

## IMPROVING BEGINNING CALCULATING ABILITY THROUGH MODIFIED COGGLAK MEDIA IN CHILDREN AGED 4-5 YEARS

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### Abstract

Researchers will conduct this research aiming to improve the numeracy skills of children aged 4-5 years through the media of saving corn at Pembina II Sooko Public Kindergarten, Mojokerto. This study used the Classroom Action Research (CAR) method which was carried out using two cycles of action. The subjects of this study were 26 children from Group A1 of TK Negeri Pembina II Sooko. Data collection techniques through observation, interviews, and documentation. The results showed that there was an increase in the numeracy skills of children aged 4-5 years through the "Modified Congklak" media. The results obtained in Cycle I were 30.8% due to several causal factors, namely the child was still confused if the number taken was 5 but the corn that was put into the glass cup was less than 5. So in Cycle II it is hoped that this can be followed up by motivating children through stories and giving rewards, training children repeatedly, and doing more interesting counting activities. In Cycle II, obtaining 76.9% stated that it had reached an indicator of success. The learning process using Modified Congklak media can improve the numeracy skills of children aged 4-5 years. Thus it can be concluded that through Modified Congklak media it can improve numeracy skills in group A1 children at Pembina II Sooko Public Kindergarten.

**Keywords:** Counting Ability; Modified Congklak Media.

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## INTRODUCTION

The ability to count is very important given to early childhood because this ability is very closely related to social life and is useful in everyday life. This is in line with the opinion of the Ministry of National Education (Musi, 2016) which states that counting is very useful for everyday life, especially in the concept of numbers which is the basis for the development of mathematical abilities. The concept of numeracy in early childhood education is needed to foster basic knowledge of mathematics which will be useful in the education that the child will take next. So that when children enter higher education, children will be ready to learn to count at a higher level.

Children's numeracy skills are included in children's cognitive development. In the pre-operational age of 4-5 years. Piaget (1964) stated that all children have the same pattern of cognitive development, namely through four stages: sensory-motor (age 0-2 years), pre operational (age 2-7 years), concrete operational (age 7-11 years), and formal operations for ages 11 and over. The stage of cognitive development of children aged 4-5 years is at the pre-operational stage, and to develop aspects of cognitive development in learning can be through activities to recognize number symbols, because at this stage children can already recognize several symbols even until the child is able to do simple counting.

In fact, there are many problems that occur in the cognitive development of children aged 4-5 years, including the low ability of children to recognize number symbols. Most of the children still make mistakes in mentioning the sequence of numbers 1-10. In addition, there are still children who write the number symbols upside down, such as writing the number symbols 3, 4, 5, 6, and 9 upside down. Children sometimes still make mistakes in pointing out the number symbols 1-10. Children still make mistakes when working on LKPD in connecting number symbols with objects up to 10, especially pictures of objects whose number is above five.

The importance of providing the right stimulus to improve children's numeracy skills from an early age. The ability to count in kindergarten greatly influences learning outcomes in the future, so an interesting, challenging and appropriate counting activity is needed for children's needs (Vogt et al., 2018). Counting activities can not be separated from everyday life. The success of children in solving problems depends on what is ingrained in children or things that are familiar to children, as well as daily activities that are often carried out by children (Wood, 2013). Every child has different numeracy abilities depending on their learning environment (Sonnenschein et al., 2015). Therefore, counting activities in children must be introduced according to the stages, in order to get good results.

Difficulties in children often occur in arithmetic activities. Strengthened by Mazzocco's opinion, it was revealed that children who have math problems are mostly constrained in numeracy skills, such as matching numbers with the number of objects (Mazzocco, 2007). Children aged 4 years are able to understand one-to-one correspondence, such as children arranging cutlery in one place, while children aged 5 years are familiar with numbers 1-20, and matching the number of objects with numbers (Charlesworth & Leali, 2012: 375). However, several studies have suggested that children have difficulty counting, that is, children still have difficulty counting objects up to 10 (Byrnes, 2008: 268). In addition, Drigas and Pappa's research (2015: 62), found similar difficulties, namely children having difficulty recognizing number symbols and making strategies in solving problems. This is due to the ineffectiveness of the methods and tools used in learning and not in accordance with the characteristics of the child.

