



The Introduction for Number Symbols in Children Aged 4-5 Years through Mathematics Play Activities

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Abstract

The introduction of number symbols in early childhood is the basis of learning mathematics. One form of educational services provided to early childhood is adjusted to the principle of learning while playing. Playing is one method that can be used in introducing the concept of symbol numbers. This study aims to provide an overview of the introduction of number symbols in children aged 4-5 years through playing mathematics. The method used in this research is a qualitative descriptive research method with literature study or literature study. This research is focused on the introduction of number symbols in children 4-5 years based on the stages of number symbol recognition. In addition, it also provides an overview of the introduction of the symbol of numbers by playing math activities that can be done at school or at home. The recognition of number symbols is an important part of learning mathematics because the introduction of number symbols at an early age will have an effect on future children's mathematics achievement. Mathematics playing activities are effectively used in the introduction of number symbols both at school and at home. Playing mathematics activities provides benefits for early childhood in learning mathematics, especially the introduction of number symbols. This is evident from the results of previous studies and other literature relating to the introduction of number symbols in early childhood through playing mathematics.

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INTRODUCTION

Early childhood education is the provision of a variety of services both in terms of education and services for stimulating growth and development from birth to six years of age. Services for early childhood are organized based on age groups and types of services, ages from birth to six years of age can be provided with child care services, ages two to four years of services provided in the form of play groups, and ages from four to six years the services

provided are Kindergarten/ Raudhatul Athfal/ Bustanul Athfal.

Early childhood has very rapid growth and development and is unique to each individual. The process of providing educational services in early childhood is provided by providing stimulation and structuring an attractive learning environment, thus enabling conditions that are conducive to children.

One form of educational services provided is adjusted to the principles of learning while playing. Where children are guided to acquire knowledge through the learning process while playing. Docket and Flear (2000) suggest that through play, besides children being able to gain knowledge, children can also develop their own abilities.

Early childhood learning is focused on obtaining stimuli in stimulating basic abilities and aspects of child development. One aspect of development that needs to be stimulated is the aspect of cognitive development in which there is learning mathematics. From the first year of life, children have the ability to learn mathematics and develop their interest in mathematics. Early childhood math abilities can predict the achievement of learning mathematics at the next level, even during their school career. In addition, early childhood math skills can also have an impact on children's literacy skills. For that mathematics becomes a core component in cognitive development. (Duncan et al., 2007; Duncan & Magnuson 2011).

The concept of early childhood mathematics is in accordance with the National Council Teachers of Mathematics (NCTM) (2000), namely: Number sense, geometry, sorting and classifying, patterns, measurement, data collection. Piaget & Vigotsky in Charlesworth (2005) kindergarten age children who are vulnerable at 4-6 years of age who are in the cognitive development stage of tapping at the pre-operational stage, are generally introduced to the following mathematical concepts, numbers, data analysis and proba-

bility, serialization. / sorting, classification, geometry, problem solving, time and speed, patterns and measurements. Based on the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 137 of 2014 cognitive abilities related to learning mathematics that must be achieved by children aged 4-5 years are counting many objects from 1-10, recognizing the concept of numbers and recognizing the symbols of numbers.

The concept of numbers is the basis of mathematics learning that must be understood by children. Learning activities to recognize the symbols of numbers aim to create children who are able to think critically, think logically and have good cognitive abilities. The introduction of the concept of number symbols can also add numeracy skills that are needed in everyday life and are part of the development of mathematics in basic education. (Rangkuti & Hasibuan, 2018).

The introduction of the concept of numbers can be done in a simple way. According to Warmansyah (2019) in introducing mathematics learning to early childhood, it can be done in the context of everyday life and an environment close to children. In addition, the introduction of the concept of numbers can be carried out according to the age characteristics of the child in the focus of this study, namely children aged 4-5 years.

Playing mathematics activities is a learning method that is in accordance with the characteristics of children aged 4-5 years which can be used in introducing the concept of the symbol of number. The involvement of children in math play activities contributes to early mathematics learning. (Zippert, Marshall & Ramani, 2019: 2).

