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IMPROVING COGNITIVE ABILITIES OF 4–5-YEAR-OLD CHILDREN THROUGH THE PATTERNED NUMBER HOPPING GAME

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Abstract:

This classroom action research aimed to improve the cognitive abilities of 4–5-year-old children through the patterned number hopping game at TK Trisula Perwari Purwakarta. The study background was the children's limited ability to recognize numbers, mention number sequences, and follow simple number patterns. The research used Classroom Action Research (CAR) with a descriptive qualitative approach. The subjects were 8 children in Group A (4 boys and 4 girls). The study was conducted in two cycles, each consisting of planning, action, observation, and reflection. Data were collected through observation, documentation, and field notes, and analyzed descriptively. The results showed an improvement in children's cognitive abilities from the pre-cycle to the second cycle. In the pre-cycle, most children had difficulty recognizing numbers and following simple sequences. In the first cycle, they began to show progress but still made mistakes. In the second cycle, almost all children were able to recognize numbers, follow number sequences, and understand simple patterns correctly. The conclusion is that the patterned number hopping game is effective, simple, and enjoyable for improving early childhood cognitive abilities, especially in number recognition, sequencing, and understanding patterns.

Keywords: *cognitive abilities, early childhood, educational games, patterned number hopping*

Abstrak:

Penelitian ini bertujuan untuk meningkatkan kemampuan kognitif anak usia 4–5 tahun melalui permainan loncat bilangan berpola di TK Trisula Perwari Purwakarta. Latar belakang penelitian ini adalah masih rendahnya kemampuan anak dalam mengenal angka, menyebutkan urutan bilangan, dan mengikuti pola bilangan sederhana. Metode penelitian yang digunakan adalah Penelitian Tindakan Kelas (PTK) dengan pendekatan deskriptif kualitatif. Subjek penelitian adalah 8 anak kelompok A yang terdiri dari 4 anak laki-laki dan 4 anak perempuan. Penelitian dilaksanakan dalam dua siklus, masing-masing terdiri dari tahap perencanaan, pelaksanaan, observasi, dan refleksi. Data diperoleh melalui observasi, dokumentasi, dan catatan lapangan, kemudian dianalisis secara deskriptif. Hasil penelitian menunjukkan adanya peningkatan kemampuan kognitif anak dari pra siklus hingga siklus II. Pada pra siklus, sebagian besar anak masih kesulitan mengenal angka dan menyebutkan urutan bilangan sederhana. Pada siklus I, anak mulai menunjukkan peningkatan dalam mengenal angka dan mengikuti pola sederhana, meskipun belum optimal. Pada siklus II, hampir seluruh anak mampu menyebut angka dengan benar, mengikuti urutan bilangan, serta memahami pola sederhana sesuai instruksi guru. Kesimpulan penelitian ini adalah bahwa permainan loncat bilangan berpola dapat digunakan sebagai strategi pembelajaran yang efektif, sederhana, dan menyenangkan untuk meningkatkan kemampuan kognitif anak usia dini, khususnya dalam mengenal angka, urutan, dan pola bilangan.

Kata Kunci: *kemampuan kognitif, anak usia dini, permainan edukatif, loncat bilangan berpola*

INTRODUCTION

Early Childhood Education (ECE) is a very important level of education because it lays the foundation for children's development in later stages. At the age of 4–5 years, children are in their golden age, a period when various potentials, including physical, linguistic, social-emotional, and cognitive, develop very rapidly. According to Piaget (in Santrock, 2021), children aged 2–7 years are in the preoperational stage, where they begin to develop symbolic thinking skills, recognize numbers, and understand simple pattern concepts. Therefore, appropriate cognitive stimulation is essential for children to grow optimally.

In fact, initial observations in group A at Trisula Perwari Purwakarta Kindergarten show that the cognitive abilities of children aged 4–5 years are still relatively low. Most children are not yet able to recite numbers in the correct order, often make mistakes when following simple patterns, and still have difficulty recognizing numbers consistently. This causes children to lack confidence in learning activities related to number recognition. If this condition is left unaddressed, children's cognitive development will be hampered, especially in terms of early mathematical readiness, which is important for entering the next level of education.

One way teachers can overcome this problem is by providing creative and enjoyable learning experiences. Learning for early childhood should use a play-based approach, because through play children can learn naturally, actively, and meaningfully. One form of educational game that can be applied is patterned number hopping. This game involves physical activity in the form of simple jumps combined with the introduction of numbers and number patterns. Through this activity, children are not only trained to recognize number sequences, but also develop logical thinking skills in following simple patterns.

Through patterned number hopping, children learn while moving, making the learning process more enjoyable and less boring. This activity also helps children to be more focused, confident, and daring to try new things. In addition, learning with visual patterns and concrete movements is in line with the characteristics of preoperational children who still think intuitively and need real experiences to understand concepts. Thus, this game is very relevant for improving children's cognitive abilities, especially in recognizing numbers, sequences, and simple number patterns.

