



Improving Beginning Numeracy Skills Using Number Stick Playing Strategies

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Abstract

The aim of the research is to improve children's initial numeracy skills through the strategy of playing with number sticks. The research was carried out at POS PAUD Flamboyan 60, Ledokombo District, Jember Regency. Children's numeracy skills, which are still lacking in terms of recognizing symbols or number symbols, need to be improved. Number stick games are used to improve children's basic numeracy skills. By using number sticks, children will help children recognize numbers visually. By seeing and holding number sticks, children can learn to identify and understand the sequence of numbers and can also be used to teach children how to count. This research uses a type of Classroom Action Research which consists of two cycles, consisting of three meetings in each cycle. This research activity takes the form of playing using number sticks by saying the numbers 1–10 in sequence correctly, grouping the numbers according to the teacher's instructions, so that children understand the concept of many and few, learn the concept of numbers, and count the number of digits that have been grouped. The results of the research show that using the strategy of playing with number sticks can improve children's initial numeracy skills. The results of this research can be shown by the criteria obtained which have developed very well in the five aspects observed in this research. The average value for cycle II was 84 and the average percentage increased, namely from before cycle to cycle I by 41% and from cycle I to cycle II by 31%.

Keywords: counting; games; stick numbers.

INTRODUCTION

Early childhood education (PAUD) is the stage of education that comes before “basic education.” This education focuses on the child's development process starting from birth (Sudarna, 2014; Suryana, 2016). It is designed to provide educational stimulation that stimulates children's physical and spiritual development and inspires them to pursue their dreams throughout their childhood, from birth to age six. Early childhood educators must have the skills to stimulate young children in ways that are appropriate to their developmental stage. In order to help children grow and develop naturally and prepare them for the next school, early childhood education also includes providing educational stimulation. According to (Ariyanti, 2016), children between the ages of 0 and 6 are stimulated; during this time they have great curiosity and ask questions about concepts that they do not fully understand. At this age children have the ability to absorb what they have seen or experienced. This is because at this time children are children with high abilities with rapid development or what is called the “golden age” (Chapnick, 2017; Hasan, 2013; Mustakim et al., 2020; Nasution, 2019; Rijkiyani, Syarifuddin, & Mauizdati, 2022; Trenggonowati & Kulsum, 2018;).

Playing while learning is a key component of early childhood education because it supports the growth and development of students. Children will gain new knowledge and do fun activities. A child's initial abilities will be formed with different growth and skills (Hasanah

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et al., 2023). With children's diverse potential, their developmental growth will also vary, so as teachers we need to facilitate every child's activity so that their development is optimal (Setyarini et al., 2023). Children aged between 4-6 years are the most easily influenced because they are still very curious about what they see. Children begin to become more sensitive to the efforts made to help them realize their full potential. A person's functional development occurs during a sensitive period. bodily and mental processes that prepare the body to respond to external stimuli. This is the time when a person must begin to develop physical, cognitive, linguistic, socio-emotional, self-concept, independence, discipline, and other traits. Morals and religious principles must also be upheld. Children's development must be stimulated and supported in ways that best suit their needs if we are to maximize their growth and development. Childhood is the most significant and fundamental stage of human growth and development. This time period is marked by a number of important events that continue into the child's final developmental stages. The Golden Age, also known as the golden period, is largely responsible for the characteristics of early childhood. Many theories and facts are discovered at a young age, when all a child's potential develops most rapidly, and they provide an explanation for this wonderful period. Early childhood is contrasted with ideas during the exploration period, the identification/imitation period, the sensitive period, and the play period. Therefore, adults and the environment in which children grow up must be able to stimulate them in a way that suits their needs and stage of development if we are to realize children's full potential.

As a level of education that supports children's growth and development through learning tailored to their needs and personalities, early childhood education is very important. This education is a necessary prerequisite for the next level, which is given to children aged 0-6 years (Gutiawati & Wulansari, 2022; Dini, 2021). In previous years, prospective students had to fulfill the requirements of various elementary schools, especially the one they liked. Numeracy ability is one of the abilities tested by schools, along with other abilities. This is a challenge because it is considered excessive and inappropriate to require a numeracy test as a prerequisite for entering elementary school. Because they aim to measure a child's basic talents, reading, arithmetic and writing tests are not suitable for use as elementary school entrance exams.

