
Analysis the Mathematical Self-Concept of Children Aged 5-6 Years Old in Pekanbaru

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Abstract: Early childhood education is the foundation for further development. Because the concepts that children get at this level will be the basis for the next level of education. One important concept is mathematics. Various studies have revealed that children have difficulty learning the most basic concepts in daily life. Therefore, it is necessary to enrich what needs to be improved, so that children will not be afraid of learning mathematics. One of the determinants of one's success is from self-concept. When a child is playing and learning mathematics, the teacher should develop a child's self-concept of mathematics. The child will have high self-concept of mathematics. It will certainly affects the learning outcomes at the next level of education. This study tried to analyze the mathematical self-concept of children aged 5-6 years. The data collection technique is carried out by observing children while playing and learning in their preparation. Based on the research findings that carried out with quantitative descriptive methods obtained the mathematical self-concept of children aged 5-6 years in kindergarten FKIP University of Riau is categorized into average level. It is taken from the empirical average of 19.98. It showed 21 children or 50% are categorized into good level and the other 16 children or 38.10% are categorized into average level and 5 children or 11.90% are categorized into poor level.

Keywords: Mathematical self-concept

1. Introduction

Math is always learned by early childhood. Mathematics is naturally integrated in most early childhood lives; when children see numbers around them. Numbers are on the telephone, house numbers, car plates, motorcycle plates, billboards, and songs that are usually sung with teachers and friends in class. So it is not excessive if Saracho dalam Krogh (2014) says that early childhood is born as a mathematician. This statement is appropriately given to early childhood considering many mathematical concepts related to daily life.

Mathematics is one of the content that was introduced to early childhood. This will be the foundation for children to study mathematics in the next level of education. So it is really important if the mathematical concept at the PAUD level is given to the stage of child development. If it is fulfilled, the children's mathematics learning outcomes at the next level of education will be optimal.

Mathematics is one of the fields of study or important things for children. Because mathematics can solve problems faced by children in their daily life. For instance, when a child wants to know how much candy is in his hand, the child is required to master the ability of the number

concept. Furthermore, in classifying the bottle cap collection, the child is expected to be able to master the data processing concept ability. When a child wants to compare height with friends, in this condition the child must be able to know the concept of measurement.

In addition, mathematics can also help children to achieve their goals in the future. Because some of the child's favourite professions require good at math. Some of their favorite professions are pilots, doctors, architects, teachers and others. In other words, in achieving these goals, children must have a strong foundation for mathematics from an early age.

In fact, the results of mathematics learning declined when they enter elementary, middle and high school. This can be proved by the results of the 2015 PISA study that ranks Indonesia is lower than Singapore, Malaysia and Vietnam. This study attempts to measure some of the competencies of fifteen-year-old students in seventy-two countries around the world. The competencies are mathematics, reading and science. Based on the research findings, it can be described that students' mathematical competencies in Indonesia are still relatively low.

Based on the explanation above, Budi Raharjo (2018) stated that mathematics is a difficult thing for students. It can be noticed in various social media where many high school students complain about the difficulty of solving math problems. The difficulties impact on the passing grade. Therefore, children, teachers and parents should build the mathematical concepts from an early age to decline the difficulty in the next level of education.

Otherwise, the foundation of the mathematical concept at the PAUD level is not optimal. Teachers and parents hope early childhood are quickly to master numeracy (the concept of numbers). Conversely in understanding a mathematical concept, a child needs a process. It is related to Charlesworth and Lind (2007) that children need continuous repetition in developing numeracy (the concept of numbers). In other words, in mastering mathematical concepts, children need processes that require repetition. Therefore, all stakeholders should pay attention to this matter.

Some mathematical concepts that must be mastered by children according to Dodge (2009) are numbers, patterns, geometry, measurement and data collection. Mathematics for children is very different from elementary, middle, high school and university levels. The description of mathematics for early childhood according to Feeney (2006) is a way to compile experiences into ideas about the amount of logic and the relationship of space between objects, people and events. For example, when children are playing, collecting various kinds of bottle caps and grouping them according to color. At that time, the child built the concept of data collection which is the forerunner of statistics. Furthermore, when the child had breakfast and formed the bread into a triangular shape, they were building the concept of geometry. At the next level of education, it will be part of the knowledge of space and form. In conclusion, mathematics for early childhood is around the environment.

One of the determinants of success is self-concept. Self-concept is a person's mind or perception about himself and is able to build behavior. Shavelson in Green (2006) states that self-concept is a person's perception of himself that is get by his experience and environment. In other words, the formation of self-concept in a child is built by the immediate environment and the opportunity to have experience.

