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The Effect of Modified Bombik Play Activities on Children's Creativity: A Pre-Experimental Approach in Early Childhood Education

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Abstract
This study investigates the impact of modified bombik play activities on the creativity of children aged 5–6 years at Sani Ashilla II Kindergarten in Padang, Indonesia. Initial classroom observations indicated low levels of creativity, marked by children's dependency on teacher models and lack of initiative. Employing a quantitative approach with a pre-experimental One Group Pretest–Posttest Design, the study involved 12 purposively selected participants from a population of 82. Data were gathered using structured observation sheets based on early childhood creativity indicators and analyzed with normality, homogeneity, and paired-sample t-tests. Results revealed a statistically significant improvement in creativity scores ($t = 32.601 > t\text{-table} = 2.131$; $p < 0.05$), demonstrating the effectiveness of the modified bombik play intervention. The findings underscore the pedagogical value of culturally contextualized and developmentally appropriate play-based media in fostering children's imagination, initiative, and expressive abilities. This study contributes to early childhood education by offering empirical support for integrating creative media innovations, particularly those that are low-cost, tactile, and visually stimulating. However, the absence of a control group and the small sample size limit the generalizability of the results. Moreover, the short intervention duration may not capture long-term developmental impacts. Future research is recommended to involve larger and more diverse samples, utilize experimental or quasi-experimental designs with control groups, and explore longitudinal effects of creative play. These steps would strengthen the evidence base for incorporating play-based strategies into national early childhood curricula and policy frameworks.

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Introduction

Early childhood represents a foundational period often referred to as the golden age of development, in which every aspect of a child's growth—physical, cognitive, emotional, and spiritual—must be nurtured holistically (Diswiko, 2020; S. N. Hayati & Putro, 2021; Su & Sun, 2025). This stage is marked by significant neural plasticity and socio-affective responsiveness, providing a unique window for shaping foundational capabilities that influence lifelong learning trajectories (Ghanamah, 2024; Maslin et al., 2023). Education in this stage is not solely about academic preparation but also about fostering attitudes, values, and behaviors essential for social and personal adaptability (Ardini & Lestariningrum, 2018; Khasanah, 2022). Therefore, any intervention in early childhood education must be thoughtfully designed to address the integrated developmental domains of the child (Khasanah, 2022; Paramitha, 2022). Within this holistic perspective, creativity emerges as one of the most critical attributes to cultivate from an early age.

Creativity in early childhood serves as a vital developmental driver, closely tied to emotional expression, problem-solving ability, and cognitive flexibility (Debeturu & Wijayaningsih, 2019; Fakhriyani, 2016; Garaigordobil et al., 2022). The ability to think creatively contributes not only to intellectual development but also enhances children's capacity to

respond adaptively to new challenges and complex tasks (Khalaf et al., 2022; Setianingsih & Handayani, 2022). Creative skills formed in early years influence language use, emotional regulation, and motor learning (Ghanamah, 2024; Malinda, 2018; Yeh & Ting, 2023). Indeed, creative engagement supports integrative learning where children synthesize experiences into novel and meaningful outputs (Maslin et al., 2024; Rakimahwati & Husna, 2023). As such, strengthening creativity during early childhood is both developmentally strategic and pedagogically essential.

The creative characteristics of early childhood manifest through fluency in idea generation, flexibility in perspective-taking, originality in concept creation, elaboration in developing ideas, and sensitivity to surrounding stimuli (Anggia, 2018; S. N. Hayati & Putro, 2021; Rachmawati, 2012). These dimensions provide measurable and observable indicators of creative behavior and serve as benchmarks for evaluating the outcomes of educational programs (Hadi et al., 2022; Khasanah, 2022). Children with high creative potential often display spontaneous curiosity, high tolerance for ambiguity, and imaginative thinking that transcends immediate reality (Ardiyanto, 2017; Diyenti, 2017; Fakhriyani, 2016). Their mental imagery and symbolic play reflect internal cognitive restructuring processes that support abstract reasoning and problem-solving (Komsiyati, 2015; Nurmayani, 2019). These elements must be actively nurtured through enriched environments that encourage experimentation, inquiry, and self-expression.

