Eduvest – Journal of Universal Studies
Volume 5 Number 7, July, 2025
p- ISSN 2775-3735- e-ISSN 2775-3727

Improving Number Addition Operations and Social-Emotional Skills Through Creative Play in Early Childhood

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ABSTRACT

This research is motivated by the importance of developing the ability to operate numbers, add, and social-emotional skills in early childhood, which are still not optimal. Initial observations at Bintang Kecil Kindergarten show that mathematics learning is still conventional and lacks integration of social-emotional aspects in the process. This class action research was carried out in two cycles with the research subjects consisting of six children in group B. Each cycle consisted of planning, implementation, observation, and reflection stages. Data was collected through observation, documentation, and interviews with school principals, then analyzed qualitatively and quantitatively. The results showed a significant increase in the operation ability of the sum number from an average TCP of 21.5 (44.79%) in the first cycle to 37.5 (78.13%) in the second cycle. Social-emotional skills also increased from an average TCP of 21.5 (44.79%) to 37.33 (77.77%). Improvements were seen in all aspects measured, including understanding the concept of addition using money, the use of mathematical symbols, as well as self-expression and collaboration in play activities. The application of creative play methods has proven to be effective in improving both aspects of child development simultaneously. These findings imply the importance of an integrated learning approach that combines cognitive and social-emotional development through meaningful play activities.

KEYWORDS *Number operations of addition, social emotional skills, creative play, early childhood*

INTRODUCTION

High-quality mathematics education for children aged 3–6 years is an important foundation for future mathematics learning (Cerezci, 2020). However, most early childhood teachers still view mathematics as a difficult subject and lack variety in their learning methods (Mutiara, 2021). As a result, many children find math learning boring. The introduction of mathematics needs to be done in an

interesting way (Suripatty et al., 2019), namely through play and the use of concrete objects (Husna & Nurhafizah, 2022; Öngören & Gündoğdu, 2021).

One of the important mathematical skills to develop is number operations, especially addition. "For early childhood, number and operations is arguably the most important area of mathematics learning" (Sarama & Clements, 2009). Number operations developed in early childhood are the basis for improving more complex mathematical skills at a later age.

Based on observations at Bintang Kecil Kindergarten, the understanding of the concept of basic number operations, especially addition, is still limited. Similar findings have also been reported in several previous studies (Fabriandari, 2017; Hasanah et al., 2023; Nurjanah, 2017). Das (2020) emphasized that learning mathematics requires realistic concepts and consideration of socio-cultural aspects.

Early childhood education serves as a critical foundation for lifelong learning, yet many children globally struggle with basic numeracy skills, which are essential for academic and daily life. According to UNESCO (2022), over 250 million children worldwide lack foundational numeracy skills by the age of 10, highlighting a significant gap in early mathematics education. This issue is exacerbated in low-resource settings where traditional teaching methods dominate, often neglecting the integration of *social-emotional* development with cognitive skills. The disconnect between numeracy instruction and holistic child development underscores the need for innovative approaches that address both domains simultaneously.

In Indonesia, early childhood mathematics education faces similar challenges, with many teachers relying on conventional methods that fail to engage young learners. A study by Mutiara (2021) found that 65% of kindergarten teachers in urban areas viewed mathematics as a difficult subject, leading to limited creativity in lesson delivery. This aligns with global trends where early math instruction often lacks play-based or contextual learning, as noted by Sarama and Clements (2009). Such methods overlook the natural curiosity of children, resulting in disengagement and suboptimal learning outcomes. The persistence of these issues calls for urgent intervention to redefine early math pedagogy.

A specific issue observed at Bintang Kecil Kindergarten in Manado is the low proficiency in number addition operations among Group B children, compounded by underdeveloped *social-emotional* skills. Initial observations revealed that only 16.7% of children met the expected developmental benchmarks for addition, while 83.3% fell into the "undeveloped" or "starting to develop" categories. This mirrors findings by Hasanah et al. (2023), who reported similar challenges in Indonesian kindergartens, where rote learning dominated and *social-emotional* integration was minimal. The lack of interactive, play-based methods in these settings highlights a critical gap in current educational practices.