Based on observations at Pembina II Sooko Public Kindergarten that found problems regarding numeracy skills. There are 10 children out of 26 children in Group A1 of TK Negeri Pembina Sooko who are still very low in their numeracy skills. They still don't understand the concept of simple counting using numbers 1-10, because the teacher still hasn't explained some random and more complex counting concepts in developing these counting concepts. However, children still do not have the ability to count well and the media used in learning is still not supportive in the form of worksheets such as connecting pictures with numbers, making as many pictures as numbers, and counting as many pictures as numbers.

In increasing the understanding of the concept of numbers for children, it needs to be given early on using a way that is easy for children to understand. This is related to Sudaryanti's opinion that in learning mathematics it is very necessary to understand and master first about mathematical concepts, one of which is counting. Meanwhile, according to (Malapata, Wijayaningsih, 2019) which states that the concept of numbers is an idea or basic knowledge in understanding the value of many sets of objects in mathematics.

In this study, researchers used modified congklak media to improve children's numeracy skills. The media for storing corn is almost the same as coklak, but modified again, made of cardboard with holes punched so that small cups can be entered to make counting using corn. There are numbers 1-10 printed using paper to make it easier for children to add, subtract, or just count. This modified congklak media, the child takes the numbers that have been prepared and then counts using corn which will later be put into the cup that is in the media. The child does it until it's finished with the teacher occasionally randomizing the numbers that have been provided. Until finally the child can count successfully by inserting corn into the modified congklak media.

The advantages of corn saving media used in conducting research include: 1) easy to obtain, 2) made of safe materials for early childhood, 3) teachers get the opportunity to get to know children more closely, 4) children can learn colors. In this study, the researchers used the same corn saving media as the counting barn media. This is the same as research conducted by Elisa Malapata & Lanny Wijayaningsih using arithmetic media as a tool to improve children's numeracy skills.

## METHODOLOGY

This study used a Classroom Action Research (CAR) design using the Kemmis and Mc model research designs. Taggart. The problem that underlies this research is in group A1 of TK Negeri Pembina II Sokoo where children still do not understand the ability to count.

Classroom Action Research is an examination in the form of an action learning activity that appears and occurs in the classroom simultaneously. This research is participatory or action in nature, which means the researcher is involved in the research. In addition, it is collaborative because it involves other people such as teachers or colleagues. This research was carried out in 2 cycles with the stages of planning (plan), action (action), observation (observation), and reflection (reflection).

Agree with the opinion of Kemmis (in Sukidin, et al, 2010: 48–49) in planning using a self-reflective spiral system that starts with plans, actions, observations, reflections and re-planning which are the basis for a square off on problem solving. This study uses data collection techniques, namely observation to find out the problems that occur in the class, interviews to find out how big the problems are in the class, documentation is carried out to find out more about more concrete problems.

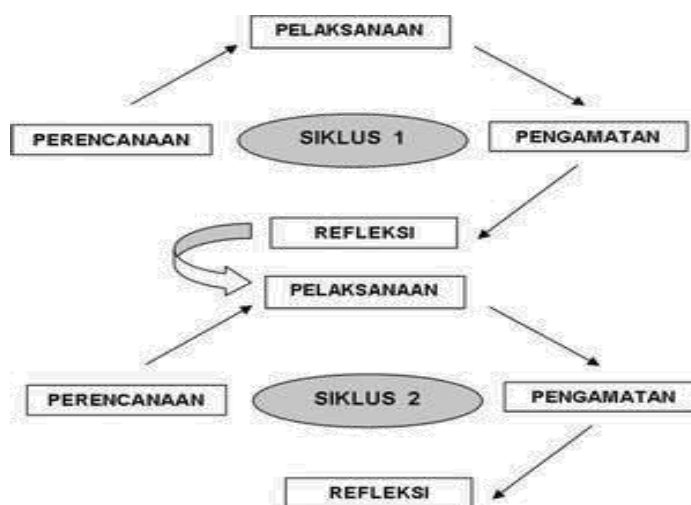


Figure 1. Chart of Classroom Action Research Stages

In this study using qualitative and quantitative data analysis techniques. Quantitative data analysis is used to determine the improvement of the learning process, especially the various actions taken in the form of observation notes and photo documents to be analyzed. Furthermore, all data obtained will be collected and reported in the form of a description. Quantitative techniques are used to determine the increase in children's learning outcomes as a result of each action taken. Meanwhile, qualitative data analysis according to Miles and Huberman (in Emzir, 2011: 129-135) explains that there are three types of activities carried out, namely data reduction, data model (Data Display), and drawing or verifying conclusions.