Based on the above description, the researcher felt it was important to conduct classroom action research with the title: "Improving Cognitive Abilities of 4-5 Year Old Children Through The Patterned Number Hopping Games at Trisula Perwari Purwakarta Kindergarten.

RESEARCH METHOD

A. Place and Time of Research

The research was conducted at Trisula Perwari Purwakarta Kindergarten, in group A with children aged 4–5 years. The location was chosen based on initial observations that showed low cognitive development in children. The research was conducted in the odd semester of the 2025/2026 academic year, for approximately two months, starting from the pre-cycle stage, cycle I, to cycle II.

B. Research Method

This research used classroom action research (CAR) because it focused on efforts to improve the learning process through concrete actions in the classroom. CAR was chosen because it suited the needs of the research conducted at Trisula Perwari Purwakarta Kindergarten, namely to improve the cognitive development of children in group A aged 4–5 years through the application of patterned number hopping games. The approach used in this study was a descriptive qualitative approach. The qualitative approach was used to describe the learning process, children's responses, and the classroom atmosphere.

The research model used is the Kemmis and McTaggart spiral model. This model is implemented cyclically, and each cycle consists of four stages, namely planning, implementation of actions, observation, and reflection. In the planning stage, the researcher and the teacher developed a learning plan, prepared patterned number hopping game media, and prepared observation instruments. In the action implementation stage, the teacher carried out the learning according to the plan that had been made by directly involving the children in patterned number hopping activities. The observation stage was carried out by the researcher by recording the children's behavior, activities, and development based on the established indicators. The reflection stage was carried out to analyze the observation results, find weaknesses or obstacles, and design improvements for the next cycle. This research was designed in two cycles, with each cycle conducted in two meetings.

C. Research Subject

The subjects in this study were children in group A at Trisula Perwari Purwakarta Kindergarten, aged between 4 and 5 years. There were 8 children in this group, consisting of 5 boys and 3 girls.

FINDINGS AND DISCUSSION

A. Initial Conditions (Pre-Cycle)

Based on the initial observations in group A at Trisula Perwari Purwakarta Kindergarten, it appears that most children still have difficulty in correctly reciting numbers in sequence, while most of the others are still confused when asked to follow simple patterns such as 1-2-1-2-1-2. The learning atmosphere also shows that children tend to be passive and unmotivated. This condition shows the need for more creative and enjoyable learning activities.

B. Results of Cycle I

In cycle I, the teacher introduced a patterned number hopping game using the numbers 1–2 stuck straight on the floor. The children were asked to jump from one number to the next in sequence. During the activity, there were positive changes compared to the pre-cycle. From a cognitive aspect, some children were able to say the numbers correctly in sequence, but there were still some who often stepped

wrong or said the wrong number.

The children's response to this activity was quite good; they began to appear excited and enthusiastic, although some children still got bored quickly after trying several times. The teacher provided guidance, direct examples, and motivation in the form of praise when the children managed to jump correctly. The results of the reflection on Cycle I showed that the learning began to have a positive impact, but improvements were still needed in terms of media variety so that the children would be more interested and not lose focus quickly.

C. Cycle II

In cycle II, the teacher made improvements by creating more varied number patterns, such as zig-zag arrangements and the use of colored numbers to attract the children's attention. The teacher also gave the children the opportunity to take turns playing so that all children had the same experience, and added motivation in the form of applause after the children successfully jumped according to the pattern.

The results of the observation showed a significant improvement. Children who were previously hesitant began to be more confident, and some even asked to try again after finishing. Almost all children were able to correctly say the numbers 1–2, follow the given number patterns, and became more fluent in saying the sequences. The children also appeared to be happier, more enthusiastic, and actively asked questions to the teacher.

Overall, the results of cycle II showed that almost all children showed the expected progress. The patterned number hopping game successfully created a fun learning atmosphere, while also effectively improving the cognitive abilities of 4-5 year old children at Trisula Perwari Purwakarta Kindergarten.

D. Research Results Recap

The following table illustrates the cognitive development of Group A children at Trisula Perwari Purwakarta Kindergarten (8 children) from the pre-cycle to Cycle II.

Table 1. The cognitive development of Group A children

Research Stage	Cognitive Condition	General Description of Development
Pre-cycle	Only a small number of children were able to correctly recite number sequences. Most were still confused when following simple patterns.	Children appear passive, lack enthusiasm, and require intensive guidance.
Cycle I	Some children can already recite numbers correctly, but still often make mistakes in following the sequence pattern.	Children begin to show enthusiasm, although some get bored quickly. Varied media are needed to capture their attention.

