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Increased Numeracy Skills of Children with Snakes and Ladders Game

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Abstract

This research aims to improve the ability to count 4 - 5 years old children with snakes and ladders in group A PAUD Dahlia. The method used in this research is collaborative classroom action research using Kemmis and Mc Taggart's models. CAR is implemented as an effort to overcome problems that arise in the classroom. Method is carried out in four stages, are planning, action, implementation, and reflection. The subjects of the study were students of group A PAUD Dahlia, ten (n=10) children. The object of this study is the ability to count 4 - 5 years old children. Data collection method used is observation. Technical data analysis was done in a descriptive qualitative and quantitative manner. The established success indicator is that at least 75% of 10 children reach the counting ability. This research was conducted in two cycles. The results of the study indicate that the numeracy skill has increased. Increased numeracy skills can be seen from the indicator ability to count objects 1-10, recognize the concept of numbers, recognize symbols 1-10, mention symbols 1-10, matching numbers with symbol numbers. Increased numeracy skills of children aged 4-5 years with snakes and ladders in the implementation of pre-action 31, 5%, and in the first cycle increased to 51.5%, because it is still less than the success criteria that should be carried out then the next action is cycle II and increased greatly good by getting a percentage of 85%. Many games for children was suggested for increase numeracy skills.

Keywords: numeracy skills; early childhood; snake and ladder game

Abstrak

Penelitian ini bertujuan untuk meningkatkan kemampuan menghitung anak usia 4-5 tahun dengan ular dan tangga di kelompok A PAUD Dahlia. Metode yang digunakan dalam penelitian ini adalah Penelitian Tindakan Kelas (PTK) kolaboratif menggunakan model Kemmis dan Mc Taggart. PTK kolaboratif diimplementasikan sebagai upaya mengatasi masalah yang muncul di kelas. Metode dilakukan dalam empat tahap, yaitu perencanaan, tindakan, implementasi, dan refleksi. Subjek penelitian adalah siswa kelompok A PAUD Dahlia, sebanyak sepuluh (n = 10) anak. Objek penelitian ini kemampuan menghitung anak usia 4-5 tahun. Metode pengumpulan data yang menggunakan observasi. Teknik analisis data dilakukan secara deskriptif kualitatif dan kuantitatif. Indikator keberhasilan yang ditetapkan adalah bahwa setidaknya 75% dari 10 anak mencapai kemampuan berhitung dengan kriteria baik. Penelitian ini dilakukan dalam dua siklus. Hasil penelitian menunjukkan bahwa keterampilan berhitung anak telah meningkat. Peningkatan keterampilan berhitung anak dapat dilihat dari indikator kemampuan untuk menghitung objek 1-10, mengenali konsep angka, mengenali simbol 1-10, menyebutkan simbol 1-10, mencocokkan angka dengan simbol. Peningkatan keterampilan berhitung anak dengan ular dan tangga dalam pelaksanaan pratindakan 31, 5%, dan pada siklus pertama meningkat menjadi 51,5%, karena masih kurang dari kriteria keberhasilan yang harus dilakukan maka tindakan selanjutnya adalah siklus II dan meningkat sangat bagus dengan mendapatkan persentase 85%. Banyak permainan untuk anak-anak yang disarankan untuk meningkatkan keterampilan berhitung.

Kata Kunci: keterampilan numerasi, anak usia dini, ular tangga.

Introduction

Developing cognitive skills for children is important because by developing children's cognitive abilities as early as possible, can affect the child's life in the future and prepare children to enter higher education levels (Duncan & Sojourner, 2013; Grace, Bowes, & Elcombe, 2014). The cognitive development of children has started since infancy (Kamerman & Gatenio-gabel, 2007) . Children aged 0 - 8 years are very decisive for children to develop their potential, which is crucial for the development of human quality (Ige, 2011; Ting, 2007). Based on the results of Keith Osborn, Burton L. White, and Benyamin S. Bloom research suggest that children's intellectual development occurs very rapidly in the early years of a child's life. About 50% of the variability of adult intelligence has occurred when a child is 4 years old. The next 30% increase occurred at the age of 8 years, and the remaining 20% in the middle or end of the second decade (Diana, 2010). This cognitive development will make it easier for children to master broader general knowledge, so that children are able to carry out their functions properly in their interactions with society and the everyday environment (Desmita, 2010; Tao, Oliver, & Venville, 2012). The meaning of cognitive development for a child's life, cognitive development refers to the child's development in thinking and the ability to give reasons (Noel, 2010). In general, understanding of cognitive development is a change in children's thinking, intelligence, and language (Amalia & Khoiriyati, 2018). The process of cognitive development makes children, able to remember, imagine how to solve problems, develop creative strategies or connect sentences into meaningful speech. Malkus, Feldman, and Gardner in Sujiono describe cognitive development as "the capacity to grow, convey, and appreciate the intention in the use of several symbol systems that incidentally are highlighted in a form of setting". These symbol systems include words, images, signs, and numbers (Sujiono, 2013). One cognitive ability that children must have is the ability to count (Jatmiko et al., 2018).