**Table 1.** Success Criteria

Kriteria	Pencapaian
<b>Berkembang Sangat Baik (BSB)</b>	76,00 - 100
<b>Berkembang Sesuai Harapan (BSH)</b>	51,00 - 75,00
<b>Mulai Berkembang (MB)</b>	26,00 – 51,00
<b>Belum Berkembang (BM)</b>	0,00 – 25,00

The calculation used in this data analysis produces a percentage of achievement which is then interpreted in sentences. Furthermore, data acquisition according to Acep Yoni (2010: 177) is as follows:

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

P = Percentage

F = Overall value obtained by the child

N = Maximum score multiplied by the total number of children

## RESULTS AND DISCUSSION

### Results

Class action research was conducted at Pembina II Sokoo Public Kindergarten. Pembina II Sokoo Public Kindergarten has 4 classes, namely A1, A2, B1, and B2. The research was conducted in class A1, which consisted of 26 children. Before carrying out classroom action research, researchers first made observations to determine the development of early numeracy skills in children aged 4-5 years.

#### *Pre-Cycle Action Data Description*

Before carrying out cycle 1 actions, the researcher observed activities that showed the ability to count in group A1 children. This was done so that researchers could find out the numeracy skills of group A1 to see the children's initial condition. The results to be obtained from this observation are compared with the results of the value after taking the action. By making a comparison between the previous value and the value after the action is taken, it will be known that the increase that occurred in the learning process.

Following are the results of the percentage of pre-cycle data that researchers obtained. The ability to count only 6 out of 26 children were able to count according to the concept of counting using the media provided by the teacher.

**Table 2.** Pre-Cycle Percentage Results

No.	Kriteria	Jumlah Anak	Presentase
1.	Muncul	6	23,1%
2.	Belum Muncul	20	76,9%

*Implementation of Cycle 1 Actions**Action Planning*

Based on discussions with colleagues, researchers develop lesson plans that will be implemented as well as prepare needs and develop needs such as: Designing a topic for the week that will be implemented PTK cycle 1 with the topic Take Care of Me, the chosen sub-topic is Pets (Ducklings); Prepare learning media, namely modified congklak media and number cards; Developing Teaching Modules related to children's initial numeracy skills; Arrange apperception activities to be carried out.

*Implementation of Activities*

Children take turns playing modified congklak media in an orderly manner. Preliminary activities begin with the teacher greeting and inviting to pray together. The teacher invites students to watch a video about playing learning media related to numeracy skills. The teacher gives trigger questions to students during the apperception. The teacher demonstrates modified congklak learning media activities in the order. The teacher asks the readiness of students to carry out learning activities.



**Figure 2.** Ability to Count with Simple Sums

In the core activities, children carry out activities under the supervision of the class teacher. Children carry out activities with modified congklak media alternately. Children who have not had time to play, the teacher provides other activities so that learning remains conducive.

When children carry out learning activities in progress, the teacher goes around to observe children in carrying out activities with the assistance of the class teacher who participates in conditioning the class. After the children have completed the activities given by the teacher, then the children are welcome to eat, rest, and after that the teacher asks the children to prepare to pray and go home.

*Observation Results of Cycle I*

This stage is carried out when the game activities take place. In this study the observation stage was carried out to obtain data on children's development in activities to improve children's numeracy skills through modified congklak media. The indicators observed in this activity are children being able to count many objects 1-10, children being able to sort numbers 1-10, children being able to pair objects 1-10, and being able to add and subtract simply according to the concept of counting. The achievement of initial numeracy skills in children through modified congklak media in cycle I illustrates that out of 26 children, there were 8 children whose numeracy skills had appeared and 18 children had not yet appeared. Recapitulation of cycle 1 can be obtained that the ability to count 1-10 totaled 8 children with a percentage of 30.8% and as many as 18 children had not appeared with a percentage of 69.2%. So in the first cycle the ability to count in children is still not good.

