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Optimizing the Numbered Heads Together Method to Improve Mathematical Word Problem-Solving Skills in LCM Material

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Abstract

This study aims to improve students' ability to solve mathematical word problems (LCM). This study used the Classroom Action Research (Kemmis & McTaggart model) method, conducted in two cycles: Cycle I and Cycle II. The sample size for this study was 25 VA grade students at SDN Duren Tiga 09 Pagi, Pancoran District, South Jakarta. Qualitative and quantitative data analysis techniques were used, with data collection methods including tests, observation, and documentation. In the pre-cycle, the average score for students' ability to solve mathematical word problems (LCM) was 42.2, with a 4% completion rate, indicating the need for intervention. The results showed significant improvement: classical completion rate jumped from 48% in Cycle I to 100% in Cycle II, with an average final score of 86.8. NHT has proven effective because it successfully creates an active and collaborative learning environment while fostering individual responsibility, and is therefore recommended as a valid strategy for solving mathematical problems in elementary schools.

Keywords: Numbered Heads Together (NHT), LCM, Mathematics Story Problems, Elementary School.

Introduction

Education is a learning process undertaken by individuals or learners to foster understanding and comprehension, while also enabling them to think more critically (BP, Munandar, & dkk, 2022). Therefore, primary education must serve as a crucial foundation in developing students' essential skills, specifically critical, creative, and collaborative thinking. Mathematics, in particular, plays a vital role in honing and training these abilities. Consequently, mathematics instruction should be designed to provide an environment that allows students to explore and gain personal experience with mathematical concepts (Azizah & Wardani, 2023). Thus, the use of appropriate teaching strategies—such as presenting problems in the form of contextual and applied narratives—is necessary to encourage students to solve problems, thereby making the process of understanding the material more straightforward (Khurriyati et al., 2022).

Students face several obstacles in learning mathematics, particularly in understanding fractional concepts, computational difficulties, and challenges in solving word problems (Andri et al., 2020). For learners, the ability to solve word problems is a fundamental aspect that must be mastered, as it serves as a basis for decision-making (Sembiring & Sutirna, 2023). In practice, many students still do not understand the concepts required to solve mathematical word problems. Classroom teachers

have revealed that students' proficiency in solving such problems remains very low, especially regarding the Least Common Multiple (LCM) and Greatest Common Factor (GCF) materials. Teachers often only provide examples and have students copy solutions without utilizing media or learning methods that could stimulate interest and strengthen student understanding. Consequently, students struggle to solve problems, particularly word problems. This is evidenced by the students' average mathematics scores, which show that 18 out of 25 students have not yet reached the Minimum Mastery Criterion (KKM).

To address these issues, teachers need to employ strategies that encourage active student participation. The Numbered Heads Together (NHT) method is considered an effective solution as it triggers discussion, interactivity, and group responsibility. Numbered Heads Together (NHT) is a cooperative learning model specifically designed to influence interaction patterns (Saehu & Aini, 2024). By implementing NHT, students are encouraged to share their thoughts and engage in active discussion through collaboration to find the best solutions to a problem (Septyaningrum & Wahyudi, 2025). During group formation, students are organized heterogenously, and each group member is assigned a unique and distinct head number, ensuring that students remain more active and engage in collective thinking throughout the learning process (Syarif, 2022).

The application of the Numbered Heads Together (NHT) method can enhance students' ability to solve word problems in mathematics. According to (Gumilang & Yasa, 2024) the NHT method requires students to be divided into small groups and involves them as peer tutors; it is designed to resemble a game where numbers are called randomly by the teacher. A study (Nurkanti et al., 2021) asserts that NHT is a relevant and effective learning strategy for improving quality while simultaneously fostering positive character traits in students during learning activities. In line with this, (Yuliani et al., 2021) state that this method is highly effective for improving learning outcomes while building a sense of responsibility and social skills. Consequently, the learning process becomes more enjoyable and encourages students to engage to their fullest potential.

This method also aims to enhance students' understanding of the learning material through group discussions, fostering the courage to express opinions and improving effective speaking skills (Inggriyani & Maulani, 2020). Consequently, the researcher conducted this study using a Classroom Action Research (CAR) method to investigate the improvement of learning outcomes through the implementation of the Numbered Heads Together (NHT) instructional model.

