessing fine motor skills during the preschool period because these skills involve children's ability to perform controlled movements and are relevant to their development and participation in early childhood activities. In the context of the present study, the four observed aspects-eye-hand coordination, manipulative movements, artistic skills, and hand movement control-illustrate different forms of fine motor performance that emerge during children's engagement with origami activities.

The present findings also correspond with Fitriyah & Jazuly (2025), who found that origami paper-folding activities were associated with the development of fine motor skills among children aged 4-5 years. However, the present study extends the findings of previous research by focusing not only on changes in children's fine motor development but also on the implementation process through which those changes occurred. Previous studies have generally emphasized the improvement or effect of origami activities on children's fine motor abilities, whereas this study provides a qualitative description of the stages of implementation, children's responses during the activities, and the factors that supported and inhibited the learning process.

The findings further indicate that differences in children's initial motor abilities influenced their participation in the origami activities. Some children were able to follow the folding instructions with relatively little assistance, whereas others required repeated demonstrations and greater teacher support. This finding is important because children do not enter learning activities with identical levels of motor development. Recent research has highlighted the importance of recognizing individual differences in motor skill learning and considering children's different levels of ability when providing learning experiences (Hudson et al., 2021). Therefore, origami activities should be implemented flexibly so that children can participate according to their respective developmental levels.

The difficulty experienced by some children in following the sequential folding steps also demonstrates that origami activities require children to perform a series of coordinated movements in the correct order. When children had difficulty completing one step, they often required additional guidance before proceeding to the next step. The teacher therefore repeated demonstrations and provided assistance according to the difficulties experienced by individual children. This finding reinforces the importance of adjusting learning activities to children's abilities rather than applying identical expectations to all children.

The supporting and inhibiting factors identified in this study further strengthen this interpretation. The availability of learning media and children's enthusiasm supported their participation in the activities, whereas differences in motor abilities and difficulties in following the folding sequence presented challenges. Thus, the implementation of origami activities cannot be separated from the learning conditions and the characteristics of the

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children involved. Appropriate learning media provide children with opportunities for direct practice, while teacher adjustments are needed to accommodate differences in children's abilities.

Overall, this study contributes to the existing literature by providing a qualitative description of the implementation of origami paper-folding activities in developing fine motor skills among children aged 4-5 years. The contribution of this study lies not only in showing the development of children's fine motor skills but also in describing how the learning process was organized, how children responded to the folding activities, and how supporting and inhibiting factors influenced implementation. Therefore, origami paper-folding activities can be understood not merely as an activity for producing paper crafts, but as a structured learning experience that provides opportunities for children to practice coordination, manipulation, precision, and hand movement control within an early childhood learning environment.

4. CONCLUSION

This study concludes that the implementation of origami paper-folding activities provided meaningful opportunities to support the development of fine motor skills in children aged 4-5 years at RA Asaasuttarbiyah Mande. The activities were implemented through systematic stages, including preparation, apperception, demonstration, activity implementation, scaffolding, completion, and evaluation. The observations showed gradual development in children’s eye-hand coordination, manipulative movements, artistic skills, and hand movement control throughout the learning sessions.

The implementation was supported by the availability of learning media and children’s enthusiasm for participating in the activities. However, differences in children’s motor abilities and difficulties in following the sequential folding steps became inhibiting factors that required adjustments in the learning process. These findings indicate that origami paper-folding activities can be used as a learning activity that provides children with opportunities to practice coordinated, controlled, and manipulative hand movements while participating actively in the learning process.

The main contribution of this study is its qualitative description of the implementation process rather than merely measuring changes in children’s fine motor skills. The study describes the stages of learning activities as well as the supporting and inhibiting factors encountered during implementation. Nevertheless, this study has limitations. The research was conducted in only one early childhood education institution and involved a relatively small group of 17 children aged 4-5 years. In addition, the observations were conducted over three learning sessions, so the findings provide a contextual description of the implementation and cannot be generalized to all early childhood education settings. Further research could involve a larger number of participants, different educational settings, and a longer observation period to obtain a broader understanding of the implementation of origami activities in supporting children’s fine motor development.

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6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the conduct of this research and the publication of this article. The authors also confirm that this manuscript is an original work, has not been published previously, and is free from plagiarism.

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