Educational institutions are expected to play a central role in cultivating creativity by embedding developmentally appropriate practices into learning environments (Canton et al., 2021; N. Hayati & Fitri, 2016; Rakimahwati & Husna, 2023). This involves not merely introducing artistic or imaginative content but also integrating pedagogy that supports autonomy, risk-taking, and divergent thinking (Debeturu & Wijayaningsih, 2019; Diswiko, 2020; Yeh & Ting, 2023). Teachers act as facilitators who mediate exploration rather than impose conformity, allowing children to experience agency in their learning processes (Hadi et al., 2022; Maslin et al., 2023). Unfortunately, institutional constraints and rigid curricula often undermine these efforts, limiting the range of learning experiences offered (Khasanah, 2022; Komsiyati, 2015). Therefore, reconfiguring school-based learning to accommodate child-led creative expression remains an urgent pedagogical task.

Within this context, play emerges as an ideal vehicle for fostering creativity in young learners due to its open-ended, intrinsically motivated, and emotionally engaging nature (Ardiyanto, 2017; Garaigordobil et al., 2022; N. Hayati & Fitri, 2016). When children play, they explore possibilities, negotiate rules, and simulate reality, thereby constructing novel meanings and insights (Diswiko, 2020; Fauziah, 2017; Nurmayani, 2019). Play is not a peripheral activity but an essential mode of learning that enhances cognitive flexibility and innovation (Ardini & Lestariningrum, 2018; S. N. Hayati & Putro, 2021; Paramitha, 2022). Its impact is particularly profound in early childhood, where developmental progress is closely linked to imaginative and physical interaction with the environment (Ghanamah, 2024; Maslin et al., 2024; Su & Sun, 2025). Thus, the integration of play into structured educational settings is a critical strategy for promoting holistic and creative development.

Among the various types of play-based learning tools, bombik play offers a unique platform for stimulating children's creativity through hands-on, constructive engagement (Hadi et al., 2022; N. Hayati & Fitri, 2016; Samsiah, 2018). Bombik, traditionally made from colorful plastic materials, allows for the assembly of diverse imaginative forms such as robots, animals, or accessories (Ardiyanto, 2017; Debeturu & Wijayaningsih, 2019; Fakhriyani, 2016). The potential of bombik to evoke symbolic thought and collaborative meaning-making positions it as an effective stimulus for developing fluency, flexibility, and originality (Diswiko, 2020; Hadi et al., 2022; Rachmawati, 2012). Furthermore, modifications to bombik using larger, repurposed materials and culturally relevant images enhance its contextual value and sustainability (N. Hayati & Fitri, 2016; Komsiyati, 2015; Paramitha, 2022). When integrated into classroom settings, such adapted play media can bridge traditional pedagogical gaps and enrich children's creative expression.

Preliminary observations conducted at Sani Ashilla II Padang revealed that children's creative engagement was relatively low due to a reliance on teacher-led activities and conventional media (Malinda, 2018; Setianingsih & Handayani, 2022; Urrahmah et al., 2021). Many children were unable to initiate or elaborate their work without adult models, signaling a lack of creative confidence and autonomy (Diswiko, 2020; Ghanamah, 2024; Khasanah, 2022). In several activities such as drawing or crafting, children appeared disengaged or distracted, suggesting that the learning environment did not sufficiently stimulate their imagination or curiosity (S. N. Hayati & Putro, 2021; Khalaf et al., 2022; Yeh & Ting, 2023). These observations underscore the inadequacy of traditional methods in addressing the multifaceted nature of creativity development (Ardini & Lestariningrum, 2018; Maslin et al., 2023; Nurmayani, 2019). In response, a more dynamic and child-centered approach, such as modified bombik play, is warranted.

