

# Developing Children's Early Numeracy Skill Through Traditional Game "Dragon Snakes"

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## ABSTRACT

The early numeracy skill is needed by children to continue their higher education which relates to mentioning symbols of numbers, sorting numbers, adding, subtracting, and knowing more and less. The numeracy skills can be improved through traditional games, namely dragon snake. The rules of the Dragon snake game were; the children took two cards, then, added the numbers and the pictures on those cards. The purpose of this study was to determine the development of numeracy skills of children aged 5-6 years through the traditional game "dragon snakes". The research method used was a quantitative research with Nonequivalent Control Group Design. The sample in this study was 62 children aged 5-6 years in Karanggeneng Subdistrict, Lamongan district. Data were collected using tests, observations and documentation. Data were analysed using Mann-Whitney data analysis that obtained Null Hypothesis (Ho) was rejected. Therefore, it can be concluded that children are easier to learn early numeracy through traditional game "dragon snake" modified with the number cards provided.

**Keywords:** *traditional game, dragon snakes, counting*

## 1. INTRODUCTION

Kindergarten is an early childhood education which has a very important role in developing the child's personality. Education in kindergarten is a bridge between the family environment and the wider community, namely the school environment or other environments. This early level of education provides educational programs for children aged four years to six years old which purpose to obtain appropriate stimulations to improve all aspects of development such as social-emotional development, religion, language, cognitive, art, and motor (Sujiono, 2009: 42).

Cognitive development is one of the basic abilities of children to think. According to Klaczynski (2004) in his research explaining that cognitive ability is the ability to think or monitor reasoning to find the reasons for anitis. Cognitive factors are very important and have a big influence on children's thought processes. Cognitive development is intended so that children are able to explore the world and

their environment through various five senses so that children gain new knowledge to be able to carry out their lives.

The results of observations in kindergartens in Karanggeneng Subdistrict, Lamongan district, especially at the age of 5-6 years were on their aspects of cognitive development in counting, where they were still unable to count in the number of objects. This was proven by their activity in counting the number of pictures on the child's worksheet (LKA). In this study, it can be seen that 17 of 31 children were able to add pictures while other 14 children were not. Other problems that children still needed teacher's assistance which showed that children had not been able to count, especially in addition. When the teacher gave questions to the children about the number of pictures written on the board, the 15 of 31 children were still difficult in adding so that the teacher needed help in doing numeracy learning, especially in addition. This is also due to learning that only used children's worksheets which was less attractive to children.

To improve children's ability to count, writers used a game to make learning more interesting and gave positive energy, namely increasing the enthusiasm of children in carrying out such activities. According to Kovacevic and Opic (2014) explained that playing for children is a fun activity and unwittingly playing is a form of learning that is fun for them. Besides Bergen (2002) in his research also explained, the game is one way that is very supportive in improving children's cognitive.

Yulita (2017: 31) explained that dragon snake is a traditional game spread throughout Indonesia. This game is played by several people, five or eight children or even more. This game is used to increase children's gross motor skills such as walking and running (Yulita, 2017: 32). Whereas this game was modified to improve cognitive abilities in counting especially addition using the symbol number by changing the way of playing. The players entered to the gate in the traditional game of the snake in accordance with his wishes. Differently, this modified game, the players enter the gate by taking 2 cards brought by the gatekeeper. After taking the card, the child must add up the numbers on the card. If the answer is true, child will enter the desired gate and if it is wrong then the child will enter another gate.

The modification of the game is based on constructivism learning theory in which children must actively learn in building their own knowledge (Lapono, et al., 2008). By using the media of number cards and picture cards, children can independently answer the question written on the card. In addition, the use of number cards is the key so that children can choose to enter the desired gate as stimulus for children and make them more disciplined. This is related to the theory of learning behavior that studies human behavior. The theory explains that, human behavior occurs through a stimulus based on either stimulus in the form of reward or a rule that causes the relationship of reactive behavior or response (Fahyuni & Istikomah, 2016: 26)

Based on these explanations, it can be concluded that the problem is the low cognitive abilities of children in the concept of arithmetic caused by the lack of a learning media in school and the lack of variety of playing instruments that can improve aspects of children's cognitive development in counting. Therefore, the objective of this study is to investigate the development of children's numeracy skills through traditional games "dragon snake".

