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Sharpening Kindergarten Children's Creativity by Learning Numbers Through Plasticine

Nurhikmah[1]*, Nur Indah Purnamasari[2]
[1]Universitas Islam Negeri Alauddin Makassar, Indonesia
[2]Universitas Negeri Makassar, Indonesia
*Corresponding Author: hikmahnur192@gmail.com

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Abstract: This study aims to explore the effectiveness of using plasticine as a learning medium for numbers in kindergarten (TK) Wulil Amri Mannurukki. The research employs a qualitative approach with a descriptive method to observe and analyze the impact of plasticine use on the cognitive development, creativity, and fine motor skills of children aged 4–6 years. The study subjects consist of 20 kindergarten children in Gowa Regency who had never used plasticine in number learning. The results indicate that the use of plasticine significantly enhances children's understanding of numerical concepts, with 85% of the subjects able to recognize and form numbers 1–10 after the intervention. Additionally, plasticine stimulates children's creativity, as evidenced by their ability to further create with numbers and related objects. Fine motor skills also show positive development, marked by improved ability to manipulate plasticine and perform other motor activities. This study concludes that plasticine is an effective and enjoyable learning medium, particularly at TK Wulil Amri Mannurukki, as it not only strengthens children's numerical understanding but also hones their creativity and fine motor skills. Therefore, plasticine is worth considering as an alternative learning medium for numbers in early childhood education.
Keywords: Number learning, plasticine, kindergarten, creativity

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Abstrak: *Penelitian ini bertujuan untuk mengeksplorasi efektivitas penggunaan plastisin sebagai media pembelajaran angka di TK Wulil Amri Mannurukki. Penelitian ini menggunakan pendekatan kualitatif dengan metode deskriptif untuk mengamati dan menganalisis dampak penggunaan plastisin terhadap perkembangan kognitif, kreativitas, dan keterampilan motorik halus anak usia 4–6 tahun. Subjek penelitian terdiri dari 20 anak TK di Kabupaten Gowa yang sebelumnya belum pernah menggunakan plastisin dalam pembelajaran angka. Hasil penelitian menunjukkan bahwa penggunaan plastisin secara signifikan meningkatkan pemahaman anak terhadap konsep angka, dengan 85% subjek mampu mengenali dan membentuk angka 1–10 setelah intervensi. Selain itu, plastisin merangsang kreativitas anak, sebagaimana dibuktikan dengan kemampuan mereka dalam menciptakan bentuk angka dan objek terkait. Keterampilan motorik halus juga mengalami perkembangan positif, yang ditandai dengan meningkatnya kemampuan anak dalam memanipulasi plastisin serta melakukan aktivitas motorik lainnya. Penelitian ini menyimpulkan bahwa plastisin merupakan media pembelajaran yang efektif dan menyenangkan, khususnya di TK Wulil Amri Mannurukki, karena tidak hanya memperkuat pemahaman numerik anak tetapi juga mengasah kreativitas serta keterampilan motorik halus mereka. Oleh karena itu, plastisin layak dipertimbangkan sebagai media alternatif dalam pembelajaran angka di pendidikan anak usia dini.*
Kata kunci: *Pembelajaran angka, plastisin, taman kanak-kanak, kreativitas*

Introduction

Preschool education is essentially organized to facilitate children's growth and development. As stated in Law No. 20 of 2003, early childhood education (PAUD) is a developmental effort aimed at children from birth to six years old through the provision of educational stimulation to support their physical and spiritual growth and development, ensuring their readiness for further education Caron and James R Markusen (2016).

Early Childhood Education (PAUD) is designed to develop essential skills as a foundation for primary education and foster holistic self-development according to the principles of early and lifelong education. The aspects developed in early childhood education include habitual development, which covers social, emotional, independence, moral, and religious values, as well as basic skill development, which includes language, cognitive, and motor-physical development (Fauziah et al.). Growth is influenced by the quantity and type of food consumed, while development is affected by social and psychological factors and the quality of the child's relationship with caregivers, ensuring a stress-free environment Hayati and Arin Tawati, (2021).