The problem identified revolves around the lack of innovative strategies in early childhood settings to actively foster creativity through engaging, child-relevant methods (Diyenti, 2017; Fauziah, 2017; Khasanah, 2022). While the use of bombik has been acknowledged in prior studies, its modified form—integrating size variation and visual content—remains underexplored as a tool for creativity enhancement (Hadi et al., 2022; N. Hayati & Fitri, 2016; Paramitha, 2022). This gap suggests an opportunity to empirically examine how such modifications affect children's creative performance across various domains (Canton et al., 2021; Ghanamah, 2024; Su & Sun, 2025). The formulation of the research problem thus centers on evaluating the effectiveness of modified bombik activities in overcoming pedagogical limitations observed in early learning environments (Ardiyanto, 2017; Debeturu & Wijayaningsih, 2019; Maslin et al., 2023). Understanding this relationship is crucial for informing future curriculum and instructional design in early childhood education.

Accordingly, this study aims to determine the effect of modified bombik play activities on the creativity of 5-6-year-old children at Sani Ashilla II Padang. It is expected to contribute to the field by offering empirical evidence on how creative media innovations can address limitations in existing pedagogical practices (Diswiko, 2020; N. Hayati & Fitri, 2016; Maslin et al., 2024). The study also holds practical relevance for educators seeking contextually appropriate tools to stimulate young learners' imagination and problem-solving capacity (Ghanamah, 2024; Khalaf et al., 2022; Yeh & Ting, 2023). Beyond its immediate implications, the findings may encourage a broader pedagogical shift toward more playful, student-centered, and creativity-oriented early learning environments (Nurmayani, 2019; Paramitha, 2022; Samsiah, 2018). Ultimately, the research seeks to advance evidence-based practices that integrate imaginative play into the core of early childhood education.

Methods

Research Design

This study employed a quantitative approach using a pre-experimental design, specifically the One Group Pretest–Posttest Design (Nuryadi et al., 2017; Sugiyono, 2021). This design allowed the researchers to measure the effect of modified bombik play activities by comparing the creativity scores of children before and after the intervention. The absence of a control group was mitigated through repeated measures within the same participants, allowing internal comparison. The design was chosen to provide preliminary empirical evidence regarding the effectiveness of play-based interventions in early childhood settings. The research was conducted during the even semester of the 2024 academic year at TK Sani Ashilla II Padang.

Participants and Sampling

The population in this study consisted of 82 children aged 5–6 years enrolled at TK Sani Ashilla II Padang. From this population, 12 children were selected through purposive sampling, focusing on those who met the criteria for participation, such as being in the target age range, demonstrating average developmental readiness, and having parental consent (Kadir, 2019). The final sample included both male and female children representing diverse backgrounds.

Ethical considerations were addressed through informed consent from parents or guardians, and the anonymity of participants was maintained throughout the research process. The relatively small but focused sample enabled in-depth observation and assessment of individual creativity changes over time.

Data Collection Procedure and Instruments

Data collection was conducted using direct observation with structured observation sheets developed by the researchers. The observation sheet was designed based on creativity indicators adapted for early childhood, which included dimensions such as creative perseverance, curiosity, imagination, and expressive ability. Each child was observed during structured play sessions involving modified bombik activities. The intervention was carried out over six sessions, with each session guided by a detailed instructional plan aligned with early childhood learning principles. Observations were conducted before (pre-test) and after (post-test) the intervention to evaluate the development of children's creativity.