Dari hasil pemaparan diatas bahwa kemampuan berhitung anak kelompok A1 TKN Pembina II Sooko belum menunjukkan kemunculan pada kegiatan siklus 1. Hasil tersebut dapat dilihat dalam presentase berikut:



**Table 3. Percentage Results for Cycle 1**

No.	Kriteria	Jumlah Anak	Presentase
1.	Muncul	8	30,8%
2.	Belum Muncul	18	69,2%

*Reflection Stage*

Based on the results of observations of activities in improving numeracy skills using modified congklak media in cycle 1, it can be concluded that children's numeracy skills have not been fully achieved properly because there are still many children who do not understand the concept of counting using objects in everyday life. This is due to several causative factors, namely the child is still confused if the number taken is number 5 but the corn that is put into the glass cup is less than 5 and if the child takes two number cards but they are still confused about how to add them all up.

Based on the results of the reflection above, the researcher and the teacher concluded that learning in cycle I was not as expected, so in cycle II it was hoped that it could be followed up by motivating children through stories and giving rewards, training children repeatedly, and doing more interesting counting activities.

*Implementation of Cycle II Actions**Action Planning*

Based on the implementation of Cycle 1, the results obtained were not in accordance with the success criteria. Therefore, researchers carry out cycle II actions by starting to develop lesson plans that will be implemented as well as preparing needs and compiling needs such as: Designing a topic for the week that will be implemented PTK cycle 1 with the topic Take Care of Me, the chosen sub-topic is Pets (Fish). Prepare learning media, namely modified congklak media and number cards. Developing Teaching Modules related to children's initial numeracy skills. Arrange apperception activities to be carried out.

*Implementation of Activities*

Children take turns playing the media to save corn in an orderly manner. Preliminary activities begin with the teacher greeting and inviting to pray together. The teacher invites students to watch a video about playing learning media related to numeracy skills. The teacher gives trigger questions to students when the apperception takes place. The teacher demonstrates modified congklak learning media activities in the order. The teacher asks the readiness of students to carry out learning activities.



Figure 3. The Teacher Demonstrates Modified Congklak Media

In the core activities, children carry out activities under the supervision of the class teacher. Children carry out activities with modified congklak media alternately. Children who have not had time to play, the teacher provides other activities so that learning remains conducive.

When children carry out learning activities in progress, the teacher goes around to observe children in carrying out activities with the assistance of the class teacher who participates in

conditioning the class. After the children have completed the activities given by the teacher, then the children are welcome to eat, rest, and after that the teacher asks the children to prepare to pray and go home.

*Observation Results of Cycle II*

This stage is carried out when the game activities take place. In this study the observation stage was carried out to obtain data on children's development in activities to improve children's numeracy skills through the media of saving corn. The indicators observed in this activity are children being able to count many objects 1-10, children being able to sort numbers 1-10, children being able to pair objects 1-10, and being able to add and subtract simply according to the concept of counting. The achievement of early numeracy skills in children through the media of saving corn in cycle I illustrates that out of 26 children, there were 19 children whose numeracy skills had appeared and 7 children had not yet appeared. Recapitulation of cycle II can be obtained that the ability to count 1-10 totaled 20 children with a percentage of 76.9% and as many as 7 children had not appeared with a percentage of 23.1%. So in the first cycle the ability to count in children is still not good.