Mathematics can be done at school or at home. Especially since the current Covid-19 pandemic, learning activities have been carried out from home. The outbreak of the Covid-19 pandemic that has spread in various countries in the world, including Indonesia, has had an impact on various aspects, one of which is education. The Ministry of Education of the Republic of Indonesia issued a policy related to the provision of education in the emergency response of the spread of the corona virus disease (Covid-19) through the Minister of Education and Culture Circular No. 4 of 2020.

This also has an impact on the implementation of learning in early childhood education institutions. Learning that has been carried out face-to-face in schools is transferred to online and offline learning which is carried out from home with assistance from parents.

Therefore, through this literature study or

literature study, the researcher provides an overview of the implementation of learning for early childhood in introducing number symbols to children aged 4-5 years with playing math activities that can be used as a guide for teachers and parents.

METHOD

This research is a literature study or literature study. Literature study or library study is a study that emphasizes the study of sources based on library data, such as books, journal articles, literature, notes and reports which are then analyzed by existing phenomena. (Nazir, 2014; Zed, 2014). Gary & Arsenault (1998) stated that literature study is intended to summarize, analyze and interpret concepts and theories related to a research project.

The steps in this study are searching for literature, assessing literacy through several criteria, examining and analyzing the contents of the literature systematically and synthesizing the contents of the literature. (Nasution, 2017).

Data analysis in this study, researchers used qualitative data analysis techniques. The method for analyzing data uses descriptive methods with the aim that the results of the analysis obtained can be described in depth and in detail.

RESULT AND DISCUSSION

Introduction of the concept of number is one indicator that must be reached by children aged 4-5 years on aspects of cognitive development in the scope of the development of symbolic thinking. (Permendikbud No. 137, 2014). This is in line with the content of mathematics standards for early childhood as stated by National Council of Teachers of Mathematics (NCTM) (2000: 91), one of which is numbers.

The introduction of the concept of numbers in early childhood, especially at the vulnerable aged 4-5 years, can be done by playing mathematics in accordance with the principles of early childhood learning.

Based on various literature studies collected from scientific sources such as books, research results, and journal articles, this study reviews and synthesizes various guidelines, both in the form of tips, suggestions and ways to introduce number symbols to children aged 4-5 years with activities play math.

Rohaeni and Gunadi (2018) state that the concept of number is the development of a cognitive aspect that becomes an accurate perception

of the symbol of number on a concrete concept. Mastery of number symbols in children aged 4-5 years is not only limited to recognizing numbers, but also children are required to understand that numbers or number symbols represent a number.

Introducing the concept of numbers to children cannot be directly introduced to children, but must go through several stages. According to Piaget (in Suyanto 2005, p. 156), introducing the concept of numbers to early childhood cannot be taught directly, but must go through several stages.

The first step in introducing the concept of numbers is that the child must first recognize the language of symbols. This language of symbols is referred to as simple abstraction or empirical abstraction. Introducing the language of symbols, namely introducing the spoken language of the names of numbers and the meaning of the names of these numbers. This stage of symbolic language can be done using real or concrete objects, and objects around the child.

The second stage is reflective abstraction. At this stage children are trained to be able to think symbolically. Here the child begins to learn to associate the number of objects with the symbol of numbers. And the third stage is connecting the concept of numbers with symbols or number symbols. When the child already knows the meaning of a number, the child is introduced to a symbol or number symbol.

Furthermore, Essa (2001: 299) steps in introducing number symbols including one-to-one correspondences, remote counting and rational counting. One-to-one correspondence is a way in which children begin to understand the concept of numbers by matching items that match other items. Rote counting is the ability to repeat numbers (counting) which will help children's understanding of the meaning of a number. Rational Counting where the child accurately attaches a number name to a series of objects being counted, so that the child understands the meaning of numbers and their recognition.

Susanto (2011: 100) suggests that the ability to recognize numbers or number symbols through several stages including: the concept stage, the transmission stage and the symbol stage.

At the concept stage, children count all kinds of objects that can be counted and seen by their senses. This stage is also called the concrete stage. Children understand the concept of number symbols through their experiences with concrete objects. The next stage, namely the transmission stage, is the transitional stage from concrete to symbol. The transmission stage is given when

the child already understands the concept of counting according to the numbers mentioned. The last stage is the symbol stage, at this stage the child is given the opportunity to recognize and write number symbols, forms and so on independently.