Data Analysis Techniques

Data were analyzed using parametric statistical tests, given that both the pre-test and post-test data met the assumptions of normality and homogeneity (Hardani et al., 2020). The normality test was performed using the Liliefors method, yielding results that confirmed normal distribution for both pre-test and post-test scores. Homogeneity of variance was assessed using the F-test, and results indicated that the data were homogeneously distributed. To test the research hypothesis, a paired-sample t-test was applied using Microsoft Excel 2013. The result showed that the t-value (32.601) exceeded the critical t-table value (2.131) at $\alpha = 0.05$, indicating a statistically significant effect of bombik play activity on children's creativity.

Creativity Indicators

The indicators of creativity used in this study were adapted for early childhood development and operationalized through observable behaviors. These included: (1) creative perseverance, such as maintaining interest in completing tasks; (2) curiosity and meaningful engagement; (3) imaginative thinking and initiative in completing tasks in original ways; and (4) expressive ability through various forms of play and art. These indicators formed the basis for assessment in both the pre-test and post-test phases and were aligned with validated child development frameworks (Rachmawati, 2012; Urrahmah et al., 2021).

Result

Preliminary Description of Research Data

This study was conducted at Sani Ashilla II Kindergarten in Padang during the even semester of the 2024 academic year. The research employed a quantitative approach using a pre-experimental method, specifically the One-Group Pretest-Posttest Design. This design was chosen to measure the effectiveness of the intervention—modified bombik play activities—in enhancing children's creativity by comparing performance before and after the treatment. The research design enabled the researchers to observe changes in the creativity scores of the same group of participants across different phases of the intervention process.

The population of the study consisted of 82 children aged 5 to 6 years. A purposive sampling technique was used to select 12 participants who met the inclusion criteria based on developmental readiness and parental consent. Data were collected through structured observation using predetermined creativity indicators tailored to early childhood development. The analysis involved parametric statistical techniques, as the data met the assumptions of normality and homogeneity. Statistical tests included the Liliefors test for normality, the F-test for homogeneity, and the paired sample t-test to examine the significance of differences between pretest and posttest scores. All statistical calculations were performed using Microsoft Excel 2013.

Indicators of Children's Creativity

The assessment of creativity in this study was based on developmental indicators specifically designed for children aged 5 to 6 years. These indicators reflect key behavioral expressions of creativity in early childhood, including cognitive flexibility, imagination, initiative, and expressive ability. The indicators were adapted and refined from existing theoretical and empirical frameworks to ensure relevance to the children's developmental stage. Each main indicator is further specified by sub-indicators that operationalize the observed behaviors during play-based activities. These components served as the foundation for structured observation throughout the intervention process.

Table 1. Indicators and Sub-Indicators of Creativity in Children Aged 5–6 Years

Main Indicator	Sub-Indicator
Demonstrates creative perseverance	The child shows strong and sustained interest in completing tasks
Exhibits interest in creative activities	a. The child demonstrates high curiosity b. The child engages in meaningful activities and asks questions
Displays imagination and originality	a. The child shows imaginative thinking b. The child initiates new activities in unique ways
Expresses creativity across different domains	a. The child expresses themselves through play, art, or performance b. The child appreciates aesthetics and beauty in their creations

These indicators were used as the primary reference for observing and assessing changes in each child's creative development before and after the implementation of the modified bombik play activities.

Pre-Test Result

The pre-test was administered prior to the intervention to determine the baseline level of creativity among the participants. Based on the collected data, individual scores ranged from a minimum of 8 to a maximum of 17 out of a possible 25 points. The mean pre-test score was 12.50, indicating a moderate level of creativity prior to the implementation of the modified bombik play activities. The distribution of scores revealed variability among participants, with several children showing relatively low creative expression. This suggests the necessity for targeted interventions to stimulate their creative development.