Figure 4. Students Playing Using Modified Congklak Media

From the results of the explanation above, the numeracy skills of the children in group A1 of TKN Pembina II Sooko have not shown their appearance in cycle 1 activities. These results can be seen in the following percentages:

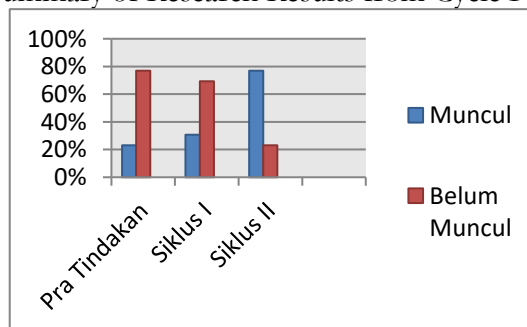
**Table 4. Percentage Results for Cycle 2**

No.	Kriteria	Jumlah Anak	Presentase
1.	Muncul	20	76,9 %
2.	Belum Muncul	6	23,1%

*Reflection on Cycle II*

From the results of observing activities using corn saving media in cycle II, the ability to count in group A1 children has shown good results. Of the 26 children, only 7 children were still unable to add subtract in a simple way according to the concept of simple counting. Children's numeracy skills have improved well. This is shown from the results of the percentage of cycle II.

Graph 1. Summary of Research Results from Cycle I and Cycle II



Based on these results it can be seen that the increase in numeracy skills in children at TKN Pembina II Sooko has succeeded in being in the good category.

The numeracy skills of group A1 TKN Pembina II Sooko have increased in each cycle. In the last cycle II there has been an increase in children's numeracy skills in the good category. Children are able to count many objects 1-10, children are able to sort numbers 1-10, children are able to pair objects 1-10, and are able to add and subtract simply according to the concept of counting in accordance with the developmental stages of 4-5 year olds.

Based on graph 1, it can be seen that there was an increase in numeracy skills using modified congklak media from cycle I 23.1% to cycle II 76.9%, an increase of 53.8%. Thus the data can be concluded that the child's numeracy ability has reached the success indicator/target of 76%, so the action is stopped.

Research conducted by researchers on children's numeracy with the media used by researchers, namely Congklak Modification to help improve children's numeracy skills has increased. This is the same as research conducted by Nuraida Fitry Lubis who said that children's numeracy skills have increased by using congklak games. Using learning media can affect children's numeracy skills (Lubis, 2017).

In the research conducted, researchers have obtained results in improving children's numeracy skills, so a learning media is needed. In this research, researchers used modified congklak media to improve early childhood numeracy skills. This is the same as research conducted by Nova Rozi which says that using egg board media through a counting game can improve mathematical logic intelligence. With the media used in learning can improve numeracy skills (Rozi, 2007).

In research conducted by researchers, it has been said that with modified congklak media, children can improve their numeracy skills. In counting there is also a fun atmosphere and you don't get bored with the way the objects used in counting can be replaced with objects that are of interest to children. This is similar to previous research, namely that cheerful counting games can improve numeracy skills and social skills. In learning to count, you can use play activities that make children happy so they don't get bored easily with the learning (UGM Library, 2000).

Research conducted by researchers related to modified congklak media can improve children's numeracy skills, because it is one of the media for learning mathematics in the form of arithmetic operations. This is similar to previous research, namely the introduction of arithmetic operations through congklak games in learning mathematics. Learning media can also improve children's arithmetic operations (Siregar, Solfitri, & Roza, 2018).

## CONCLUSION

The application of modified congklak media in cycles I and II showed that there was an increase in numeracy skills. Of the 19 children, 8 children showed physical motor skills in cycle I and cycle II increased by 19 children. The percentage of the ability to count in group A1 children who had appeared in each cycle was 23.1% pre-cycle, 30.8% for the first cycle and 76.9% for the second cycle.

From the results of the research that has been done, during the learning process, the application of modified congklak media can improve the ability to count in children in group A1 TK Negeri Pembina II Sooko in the good category.

## REFERENCES

- Arikunto, Suharsimi. (2010). *Prosedur Penelitian Suatu Pendekatan Praktek*. Jakarta: Rineka Cipta.
- Borg, W.R., Gall, J.P. & Gall, M.D. 2013. *Educational Research An Introduction, Seventh Edition*. Boston: Pearson Education