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Research Stage	Cognitive Condition	General Description of Development
Cycle II	Most children are able to recognize numbers, recite sequences correctly, and follow simple number patterns.	Children are more active, enthusiastic, and show progress as expected. The learning atmosphere is enjoyable.

From the above recapitulation, it can be concluded that there is a clear improvement in children's cognitive aspects from pre-cycle to cycle II. Initially, children were still hesitant, lacked confidence, and had difficulty recognizing number patterns, but after being given activities through patterned number hopping games, children became more active, confident, and able to perform activities better.

The results of the study show an increase in the cognitive abilities of 4-5 year old children after the implementation of *patterned number hopping* games. In the pre-cycle, the children still seemed to have difficulty hopping correctly, maintaining balance, and were not confident in trying. In terms of cognitive aspects, most of the children were not yet able to recognize numbers well, often made mistakes in naming the sequence, had difficulty focusing, and had difficulty following simple number patterns.

After the intervention in cycle I, positive changes were observed, although they were not yet optimal. Children began to dare to try hopping according to the numbers arranged, even though some still made mistakes or lost their balance. Cognitively, some children began to be able to recite numbers in sequence, but were still inconsistent in following number patterns. These changes indicate that simple games involving physical movement can help increase children's activity and courage. This is in line with Piaget's theory (in Santrock, 2021), which states that preoperational children learn best through concrete objects and real activities that they can experience directly.

The results in cycle II showed a significant improvement compared to cycle I. Almost all children were able to jump with balance, maintain body coordination, and do so with confidence. Cognitively, children became more fluent in saying numbers and were able to follow simple number patterns correctly. Teachers who provided variations in patterns, number colors, and motivation in the form of praise and applause succeeded in fostering children's enthusiasm for learning. This is in line with Sujiono's (2019) opinion that learning in early childhood should be done in a fun, creative way that integrates various aspects of child development.

Overall, the results of this study indicate that *patterned number hopping* games are effective in improving children's cognitive abilities. This game not only trains concentration, accuracy, and understanding of number and pattern concepts, but also trains large muscle strength through hopping activities. In addition, learning packaged in the form of games has been proven to make children more active, confident, and enthusiastic in participating in activities. This is in line with the principle of learning through play, which is the basis of early childhood education.

Thus, learning using *patterned* number hopping games can be used as an alternative strategy for early childhood teachers in developing children's

physical-motor and cognitive aspects simultaneously. The implementation of this game is simple, inexpensive, and can be done in various ways to attract children's attention and foster their interest in learning.

The implementation of Cycle I took place on Friday, August 22, 2025, yielding the following results:

Table 2. Cycle I

No	Child's Name	Pre-Cycle	Cycle 1	Final Notes
1.	RRS	BB	BB	Not yet developed
2.	AHN	BSH	BSH	Developing as expected
3.	ZSA	BB	MB	Starting to develop
4.	MTA	BSH	BSH	Developing as expected
5.	MEY	BSH	BSH	Developing as expected
6.	SKU	BSH	BSH	Developing as expected
7.	ZAN	BSH	BSH	Developing as expected
8.	MLA	BB	BSH	Developing as expected

The implementation of cycle II was on Friday, August 29, 2025, which yielded the following results:

Table 3. Cycle II

No	Child's Name	Cycle 1	Cycle 2	Final Remarks
1.	RRS	BB	MB	Starting to develop
2.	AHN	BSH	BSB	Developing very well
3.	ZSA	MB	BSB	Developing very well
4.	MTA	BSH	BSH	Developing as expected
5.	MEY	BSH	BSB	Developing very well
6.	SKU	BSH	BSB	Developing very well
7.	ZAN	BSH	BSB	Developing very well
8.	MLA	BSH	BSH	Developing as expected

Description:

- BB = Not yet developed
- MB = Starting to develop
- BSH = Developing as Expected
- BSB = Developing Very Well

CONCLUSION

Based on the results of classroom action research conducted in group A of Trisula Perwari Purwakarta Kindergarten with 8 children as subjects, it can be

concluded that patterned number hopping games can improve the cognitive abilities of 4-5 year old children.

In the pre-cycle, most children still had difficulty recognizing numbers, reciting simple number sequences, and following number patterns. Children often made mistakes in reciting sequences and were not yet able to understand patterns consistently.

After the intervention in cycle I, the children began to show progress. They were better able to recognize numbers 1–5, and some were able to follow sequences correctly, although there were still errors in understanding patterns.

In cycle II, almost all children were able to recognize numbers well, recite simple number sequences consistently, and follow number patterns according to the teacher's instructions. The children also appeared more enthusiastic, confident, and active in participating in learning activities.

Thus, it can be concluded that patterned number hopping games are a simple, fun, and effective learning strategy for improving the cognitive abilities of early childhood, particularly in terms of recognizing numbers, understanding sequences, and following simple number patterns.

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