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Utilizing Natural Materials to Stimulate Creativity in Children Aged 5–6 Years: A Classroom Action Research Study in Early Childhood Education

[1]Fitri Febri Handayani, [2]Triyana, [3]Sefriyanti, [4]Amalia Husna, [3]Husnul Hafidhoh

[1]Semarang State University, Semarang, Central Java, Indonesia
[2]Manado State University, North Sulawesi, Indonesia
[3]Darussalam Islamic Higher Education Institute of Lampung, Lampung, Indonesia
[4]Padang State University, West Sumatra, Indonesia
[5]Kuningan Islamic Higher Education Institute, West Java, Indonesia

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Corresponding Author:
Fitri Febri Handayani
handayanifitrifebri@mail.unnes.ac.id

ABSTRACT: Early childhood education plays a crucial role in stimulating creativity as a foundation for developing high-quality human resources. Children's creativity can be fostered from an early age through meaningful and contextual learning experiences, one of which involves the use of natural materials closely connected to children's everyday environments. This study aimed to examine improvements in creativity among children aged 5–6 years through the use of natural-material-based learning media in early childhood education settings. This study employed a Classroom Action Research (CAR) design based on the Kemmis and McTaggart model, implemented in two cycles. The participants consisted of 25 children from Group B at PAUD Kasih Ibu, Kempas District. Data were collected through structured observation and field notes, while data analysis used percentage techniques to identify changes in children's creativity across action cycles. The findings indicate that the use of natural materials effectively and gradually enhances children's creativity. Improvements were observed in children's abilities to explore, imagine, try new ideas, and express ideas independently. These results suggest that natural materials function as effective contextual learning media that support creativity development in early childhood. Therefore, this study provides practical implications for early childhood educators in designing creative, contextual, and sustainable learning experiences.

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INTRODUCTION

Education plays a crucial role in determining the success of a nation's development, as the quality of human resources is strongly influenced by the effectiveness of its education system (Noviana et al., 2019). Efforts to improve educational quality should therefore begin at the earliest level, namely Early Childhood Education (ECE). ECE serves as a fundamental foundation for human resource development, as children aged 0–6 years are in a critical period of optimal growth and development, often referred to as the golden age, which significantly influences later stages of life (Anzani et al., 2020).

During this period, children require appropriate and meaningful stimulation to support holistic development, including cognitive, socio-emotional, motor, language, artistic, and creative aspects (Handayani, 2022; Nelly & Mayar, 2020). Consequently, learning activities in ECE must be designed to be contextual, meaningful, and aligned with children's developmental characteristics. Learning experiences that are concrete and directly connected to children's daily lives are more likely to stimulate active engagement and meaningful understanding.

In the context of 21st-century challenges, creativity has become an essential developmental competence that should be cultivated from an early age. Creativity is not merely defined as the ability to produce artistic works, but also encompasses flexible, original, and adaptive thinking skills that enable individuals to respond effectively to various situations and problems (Astini et al., 2021; Safi et al., 2021). Research indicates that creativity in early childhood develops through the interaction of personal characteristics, environmental conditions, learning processes, and the products created by children (Kusumawardani et al., 2018). Therefore, learning environments that provide opportunities for exploration, imagination, experimentation, and expression are crucial in fostering children's creativity.

Various studies have examined strategies for developing creativity in early childhood through activities such as drawing, storytelling, role-

playing, and other art-based learning experiences (Adinda et al., 2020; Debeturu & Wijayaningsih, 2019). However, in many early childhood education settings, learning media still tend to rely heavily on ready-made or manufactured materials. Such materials are often limited in variation and context, which may restrict children's opportunities to explore freely and express creative ideas according to their developmental needs (Anggraini et al., 2024; Oktari, 2017).

Natural materials offer a relevant and contextual alternative learning resource for early childhood education. These materials include objects readily found in the surrounding environment, such as sand, stones, leaves, twigs, seeds, shells, and other natural elements that are concrete, low-cost, and easily accessible (Arini & Fajarwati, 2020; Widyaningtyas et al., 2021; Handayani & Munastiwi, 2025). The use of natural materials in learning activities provides rich sensory experiences, increases children's engagement, and encourages the emergence of creative ideas through exploratory and constructive play.

Empirical studies over the past decade have shown that nature-based learning positively contributes to the development of creativity in early childhood. Interaction with natural materials allows children to experiment freely, develop imagination, and express ideas in original forms (Ekayati & Fitriani, 2020; Mar'ataini et al., 2020; Fajrie et al., 2024; Hariyanto, 2023; Qiromah et al., 2024; Rahmah et al., 2025). In addition, the use of natural materials in art and constructive play activities has been reported to enhance fluency and flexibility of thinking among children aged 5–6 years (Elvariani et al., 2024; Ulfah, 2024; Yunita et al., 2025).

Despite these findings, most previous studies have primarily focused on learning outcomes rather than examining the gradual and reflective process of creativity development. Empirical research employing Classroom Action Research (CAR) to systematically observe changes in children's creativity remains limited, particularly in local early childhood education contexts. Many existing studies rely on descriptive or one-shot experimental designs and do not utilize reflective action cycles to monitor creativity development based on observable indicators.