Numeracy is part of mathematics. Mathematics comes from the Greek, "mathenaein" or "mathin" which means to study. According to Lunchis, mathematics discusses symbols, numerically. Griffith also suggested that counting is part of a component regarding the concept of numbers, symbols of numbers so that they are able to count correctly (Sri Handayani, 2014). One of the abilities developed in the 4-5 years age range is the ability to recognize the concept of numbers. Ministry of Education and Culture 137 of 2014, regarding the standard of Child Development Achievement Levels (STPPA) aged 4-5 years, namely: 1. Telling many objects one to ten 2. Knowing the concept of numbers 3. Knowing the symbol of numbers (NailiRohmah, 2016). Jackman argues that real things count to help children use their own experience with objects to better understand numbers. The purpose of the statement is the child will be able to understand counting through concrete objects with direct involvement (Suryana, 2016). 4-year-old children have been able to

classify objects according to one category, they also begin to show relationships in numbers and quantities, such as counting, measuring, and comparing. Ability to count children according to the Minister of Education Regulation Number 58 of 2008 are: 1) numerating numbers 1-10, 2) counting objects 1-10, 3) reading the symbol numbers 1-10, 4) connecting objects with numbers 1-10 (Novianti, 2015). Slavin in (Wahjusaputri, 2019) says that the counting stages are as follows: (1) the concept / understanding stage; (2) Transmission / transition stage; (3) Symbol stage.

One way to develop cognitive in children as early as possible by increasing the ability to count in children. In the observations of researchers at PAUD Dahlia that the use of creative and educational media for children's mathematical development is still lacking. Children's interest and enthusiasm in learning to count is still low. By increasing the numeracy ability of children aged 4-5 years, there are so many benefits that can be obtained, there are so many needs that can be fulfilled at the next level even in the life of the child as an adult later. Children will learn how to think logically, children will learn to think concretely, all of that is very influential to meet a more difficult life in the future. Children will be better prepared to face life to come, children will be helped by solving problems that come with all future problems. People assume that it is still too early to teach mathematics to young children. This must be considered because the introduction of early mathematics for early childhood is very important for the child's future. After the researchers observed PAUD Dahlia on November 7-8, 2018 who had applied early mathematics learning for early childhood, but the method still used monotonous and boring learning techniques for children. The ability of teachers to learn to count 4 - 5 years old children uses the method of counting the number of fruits and writing or copying numbers that have been modeled by class teachers.

So that children consider learning mathematics or arithmetic not attractive to them. This can happen because of the lack of early mathematics learning media used for learning (Holis, 2016). Therefore, the researcher conducted a classroom action research study at PAUD Dahlia, 10 children of group A whose initial numeracy skills were lacking. Counting children aged 4 - 5 years is very important to help children prepare to enter elementary school.

In the snake and ladder game, there are numbers in each box in the game. Children can memorize numbers (Tashnim, Nowshin, Akter, & Das, 2017) by playing snakes and ladders (Muthmainnah, Maryatun, & Hayati, 2016). If the dice that the child throws appears on the side of the dice which contains five points, the child moves their pawns as many points as appear on the dice then their player will stop at one number. This is very helpful for children to memorize numbers. Because every box on the board snakes and ladders there are numbers in a systematic sequence. If there are twenty-two boxes of snakes and ladders in the board, it means that there are numbers from one to twenty, and the remaining two boxes for start and finish

(Kurniawati, 2013). Snakes and ladders game can also help children to be able to count systematically or in sequence. Children who have rolled the dice will naturally count on each box in sequence or systematically. If the child throws the dice and the sides appear with four eyes, it means that the child runs the pieces up to four times. The game snakes and ladders can also train children to be patient or queue up to wait their turn. Because in the game of snakes and ladders requires at least two players. If children play snakes and ladders in groups, they will learn to wait patiently for their turn to play. This study aims to improve the ability to recognize the symbol of early childhood numbers through the game of snakes and ladders.