Based on the aforementioned discussion, the researcher seeks to conduct this study as a strategic step for teachers to enhance the abilities of fifth-grade elementary school students. The novelty of this research lies in the integration of a modified Numbered Heads Together (NHT) method to address students' cognitive rigidity in transforming word problem narratives into mathematical models, specifically regarding the Least Common Multiple (LCM) material. Unlike previous studies that generally focus only on cognitive learning outcomes, this research deeply explores how individual accountability mechanisms within heterogeneous groups can overcome students' difficulties in identifying keywords and selecting relevant mathematical operations in real-world situations. Through this approach, NHT functions not merely as classroom management but as a catalyst for students' logical reasoning in problem-solving. Consequently, the objective of this study is to identify the application of the Numbered Heads Together (NHT) method in improving the ability to solve Least Common Multiple (LCM) word problems among fifth-grade students. It is also expected that this research will provide significant implications for teachers in enhancing the quality of mathematics instruction at the elementary school level.

Methods

The research method employed is Classroom Action Research (CAR), a reflective approach implemented by teachers to improve classroom instructional practices and overcome various obstacles faced by students (Parende & Pane, 2020). The design model used is the Kemmis & McTaggart model, commonly known as the spiral cycle. This research consists of Cycle I and Cycle II, each involving four stages: planning, acting (implementation of action), observing, and reflecting.

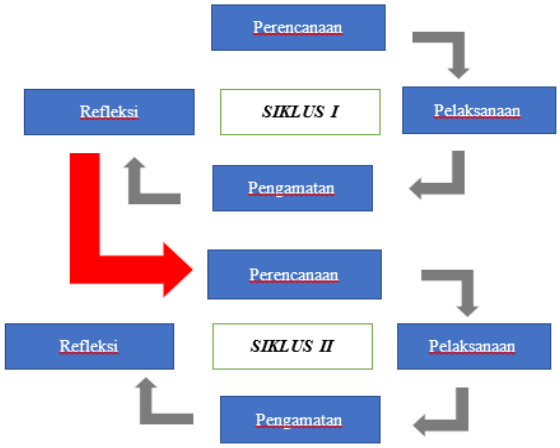

Figure 1. Model Kemmis & MacTaggart

The cycle process is repeated in subsequent cycles if improvements or changes have not yet materialized, and is only concluded once the researcher observes a significant enhancement (Sholikah et al., 2023). The subjects of this research were 25 fifth-grade students, consisting of 14 male and 11 female students. This study was conducted at SDN Duren Tiga 09 Pagi, Pancoran District, South Jakarta, during the odd semester of the 2025/2026 academic year. The data analysis techniques employed in this research include both qualitative and quantitative methods. Consequently, the data collection techniques used were tests, observations, and documentation. These methods were implemented to enable the teacher and researcher to determine whether students achieved the criteria for success both individually and classically.

Results and Discussions

1. Results

This study aims to improve the ability to solve mathematical word problems regarding the Least Common Multiple (LCM) among 25 fifth-grade students at SDN Duren Tiga 09 Pagi. The success indicator for this action was established as a class average score reaching the Minimum Mastery Criterion (KKM) of 71, with a minimum classical mastery percentage of 75%. During the pre-cycle phase, the initial ability to solve LCM word problems was categorized as low. The data revealed a class average of 42.2, with only one student achieving the KKM, while 24 students (96%) failed to meet the criterion. These data indicated that corrective action through the Numbered Heads Together (NHT) learning method was necessary.

The implementation of Cycle I was conducted over four meetings using the NHT method. The action involved the teacher dividing students into groups, assigning numbers, and explaining the material. Subsequently, the teacher presented questions via student worksheets (LKPD), where students discussed, brainstormed, and formulated strategies to solve the word problems. The teacher then selected students to present their answers. The results showed a significant increase in the average score to 63.6, an improvement of 21.2 points. The number of students achieving mastery

also rose to 12, while 13 students did not meet the criteria. Despite this improvement, the results of Cycle I (48% classical mastery) had not yet reached the established success indicator. Therefore, adjustments to the action were required, and the study proceeded to Cycle II.