According to Ministerial Regulation No. 58 of 2009, one of the standards for early childhood education is the standard for developmental achievement levels Joni, (2023). This standard provides an overview of the expected growth and development within a specific age range, covering aspects such as religious and moral values, physical, cognitive, language, and social-emotional development.

One of the crucial aspects that must be developed in early childhood learning is cognitive development. In Ministerial Regulation No. 137 of 2014 on National PAUD Standards, cognitive aspects include: (a) Learning and problem-solving, which involves the ability to solve simple everyday problems flexibly and socially acceptable ways while applying knowledge or experience in new contexts. (b) Logical thinking, which includes recognizing differences, classification, patterns, initiative, planning, and understanding cause-and-effect relationships. (c) Symbolic thinking, which encompasses the ability to recognize, name, and use numerical concepts, identify letters, and represent various objects and imaginations through drawings Supinah, Suryatik, and Eriani, (2024).

Childhood, particularly the kindergarten (TK) years, is a crucial period for cognitive and motor development. At this stage, children begin to grasp fundamental concepts that serve as a foundation for future learning, one of which is number recognition. However, introducing numbers to kindergarten children is not always easy. It requires creative, engaging, and enjoyable learning methods to help children effectively receive and understand numerical concepts.

Creative educators who utilize educational play materials as learning media have a significant impact on children's education and can also determine the quality and future development of PAUD Ceria Ayu Maisarah, Muchammad Eka Mahmud, and Wildan Saugi, (2020). Therefore, early childhood educators are required to be consistently creative and possess multi-competence in teaching young learners. A fun learning experience positively influences children's growth and development. Early childhood learners can easily absorb lessons when they are delivered through creative learning methods. One of the most effective and enjoyable methods is using plasticine.

Plasticine, as a moldable play material, offers various ways to enhance children's creativity while simultaneously introducing numbers in a playful setting. By using plasticine, children can form different numerical shapes, associate numbers with object quantities, and develop their fine motor skills. This approach not only strengthens their understanding of numbers but also stimulates their creativity and imagination. Learning numbers through plasticine provides children with an opportunity to engage in non-traditional

learning, focusing not only on the final outcome but also on an interactive and participatory learning process. This article will discuss the benefits and implementation strategies of using plasticine for number learning in kindergarten, highlighting how this method can foster creativity and essential skills from an early age.

Method

This study employs a qualitative approach with a descriptive method to explore the effectiveness of using plasticine in teaching numbers to kindergarten children Mutiara Magta Nina Astria, Made Sulastri, (2015). This method was chosen to gain an in-depth understanding of how plasticine can serve as a creative and interactive learning medium and its impact on children's cognitive development and creativity.

The research subjects were kindergarten children aged 4-6 years, enrolled at Wulil Amri Mannurukki Kindergarten, Gowa Regency. A total of 20 children participated in the study, consisting of 10 boys and 10 girls. The participants were selected using purposive sampling, with the criterion being children who had no prior experience using plasticine for number learning.
The primary research instruments used were observations, interviews, and documentation: 1) Observations were conducted during learning sessions where children interacted with plasticine to form numbers and engage in related activities. 2) Interviews were conducted with kindergarten teachers at Wulil Amri Mannurukki and parents to gain insights into the observed changes in children's cognitive abilities and creativity throughout the study. 3) Documentation included photographs of children's creations and teachers' daily notes regarding each child's progress during the study.

The collected data was analyzed using a qualitative descriptive method. Observation and interview data were coded and categorized into key themes such as fine motor skill development, numerical concept comprehension, and creativity. Documentation data were used to support research findings. To ensure data validity, the study employed data triangulation, comparing results from observations, interviews, and documentation. Additionally, member checking was conducted with teachers and parents to verify that the findings accurately reflected their experiences.

Result and Discussion

Playing with Plasticine

The Department of Education and Culture (Depdikbud), as cited in Rewinda, states that plasticine is a medium that can be used to develop children's fine motor skills Evin Oktania Ariska, (2021). Plasticine has a soft texture, making

it easy to shape into objects desired by children. Children enjoy playing with plasticine because it allows them to squeeze, press, and mold it into objects, animals, people, and other forms, in accordance with their creativity and imagination. Additionally, its vibrant colors serve as an attractive feature for children.