## **1.1. Literature Review**

### **1.1.1. Cognitive Development**

Cognitive is a process of thinking, namely the ability of individuals to connect, assess, and consider something dealing with certain events. The process of cognitive development is related to the level of intelligence that makes someone look very interested in something which then process the mind through ideas and learning (Susanto, 2011: 47).

Dea (2017) explains that cognitive development is a development related to the intelligence of children which is

shown through the ability to remember, understand various objects and get to know. The ability to remember, recognize and understand various objects is very important because this will make children easier to adjust to their environment. Children will more easily adjust their personality and social if children have sufficient understanding and understanding of people, events and objects.

According to Klaczynski (2004) in his research explains that cognitive ability is the ability to think or monitor reasoning to find reasons.

Based on the previous explanations it can be understood that cognitive development is an aspect of development that involves the child's mind or reasoning to think logically, think critically, be able to understand various objects and be able to solve the problems. Children's cognitive development is very important because they are able to adjust to their environment so that children are able to have sufficient understanding and understanding of people, events and objects.

Jamaris (2006: 25) also states that, cognitive development characteristics of children aged 5-6 years include; (1) children are able to understand the number and size, (2) children are interested in letters and numbers, (3) there are children who are able to write, copy, or count, (4) children are able to recognize some colors, (5) children begin to recognize time and names -the name of the day in one week, (6) at the age of the last six years, the child has begun to be able to read, write, and count.

Hijriati (2016: 45) explains that many factors can influence a child's cognitive development. These factors are as follows:

- Factors of heredity, or usually called nativism which is coined by a philosopher, Schopenhauer, he states that humans are born with certain potentials which can't be influenced by the environment.
- Environmental factors, the environmental theory or empiricism is coined by John Locke. Locke states that a human being is born pure like a clean white paper and has no stains at all (Hijriati, 2016: 45).
- Maturity factor, every human organ can be said to be mature if the organs are able to carry out every task or function.
- Formation factors, formation is all the conditions that exist outside oneself that can affect the development of intelligence (Hijriati, 2016: 45).
- Interest or talent factors, namely the desire to direct at something and encourage to do even better.
- Factors of freedom, namely the freedom of humans to choose something or certain methods to solve problems (Hijriati, 2016: 45).

### **1.1.2. Counting**

What is meant by the ability to count is the ability that every child has to develop. This ability starts from the closest

environment which can increase to the level of understanding of the amount, which is related to addition and subtraction (Susanto, 2011: 98). So, based on a study of numeracy skills. Thus, research focuses on arithmetic about the concept of summation.

Relating to branch of mathematics is counting. Counting comes from the word count. In the Indonesian General Dictionary, the word "count" is related to numerating (addition, subtracting, dividing, and multiplying and so on). While counting is the meaning in finding amount (the rest, income, etc. by adding or subtracting) (Mushlih, 2018: 103).

The early numeracy research conducted by Jean Piaget on intellectuals, which revealed that children at the age of 2-7 years are in the pre-operational stage, then the period of math / math activities will go through stages in early childhood as follows (Susanto, 2011: 100-101);

- **Concept / understanding stage**  
Here, the child performs the concept of counting by counting everything both objects such as fruits, blocks, and others that are around. These numeracy activities must be able to amuse children in understanding the concept of numbers. At this stage the teacher or parents must provide interesting learning so that the child does not feel bored and bored.
- **Transmission / transition stage**  
The child makes the transition from concrete to symbols, at this stage the child really understands. Therefore, this stage can be done if the child really has mastered the concept stage well, namely when the child is able to count correctly in accordance with the number of objects that are counted and in accordance with the numbers mentioned. The transition phase must be done with sufficient time until the child masters this stage (Susanto, 2011: 101).
- **The symbol stage**  
The children have been given the opportunity to write themselves. At this stage children are able to write symbols of numbers, geometric shapes, and so on as a way to introduce the concept of arithmetic or mathematics.