According to Marsh (2006), academic self-concept is part of self-concept. It can be described that academic self-concept is a more specific self-concept. In other words, children's academic

self-concept will be formed in the school environment and become part of the general self-concept. Furthermore, academic self-concept according to Marsh in Guay (2010) can be seen from the child's interpretation of the school environment and the teaching and learning process both inside and outside the classroom. It stated that the perception and interpretation of children is influenced by the results of past academic experience and the assessment of teachers and friends.

Academic self-concept is one of the determinants of children's success in achieving learning outcomes. It is important for teachers to improve academic self-concept by providing motivation and role models for children. Based on the results of research by Yusuf Prasetya Hadi and Tri Esti Budiningsih (2014) students' academic self-concept in Indonesia is low. It will be bad affected to the world of education in Indonesia.

Self-concept refers to an individual description of his academic abilities, which includes the ability to participate in learning activities, the ability to achieve in the academic field and activities in school or in the classroom that are related to one's perceptions, thoughts, feelings, and judgments of academic abilities. The aspects of the mathematical self-concept of children aged 5-6 years in this study are *self-concept of classroom*, *self-concept of ability* and *self-concept of achievement*.

The indicator of the *self-concept of classroom* aspect is the child's relationship with classmates when playing and learning mathematic, the relationship of the child with the teacher when playing and learning mathematic and children's views about playing activities and learning mathematic. Meanwhile, the indicators of *self-concept of ability* aspects are the way children face playing activities and learn mathematic, how children solve problems of mathematic and how children focus their attention when playing and learning mathematic in the preparation center. Furthermore, the indicators of *self-concept of achievement* aspects are the way of children receive their abilities after playing and learning mathematic and ways children improve their abilities when playing and learning mathematic.

Based on some descriptions above, it can be illustrated that self-concept of mathematics is a child's perception of his ability in the academic field of mathematics which is influenced by the views of the teacher and his friends when playing and learning mathematics. The mathematical self-concept is what we believe about who we really are. The description is the whole abilities and characteristics. Furthermore, self-concept starts to develop more clearly and stronger along with one's achievement in cognitive abilities and early childhood development.

2. Methodology

2.1 Type of Research

In this research, the researcher collects some information about the mathematical self-concept of children aged of 5-6 years. Therefore, this research was carried out using descriptive methods with a quantitative approach. This method describes, integrates, classifies and organizes. The descriptive method is looking for theory and focuses on observation naturally.

2.2 Research Settings

The study was conducted on July to August 2018 with research subjects aged of 5-6 years in kindergarten FKIP University of Riau.

2.3 Research Subjects

The population of this research were all children aged of 5-6 years in kindergarten FKIP University of Riau with a total of 42 divided into two classes. All children are used as sample of this research. The sampling technique is conducted by using saturated samples.

2.4 Data Collection Technique

Data regarding self-concept of children aged of 5-6 years in the research was carried out using observation. When observation takes place, the child is carrying out the core activities at the preparation which lasts for 90 minutes. Assessment of mathematical self-concept consists of categories of good, average and poor. The mathematical self concept instruments of children aged 5-6 years are as follows:

Table. 1 Instrument of Mathematical Academic Self-Concept of Children Aged 5-6 Years

Sub Components of Self-Concept	Indicator	Scoring		
		Good	Average	Poor
<i>Self-concept of classroom</i>	1. Relationship between children and classmates when playing and learning mathematical concepts			
	2. Relationship between children and teachers when playing and learning mathematical concepts			
	3. The child's view of playing activities and learning mathematical concepts			
<i>Self-concept of ability</i>	1. The children way to face playing activities and learning mathematical concepts			
	2. The children way to solve problems mathematical concepts			
	3. The children way to focus when playing and learning mathematical concepts			
	4. The children way to complete playing activities and learning mathematical concepts			
<i>Self-concept of achievement</i>	1. The children way to receive his ability after playing and learning mathematical concepts			
	2. The children way to improve their abilities when playing and learning mathematical concepts			

Note:

g= good when get 3 point

a= average when get 2 point

p= poor when get 1 point

2.5 Data Analysis Techniques

Based on the research purpose, the data were analyzed to find out the results of descriptive statistics that describe the self-concept of children aged of 5-6 years in the FKIP Kindergarten of the University of Riau. Furthermore, the formula is used to find out the mapping of mathematical self concept distribution (good, average, poor) below:

$$P = \frac{F}{N} \times 100\%$$

P = percentage

F = frequency

N= total

3. Results and Discussions

The concept of mathematics is introduced to early childhood. The mathematical concepts are numbers, patterns, geometry, measurement and data collection. These concepts will be the foundation for children to study mathematics in the next level of education. It is important things if the mathematical concept at the PAUD level is given according to the stage of child development. From the observations made by researchers, information can be obtained about the description of children's academic self-concept through three aspects: classroom self concept, ability self concept and achievement self concept.