Based on the results of initial observations at POS PAUD Flamboyan 60, the problem encountered was that the numeracy skills of group B children were still not properly stimulated. Children's numeracy skills need to be improved because children are still lacking in recognizing real number symbols or signs. This is in line with what was expressed by the teacher when the researcher interviewed, the teacher explained that aspects of cognitive development, especially those related to initial numeracy, needed to be stimulated more. This is necessary because there are still some children who cannot recognize real number symbols or symbols. Knowledge about counting is important for children because it is related to children's initial numeracy skills. With the existing problems, a learning activity that is fun and can develop the potential of children's numeracy skills is needed. A solution is needed so that it can improve the quality of learning and develop numeracy skills.

Physical development in the form of gross and fine motor skills, moral and religious development, and physical education are types of education that lay the foundation for growth and development. (creativity and mental sharpness) intelligence/cognition, socioemotional (attitudes and feelings) and Communication and Language need to be trained so that the development of children's abilities can be optimal. As a teacher at POS PAUD Flamboyan 60 Ledokombo District, it is necessary to carry out fun learning activities. Learning and playing activities that can develop all children's potential in accordance with the theme that will be presented. Learning activities by giving assignments with group games that involve grouping number symbols packaged on sticks and used to calculate numbers will stimulate their

numeracy skills and recognize number symbols. By using number sticks, it becomes a learning and playing strategy that can arouse children's imagination and enthusiasm for learning to count.

Playing is defined as a fun activity, having the freedom to channel and express what the heart desires (Erfayliana, 2016). the child's physical and mental development exceeds what is necessary. Number sticks are a very simple but powerful teaching tool that can be used for counting and play activities. How to play this game is quite easy, just use and prepare some used or new ice cream sticks, number symbols or symbols that have been made from cardboard. Stick is considered a noun denoting a stick or piece. The most common numbers that will be used as counting symbols are the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10. Number sticks in this context refer to a collection of sticks, each of which has a different symbol. has been printed from cardboard. Stick number games are intended to give children the opportunity to play and learn new things, express themselves, use creativity, and do all this in a fun way. In addition, play activities can teach children about their identity, the people they live with, and their surrounding environment. At the child's initiative, number stick games should be played so that children can have fun learning activities and can improve their numeracy skills. Apart from being involved in child-friendly activities, this game is very fun and fulfills children's needs in practicing their numeracy skills. Children no longer feel pressured to learn the skills they have. Instead, they can play number stick games together while having fun. Playing with children can help them develop their skills. so that children can continue their education to a higher level and be better prepared to face their environment.

Playing with number sticks will give children the opportunity to improve their counting skills. Children will not only get something new, but will also carry out fun activities with their friends. By using number sticks, children will help children recognize numbers visually. By seeing and holding number sticks, children can learn to identify and understand number sequences. Playing with number sticks can also be used to teach children how to count. They can manipulate number sticks to count from 1-10. They can create patterns, shapes, or even create simple pictures using these sticks. This is shown by previous research which has used number sticks in early childhood learning activities. According to (Fauzziddin, 2017), in his research, he stated that the results of his research using the number card activity which was carried out in two cycles and each cycle consisted of 2 meetings, showed that children's cognitive abilities had increased as seen from the results of observations assessing children's cognitive abilities. Apart from that, (Farihah, 2017) stated in her research entitled developing early childhood numeracy skills through playing with number sticks that learning through playing with number sticks can develop and improve initial numeracy skills, especially in the ability to show the order of objects for numbers 1-10 and mention number symbols. 1-10.

From the various sources that have been quoted, it is clear that counting is one of the components of mathematics, especially the concept of number, which functions as a foundation for the growth of mathematical abilities and functions as a means of laying the foundation for learning in mathematics subjects and is the basis of education. A child's immediate environment is the starting point for this development, and depending on how their abilities develop, they may progress to the number recognition stage, which includes addition and subtraction. The principles of implementing counting games in Kindergarten include counting games that are played in stages starting with counting objects or experiencing certain events through observing nature and going through levels. Denote the level of difficulty by drawing lines between each level, such as from concrete to abstract, from simple to more complex. By encouraging the brain to think logically and mathematically, it has benefits for children in teaching counting, thereby increasing children's development and intelligence (Kurniawati, 2014). Based on this

description, the aim of this research is to improve children's initial numeracy skills through the strategy of playing with number sticks.