Previous research has demonstrated the potential of play-based learning to enhance both cognitive and *social-emotional* skills. For instance, Husna and Nurhafizah (2022) showed that using concrete objects like money in play activities improved children's understanding of addition by 40%. Similarly, Öngören and Gündoğdu (2021) emphasized the role of creative play in fostering collaboration and self-expression. However, these studies often focused on either cognitive or *social-emotional* outcomes in isolation, leaving a gap in understanding how integrated approaches can simultaneously address both domains. This gap presents an opportunity for innovative research that bridges these two critical areas of development.

The urgency of this research lies in the need to equip children with foundational skills that are vital for future academic success and social adaptability. Early deficits in numeracy and *social-emotional* skills can lead to long-term disadvantages, including lower academic achievement and reduced employability, as highlighted by the World Bank (2021). By addressing these gaps during the formative years, educators can mitigate these risks and foster well-rounded development. The current study responds to this urgency by proposing a creative play method designed to enhance both skills concurrently, offering a scalable solution for early childhood settings.

This study introduces novelty by combining number addition operations with *social-emotional* skill development through structured creative play, an approach rarely explored in existing literature. While past studies like those of Dodge et al. (2010) advocated for integrated learning, few provided actionable frameworks for simultaneous skill development. The present research fills this void by designing and testing a play-based intervention that uses real-world contexts, such as buying-selling simulations, to make learning both meaningful and engaging. This dual focus distinguishes the study from prior work and contributes to a more holistic understanding of early childhood education.

The purpose of this research is to evaluate the effectiveness of creative play in improving number addition operations and *social-emotional* skills among early childhood learners. By employing a classroom action research design, the study aims to provide empirical evidence on how play-based methods can transform traditional pedagogy. The findings will offer practical insights for teachers seeking to adopt more effective and enjoyable learning strategies, thereby addressing the limitations of conventional approaches. This aligns with global calls for child-centered education that prioritizes both cognitive and affective domains.

A significant contribution of this study is its potential to influence curriculum design and teacher training programs. By demonstrating the efficacy of integrated play-based learning, the research advocates for policy changes that encourage the adoption of such methods in early childhood education. Additionally, the study's

emphasis on real-world applications, such as using money in play, provides a replicable model for educators in diverse settings. These contributions are particularly relevant for regions struggling with numeracy and *social-emotional* deficits, offering a pathway to equitable and quality education.

The primary objective of this research is to measure the impact of creative play on children's ability to perform number addition operations and their *social-emotional* development across two cycles of intervention. Using quantitative metrics like the Developmental Achievement Level (TCP) and qualitative observations, the study seeks to identify patterns of improvement and the factors driving them. Secondary objectives include evaluating teacher and child engagement during play activities and assessing the scalability of the method for broader implementation. These objectives are designed to yield comprehensive insights into the intervention's practicality and effectiveness.

The benefits of this research extend beyond immediate academic improvements, fostering lifelong skills such as problem-solving, collaboration, and emotional regulation. For educators, the study provides an evidence-based framework to enhance teaching practices, while policymakers gain data to support investments in play-based learning. Parents, too, can leverage the findings to reinforce learning at home through simple, creative activities. Ultimately, the research underscores the transformative power of integrating play into early education, paving the way for a generation of children who are both numerically proficient and socially adept.

RESEARCH METHODS

This study used the Kemmis and McTaggart model of Classroom Action Research (PTK) method, which was carried out in two cycles. Each cycle consisted of planning, implementation, observation, and reflection stages. The research was conducted at Bintang Kecil Kindergarten, Manado City, from September to October 2024, with six children in group B as the research subjects.

Data collection employed observation techniques using Likert scale checklist instruments, documentation, and interviews with the school principal. Data validity was ensured through triangulation of methods and sources. Data analysis was carried out both qualitatively and quantitatively. Qualitative analysis followed the Miles and Huberman model, including data reduction, data presentation, and drawing conclusions. Quantitative analysis used descriptive statistics to calculate the mean and percentage improvement.

Success criteria were determined through the Development Achievement Level (TCP) with the following categories: Not Developing (BB) = 12–20.99, Starting to Develop (MB) = 21–29.99, Developing as Expected (BSH) = 30–38.99,

and Developing Very Well (BSB) = 39–48. The success target was set at a minimum of 75% of the maximum TCP.

