

## ***Unit Blocks Play Activity; What Do You See From Their Play? (The Study of Mathematical Thinking Development Children 3 – 5 Years Old)***

**Eriva Syamsiatin**<sup>1,a)</sup>

<sup>1</sup> Prodi PG PAUD, Universitas Negeri Jakarta, Jl. Rawamangun Muka, Jakarta, Indonesia

<sup>a)</sup>E-mail: [eriva@unj.ac.id](mailto:eriva@unj.ac.id)

**Abstract.** Unit block was one of famous children's play materials. Children develop and practice variety of skills during play activities with blocks. Unit blocks help children to construct mathematical thinking skills and concept. The study was to reveal early mathematic thinking skills development children age 3-5 years old that showed during playing unit blocks. The unit blocks was used in this was Pratt's Unit Blocks. Pratt's block has a unique composition of block about 5 1/2" long by 2 3/4" wide by 1 3/8" in height. In order to reveal this phenomena qualitative research method was implemented. Participant of the study were children of aged 3-5 years olds at East Jakarta. Children were observed and interviewed during play. In order to strengthen the data play activities were also documented through photographs. The results shows children's early mathematic thinking skills for children age 3 – 5 years old by playing unit blocks is children showed early mathematic matching skill such as classifying skill, comparing skill and ordering skill. Children has shown different types in each stage of their live. Theoretically early mathematic skill were performed through play unit blocks activities. Stimulation of early mathematic thinking skill will develop properly if children were have adequate play materials and environment. Blocks play activities can support their academic life later.

**Keywords:** unit blocks, thinking, mathematics, play

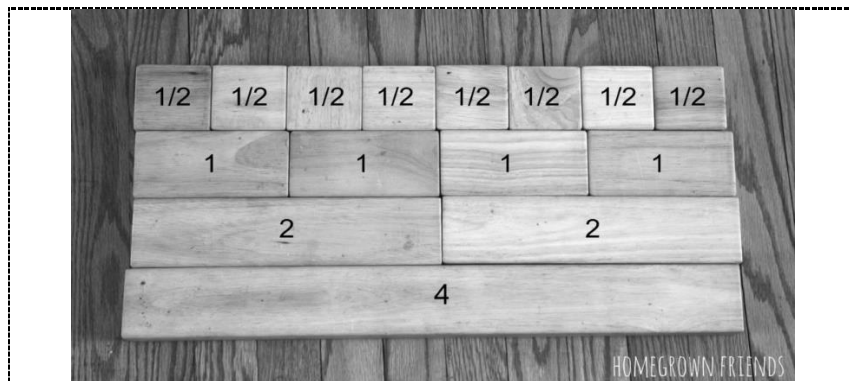
### **1. Introduction**

Play is the most crucial activities in children's life. Children can spent hours a day just for play. They can play with their parents, siblings, pets, and other adults. Children also love to play with objects around them. Play gives children the opportunities to learn and develop. Children can develop cognitive, social, and motor development. Play help children develop cognitive skills through exploration to real object. They also develop social development by interacting with others while playing. Children develop motor development by manipulating things and tested their movement into the limit. Through play children also learn foundation of basic knowledge such as mathematics, science, social studies and literacy.

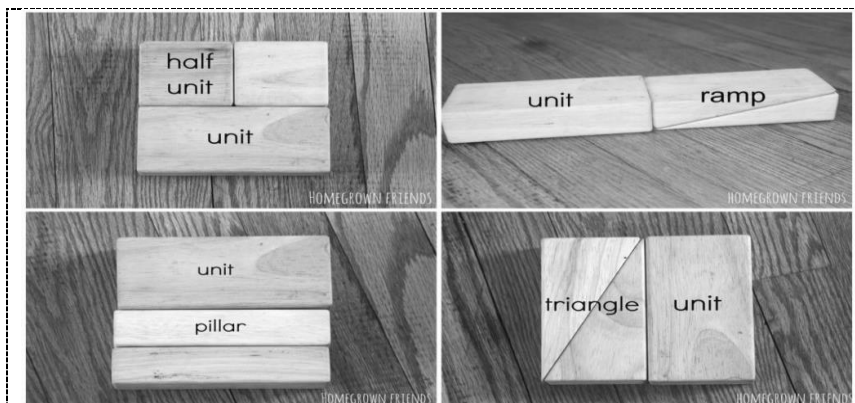
Children learn mathematics throughout their lives. They start to observed and continue manipulated the objects. Mathematics thinking skill were develop slowly the acquisition of these skills Eliason & Jenkins (2008:319) the early years are the time for every child to develop a solid foundation of mathematics understanding and knowledge, the ability to solve problems, and positive beliefs about mathematics. Seefeldt and Wasik (2006) children of three, four and five

years old develop a cognitive skills that they are going to use in understanding numbers and quantity. Mathematics consists of Based on NCTM Principles and Standards for School Mathematics identifies a new age band that includes preschoolers for the first time. Tipps, et al, (2011) Children’s number sense and knowledge of number begin through matching, comparing, sorting, ordering, and counting sets of objects. Gestwicki (2007). From these statements showed that before children were able to learn Mathematics concept, by developing thinking skill first as a fundamental skill in learning Mathematics.

Unit blocks is a wooden blocks that has a basic component from pine or latex wood. Wooden block was designed by Caroline Pratt. Pratt designed the wooden unit blocks that became a basic play material in pre-school and kindergarten in United States. The used of the blocks now become most famous play materials in the world. The characteristics of Pratt’s blocks has a unique composition of block about 5 1/2" long by 2 3/4" wide by 1 3/8" in height. This composition was for very basic block named “unit block”. The unit block as a basic size for other blocks. For example; double unit has length twice of unit and pillar blocks has same length with unit blocks.