METHODS

The research was conducted at POS PAUD Flamboyan 60, Ledokombo District, Kab. Jember. The distance of this school is around 80 km from the capital city of Jember Regency (East Java Province). Because the children at this school aged between four and five years have poor numeracy skills. This is the reason behind choosing this class as a research subject. Classroom Action Research (CAR) is planned for these two cycles with three sessions/meetings, each lasting more than one teaching hour (1x40 minutes). Planning, implementation, observation and reflection are carried out every cycle. Percentage and average analysis of the assessment aspects was used in the data analysis of this research. The study is said to be successful if the child's numeracy skills in the five aspects studied meet very specific criteria, namely developing very well. Quantitative data that has been processed using percentage descriptions after being obtained from observations. The level of learning outcomes at the beginning of a child's numeracy development is determined by averaging students' scores and using the strategy of playing number sticks.

Analysis of Teacher and Student Activities Formula:

$$P = \frac{F}{N} \times 100\% \dots\dots\dots (1)$$

where: P : Percentage number, F : The frequency the percentage is being searched for, N : Number of cases (number of frequencies/number of individuals).

Table 1. Intervals and categories of teacher and student activities

Intervals	Category
0.5% - 40%	Not enough
40% - 70%	Enough
70% - 100%	Good

To measure the increase in children's numeracy skills during learning activities, the formula is used:

$$P = \frac{POSRATE - BASERATE}{BASERATE} \times 100\% \dots\dots\dots(2)$$

where: P : Percentage Increase, Posrate: Markafter taking action, Baserate : Markbefore taking action. If The final result of the child's ability is known, the increase in the child's numeracy ability can be classified as follows:

Table 2. Intervals and Categories of Developmental Improvement

Intervals	Category
0% - 25%	BB (Undeveloped)
26% - 50%	MB (Starting to Grow)
51% - 75%	BSH (Developing According to Expectations)
76% - 100%	BSB (Very Well Developed)

(Zainal & Jaiyarah, 2009)

RESULTS AND DISCUSSION

This research using the number stick playing strategy was carried out at POS PAUD Flamboyan 60, Ledokombo District, Kab. Jember. This research was carried out in 2 weeks

including 2 cycles. In this study, the research subjects were 16 children aged 4-5 years, 8 boys and 8 girls.

❖ Children's Activities

Table 3. Recapitulation of Children's Activities at the age of 3-4 years at POS PAUD Flamboyan 60 cycle 1 and cycle 2

No.	Observed aspects	Cycle 1	Cycle 2
1	Children pay attention to the teacher's explanation	2	3
2	Children follow the rules of the game	2	3
3	Children work together with their group friends	2	3
4	Children complete tasks well	2	3
5	Children return and tidy up the learning media that has been used in its place	2	4
	Amount	10	16
	Average	50	80

Based on average cycle I obtained mark 50% with sufficient criteria. In the second cycle, there was an increase with a score of 80 which was also considered a good category.

❖ Teacher Activities

Table 4. Teacher Activities for Children aged 3-4 years at POS PAUD Flamboyan 60 Cycle 1 and Cycle 2

No.	Observed aspects	Cycle 1	Cycle 2
1	The teacher prepares number sticks	2	3
2	The teacher is able to convey the material well	3	4
3	Teachers are able to organize children	2	4
4	Teachers help students who are having difficulty	3	4
5	Teachers are able to guide children in their work groups	2	3
	Amount	12	18
	Percentage	60	90

Based on average cycle I obtained mark 60%, with criteria Enough And on cycle II the score is 90 with good criteria.

❖ Recapitulation of Children's Beginning Numeracy Abilities

Activity child increase after finish activity game stick number. Matter This showed with enhancement ability counting beginning child age 4-5 year in POST preschool Flamboyant 60. Enhancement ability counting beginning child can seen on table in lower this.

Table 5. Recapitulation of Initial Numeracy Skills for Children aged 4-5 years at POS PAUD Flamboyan 60 before cycle, cycle I, cycle II

No.	Observed aspects	Before the cycle	Cycle 1	Cycle 2
1	Children can say the numbers 1-10 in sequence correctly	53.33	60	80
2	Children can group numbers according to teacher orders	60	73.33	93.33
3	Children can understand the concepts of much and little	40	60	80
44	Children can recognize the concept of numbers	40	73.33	86.67
55	Children can count the number of numbers that have been grouped	33.33	53.33	80
	Amount	226.67	320	420
	Average	45.33	64	84

Based on the recapitulation data, the initial numeracy skills of children aged 4-5 years can be seen to increase between before cycle, cycle I, cycle II. Before the cycle, an average score of 45.33 was obtained with the criteria starting to develop. The first cycle score obtained an average of 64 with the criteria of developing as expected, and the second cycle obtained an average score of 84 with the criteria of developing very well. Based on the success of the research, the five aspects are in the criteria for very good development. This is proven in aspects i) the child can say the numbers 1-10 in sequence correctly, getting a score of 80; ii) the child can group numbers according to the teacher's instructions to get a score of 93.33; iii) children can understand the concept of a lot and a little and get a score of 80; iv) children can recognize the concept of numbers and get a score of 86.67; and v) the child can count the number of numbers that have been grouped to get a score of 80. Because the five aspects have been fulfilled, this research is complete and has met the criteria for success in the research.