Based on this research gap, the novelty of the present study lies in its application of Classroom Action Research as a methodological approach to systematically and sustainably observe creativity development among children aged 5–6 years through the use of natural materials. Unlike

previous studies that emphasize final outcomes, this research focuses on the process of creativity improvement in each action cycle, encompassing the stages of planning, implementation, observation, and reflection. Therefore, this study contributes both methodologically and practically by providing empirical insights into the gradual and contextual use of natural materials in early childhood learning.

Accordingly, this study aimed to examine improvements in creativity among children aged 5–6 years through the use of natural-material-based learning media at PAUD Kasih Ibu, Kempas District. The findings are expected to contribute academically to the development of environment-based learning studies in early childhood education and to serve as a practical reference for educators in designing creative, contextual, and sustainable learning experiences.

METHOD

This study employed a Classroom Action Research (CAR) approach conducted collaboratively between the researcher and the classroom teacher. CAR was selected because it is appropriate for improving the quality of learning processes through real actions implemented directly in the classroom context. According to Kemmis and McTaggart, Classroom Action Research is a reflective and cyclical process that enables teachers and researchers to identify instructional problems, design improvement actions, and evaluate their impact systematically through repeated action cycles (as cited in Rahayu et al., 2021).

The research was conducted through four main stages: planning, action implementation, observation, and reflection. The classroom actions were implemented in two cycles, with each cycle consisting of three meetings. These repeated cycles were designed to provide children with gradual and continuous opportunities to explore natural materials and express creative ideas.

The research subjects consisted of all children aged 5–6 years (Group B) at PAUD Kasih Ibu, Kempas District, totaling 25 children. Natural materials were intentionally integrated into learning activities as the primary learning media to stimulate and observe the development of children's creativity throughout the action process.

Data were collected using structured observation and field notes. Observation was conducted using an observation sheet based on the

Guttman scale to assess children's creativity during learning activities involving natural materials. The Guttman scale was chosen because it is suitable for measuring observable behaviors using dichotomous responses ("Yes" or "No"), allowing for objective and consistent assessment of creativity indicators (Sugiyono, 2019).

The observation instrument was developed based on creativity indicators appropriate to early childhood developmental characteristics and the objectives of the study. Content validity was established through expert judgment involving the classroom teacher and early childhood education experts to ensure alignment between the indicators and the aspects of creativity being measured.

Field notes were used to record important events, children's responses, and classroom dynamics that were not captured through the observation sheets, thereby enriching the qualitative description of the learning process. Quantitative data were analyzed using percentage techniques based on the formula proposed by Sudijono (2019):

$$P = \frac{f}{N} \times 100\%$$

Where:

P = Percentage of indicator achievement

f = frequency of indicator occurrence

N = Number of children

The analysis results were interpreted using four creativity development criteria adapted from Arikunto (2015):

81% - 100% = Very Good

61% - 80% = Good

41% - 60% = Fair

21% - 40% = Poor

The success indicator of the study was achieved when the majority of children reached the Good or Very Good categories across the assessed creativity indicators (Hewi, as cited in Handayani, 2022). If these criteria were not met in a cycle, the research proceeded to the next cycle as part of the reflective improvement process. As a limitation, the findings of this study reflect learning conditions in a single class with a limited number of participants and are therefore not intended for broad generalization.

RESULTS AND DISCUSSION

Pre-cycle Analysis

The pre-cycle stage was conducted to identify the initial condition of children's creativity before the implementation of learning activities using natural materials. Preliminary observations were carried out in November 2021. Creativity indicators were adopted from the Early Childhood Creativity Profile developed by Kusumawardani et al. (2018).

Table 1. Children's creativity in the pre-cycle stage

Indicator	F	P (%)	Category
Asking questions	15	60	Fair
Demonstrating imagination	13	52	Fair
Trying new things	10	40	Poor
Exploring	10	40	Poor
Performing unique activities in their own way	14	56	Fair
Showing strong initiative	8	32	Poor
Viewing problems from multiple perspectives	9	36	Poor
Demonstrating artistic sensitivity	16	64	Good

The pre-cycle observation results showed that children's creativity was predominantly categorized as Fair and Poor across most indicators. Only one indicator, artistic sensitivity, reached the Good category. These findings indicate that learning activities conducted prior to the intervention were not yet effective in optimally facilitating children's creativity development.

This condition supports Vygotsky's view that children's creativity develops through direct interaction with meaningful social and material environments (Vygotsky, 2004). Limited exposure to concrete and exploratory learning materials may restrict children's opportunities to generate creative ideas and express them freely.

Cycle I Analysis

Cycle I was implemented from December 6 to December 8, 2021, through learning activities utilizing natural materials, such as creating butterfly shapes from leaves, tracing leaf patterns, and matching numbers using shells. Observation results indicated an improvement in children's creativity across most indicators compared to the pre-cycle stage.