According to Yusuf et al. (2003: 153) there are several principles that need to be considered in teaching the concept of arithmetic to children, namely prepare children to learn to count; learning that develops from concrete to abstract; provide opportunities for children to practice and repeat; do activities to different new situations; know and understand the strengths and weaknesses of children so the teacher can understand what methods should be used.

### 1.1.3. Traditional Game "Dragon Snake"

According to Kovacevic and Opic (2014) traditional games are part of the activities done by ancestor childhood but mostly extinct. Meanwhile, according to Dewi (2016), a

traditional game is a game inherited from one generation to the next. Traditional games contain noble, positive human values, and importantly, are not the result of industrialization but human thought. Therefore, it can be understood that traditional games are children's games in a particular culture and are inherited from generation to generation and have many variations in each region.

In research conducted by Elfiadi (2016: 54), there are several functions and benefits of a play activity which covers all aspects of development, namely; cognitive, language, religious and moral values, social-emotional, physical motor, creativity / art.

Fad (2014: 80) argues that the game of dragon snake is a traditional game spread throughout Indonesia and done by several children, two children players facing each holding hands and upward to form a tunnel. While other players form trains running through the tunnel while singing. Meanwhile, Fadillah (2017: 109) explains, that the traditional game of the snake is one form of traditional games played by some children and forms like an elongated snake. In the game, there are two children who become stretchy snakes.

From some explanations, it is concluded that the game of the dragon snake is a game made by 5 people or more. The game of the dragon snake is done while singing so it can be more fun. In this game, two children become gates (handling hand each other forming a gate), and the other children line up while holding the shoulders of their friends in front of them (like train).

### 1.1.4. Modification of the Traditional Snake Dragon Game

The modified dragon snake game generally has the same characteristic and rule as the traditional one. However, writer will change some rules and ways of playing so that it will be more interesting to do and meet the objective as formulated by writers. The media used in this game are number cards (picture symbols 1-10) and picture cards. The rules are that 2 teachers become gates and all children become dragons. Here are the rules of playing.

- The teachers become gate and all children become dragons
- The dragon snake starts to pass through the gate while singing
- Each song stops then the gate will be closed and the captured child is asked to take 2 cards under the gate guard then the child is asked to add up the 2 numbers on the card. The dragon song lyric is as follow.

"The dragon snake is really long. Always running around here. The delicious bait that is sought after. Now s/he is on the backward."

*"Ular naga panjangnya bukan kepalang. Menjalar-jalar selalu kian kemari. Umpan yang lezat itulah yang dicari. Kini dianya yang terbelakang."*

- If the answer is correct then the child is allowed to enter the desired gate, but if not then the child enters another gate.
- The dragon returns around the gate until all the children are caught and enter the gates.
- Both gates do the overhang, the winning gate gets all children as dragon child.
- Then the lost gate (one of the teacher) chases and catches the dragon child.

**2. METHOD**

The research design used in this study is Quasi Experimental design, using Nonequivalent Control Group Design.

The population in this study were 75 children aged 5-6 years in the Karanggeneng Subdistrict, Lamongan District. The writer used the Krecjie table to determine the samples. The total population used was 75, after finding the error level of 5% then 62 children were elected as samples. There were 31 children taken from each school

In this study, writers used observation and validation sheets to determine the effect of the traditional game of the snake on aspects of numerical cognitive development.

To obtain relevant data, the writers used several techniques in collecting data that are consistent with the purpose of the study such as non participant observation and documentation.

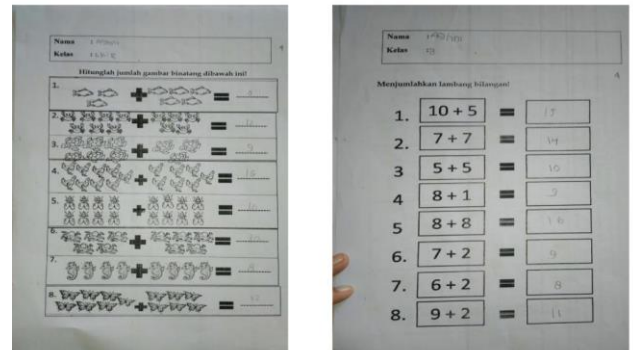
The data were analyzed by descriptive analysis and statistical inference analysis that used test stages of statistical inference requirements (normality, validity and reliability). Data analysis was performed using statistical package computer software for social science or commonly referred to as SPSS for Windows Evaluation Rerleas 23.0.