Method

The method used in this research is collaborative classroom action research using Kemmis and Mc Taggart's models. CAR is implemented as an effort to overcome problems that arise in the classroom. Method is carried out in four stages, are planning, action, implementation, and reflection (Khasinah, 2013). Data analysis using the Miles and Huberman model (Hashimov, 2015).

Results and Discussion

Data taken related to the ability of children regarding increasing the numeracy ability of children aged 4-5 years through snakes and ladders in group A was obtained by pre-action. In this pre-action, the researcher collected information and data collection of children through documentation and direct observation to class A teachers. The observation activities were carried out from 7 to 8 November 2018. Assisted by class A teachers, the researchers collaborated to conduct an assessment for initial action. This pre-action activity was carried out on November 6, 2018 using observational instruments to measure the numeracy ability of children aged 4-5 years with 5 questions related to the ability to reach children aged 4-5 years.

Researchers provide snakes and ladders game to children without being told how the rules of play or how to play snakes and ladders game, aiming that researchers know how the child's ability or whether the child is familiar with the snake and ladder game before doing action research. Suyadi (Jawati, 2013) explained that "the game is not intended as a mere toy, but a game that can stimulate children's learning interest.

This aims to make it easier for researchers to assess the numeracy skills of children aged 4-5 years. Researchers only give and hold the ladder snake game without being told how or rules to follow during the game, the child plays the snake ladder game with or without instructions or rules.

There are four grading scales that pay attention to the items of descriptors in the assessment to be given, for a score of 4 (BSB) to develop very well: if the child can be done independently appropriately and quickly without the help and reminded of

the teacher. For score 3 (BSH) develops as expected: if the child is able to perform independently without help and is reminded by the teacher. For a score of 2 (MB) begins to develop: if the child does it is still guided by the teacher. For a score of 1 (BB) not yet developed: if the child cannot do and is helped or exemplified by the teacher. Based on the results of observations made by researchers for two days, some children's ability to count children aged four to five years still need to be improved again. Most children are still unfamiliar with numbers, unable to calculate systematically. Based on the results obtained through observation activities that researchers have done that children need a fun way of learning to increase their enthusiasm for learning. By learning while playing children will feel happy to do it. Children need a stimulus by providing a new learning model so that their development and knowledge about their ability to count increase optimally.

In playing opportunities children always communicate with their co-star, both verbally and nonverbally. Initially in playing children only use body language, but over time, increasing vocabulary eating children will use verbal language in order to communicate with their playmates. Language development can be developed when children express their desires, express opinions, and provide comments to co-workers (Rohmah, 2016).

After the results of the analysis obtained from observations made by researchers on learning done in Dahlia PAUD there are still many shortcomings that still need to be corrected. Some children are still unable to calculate mathematically and there are still those who are not familiar with the concepts and numbers, because they themselves are less enthusiastic about learning to count or they tend to get bored with how to learn numbers.

To determine the condition of numeracy development skills of children aged four to five years, researchers conducted pre-research based on instruments that have been tested on children. This observing activity is carried out by researchers and class teachers during learning or during teaching and learning activities. Based on the results of observations and pre-research in group A Dahlia PAUD, 10 children, the results of the numeracy ability of group A PAUD Dahlia children who have not succeeded in the numeracy ability of children aged 4-5 years. The highest total is 10 and the lowest is 5. At the lowest score there are 2 respondents who get a score of 5 and the highest score there is only 1 respondent obtained by respondents 3. Thus it is necessary to increase the numeracy ability of children aged 4-5 years.

After conducting action research for five meetings in cycle one it can be concluded that ability counting children aged 4 - 5 years using the snakes and ladders game experienced a significant increase compared to before taking action through the snakes and ladders game. Before the action was carried out 8 children were still unable to recognize numbers, children were still upside down in mentioning number numbers, they still did not understand the concept of numbers,

is still unable to match numbers with numbers and there are only 2 children who are quite fluent namely ASP and RG.