**Figure 1.** Figure Pratt’s Blocks (Unit blocks as a basic size “number1” )



**Figure 2.** Figure Other Pratt’s blocks shapes (different shape and size but the size is referring to unit blocks)

Unit block is the same shape as the blocks of the fourth Froebel Gift based on the proportions 1:2:4. Other blocks were derived from this standard block, some smaller and others larger as described by Froebel in *The Education of Man* 1826. Unit blocks must be sturdy and accurately cut so that children aged two through seven may use them to create, solve problems, and challenge themselves. Unit blocks became famous in Indonesia. Early childhood education institution start to equip themselves since 2001. At that time the study of natural color wooden was introduced MoE. The massive used of the wooden blocks has thought preschool teacher to have deep observation of the benefit the used of wooden blocks in learning through play. The purpose of this study was to reveal children's mathematical thinking through block play activities.

## **2. Method**

The research was qualitative research. Participants of the study is 3 – 5 years old children. The children which were actively enrolled blocks play activities in blocks centre East Jakarta. There were 23 children was observed. The participants were from pre-school and. They were play in blocks play centre twice in a week. The children were observed and interviewed during they play at the centre for four months.

### **Procedures**

The qualitative data was obtained from observation, interview and children's play portfolio through photograph. These children were played in a blocks centre for 90 minutes and observed carefully during their play. The observation was conducted in a natural play activities. Photograph was taken to documented children's constructions.

Interviewed was also implemented. To gain deep information of a thinking process that happened in children's mind, think aloud protocol was implemented. The think aloud protocol consist of several open question. These open question gives the opportunity to children give more explanation based on their work.

Children were interviewed in semi-structure way. Open question was designed related to block play activities, mathematics thinking and concepts. They were asked about the blocks choice, how they choose these blocks, the building that they have made and reason why they built it.

Teachers were also interviewed in order to get the information of children play activities in the centre. Children's play portfolio were analysed to see their mathematical thinking from previous play activities. These data were analysed qualitatively represented children's early mathematical thinking in matching, classifying and ordering the blocks.

Data were triangulated through observing children's photos, children and teacher were being interviewed. After these data was collected

## **3. Result and Discussion**

### *3.1. Developing matching skills*

Based on the observation of 4 years; 0 months children were able to match varieties of blocks unit. They were matched two different shapes of blocks without considering its accuracy and precisions. Children were matched two blocks with accuracy and same precision if the shape is same.



figure 3. Two different shapes were matched



Figure 4. Two different shapes and same shape and size were matched

Children of 4 years; 2 months old were able to matched more than two blocks to represent more complex construction resemble a building. In picture 3 was shown that children using three cylinders representing pillars and one floor block to represent the roof.



Figure 5. Two or different shapes were matched to represent a house

Another group of older children these were develop advanced children were able to matched two blocks to resemble a new shape. For example children matched two triangle blocks to create a square. From this phenomena was shown that children begin to understand parts-whole. This part-whole understanding was a basic thinking skill for children to understand number sense and geometry.

### *3.2. Developing classifying skills*

classifying blocks according to its characteristics. First they try to classify the blocks by its shape than continue to size. The classification activities was seen during block play activity and tidy up the blocks after play activities.

Children were used more of same shape and size of blocks to develop a building. They made a large construction by using more blocks. At this age was also found that children tend to used same and or similar shape to construct one dense construction.



Figure 6. Children 4 years; 2 months.  
Grouped same shapes to develop



Figure 7. Similar shape of block to construct one  
dense construction

In other group of older children, they were used more variety of blocks to represent something. They also were able to identify that if two or more shapes of blocks were combine it will form a new shape that represent a construction. For example children were using floor block more than two blocks to create a large roof.

### *3.3. Developing skills in ordering, sequencing and seriation*

Children put the blocks in without considering any arrangement. Children at this group age arrange the same shape blocks similar to row or line, it has no beginning or ending. Different older group of child. They begin to show that children used different shape of



Figure 8 Triangle blocks were used at the tip of line construction

Blocks at each tip of line constructions. It was shown that children begin to develop their understanding and logic thinking that something has beginning body and end. These group of child can explain the process of construction in sequence logically. This skill will support children when they want to solved a mathematics problems.

#### **4. Conclusion**

Based on these data indicates that children thinking skill were develop slowly throughout the year. These skill were developed and changed into another skill. Children from tend to have similar pattern in matching and classifying skills. Children were changed For instance matching skill in younger group was shown that children match two blocks without considering the shape connection, precessions and, but in older group of children acquisition of the skill was occur for example children matched two or more shapes and size of blocks to form new shape considering the precision and connectedness.

The skill changes shown that the acquisition were happened throughout the year. As children getting older these skill were support other skill in learning mathematics. Children can master part-whole begin with matching activities. After mastering a matching skill children begin to showed classification skill. First children to classify blocks and separated each groups at the end of 4 years olds children are able to combine among these group of blocks to develop a construction that resemble the objects. Last skill was ordering, sequencing and seriation. These skills was also develop gradually form ordering block representing line to more abstract skill such as re-telling the whole construction process in a logic ways.

Suggestion for future study is these skills were need to be measured in qualitatively. Qualitative method can be conducted to confirm the milestones of the acquisition. The participants of future study should be extended and selected from various background.

Mathematics thinking skill is a very important phases that every children will went through it. The most important things for teacher is to help by providing appropriate play materials and activities. Unit Blocks gives a lot of opportunity for children to explore these skills. The development of these skills were the basic skill before understanding number concept, measurement, geometry and statistics..

### **5. Acknowledgments**

This was dedicated for children who loves play blocks.

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