

# Improvement in Student Learning Outcomes in Mathematics Using The Numbered Head Together Learning Model Assisted by Snake And Ladder Media in Grade IV of SDN 44/II Karak

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## Abstrak

Low learning outcomes among fourth-grade students, with only eight students achieving the minimum competency standard (KKTP) with a score of 44.44%, formed the background for this study. This shows that learning achievements in mathematics have not met the minimum competency requirement of 70%. This study aims to describe how the Numbered Heads Together approach, combined with a snakes and ladders game, can improve learning outcomes and processes in the fourth grade of SDN 44/II Karak. Eighteen students were the subjects of this classroom action study. The study was divided into two cycles, each consisting of two meetings led by the researcher. The process included planning, implementation of actions followed by observation, and reflection at the end of each cycle. The results of the study indicate that the process and outcomes of fourth-grade mathematics learning can be improved by applying the Numbered Heads Together paradigm. 1) In meeting I of cycle I, teacher observations showed 68.42% and 80%, but in cycle II, meeting I increased to 84.21% and meeting II to 93.33%. The student observation results were 54.09% in cycle I and 61.28% in meeting II. Meeting I increased to 73.16% in cycle II, while meeting II increased to 63.61%. 2) Student mathematics learning increased from 52.17% in cycle I to 82.60% in cycle II. The Numbered Heads Together paradigm combined with the snake and ladder media can improve the results and process of fourth-grade mathematics learning.

## Keywords:

Learning Process; Learning Outcomes; Mathematics; *Numbered Heads Together* Model; snakes and ladders media.

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## 1 Introduction

Education is a necessity for humans, because since birth they have been given reason by Allah SWT. With reason, humans realize that in order to acquire knowledge, education is very necessary. Education is not merely a transfer of knowledge, but an effort to develop their potential and abilities, and aims to shape humans holistically, not only cognitively but also in balanced affective

and psychomotor aspects (Kusumawati et al., 2023) . Education is an effort to shape. According to Law Number 20 of 2003 concerning the National Education System, education is a deliberate and planned effort to create a learning environment and teaching and learning process that helps students actively develop their potential in religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by them, the community, the nation, and the state (Zakki et al., 2022) .

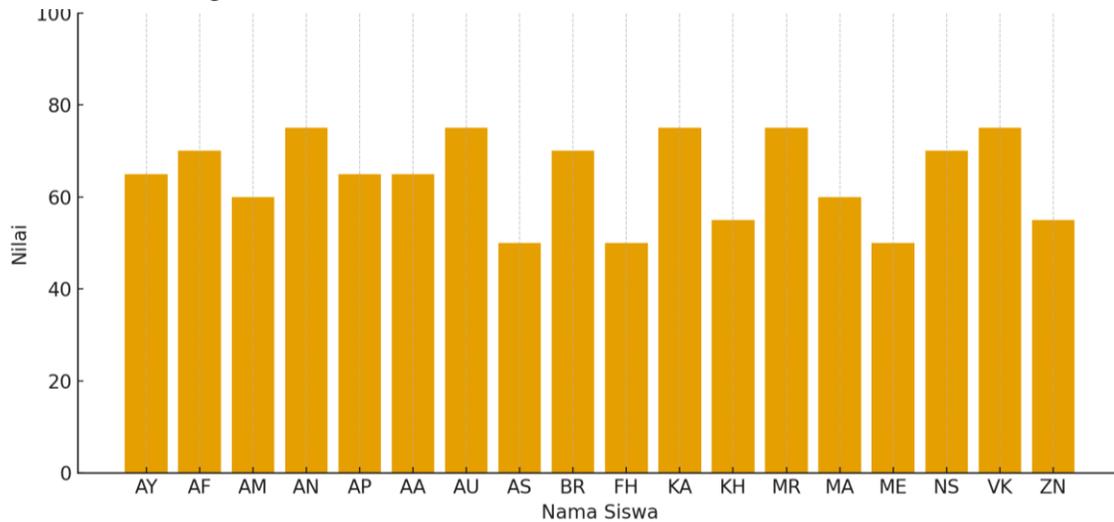
Along with developments in the field of education, the curriculum, which was initially considered a collection of subjects, has now changed in meaning to become a series of activities or a whole learning experience provided to students to achieve educational goals and become the responsibility of the school, especially in relation to expected learning outcomes. If the curriculum is implemented properly and supported by components that also function effectively, then the learning process will run well. The components of learning include students, teachers, learning objectives, teaching methods, media, and evaluation. Increasing learning activities is one way to improve teaching standards in elementary schools. Various initiatives are still underway to improve educational standards, such as improving learning outcomes and teaching quality, especially in mathematics ( Zahwa et al., 2022).

Currently, Indonesia has adopted the Merdeka Curriculum. The Merdeka Curriculum is a curriculum that aims to prepare students to face global challenges in the future (Armini, 2024) . The focus of this curriculum is 21st-century development, including in the field of mathematics. This curriculum emphasizes 21st-century development, including in mathematics. According to (Zulmaulida et al, 2024) , mathematics is the science that studies the logic of form, structure, quantity, and related concepts. Today, mathematics permeates every aspect of our lives. Human society would never have achieved its current level of progress without mathematics. Because mathematics is the science of calculation and serves various purposes, even for basic ideas, everyone uses it to simplify their daily lives.