- Cahyadi, F., & Hernita, M. I. (2018). Peningkatan Keaktifan Dan Kemampuan Berhitung Melalui Media Puzzle Pada Anak. *Paudia : Jurnal Penelitian Dalam Bidang Pendidikan Anak Usia Dini*, 5(1). <https://doi.org/10.26877/paudia.v5i1.1177>
- Humairo, V. M., & Amelia Zahrina. 2020. Peningkatan Kemampuan Berhitung Awal Melalui Modifikasi Bentuk Permainan Congklak. *Jurnal AUDHI*, Vol. 3, No. 1.
- Irawati, R. M. (2012). Peningkatan Kemampuan Berhitung Anak Melalui Permainan Memancing Angka Di Taman Kanak- Kanak Sangrina Bunda Pasar Tiku. *JURNAL ILMIAH PESONA PAUD*, 1(3). Retrieved from <http://ejournal.unp.ac.id/index.php/paud/article/view/1658>
- Kemmis, S & Mc Taggart, R. 1998. *The Action Research Planner, Third Edition*. Victoria: Deakin University.
- Lubis Fitry Nuraida, 2016. Peningkatan Kemampuan Berhitung Anak Usia 5-6 Tahun Melalui Permainan Congklak Di Tk Aisyiyah 19 Medan. *ESJ* : 5(2). <https://jurnal.unimed.ac.id/2012/index.php/elementary/article/viewFile/4476/3920>
- Luthfiah Erni & Rakhmawati Nur Ika Sari. 2018. Pengembangan Permainan Domino Angka Terhadap Kemampuan Mengenal Lambang Bilangan 1-10 Anak Usia 4-5 Tahun. *Jurnal Teratai*, 7(2) 1-8. <https://core.ac.uk/download/pdf/230644138.pdf>
- Malapata, E. & Wijayaningsih, L. (2019). Meningkatkan Kemampuan Berhitung Anak Usia 4-5 Tahun Melalui Media Lambung Hitung. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini* 3(1), 283 – 293.
- Novianti, R. (2015). Pengembangan permainan roda putar untuk meningkatkan kemampuan berhitung angka anak usia 5-6 tahun. *Jurnal Educhild*, 4(1), 56–63.
- Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia No.137 Tahun 2014, Jakarta: Direktorat PAUD.
- Purwanti Rini. 2020. Peningkatan Kemampuan Berhitung Permulaan Melalui Permainan Tradisional Congklak. *JEMECE* : 1 (1), 45-54. <https://ejournal.stkipmodernngawi.ac.id/index.php/JMECE/article/view/159/102>
- Reswita, R., & Wahyuni, S. (2018). Efektivitas Media Pasir dalam Meningkatkan Kemampuan Konsep Bilangan pada Anak Usia 5-6 Tahun di Tk Aisyiyah Bengkalis. *Lectura : Jurnal Pendidikan*, 9(1), 43–51. <https://doi.org/10.31849/lectura.v9i1.927>
- Rifana jita ridyawati. (2015). Peningkatan Keterampilan Menyimak Cerita Melalui Media VCD Film Kartun. *Jurnal Pendidikan Guru Pendidikan Anak Usia Dini Edisi 5 Tahun Ke-4 2015*. Retrieved from [journal.student.uny.ac.id/ojs/index.php/pgpaud/article/download/327/299](http://journal.student.uny.ac.id/ojs/index.php/pgpaud/article/download/327/299)
- Roza Yunita. 2018. Pengenalan Konsep Operasi Hitung Bilangan Melalui Permainan Congklak Dalam Pembelajaran Matematika. *Al-Khwarizmi Jurnal Pendidikan Matematika dan Ilmu Pengetahuan Alam* 2(1): 119-128
- Rozi Nova. 2012. Peningkatan Kecerdasan Logika Matematika anak Melalui permainan Berhitung Menggunakan papan Telur Di Tk Aisyiyah 7 Duri. *Jurnal Pesona PAUD* : 1 (1). 1-10.
- Siregar, S. N., Solfitri, T., & Roza, Y. (2018). Pengenalan Konsep Operasi Hitung Bilangan Melalui Permainan Congklak Dalam Pembelajaran Matematika. *Al-Khwarizmi: Jurnal Pendidikan Matematika Dan Ilmu Pengetahuan Alam*, 2(1), 119–128. <https://doi.org/10.24256/jpmipa.v2i1.107>
- Vogt, S, W.Krempel, dan J.Suchard. 1994. *Process for Producing A Soluble Cocoa Product*. Food Chemistry. United States Patent. Hlm 1-6.