From some of the literature above, the introduction of the number symbol in early childhood is introduced to various stages, including the initial stage of the number symbol being introduced to the concept of numbers using concrete objects, then the child is introduced to the second stage, namely the concrete stage towards the introduction of abstract symbols, where The objects used have used manipulative objects from their original form followed by pictures and the last is the visualization stage of previous objects using the symbol number.

Burns & Lorton in Sudono (2010: 22) states that if the child can understand the mastery of concepts and then master the transition stage at a later stage, the child can understand the symbol of numbers well.

The introduction of the concept of number symbols in early childhood can be introduced to playing activities. Bermian is important in early childhood learning and development. By playing, children can discover, test and apply mathematical concepts naturally through the activities they do. In addition, playing also allows children to show the feelings, emotions and ideas they have.

Martin, R. B., Cirino, P. T., Sharp, C., & Barnes, M. (2014: 21) suggest that number recognition and numeracy skills need to be developed properly to achieve success in mathematics. This is in line with what was expressed by Chu, F. W., van Marle, K., & Geary, D. C. (2015: 6), who stated that the introduction of number symbols in children can predict their mathematical achievement.

Introducing numbers in early childhood should be done by playing/ playing games because with playing activities, children feel happy, comfortable and children will learn about life, train courage so that they grow a sense of self-confidence. (Komariah, 2013: 95).

In addition, the results of research by Aunio & Niemivirta (2010: 428) state that the skills to recognize number symbols, numeric sequencing skills and early numeracy skills in kindergarten can predict basic arithmetic skills in the early grades of elementary school. In line with the research results of Shanley, et. al (2017: 9) which states that the introduction of number symbols in kindergarten and early grade elementary school children will have an effect on their subsequent

mathematics achievement.

Learning mathematics for children should be done with fun and the object is from simple things that are close and popular with children. In accordance with the nature of early childhood playing while learning, learning while playing so that children do not realize that the game is a process of learning mathematics. (Amalia, 2020: 546).

In recent years, playing activities or games are used in mathematics learning, so that learning mathematics becomes a fun learning.

"Maths and play are very useful partners. If we want children to become successful mathematicians, we need to demonstrate to them that maths is enjoyable and useful, and that it can be a sociable and cooperative activity, as well as a quiet and individual one. We must be careful, too, to remember that play is not just a way introducing simple ideas. Children will often set themselves much more difficult challenges if we give them control of their learning than if it is left up to the adults." (Griffiths, 1994; Özdoğan, 2011).

For this reason, learning mathematics can be introduced to early childhood with playing activities, one of which is playing mathematics. Playing mathematics for early childhood is an activity designed to introduce early math concepts with a fun way of playing (Direktorat PAUD Kemdikbud, 2020).

Math play activities that can be done in number recognition and number concepts are by counting the number of objects around the child. For activities at school, the teacher can invite children to count books, pencils, male friends and female friends. For activities at home, this can be done by inviting children to count objects in the living room, bedroom, or kitchen.

The results of research conducted by Sari (2013; 269), play mathematics activities in introducing the symbol of numbers using concrete objects and carried out directly by the child, where the five senses of the child are directly involved so that the child gains knowledge from the child's interaction with the environment. directly. In playing mathematics activities the teacher can also use the approach of playing, singing, telling stories, field trips, conversing, question and answer and drama.

Maragustam's research (2017: 349) also suggests several math play activities that can be implemented in the introduction of number symbols, namely playing mathematics with concrete objects, namely playing activities that introduce numbers through guidance, reasoning and playing. In this play activity, teachers can use concrete objects that can be obtained around the ins-

titution. How to play, counting concrete objects accompanied by moving objects from one place to another. Furthermore, the activity of playing mathematics with semi-concrete objects. In this play activity, the teacher uses pictures for example pictures of fish that are numbered according to the number of pictures of fish, and manipulative fish from cardboard paper and plates that are numbered. The way to play is to count a lot of fish images and show a number symbol in the form of a number according to the number of fish, and put the fish manipulative as a concrete object onto the plate according to the numbers on the plate.