From results monitoring development Which observed on cycle I and before cycle. There is an increase of 41.19% to find the average child using the following formula:

$$P = \frac{POS\ RATE - BAS\ RATE}{BAS\ RATE} \times 100\% \dots\dots\dots(3)$$

$$P = 0.4119 \times 100\%$$

$$P = 41.19\%$$

Based on results observation, behavior Which observed on cycle II And cycle I as big as 31.25% with formula:

$$P = \frac{POS\ RATE - BAS\ RATE}{BAS\ RATE} \times 100\% \dots\dots\dots(4)$$

$$P = 0.3125 \times 100\%$$

$$P = 31.25\%$$

Based on results Which obtained Skills counting beginning child age 4 until 5 yearat POS PAUD Flamboyan 60, Ledokombo District, Kab. Jember. Knowing that there was an increase, from the results of observing the aspects observed in cycle I and before the cycle there was an increase of 41.19%. In cycle I to cycle II there was an increase of 31.25%. With an increase in the percentage in the cycle, this shows that playing with number sticks can improve the beginning numeracy skills of children aged 4-5 years. POS PAUD Flamboyan 60, Ledokombo District, Kab. Jember.

Based on the teacher's observations, data analysis through percentage results, it can be said that playing with number sticks can improve the starting numeracy skills of children aged 4-5 years. Because from the teacher's observations before the child was given treatment, the average value of the child's initial numeracy ability was 45.33, which consists of five indicators, namely: (i) the child can say the numbers 1-10 in sequence correctly; (ii) Children can group numbers according to teacher orders; (iii) Children can understand the concepts of much and little; (iv) Children can recognize the concept of numbers; (v) Children can count the number of numbers that have been grouped.

Based on observations before treatment, researchers found the lowest value of the fifth indicator, namely understanding how to count numbers. The research then continued in cycle I which lasted for three meetings. In the summary of Cycle I including Meeting I, Meeting II and Meeting III, there was an increase with an average of 64% with feasibility or an increase of 41.19% before treatment. However, even though there was an increase in the percentage before treatment in cycle I, it turned out that the increase in indicator five in the study was still not optimal. From the analysis which was adjusted to the indicators of success not being met, the researchers carried out cycle II which consisted of three meetings. In cycle II, the results of the recapitulation of the average value of children's initial numeracy skills were an average of 84 or an increase of 31.25% from cycle I. So the accumulated increase in children's initial numeracy skills from before treatment to cycle II increased by 72.44% with good criteria. Thus, the researcher did not continue the research until the next cycle, because in cycle II the success indicator had been achieved, namely the average child's initial numeracy ability was in the very well developed category (all five aspects). Therefore, using number sticks can improve the numeracy skills of children aged 4 to 5 years. In this study, researchers also found the cause of the low percentage value of the five indicators before treatment until cycle II. The cause of the less than maximum average value for indicator five compared to the other indicators is that children do not understand the numbers collected and then how to add these numbers. With the success and increase in children's counting through number sticks, teachers need to provide games that are fun, motivate children, and can create an atmosphere of playing while learning, learning while playing. So that children's numeracy skills can improve as desired.

CONCLUSIONS

Based on data analysis and discussion in the previous chapter, it can be concluded that (1) The application of number sticks can improve the starting numeracy skills of children aged 4-5 years at POS PAUD Flamboyan 60. Each cycle is carried out three times and the average value is obtained at cycle II was 84 and the five aspects observed in this research were at very well developed criteria. Thus the researcher did not continue to the next cycle; (2) based on the percentage increase in starting numeracy skills of children aged 4-5 years through the strategy of playing number sticks at POS PAUD Flamboyan 60, Ledokombo District, Kab. Jember experienced an increase, namely before cycle to cycle I by 41.19% and from cycle I to cycle II

31.25%. With the results of this research, children's initial numeracy skills have increased through the use of the number stick playing strategy.

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