In the test, the data validity and reliability must be valid and reliable. If the data is valid, it can be continued for further analysis, but if the data is not valid, it must be rechecked first if necessary data retrieval should be repeated for data validity and reliability. The use of data normality test aims to determine the results of the pre-test and post-test. This test was conducted to determine whether the treatment is running normally or not.

The normality test used is the Kolmogorov-Smirnov statistical test. If the data is normal, then the next analysis uses parametric statistics T / Test. If the requirements on parametric testing are not met then the analysis is continued using the non-parametric Mann-Whitney test. To find out whether there is an increase in numeracy skills or not, it can be done by comparing the results of pre-test with post-test on the target trials that can be done by using the value of  $\alpha = 0.05$ . If the value of  $t_{observed} > t_{Table}$ , then there is a significant increase. But if  $t_{observed} < t_{Table}$ , then there is no significant effect on the study.

**3. RESULT AND DISCUSSION**

Pre and post test were conducted for 3 days for 30 minutes/test. The questions have 4 indicators, namely (1) children can count the number of images, (2) children can sort 1-20 symbols, (3) children can connect the number of images with the symbol numbers, and (4) children can use the symbol numbers to calculate the addition operation.



**Figure 1.** Pre test and post test questions

To test the hypothesis based on the pre and post test results, data validity test was first performed. Validity test is seen based on the Pearson correlation value between indicators with the total number of indicators. It is valid if the value of sig.  $< \alpha (0.05)$ . The validity test results are as follows:

**Table 1.** Table Styles

Indicator	Pre-test Control		Post-test Control		Mark
	Corelation	Sig.	Corelation	Sig.	
Pre_1	0,896	0,00	0,665	0,00	Valid
Pre_2	0,711	0,00	0,613	0,00	Valid
Pre_3	0,894	0,00	0,665	0,00	Valid
Pre_4	0,821	0,00	0,562	0,00	Valid

Based on Table 1, the value of sig was lower than Alpha (0.05) so that it was concluded that the questions of the pre-test and post-test were declared valid.

**Table 2.** Validity Test of Experiment Groups

Indicator	Pre-test Experiment		Post-test Experiment		Mark
	corelation	Sig.	corelation	Sig.	
Pre_1	0,791	0,00	0,64	0,00	Valid
Pre_2	0,887	0,00	0,86	0,00	Valid
Pre_3	0,763	0,00	0,797	0,00	Valid
Pre_4	0,61	0,00	0,646	0,00	Valid
Indicator	Pre-test Control		Post-test Control		Mark
	corelation	Sig.	corelation	Sig.	
Pre_1	0,896	0,00	0,665	0,00	Valid
Pre_2	0,711	0,00	0,613	0,00	Valid
Pre_3	0,894	0,00	0,665	0,00	Valid

Pre_4	0,821	0,00	0,562	0,00	Valid
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Asymp. Sig. (2-tailed)	0,011
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Based on Table 2, the value of sig was less than Alpha (0.05) meaning that, the questions of the pre-test and post-test experimental indicators were declared valid.

The reliability test of Cronbach's Alpha value was used. If the Cronbach's alpha value was > 0.60, it is declared reliable. This can be seen in the following Table 3:

**Table 3.** Reliability Test Results

Group	Cronbach' Alpha	Mark
Pre_control	0,824	Reliable
Post_control	0,835	Reliable
Pre_Experiment	0,805	Reliable
Post_Experiment	0,795	Reliable

The table show that Cronbach' Alpha score was greater than 0.60, meaning that the indicator items above are reliable.

Normality test is done to test whether the analyzed data has normal distribution or not. This data were calculated using Kolmogorov-Smirnov statistics.

**Table 4.** Normality Test

	Total of posttest in experiment group	Total of posttest control group
N	31	31
Statistic Test	0,184	0,189
Asymp. Sig. (2-tailed)	0,009	0,006

Table 4 shows the Sig score. The post-test control and experimental data was smaller than 0.05, meaning that Ho was rejected. Thus, the data were not normally distributed.