Table 1.
Data Pre Cycle

Subject	Item Indicator					Σ	%	Category
	1	2	3	4	5			
ZA	1	1	1	1	1	5	25	Low
ZA	1	1	1	1	1	5	25	Low
ASP	2	2	2	2	2	10	50	Low
LF	2	1	1	1	1	6	30	Low
SRA	1	1	1	2	1	6	30	Low
JI	1	1	1	1	1	5	25	Low
RG	2	1	1	1	2	7	35	Low
KHJ	1	1	2	1	1	6	30	Low
CBP	2	1	1	1	1	6	30	Low
HF	1	1	2	2	1	7	35	Low

Seeing improvement in children after action research in cycle 1. As in the ability to say objects 1 - 10 there are 5 children whose abilities are increasing well the rest still need stimulus to further enhance the ability to say things 1-10, there are still children who say when objects say numbers that children don't mention. In the ability to recognize the concept of numbers only a small part can distinguish based on numbers. For example 2 apples on the table equal to the number of two oranges on the basket. From the start, there were 2 children who understood a little about the concept of the remaining numbers. After taking action the child's ability to recognize the concept of numbers has increased. 5 out of 10 children their abilities are increasing.

The ability of children to recognize symbol numbers at the beginning before doing action research in the first cycle the ability of children to recognize symbol numbers is very low. Some children are not able to recognize numbers if the teacher shows and then asks the symbol of the numbers. Furthermore, the child's ability to call the symbol number. In the beginning before it did (Susanti & Gadafi, 2019).

Children have not been able to mention the symbol number. If asked, children tend to be random or inverted in mentioning the number symbol, there are some children who are just speechless. After doing the action research in cycle 1, there were 5 abilities meeting children in recognizing numbers begin to develop. However, out of 10 children, there are still 6 children who still need stimulus to improve their numeracy skills. Finally the ability of children to match numbers with symbol numbers. In the beginning before doing the research in the first cycle, many children were still wrong in matching numbers with number symbols. After doing the first cycle of research conducted as many as 5 meetings there are at least 4 children who have started to get to know the concept of numbers. From the observations of

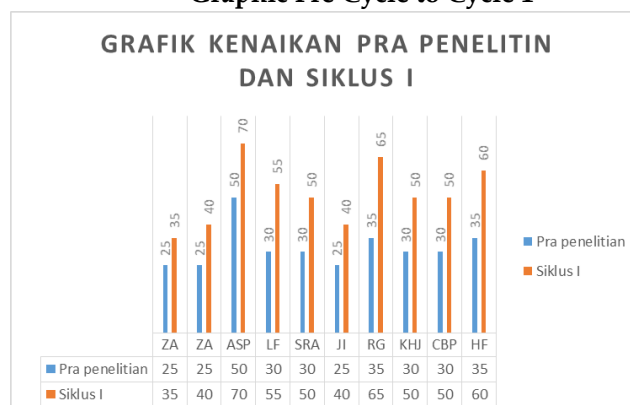
researchers in cycle 1 the numeracy ability of children aged 4-5 years has increased quite well. This is evidenced by the increase, in 10 children almost all children have increased. There are two children, ZA and ZA, they are siblings who happen to be able to count 4 - 5 years old children who are still below their friends. From the total number of children who have experienced an increase, but the increase they have experienced has not reached the standard limit in the ability to count 4 - 5 years old children should be. Therefore the researcher discusses this with the teacher, seeing from the results of the analysis of action research in the first cycle the researcher and the teacher agree to conduct further research, namely research cycle II

Tabel 2.
Data Cycle 1

Subject	Cycle I		Point	
	Point	%	Point	%
ZA	7	35	2	10
ZA	8	40	3	15
ASP	14	70	4	20
LF	11	55	5	25
SRA	10	50	4	20
JI	8	40	3	15
RG	13	65	6	30
KHJ	10	50	4	20
CBP	10	50	4	20
HF	12	60	5	25

In the table, it appears that the ability to count udia children 4-5 years through snakes and ladders game has increased. The total score on the numeracy ability of children aged 4 - 5 years before the action was 63 with an average percentage score of 31.5%, but after taking action in the first cycle the numeracy ability score of children aged 4-5 years increased to 103 with an average percentage the numeracy ability of children aged 4-5 years is 51, 5%.