Descriptive statistics of research findings can be seen in table 2 and table 3 below:

Table. 2 Hypothetic Score

Data	Min Scor	Max Scor	Mean	Standar Deviation
Hypothetic	9	27	18	3

Table3Empiric Score

Data	Min Scor	Max Scor	Mean	Standar Deviation
Empiric	13	25	19,98	3,69

The table before provides an overview of the results of self-concept of children aged of 5-6 years in kindergarten FKIP University of Riau. It illustrates the minimum score is 13 obtained by children aged of 5-6 years in kindergarten FKIP University of Riau and the maximum score is 25 and the average score is 19.98 obtained by children.

The mathematical self-concept in this research has 3 sub-components with 9 indicators and the scores obtained as follows:

Table. 4 Score of Children Aged of 5-6 Years of Mathematical Self-Concept Components

Sub components	Total of Indikator	Factual Score	Ideal Score	Average	Percentage
self-concept of classroom	3	298	378	7,10	78,84
self-concept ability	4	360	504	8,57	71,43
self-concept of achievement	2	181	252	4,31	71,83
Total	11	839	1134	6,66	73,99

Source: Processed Data Research

From table 4, sub-components of classroom self-concept obtained 298 or 78.84% . It means that the child has a good relationship with classmates when playing and learning mathematical concepts. Not only that, it turns out the child has a good relationship with the teacher while playing and learning mathematics. In this study, it also shows the views of children who are classified as good or positive in playing or learning mathematics. This view makes the students are interested in mathematic learning, so the understanding of the mathematical classroom self-concept will improve.

Sub-component of mathematical self-concept about ability is obtained by 360 or 71.43%. It means that children have the ability to deal between games and learning of mathematical concepts. And, they have the ability to solve problems in between games and mathematical concepts. Early childhood have an attention that is relatively short but in this research it was found that children are able to focus their attention when playing games and learning mathematical concepts and children also have the ability to do each task in learning between games and mathematical concepts.

Sub components of mathematics achievement self-concept obtained 181 or 71.83%. It means that the child is able to receive the abilities gained when playing and learning mathematical concepts but the child continues to improve his ability to understand mathematical concepts. Furthermore, so that the data is more clearly described and the researcher presents the data in the diagram as follows:

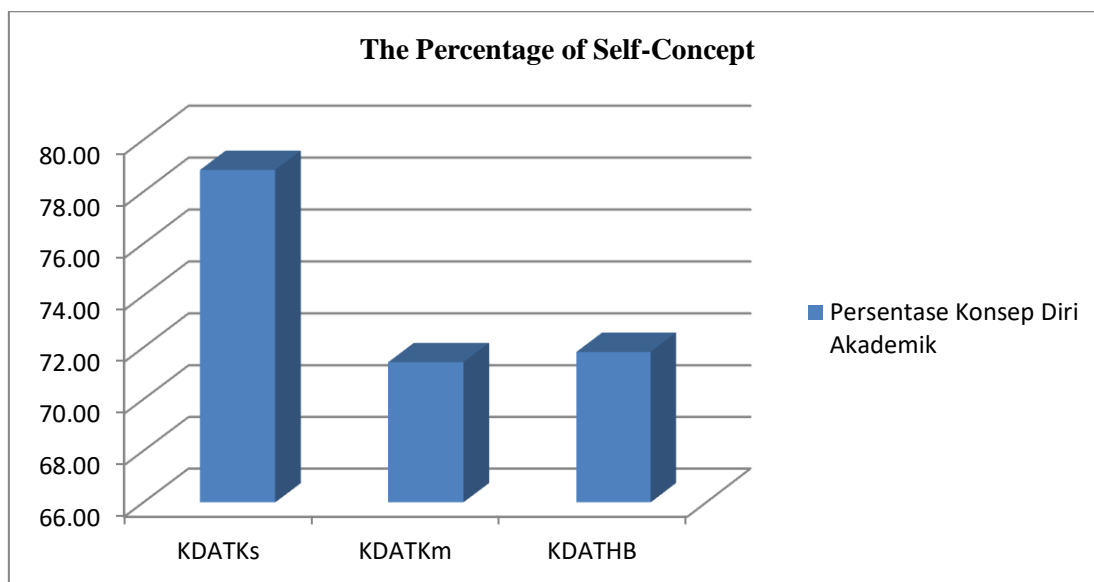


Figure.1 Percentage of Mathematical Self Concepts of Child Aged 5-6 Years Old

From the picture before, it illustrates the three sub-components of mathematics self-concept of children aged of 5-6 years in kindergarten FKIP University of Riau. Classroom of self-concept (KDATKs) was obtained 78.84%, ability of self-concept (KDATKm) was 71.43%, and achievement of self-concept (KDATHB) was 71.83%. From the three sub-components of mathematical self-concept, the highest is the classroom of self-concept .