Komariah's research results (2013) show that introducing the concept of numbers to children aged 4-5 years should be gradual and continuous, starting with learning to count, namely by mentioning numbers 1,2,3,4,5... etc. This activity can also be introduced through the activities of playing mathematics, such as sorting and grouping objects into the same type. In addition, the teacher can also provide pictures for example pictures of balloons and swans, then the teacher asks the child to mention the large number of objects in the picture. Furthermore, in training anat to say the teacher can also provide pictures for the child to color, then after coloring the child is asked to count the number of objects that were colored. In introducing the symbols of numbers 1-10, the teacher can also invite children to bold the numbers 1-10.

Playing math activities at home introducing mathematical concepts can be done by counting plants in the yard, collecting and counting stones, writing down motorbike number plates, counting the number of tables / chairs in the living room, forming numbers with seeds, and counting the number. plate / bowl / spoon. (Directorate of PAUD Kemdikbud, 2020).

The results of Fitria's (2013) study of learning numbers and introducing the concept of numbers can be done by counting the number of objects in the living room such as chairs, tables, cabinets and at the same time introducing the concept of big-small, far-near, high-low. It is even simpler to count steps when entering the room, this simple thing makes mathematics a part of the child's daily activities at home.

Subsequent research states that one of the activities parents can do so that children can easily understand mathematical concepts include introducing the symbols of numbers, namely by using objects around the child, such as using grains. (Lestarinigrum, 2015).

Math play activities provide various bene-

fits for children. As stated by Holton et al. (2001)

"during the mathematical play children use their current knowledge and mathematical play develops links between the current schemata while the play is occurring. Mathematical play reinforces the current knowledge and it assists future problem solving/mathematical activities. During the mathematical play activities, children come across different types of daily problems and they construct several solution ways for them spontaneously. Therefore mathematical plays support the logical thinking and create powerful learning environments."

According to the Directorate of Early Childhood Education, Ministry of Education and Culture (2020: 2) playing mathematics provides benefits for early childhood, including, 1) teaching correct mathematical concepts in an interesting and fun way; 2) avoiding the child's fear of mathematics from the start; 3) help children learn mathematics naturally through play; 4) stimulating aspects of children's cognitive development to learn to solve problems, think logically, critically and creatively; 5) know math concepts thoroughly as a basis for children's reading skills; 6) Building social emotional aspects, children learn to work together with friends or adults, are confident, independent, patient and able to learn to obey the rules of the game.

Playing activities have an influence on learning mathematics. By playing, children can integrate experiences and understandings and make use of their experiences, explore and create meanings related to mathematical concepts. (Dockett & Perry, 2010: 717). Learning mathematics intrinsically becomes attractive to children if they build their experiences and ideas in math play activities.

From the various literature found, researchers can conclude that introducing number symbols to children aged 4-5 years must be in accordance with the stages of recognizing number symbols. Starting from the introduction of concrete objects around the child to the recognition stage through semi-concrete objects in the manipulative form of an object to the introduction of abstract number symbols..

The introduction of number symbols in children aged 4-5 years can be done by playing math activities that can be carried out at school or at home. The introduction of number symbols in schools is carried out with various strategies and approaches that can be implemented in playing activities. While playing mathematics at home is carried out by using objects at home with the help of the child's parents.

CONCLUSION

The introduction of number symbols in early childhood is the basis of learning mathematics. The introduction of number symbols in children aged 4-5 years should be done with fun activities, one of which is playing math activities that can be done at school or at home.

Mathematics playing activities are also carried out by utilizing concrete objects that are around the child both in the school environment and in the home environment. The introduction of number symbols in children is continued by using semi-concrete objects or manipulative objects, and in the final stage, the introduction of number symbols in children can be taught by introducing number symbols. The activity of introducing number symbols in early childhood, if carried out appropriately in accordance with the stages, consistently and continuously and in a pleasant atmosphere, then the child will be trained and can master and even enjoy learning mathematics which will affect their mathematics achievement.

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