In testing the assumption of normality, the data are not normally distributed so that the statistical method to determine the difference in influence of two independent samples was the Mann-Whitney statistic. Mann-Whitney test results was shown in the following table 5:

**Table 5.** Mann-Whitney Test

	Post test
Mann-Whitney U	303,500
Wilcoxon W	799,500
Z	-2,530

Hypothesis is described as follows:

- Ho : There is no increase in children's ability to count through traditional dragon games
- Ha : There is an increase in children's numeracy skills through the traditional dragon game

Decision making criteria:

Based on Table 5, the score of sig = 0.01 < alpha (0.05), meaning that Ho was rejected. Thus, it was concluded that there was a significant development in children's numeracy skills using a traditional game of the dragon that was modified in term of playing rules, namely by providing a picture number card that had to be completed by the child in the form of matching the number of pictures with a number symbol and adding the number symbols from the 2 number cards taken.

This study proves that there is an increase in the ability to calculate addition using the number symbol through the traditional game "dragon snake". Yulita (2017: 31) explained, the traditional game of snakes is generally used to improve physical motor skills especially the gross motor skills of children. In line with the research conducted by Abdullah et al. (2013), it shows that traditional games have a great effect in improving aspects of children's motor skills. However, this modified traditional game "dragon snake" was used to improve the cognitive abilities of children in calculating the concept of adding numbers using symbols by changing the way that they play.

Ramani and Siegler (2008), have conducted research using a game that is a number board game to improve children's numeracy skills. In line with research conducted Whyte and Bull (2008) explained that, board game also has a significant influence in improving children's abilities in the concept of counting. In this research, researchers also used a game to improve children's numeracy skills, but not the number board game used but the modified traditional dragon game.

The hypothesis testing obtained sig = 0.01 < alpha (0.05), Ho was rejected. Thus, it could be said that there was an influence of the modified traditional game "dragon snake" on the aspect of developing the children's numeracy ability aged 5-6 years after the treatment. The game has been validated by material experts and media experts so that the game was able to improve numeracy skills in children. The reason for using a game in this study is supported by research conducted by Banavides et al. (2016) explaining that playing is one of the activities that can improve children's numeracy skills.

The use of modified traditional game "dragon game" has a significant impact in improving children's numeracy skills where experiment group increased higher than control group after treatment given. The results of this study were supported by Abdullah (2017), from the study stated that, traditional games have a significant impact on aspects of child development and traditional games are also able to be an interesting learning for children.

In addition, research conducted by Kovacevic and Opic (2014) explains that, traditional games can improve children's

social relationships. Similar research results have also been done by Aypay (2016) showing that traditional games have a significant influence in arousing fun and having fun characteristics and unwittingly the game is a source of learning for children.

This research is also supported by Susanto (2011: 103) states that children will understand more easily the concept of arithmetic, if the learning is fun. One of the fun learnings is using a game. Research conducted by Hitti (2012), supporting this opinion that games can increase children's interest in learning the concept of arithmetic.

The early childhood will be more interested in learning through a game than just using a child worksheet. Through games children will be more interested to learn because playing is a fun activity for them. Supported by research conducted by Skwarchuk et al. (2014) explains that the concept of arithmetic which is done through a game is easier for children to understand than through general enrichment activities or worksheet. In addition, Dieleman and Huisingsh (2006), also conclude that the game is proved to be useful as a component in the learning process.

The results of studies starting from giving pre-test, and treatment to post-test administration shows that children are easier to count through number of images than directly add using the symbol number. This was proven by the increase in children's post- test score on counting number of objects. Furthermore, the children are easier to do numeracy learning sequentially starting from 1-20 proven by the increase in the post-test scores on the indicators of children's ability to recognize and calculate the numbers 1-20.

The link between the research that has been done and some of the opinions above prove that the modified traditional game "dragon snake" is able to become a new medium that is more interesting to provide learning about the concept of arithmetic that is feasible and effective and has an influence for children in improving numeracy skills in children aged 5- 6 years.

#### 4. CONCLUSION

Based on objectives of this study, it could be concluded that it was easier for children to learn to count using modified traditional games "dragon snake" with picture card numbers.

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