RESULTS AND DISCUSSION

This study revealed significant developments from the beginning to the end of cycle II. Based on initial observations in Bintang Kecil Kindergarten, the ability to operate children's summation numbers is still limited with an average TCP of 17.5 (36.46%) in the Undeveloped (BB) category. Of the six children observed, five children were in the BB category with a TCP between 14-20, and only one child reached the MB category with a TCP of 21. Social-emotional skills also showed similar results with an average TCP of 17.83 (37.15%) in the BB category.

After the implementation of creative play in cycle I, there was an increase in the ability to operate the number of additions with an average TCP of 21.5 (44.79%) in the MB category. In the indicator of knowing the concept of adding using money, the average TCP reached 7.17 (MB) with five children reaching the MB category and one child still in the BB category. Children begin to be able to identify the nominal amount of money and relate it to the price of goods in the context of role-playing. For indicators identifying the "+" and "=" symbols, the average TCP also reached 7.17 (MB) with four children reaching the MB category and two children in the BB category. Children begin to understand the use of mathematical symbols in the context of simple transactions. In the indicator of calculating the results of simple money summation, the average TCP reached 7.17 (MB) with five children reaching the MB category and one child in the BB category.

Social-emotional skills in the first cycle showed improvement with an average TCP of 21.5 (44.79%). In terms of self-expression and creativity, the average TCP reached 7.5 (MB) with five children reaching the MB category. Children are beginning to show initiative in role-playing although some still need encouragement to express themselves. The aspects of social interaction and collaboration reached an average of TCP 7.0 (MB) with five children reaching the MB category. Children are beginning to be able to interact in small groups even though collaboration is still limited to simple activities. For the aspects of imagination and role-playing, the average TCP reached 7.0 (MB) with four children reaching the MB category. Children are starting to be able to follow the flow of the game even though creativity in role development is still limited.

Cycle II showed a more significant increase in the ability to operate the sum number with the average TCP reaching 37.5 (78.13%) in the BSH category. All indicators showed an increase to 12.5 (BSH). In getting to know the concept of adding using money, two children achieved BSB and four children achieved BSH. Children are able to make transactions with a better understanding of the value of money and begin to show initiative to help friends who have difficulty counting.

On the indicator of identifying mathematical symbols, two children achieved BSB and four children achieved BSH, indicating a more mature understanding of the concept of addition. The indicator of calculating the results of simple money sum also shows similar developments with the ability to verify the results of calculations has increased.

Social-emotional skills in the second cycle increased with an average TCP of 37.33 (77.77%). The self-expression and creativity aspects showed an average TCP of 11.5 (BSH) with all children achieving BSH. Children are able to express ideas and feelings spontaneously with creativity in the development of increased dialogue. The social interaction and collaboration aspects achieved an average TCP of 12.5 (BSH) with three children achieving BSB and three children achieving BSH, showing a significant improvement in cooperation and communication skills. Aspects of imagination and role-playing achieved an average TCP of 12.17 (BSH) with children demonstrating the ability to develop roles creatively and a deeper understanding of social contexts.

Improvements in both aspects are in line with Vygotsky's theory of the Zone of Proximal Development (ZPD), where children show higher abilities when learning in meaningful social contexts. This success is supported by the effective integration of learning between mathematics and social-emotional, the use of real context in learning, the application of the principle of fun play, the gradual increase in the complexity of activities, and the positive reinforcement and peer support. The results show that the creative play method is effective in developing both aspects simultaneously, supporting the opinion of Dodge et al. (2010) about the importance of integrated learning in early childhood education.

CONCLUSION

Classroom action research in Bintang Kecil Kindergarten shows that the application of creative play methods significantly improves the ability to operate numbers, sums and social-emotional skills of early childhood. The average Developmental Achievement Level (TCP) for summation ability increased from 21.5 (44.79%) in Cycle I to 37.5 (78.13%) in Cycle II, thanks to structured role-playing activities such as buying and selling simulations and mini markets. In addition, children's social-emotional skills also improved, with TCP rising from 21.5 (44.79%) to 37.33 (77.77%), indicating progress in self-expression, social interaction, and imagination. This study recommends support from schools for the development of creative play methods, teacher training, and parental involvement in supporting learning at home. Furthermore, further research is suggested to explore the variety of methods and the long-term impact of these approaches, as well as the management of early childhood education programs that integrate cognitive and social-emotional aspects in the curriculum.

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