According to Jean Piaget, playing with plasticine can be classified as a constructive play activity, where children use materials to create or shape something. This activity enables children to develop cognitive abilities through direct manipulation and experimentation, helping them understand more complex concepts through exploration Siti Arlinah and Rohita, 2014. Meanwhile, Lev Vygotsky emphasized that play, including playing with plasticine, is a way for children to learn through social and cultural interaction Kartika Fajriani and Yeni Aslina, (2020). Engaging with plasticine allows children to express their imagination, experiment with new ideas, and participate in collaborative learning with peers or adults. These interactions are crucial for their language, cognitive, and social development Keysha Nur Shaffa Ap and others, (2024).

In general, playing with plasticine, as highlighted by experts, is an activity that is not only enjoyable but also highly beneficial for children's cognitive, social, and motor development. This activity provides children with opportunities to learn through exploration and experimentation, while also fostering essential skills for their holistic growth.

Figure 1. Introduction to Plasticine

The image represents the initial stage of introducing plasticine to children participating in a learning session. Each child appears focused and enthusiastic as they listen to the teacher's explanation about the purpose and usage of plasticine before engaging in play-based learning activities. Following the explanation, each child is given a portion of plasticine to hold and explore its texture. Their gestures indicate excitement and eagerness to interact with the material.

This aligns with Maria Montessori's perspective, which emphasizes that playing with plasticine supports the sensory-based learning approach she developed. According to Montessori, children learn best through direct

interaction with different textures and shapes. Plasticine provides a rich tactile experience, allowing children to enhance their fine motor skills, hand-eye coordination, concentration, and creativity.

Benefits of Learning with Plasticine

Learning with plasticine offers various significant benefits, especially for early childhood development(Nurhikmah). This study highlights the positive impact of using plasticine as a learning medium for numbers in preschool children, with key findings including:

1. **Improved Understanding of Numerical Concepts**

Introducing mathematics or number concepts to young children (preschoolers) becomes more effective when educators establish clear foundational concepts and implement them gradually using familiar, everyday activities Anita Oktaviana, Septiani Susanti, and Sinta Oktavianti, (2024). Mathematics learning should be engaging and enjoyable to foster children's interest. Likewise, introducing number concepts should be linked to real-life experiences. For young children, mathematics should be taught in a concrete manner and connected to daily life. Some essential concepts introduced in early childhood education include matching (correspondence), comparison/sequencing, classification, addition, and subtraction Berda Asmara, (2020). At TK Wulil Amri, the first fundamental concept taught using plasticine as a learning tool is number recognition and sequencing from 1 to 10. Plasticine serves as a hands-on educational aid to make learning interactive and engaging for children.

Figure 2. Students Begin Forming Numbers 1-5

The image illustrates significant progress in children's ability to recognize and recall numbers. Before the intervention, approximately 40% of the children could only recognize numbers 1 to 5. However, after incorporating plasticine into the learning process, 85% of the children were able to recognize and shape numbers 1 to 10 accurately.

2. **Creativity Development**

Creativity plays a crucial role in enhancing academic achievement. Studies indicate that the higher a person's creativity, the better their academic

performance. Creativity is an essential skill that influences various aspects of life, making it necessary to nurture from an early age. Creativity emerges from the interaction between individuals and their environment Moh Fauziddin Minarni, Melvi Lemana Alim, (2023). It involves the ability to generate new combinations of ideas based on existing data, information, or experiences acquired throughout life whether from school, family, or the community. The learning environment plays a critical role in fostering children's creativity(Reiska Primanisa and Rocmah). Using plasticine to introduce number concepts and sequencing is a concrete example of a hands-on activity that enhances young learners' creative skills. This approach encourages exploration, imaginative thinking, and self-expression, particularly in early childhood education.

Figure 3. Evidence of Children's Creativity

In the image, children are seen not only focusing on forming numbers but also creatively shaping objects related to numbers. For example, they make meatball-like spheres before transforming them into numbers or create animals corresponding to the numbers they form. This demonstrates that plasticine does not only aid in learning numbers but also stimulates children's imagination and creativity. During the learning session, children showed high enthusiasm and active engagement. They enjoyed the process, displaying great interest in exploring various shapes and techniques in forming numbers with plasticine.