One of the basic subjects in the autonomous curriculum is mathematics. From elementary school to college, mathematics is taught as an educational science. Therefore, all students must be taught mathematics to develop their cooperation skills as well as logical, analytical, critical, and creative thinking skills( Wahyu et al., 2012). Based on the results of research observations at SDN 44/II Karak, Bathin III Ulu District, on January 13-14, 2025, it was found that students' mathematics learning outcomes were still low. The low mathematics learning outcomes in grade IV were caused by students' difficulties in understanding the material due to the lack of innovative models and media, making it difficult for students to accept the learning material.

Teachers at SDN 44/II Karak rarely use teaching models other than lectures in their teaching, especially in mathematics, and the only teaching media used is the blackboard, with no variation in the learning process, making lessons boring and reducing students' interest in learning. Teachers allow students to ask questions about concepts they do not understand and share their thoughts on the material being studied to gauge their understanding. However, when faced with content

they do not understand, students are still hesitant to ask questions verbally and lack the confidence and courage to express their ideas. As shown in the following table, this results in low mathematics learning outcomes for students.



**Diagram 1.** Midterm Exam Results for the Odd Semester of the 2023/2024 Academic Year for Mathematics at SDN 44/II Karak

Based on the table above, the learning outcomes of fourth-grade students at SDN 44/II Karak are still low. To overcome problems in the learning process, the selection of appropriate learning models and media is very important for teachers because this greatly affects student learning outcomes. If the models and media used are not interesting, the learning process will not be delivered well because students will become more passive and inactive.

According to Barutu *et al* (2017) , student achievement can be improved by applying the Numbered Heads Together (NHT) cooperative learning approach. To create learning resources and apply learning models or methods in the classroom, educators need to have the necessary knowledge and skills. Ultimately, teachers can attract students' interest in learning mathematics with various teaching and learning activities that refer to models and approaches. The Numbered Heads Together (NHT) cooperative learning model is one such model. According to (yanti *et al*, 2021) , the development of snake and ladder learning materials led to the conclusion that incorporating snake and ladder game materials into educational activities facilitates student understanding and encourages them to learn for positive learning outcomes.

## 2 Method

The research methodology in this study is known as Classroom Action Research (CAR), which is research conducted with the aim of improving teaching standards in the classroom (Magdalena, 2023). CAR is conducted in a natural environment and focuses on the learning process in the classroom. Students in CAR receive guidance from educators. The tasks in this guidance are deliberately designed to be completed by teachers with specific objectives. Therefore, improving the quality of learning is the goal of CAR, and the

activities carried out must be guidance that is considered superior to other potential activities. In other words, students need to be given imaginative and creative activities. Planning, implementation, observation, and reflection are the four steps in the process of implementing Classroom Action Research (Setiawan et al, 2020) .

Grade IV of SDN 44/II Karak, Bathin III Ulu Subdistrict, Bungo Regency, was the location of this study. This study was conducted in Grade IV of SDN 44/II Karak in the even semester of the 2024–2025 academic year. This study involved Grade IV teachers from May 20 to 31, 2025. A total of 18 fourth-grade students at SDN 44/II Karak, 12 of whom were female and 6 of whom were male, were the subjects of this study. This study focused on improving the learning outcomes of fourth-grade students at SDN 44/II Karak in mathematics by utilizing the NHT paradigm using the Snakes and Ladders media. To collect data in this study, tests, documentation, and observation methods were used. The process of monitoring, analyzing, characterizing, and connecting all data related to initial conditions, learning processes, and learning outcomes to draw conclusions about the effectiveness of learning actions is known as data analysis in classroom action research.

### 3 Results and Discussion

#### 3.1 Results

The researcher observed the students' mathematics learning process using an observation sheet to assess the process in the students' mathematics learning activities. The results of the educator's observations in cycles and I are as follows:

**Table 1.** Shows The Percentage Of Observations Of Student Aspects In The Implementation Of Mathematics Learning in cycles I

|                 |       |
|-----------------|-------|
| Cycle           | 54.09 |
| Cycle I meeting | 61.28 |
| Cycle I meeting | 73.16 |
| Cycle I Meeting | 83.61 |

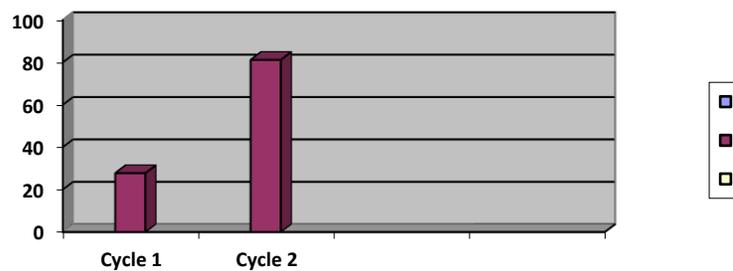
Table 1 above shows that student learning processes improved from Cycle I to Cycle II. In the first cycle, students scored 61.28% and 83.61%, respectively. This was due to students' shyness and fear of speaking in Cycle I, as well as their inability to understand learning activities that used the Numbered Head Together approach with the help of snakes and ladders media. During Cycle I, students began to take an active role in their education, were confident enough to express their thoughts, and were able to work well in groups. The learning exercises that used the Numbered Head Together paradigm were well understood by students in Cycle I. During this cycle, the average proportion of students who understood all the material was 27.77%, while in Cycle I the figure reached 81.25%.