Furthermore, to describe the subject obtained, it must be made a frequency distribution of the value of the variables examined by classifying the subject into five groups, namely a good, average and poor. To make the categorization by dividing the standard deviation from the normal distribution into three parts as follows:

- Good : $x > \{ \text{Mean} + (1 \text{ SD}) \}$
- Average : $\{ \text{Mean} - (1 \text{ SD}) \} < x < \{ \text{Mean} + (1 \text{ SD}) \}$
- Poor : $x < \{ \text{Mean} - (1 \text{ SD}) \}$

This research needs the criteria to provide a clear description. For the self-concept scale, children aged of 5-6 years consist 9 indicators with the score of each item ranging from 1, 2, 3. Thus the minimum score that may be obtained by the subject is $X = 1 \times 9$, $X_{\text{min}} = 9$ and the maximum score the subject might be obtained is $X = 3 \times 9$, $X_{\text{max}} = 27$. The range is $27 - 9 = 18$, thus the standard deviation is $18/6 = 3$ with an average $(27 + 9) / 2 = 18$. Based on the formula, it can be made three categories of self-concept groups of children aged of 5-6 years of research subjects as follows:

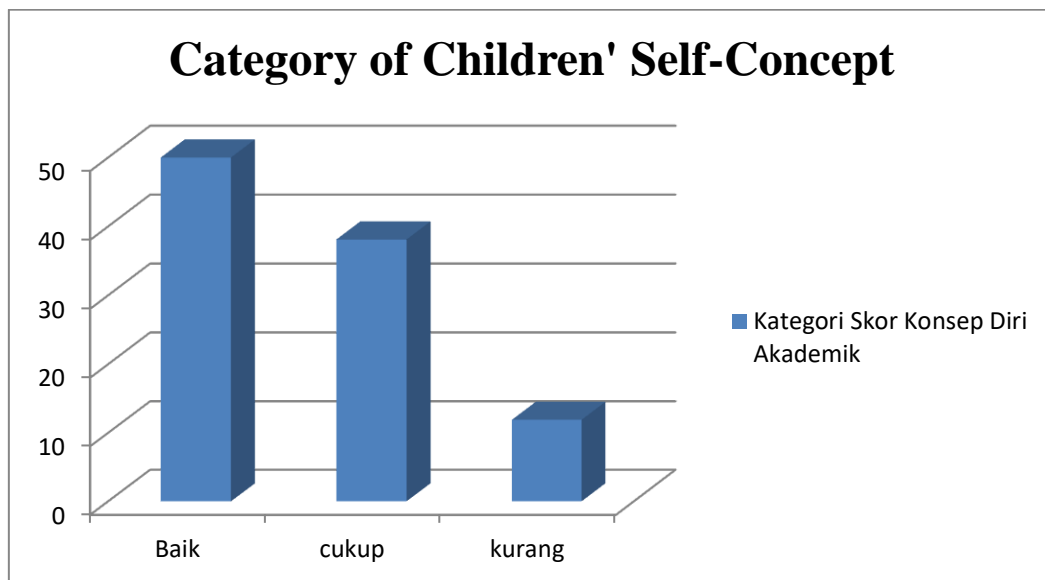
Table. 5 Scores Category of Child Self Concepts Aged of 5-6 Years

Categori	Score	Frequency	Percentage
Good	$x \geq 21$	21	50
Average	$15 \leq x < 21$	16	38.10
Poor	$x < 15$	5	11.90
Total		42	100

Source: Processed Data Research

Table 5 shows that the mathematical self-concept of children aged of 5-6 years old in FKIP Kindergarten, University of Riau have 21 children or 50% get good category, 16 children or 38.10% get average category, and 5 children or 11, 90% get poor category. In looking at the empirical average produced in this research is 19.98, the mathematical self-concept of children aged of 5-6 years in FKIP Kindergarten, University of Riau get average level.

To make the data more clearly described, the researcher presents the data in the diagram as follows:



Graph. 2 Scores Category of Children Self Concept Aged of 5-6 Years old

4. Conclusions

Based on the research findings, it was concluded that the mathematical self-concept of children aged of 5-6 years in FKIP Kindergarten, Riau University is in the average category. It can be seen from the obtained empirical average of 19.98. Children have perceptions and interpretations of the game and learning mathematical concepts namely numbers, patterns, geometry, measurement and data collection are quite good. It shows the child is good enough in assessing the learning environment both inside and outside the classroom.

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