Table 2. Children's creativity in cycle I

Indicator	F	P (%)	Category

Asking questions	20	80	Good
Demonstrating imagination	18	72	Good
Trying new things	15	60	Fair
Exploring	16	64	Good
Performing unique activities in their own way	18	72	Good
Showing strong initiative	14	56	Fair
Viewing problems from multiple perspectives	17	68	Good
Demonstrating artistic sensitivity	21	84	Very Good

Children began to demonstrate increased engagement in asking questions, exploring materials, and showing artistic sensitivity. However, several indicators, such as trying new things and showing strong initiative, remained in the Fair category. This suggests that children were still adapting to learning activities that emphasized independent exploration and creative expression.

According to Torrance's theory, creativity develops progressively through repeated exposure to environments that support freedom of expression and experimentation (Alabbasi et al., 2022). Therefore, the gradual improvement observed in Cycle I is consistent with the natural process of creativity development in early childhood.

Several challenges were identified during Cycle I, including excessive classroom noise due to high enthusiasm, difficulties in attaching natural materials, overuse of adhesive, limited attention to teacher instructions, and a tendency among children to imitate peers rather than generate original ideas. These challenges became the basis for reflection and instructional improvement in the next cycle.

Cycle II Analysis

Based on reflections from Cycle I, several improvements were implemented in Cycle II, including establishing simple classroom rules, using appropriate adhesive materials, applying visual and auditory cues for classroom management, providing step-by-step instructions, and offering positive reinforcement for creative efforts.

Cycle II was conducted from December 13 to December 15, 2021, through activities such as making collages with coconut pulp, stamping using banana leaf midribs, and forming letters with seashells. Observation results showed a significant improvement in all creativity indicators, with most reaching the Good and Very Good categories.

Table 3. Children's creativity in cycle II

Indicator	F	P (%)	Category
Asking questions	23	92	Very Good
Demonstrating imagination	23	92	Very Good
Trying new things	19	76	Good
Exploring	23	92	Very Good
Performing unique activities in their own way	20	80	Good
Showing strong initiative	18	72	Good
Viewing problems from multiple perspectives	22	88	Very Good
Demonstrating artistic sensitivity	24	84	Very Good

These findings indicate that natural materials functioned as open-ended learning media that encouraged divergent thinking, exploration, and independent decision-making. The reflective nature of Classroom Action Research enabled continuous adjustment of instructional strategies to better accommodate children's developmental needs.

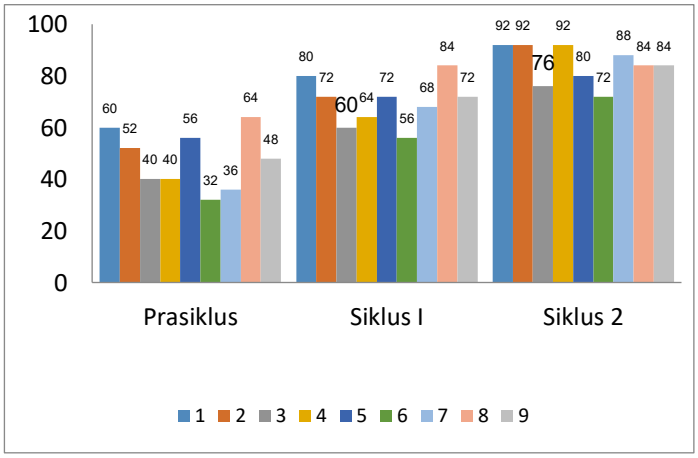

Figure 1. Recapitulation of children's creativity in pre-cycle, cycle I, and cycle II

The overall improvement from the pre-cycle stage through Cycle I and Cycle II demonstrates that creativity development occurs gradually through repeated and meaningful learning experiences. This finding aligns with Vygotsky's sociocultural theory, which emphasizes that creativity is constructed through social interaction and engagement with cultural and material tools (Vygotsky, 2004; Lev Vygotsky, 2011). In the context of this study, natural materials functioned as cultural artifacts that enabled children to actively interact with their environment, construct meaning, and express ideas through exploratory and constructive activities.

Furthermore, the incremental improvement from Cycle I to Cycle II also supports Torrance's perspective that creativity develops through sustained exposure to learning environments that promote freedom of thought and expression (Alabbasi et al., 2022). A psychologically safe learning environment that values diverse ideas allow children to experiment without fear of making mistakes, which is essential for fostering creative growth.

CONCLUSION

Based on the results of this study, it can be concluded that the use of natural-material-based learning media contributes positively to the development of creativity among children aged 5–6 years. The integration of concrete, contextual, and open-ended natural materials provided children with opportunities to explore, imagine, and express ideas independently within a supportive learning environment.

Through the cyclical and reflective process of Classroom Action Research, children's creativity was observed to develop gradually across action cycles, indicating that creativity is a developmental process fostered through continuous and meaningful learning experiences. The findings suggest that early childhood educators are encouraged to systematically integrate natural materials as alternative learning resources that are accessible, cost-effective, and relevant to children's everyday experiences.

Considering the limitations of this study, which involved a single institution and a limited number of participants, future research is recommended to involve more diverse educational contexts and to employ varied creativity assessment instruments in order to enrich empirical and methodological insights into early childhood creativity development.

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