Based on Table 2, it can be seen that the increase in student learning test scores in Cycle I of 27.77% is still low and not many students achieved mastery, while in Cycle II, the increase reached 81.25%. It can be seen that 23 students have achieved mastery out of 16 students. This is proven because learning using the *Numbered Heads Together* model with the help of a snakes and ladders

board greatly facilitates educators in delivering material. As a result, students were able to improve their learning outcomes in mathematics. By using this model, students are required to be confident, dare to speak in front of others, take responsibility, and express their opinions in front of the class. Therefore, the application of *the Numbered Heads Together* model can encourage students to be more confident and courageous. (2024)

**Table 2.** Shows The Average Percentage Of Fifth-Grade Students' Final Exam Results In Mathematics In Cycle II and Cycle I.

|                            |       |
|----------------------------|-------|
| Exam questions for cycle   | 27.77 |
| Exam questions for Cycle I | 81.25 |



## 3.2 Discussion

### 3.2.1 The mathematics learning process using the *Numbered Heads Together* model

Based on the observations conducted, there was an improvement in the students' learning process from cycle to cycle I. In the cycle meeting, the percentage of student participation reached 54.09%, increasing to 61.28% in the I meeting. Meanwhile, in the cycle I meeting, it increased to 73.16% and in the I meeting, it reached 83.61%. This shows a significant increase from cycle to cycle I.

In the cycle, students still appeared shy and did not yet understand the learning process using the *Numbered Heads Together* (NHT) model. According to (Patimah, 2025) , adaptation to a new learning model takes time because students must become accustomed to a learning structure that emphasizes cooperation. This condition was evident in students who tended to be passive, did not dare to express their opinions, and lacked confidence in group discussions.

However, in cycle I, there were significant changes. Students became active, dared to express their opinions, and were able to work together with their groups. This is in line with the opinion of() , which states that cooperative learning, especially NHT, can increase student active involvement because each group member has responsibilities. In addition, (Akbar *et al.*, 2023) emphasizes that the NHT model can encourage equal participation among students because the teacher can call on specific numbers to answer.

The use of snakes and ladders in learning also supports increased student activity. Learning media serves as a means to clarify the delivery of material and increase motivation( Suhada *et al.*, 2025) . "With the use of snakes and ladders games, students become more enthusiastic about participating in mathematics learning, which is generally considered difficult( Cahyani & Maimunah, 2025) .Andini *et al.*,

(2024) also emphasize that the use of games in learning can create a fun learning atmosphere and encourage active student participation."

### 3.2.2 Cognitive learning outcomes in mathematics for students using the *Numbered Heads Together* model

Students' cognitive learning outcomes improved significantly during the learning process. This figure was only 27.77% at the end of the learning cycle, but rose to 81.25% in cycle I. This shows that from cycle to cycle I, there was a growth of 53.48%. This improvement occurred because students in cycle I were more active, confident, and able to understand the material through group work. According to (Musdalifah, 2023), cooperative learning provides opportunities for students to learn from their peers, so that difficult concepts can be understood more easily. This can be seen from the students' ability to answer final exam questions, which improved significantly.

Pendy & Mbagho (2021) emphasizes that the effectiveness of NHT lies in the structure of individual responsibility, where each student has an important role in the success of the group. Therefore, students cannot simply rely on their peers, but must understand the material being studied. The results of this study are also in line with the findings of, (2022), which show that NHT can improve mathematics learning outcomes while developing social skills.

In addition, the improvement in student learning outcomes is also inseparable from the use of snake and ladder media, which makes the learning process more concrete and enjoyable. According to (Nurrita, 2018), learning media serves to improve the quality of the learning process by increasing student motivation to learn.

## 4 Conclusion

The researcher reached the following conclusions after conducting two cycles of classroom action research using the Numbered Heads Together method with snake and ladder media to improve the learning process and outcomes of fifth-grade students in mathematics. Fifth-grade math teachers at SDN 44/VI Karak can improve the quality of their teaching by applying the Numbered Head Together model. This will increase their initial teaching level from 68.42% in the good category to 93.33% in the excellent category. Fifth-grade students at SDN 44/II Karak can improve their mathematics learning process from 54.09% in the poor category to 83.61% in the excellent category by applying the Numbered Head Together model with the help of a snakes and ladders board game. Fifth-grade students at SDN 44/II Karak can achieve better mathematics learning outcomes by applying the Numbered Head Together model with the help of a snakes and ladders game. The completeness of student learning outcomes in cycle I, which increased from 27.77% to 81.25%, demonstrates this.

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