3. Improvement of Fine Motor Skills

Motor development consists of gross motor and fine motor skills. At the preschool age, physical movements contribute not only to physical growth but also to self-esteem development. A lack of fine motor skills may result in low self-acceptance, leading children to easily feel frustrated, discouraged, and uninterested in other activities(Tamphu et al.). Solehudin reinforces this idea, stating that physical growth at this stage requires active engagement in various activities. These activities are essential for both small and large muscle development Nurul Septiani and others, (2024). Strengthening small muscles is particularly important for acquiring basic academic skills, such as drawing and writing.

Children develop motor skills at different rates some progress slowly, while others follow typical developmental patterns depending on their maturity level(Nursalam;). Thus, from an early age, engaging children in enjoyable activities can stimulate their fine motor development effectively. Play-based activities are crucial, as children's motor movements influence other aspects of their development. According to Ghazali, playing impacts children's physical-motor growth, psychological well-being, and intelligence development Karmila P. Lamadang and others, (2024). This aligns with interviews conducted with teachers and parents at TK Wulil Amri Mannurukki, who expressed that
Interview Results with the Teacher:

> *"Introducing the concept of numbers and sequencing them using plasticine is very effective because it helps kindergarten children learn faster. Moreover, this learning method, combined with plasticine, also supports children's motor development, especially fine motor skills, which are beneficial for their muscles."*

Interview Results with a Parent from TK Wulil Amri:

> *"Learning numbers from 1 to 10 using plasticine makes it easier for children to understand quickly. A clear example is when children practice at school and are given homework at home to reinforce their habit of forming numbers from 1 to 10. As a result, I have observed significant progress in my child's understanding of the lesson, as they respond well and complete their assignments successfully at home."*

Figure 4. Homework: Creating Numbers 1-10

The use of plasticine has proven effective in refining children's fine motor skills. Both teachers and parents reported that children have become more skilled in using their fingers to shape plasticine, which also has a positive impact on other activities such as writing and drawing. This study aligns with kinesthetic learning theory, which suggests that children learn more effectively when they engage in physical activities that support conceptual understanding. Using plasticine as a learning medium allows children to learn through hands-

on experiences and object manipulation, reinforcing their understanding of numerical concepts.

Additionally, the findings support the idea that interactive and enjoyable learning methods, such as plasticine-based activities, can enhance children's motivation and interest in learning. Children who actively participate in the learning process tend to develop deeper comprehension and better retention of the material(Nurhikmah, Nursalam, Eko Prayetno). The use of plasticine has also been shown to be effective in fostering creativity and developing fine motor skills, both of which are crucial for early childhood development. Well-developed fine motor skills serve as a strong foundation for other academic abilities, such as writing, which will be essential as children progress to higher levels of education(Nurhikmah, Nursalam, Eko Prayetno).

However, this study also revealed some challenges. Some children initially struggled to form precise shapes, especially with more complex numbers such as 8 and 9. This highlights the need for additional guidance from teachers to help children master the techniques of shaping plasticine effectively. Overall, incorporating plasticine into number learning is beneficial not only for children's cognitive development but also for enhancing their fine motor skills and creativity. This method can serve as an effective alternative to conventional learning approaches, particularly in kindergarten settings that emphasize learning through play and exploration.

Conclusion

The use of plasticine as a learning medium for numbers in kindergarten has proven effective in enhancing number concept comprehension, fostering creativity, and refining children's fine motor skills. This learning method not only makes it easier for children to recognize and remember numbers but also creates a more enjoyable and interactive learning process, which in turn boosts children's motivation and participation in educational activities. Children involved in this study showed significant improvements in their ability to recognize numbers from 1 to 10, as well as in their fine motor skills. Additionally, the use of plasticine encouraged them to explore further by connecting numbers with real-world objects, enriching their overall understanding.

Although some challenges exist in teaching children to form more complex numbers, with proper guidance, plasticine can serve as a highly effective learning tool. Therefore, plasticine deserves to be considered as an effective learning medium for early childhood education, particularly in kindergartens, as part of efforts to develop children's cognitive abilities, creativity, and motor skills in a holistic manner.

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