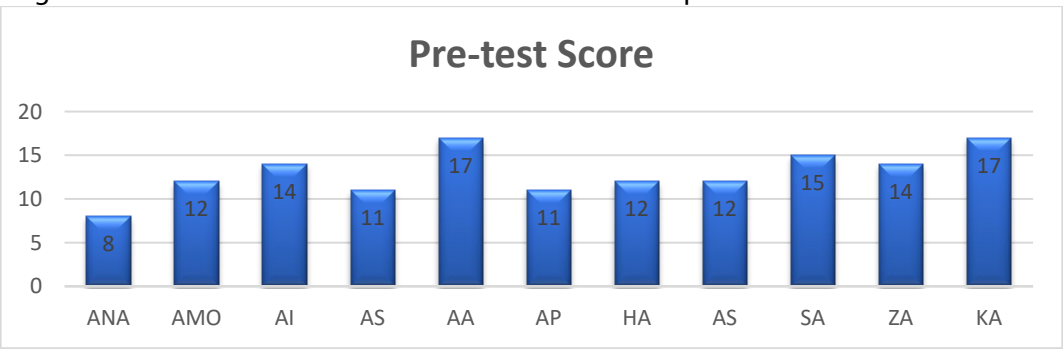

Figure 1. Pre-Test Scores of Individual Participants (N = 12)

Treatment

Following the pre-test, the intervention was carried out through the implementation of modified bombik play activities. The treatment consisted of six structured sessions, each guided by lesson plans aligned with the study's objectives and creativity indicators. These sessions involved collaborative, imaginative, and expressive play designed to foster curiosity, initiative, and aesthetic appreciation in children. Throughout the intervention, the researchers conducted

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continuous observations to monitor behavioral changes associated with creativity. The treatment phase served not only as a stimulus for learning but also as a dynamic context for assessing children's creative progress.

Post-Test Result

The post-test was conducted after the completion of all intervention sessions to evaluate the changes in children's creativity. The results showed a significant improvement in creativity scores, with post-test values ranging from 20 to 25. The average post-test score was 22.75, reflecting a marked increase compared to the pre-test average of 12.50. This gain of 10.25 points indicates the effectiveness of the bombik play activities in enhancing the creativity of the children. The data demonstrate a substantial upward shift across all participants, suggesting consistent positive outcomes of the treatment.

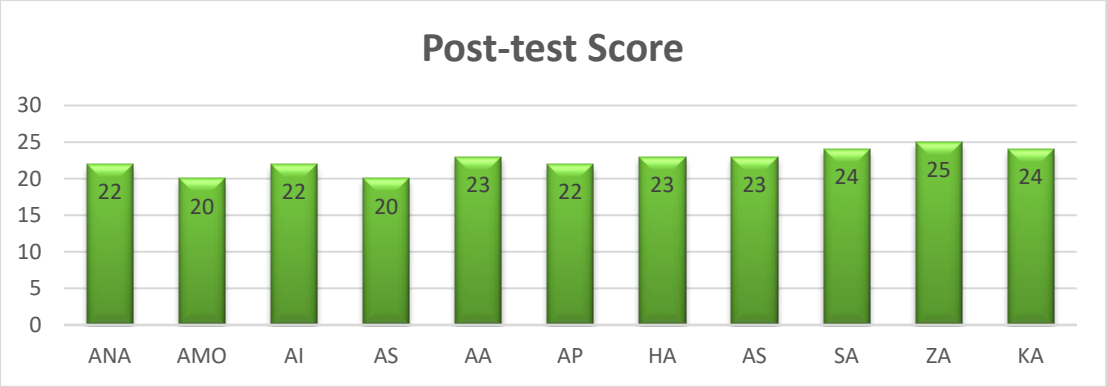

Figure 2. Post-Test Scores of Individual Participants (N = 12)

Statistical Assumption Testing

Before conducting inferential analysis to determine the effectiveness of the intervention, a series of assumption tests were performed to ensure the appropriateness of parametric statistical methods. These included the normality test, homogeneity of variance test, and hypothesis testing using a paired sample t-test. The significance level used in all analyses was set at $\alpha = 0.05$.