Picture 1.
Graphic Pre Cycle to Cycle 1



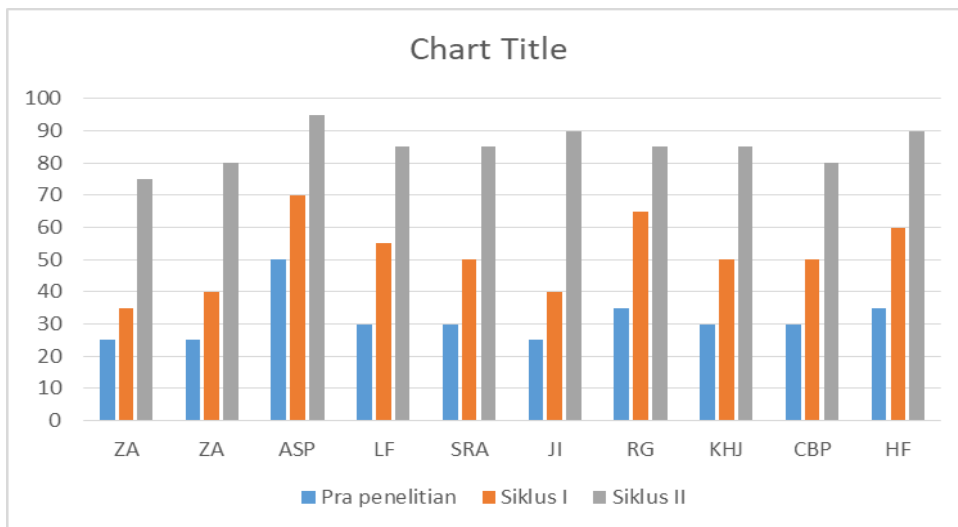
The increase in the previous score reached 40 with an average percentage of 20%. If the table is depicted in the diagram can be seen in the graph above.

Tabel 3. Cycle II

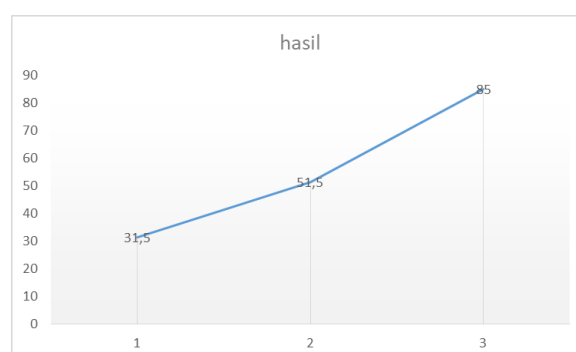
Subject	Cycle II	
	Score	%
ZA	15	75
ZA	16	80
ASP	19	95
LF	17	85
SRA	17	85
JI	18	90
RG	17	85
KHJ	17	85
CBP	16	80
HF	18	90

The table shows that the numeracy ability of children aged 4-5 years with the snake ladder game from before taking action to taking action in cycle II occurs in accordance with the target that has been determined by researchers. Increased numeracy ability of children aged 4-5 years seen in the total score of all children before taking action is 63 with an average percentage of numeracy ability of children aged 4-5 years playing snakes and ladders is 31, 5%. Then when the action is taken in the first cycle the total score of the whole child increases to 103 with the average 51,5%. When action is taken again in cycle II, experience increased the score to 170 with an average percentage of 85%. Also presented diagrams that illustrate the percentage increase in numeracy skills of children aged 4-5 years before taking action until the action in cycle II are as follows:

Picture 2.
Graphic Data Pre Cycle, Cycle 1 and Cycle 2



Picture 3.
Graphic Data Cycle



The increase in the percentage shows that by taking action in the second cycle, the numeracy ability of children aged 4-5 years has increased significantly and better. Therefore, researchers no longer need to do the next cycle because the researchers' goal to achieve the desired target has been answered with children's numeracy skills 4-5 years of age have increased by playing the snake and ladder game (Klemans, Peeters, Segers, & Verhoeven, 2012).

Conclusion

Based on the results of action research and discussions that have been carried out, it can be concluded that the activities of playing snakes and ladders can improve the ability to count 4 - 5 years old children in group A PAUD Dahlia. By doing these snake ladder activities, the ability to count 4 - 5 years old children, the ability to count objects, recognize symbols of 1-10, mention symbols of numbers 1-10, recognize the concept of numbers, match numbers with symbol numbers can be increased by playing snakes and ladders. The increase can be seen from the pre-action percentage with an average of 31.5% after the action, namely in the first cycle, it increased with an average percentage of 51.1%. With an increase in the first cycle the results do not meet the criteria for success of the predetermined action that is 75% and the results of the percentage in the second cycle the average success increased to 85%. This improvement can be seen from the ability of children to spell objects, recognize symbols 1-10, mention symbols 1-10, recognize the concept of numbers, and match numbers 1-10. Implications in this study were carried out to improve numeracy skills of children aged 4-5 years in group A children. Given the importance of the numeracy ability of children aged 4-5 years, therefore a fun method is used to improve the numeracy ability of children aged 4-5 years through the snakes and ladders game. Also improve other children's abilities such as emotional social abilities and fine motor skills to develop and build children's motivation and interest in learning and create an active and creative atmosphere in the learning process.

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