Normality Test

The normality test was conducted using the Liliefors method to determine whether the distribution of the pre-test and post-test scores approximated a normal distribution. The results indicated that the L-count value for the pre-test was 0.175 and for the post-test was 0.118, both of which were lower than the L-table value of 0.206. Since the calculated values were below the critical threshold (L-count < L-table), it can be concluded that the data from both the pre-test and post-test were normally distributed. This result confirms the validity of using parametric statistical tests for further analysis.

Table 2. Normality Test Results Using Liliefors Formula

Test	N	L-count	L-table (α = 0.05)	Conclusion
Pre-test	12	0.175	0.206	Normally distributed
Post-test	12	0.118	0.206	Normally distributed

Homogeneity Test

The homogeneity of variance test was used to determine whether the variance between the pre-test and post-test groups was equal. This test employed the F-test, where an F-count value of 1.685 was obtained, which was lower than the F-table value of 2.333. Because F-count < F-table, it was concluded that the variances of the two sets of data were homogeneous. This result supports the assumption of equal variances required for parametric testing.

Table 3. Homogeneity of Variance Test Results Using F-Test

Test	N	F-count	F-table (α = 0.05)	Conclusion
Pre vs Post	12	1.685	2.333	Homogeneous variance

Hypothesis Testing

To evaluate the effect of the modified bombik play activities on children's creativity, a paired sample t-test was conducted. The test compared the pre-test and post-test scores of the same group to determine whether the observed changes were statistically significant. The analysis yielded a t-count of 32.601, which was significantly higher than the critical t-table value of 2.131 at the 0.05 significance level. Since t-count > t-table, the null hypothesis (H_0) was rejected and the alternative hypothesis (H_1) was accepted. This result indicates a statistically significant improvement in children's creativity as a result of the intervention.

Table 4. Hypothesis Testing Results Using Paired Sample t-Test

Comparison	N	t-count	t-table (α = 0.05)	Conclusion
Pre vs Post	12	32.601	2.131	Significant difference (H_1 accepted)

Discussion

The significant increase in creativity scores observed in this study highlights the effectiveness of modified bombik play activities in stimulating creative development among children aged 5–6 years. After participating in six structured play sessions, the children's average score rose from 12.50 to 22.75, indicating not only numerical improvement but also behavioral changes that reflect more fluent, flexible, and original expressions of thought. These gains were consistently observed across participants, with every child showing higher post-test scores, which reinforces the reliability of the intervention's impact. Statistical analysis confirmed that the improvement was not due to chance; the paired sample t-test produced a t-value of 32.601—far exceeding the critical value at the 0.05 level. This provides robust evidence that bombik play, when modified with attention to form, color, and content relevance, can be an effective tool in enhancing early childhood creativity (Garaigordobil et al., 2022; Maslin et al., 2023; Su & Sun, 2025).

Beneath the statistical increase, the qualitative shifts in children's behaviors are especially noteworthy. During the early sessions, some children showed reluctance, limited initiative, or needed frequent prompts. However, as the activities progressed, those same children began initiating new ideas, constructing unique forms, and engaging in extended conversations about their creations. The indicators most prominently developed were perseverance in completing tasks, imaginative ideation, and expressive engagement across domains such as storytelling and symbolic representation (Debeturu & Wijayaningsih, 2019; Fakhriyani, 2016; Urrahmah et al., 2021). Observational notes captured children eagerly building imaginative shapes like spaceships, bracelets, and abstract figures using bombik materials, often without teacher modeling—demonstrating autonomy and originality in their approach to problem-solving and expression.

These transformations align closely with foundational theories of child development. Vygotsky's concept of the zone of proximal development emphasizes the role of socially mediated play in advancing cognitive functions, and this was clearly evident in how children scaffolded one another's ideas during group activities (Vygotsky, 1978). Similarly, the design of the modified bombik activities reflected Torrance's four key components of creativity—fluency, flexibility, originality, and elaboration—as evidenced in the increasing diversity, novelty, and complexity of the children's constructions (Fakhriyani, 2016; N. Hayati & Fitri, 2016). The tactile and visual nature of bombik also supported Piaget's emphasis on sensory-motor exploration during early childhood learning. In essence, the intervention became a medium where theory met practice, allowing for the natural expression of developmental potentials within a supportive environment.

What makes this study particularly valuable is its resonance with and contribution to existing research while also offering something distinct. Prior studies have found that creative games and hands-on manipulation enhance children's problem-solving and learning capacities, especially when those games are structured to invite exploration (Canton et al., 2021; Ghanamah, 2024; Hadi et al., 2022). The current findings affirm those conclusions but go further

by modifying the bombik play tools to reflect children's immediate experiences—using larger, colorful pieces with familiar images of animals and fruit—which may explain the heightened engagement and depth of response observed. This cultural and developmental adaptation sets the study apart from digital or abstract creative interventions that often lack sensory depth or contextual relevance (Maslin et al., 2024; Paramitha, 2022; Yeh & Ting, 2023). Instead of merely confirming existing models, the findings here suggest a way to localize and humanize creative learning tools for young children.

The modified bombik itself represents more than a toy; it becomes a pedagogical bridge between imagination and learning. The visual richness and manipulative structure of the bombik provided an aesthetic entry point, while its openness allowed children to negotiate meanings and express themselves beyond verbal boundaries (Anggia, 2018; Hadi et al., 2022; Rachmawati, 2012). The observed behaviors—children discussing their creations, altering their designs independently, or collaboratively extending peer work—illustrate that this form of play encourages elaboration and persistence, both of which are hallmarks of creative cognition. Teachers noted how previously reserved children began to speak more during sessions, offering narratives and explanations for their creations, which demonstrates how creative play can indirectly foster language and social-emotional development as well (Diyenti, 2017; Nurmayani, 2019; Samsiah, 2018). These observations reinforce the conclusion that carefully modified play materials can function as tools for deeper cognitive activation and personal expression.

Beyond its theoretical contributions, this study offers clear implications for early childhood education practices. For teachers, integrating bombik play into daily instruction provides a structured yet flexible platform for observing and nurturing individual creative growth. The low-cost, reusable nature of bombik makes it a sustainable option for under-resourced schools, while its adaptability allows educators to align it with various learning goals (Khasanah, 2022; Komsiyati, 2015; Setianingsih & Handayani, 2022). Curriculum developers might consider embedding similar play-based modules within early learning frameworks to balance academic preparation with creative exploration. At the policy level, the success of this intervention supports broader initiatives that prioritize creativity as a key learning outcome in early education, especially in post-pandemic contexts that call for adaptive and resilient learning environments (Ardiyanto, 2017; Fauziah, 2017; N. Hayati & Fitri, 2016). In sum, the results affirm that creativity can and should be cultivated from an early age through purposeful, enjoyable, and culturally sensitive pedagogical design.

Conclusion

The findings of this study demonstrate that modified bombik play activities significantly enhance the creativity of children aged 5–6 years at Sani Ashilla II Padang, as evidenced by the increase in mean scores from 12.50 to 22.75 and supported by the paired sample t-test result ($t = 32.601$, $p < 0.05$). This improvement indicates that play-based interventions, when culturally adapted and developmentally appropriate, can effectively stimulate imaginative thinking, expressive ability, and initiative in early childhood. The results affirm the value of integrating creative play into educational practice and offer empirical support for educators and curriculum designers seeking low-cost yet impactful strategies to enrich learning environments for young children. Future research may consider broader samples and comparative designs to further validate and expand these findings.

Declarations

Author Contribution Statement

All authors contributed equally and approved the final manuscript.

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Data Availability Statement

Data are available from the corresponding author upon reasonable request.

Declaration of Interests Statement

The author declares no conflict of interest.

Additional Information

No additional information is available.

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