Table 1.
Hasil Penelitian Penerapan Metode NHT

Tahapan Penelitian	Rata-rata Nilai Kelas	Jumlah Siswa Tuntas (Nilai > 71)	Presentasi Ketuntasan Klasikal	Peningkatan dari Tahap Sebelumnya	Keterangan
Pra-Siklus	42,2	1	4 %	-	Belum Tuntas
Siklus I	63,6	12	48 %	44 %	Belum Tuntas
Siklus II	86,8	25	100 %	52 %	Tuntas

Observational results also indicated an increase in collaborative student activity. However, reflection on the learning process identified several weaknesses that required improvement, including some students' continued difficulty in formulating systematic problem-solving steps. Furthermore, some groups were not yet effective in distributing tasks for solving word problems.

The planning for Cycle II actions was based on the reflections and improvements from Cycle I. Specifically, the teacher provided more detailed explanations regarding the student worksheets (LKPD) and the proper method for documenting step-by-step solutions for mathematical word problems. The results showed that the class average increased drastically to 86.8, with individual mastery achieving a 100% success rate for the entire class. Observation during Cycle II revealed that all students were actively engaged in group discussions, and the random numbering mechanism effectively enhanced their readiness. Moreover, students' proficiency in solving word problems improved significantly. This was evidenced by their accuracy in identifying keywords and selecting the relevant mathematical operations.

2. Discussions

The discussion of the research findings indicates that the Numbered Heads Together (NHT) method has a positive and significant impact on improving students' ability to solve mathematical word problems regarding the Least Common Multiple (LCM) in the fifth grade. This aligns with the perspective of (Kawuwung, 2021), who suggests that the implementation of NHT creates an interactive learning environment and encourages comprehensive cognitive engagement. Consequently, the successful application of the NHT method in learning activities fosters active interaction and collaboration among students. Group division and random numbering instill a sense of individual accountability, as every member is required to master the material to be prepared when their number is called by the teacher to answer.

The quantitative improvement in learning outcomes is supported by the students' ability to formulate strategies and systematic steps for solving word problems, acquired through group discussions. This method is highly effective in developing students' mathematical reasoning and critical thinking. Research by (Putri et al., 2022) states that involvement in discussions makes students active in the learning process, rendering each student responsible for the assigned group tasks. Therefore, the effectiveness of this method in the context of word problems is evident in the drastic increase in average scores. From an initial pre-cycle average of 42.2, the score rose to 63.6 in Cycle I and further increased to 86.8 in Cycle II.

These data confirm that NHT is an appropriate strategy to overcome students' difficulties in understanding and solving narrative-based mathematical problems. According to (Kusnaeni et al.,

2023), the NHT method can significantly influence the improvement of learning outcomes. Furthermore, studies conducted by (Nisa et al., 2022) and (Murwanto, 2020) show that the application of NHT enhances motivation and leads to better academic performance. This study is also relevant to the findings of (Yuniar, 2023),which describe the NHT method as a catalyst in the classroom, producing an interactive and joyful learning atmosphere. Indirectly, this increases student activity, creativity, and participation. Overall, these findings consistently prove that the Numbered Heads Together (NHT) model is a valid and effective cooperative learning strategy for addressing the low proficiency in solving mathematical word problems at the elementary school level.

Conclusion

This classroom action research demonstrates that the implementation of the Numbered Heads Together (NHT) cooperative learning model effectively enhances students' ability to solve mathematical word problems regarding the Least Common Multiple (LCM) in the fifth grade at SDN Duren Tiga 09 Pagi. Student learning outcomes showed marked improvement from the pre-cycle to the final cycle. Initially, classical mastery reached only 4% with an average score of 42.2. Following corrective actions over two cycles, mastery increased to 100% with an average score of 86.8, exceeding the established success targets. Beyond numerical improvements, the application of NHT created a more active and enjoyable learning atmosphere, encouraging full engagement from every student. The numbering and random calling mechanism ensured that all learners felt responsible for mastering the material. Consequently, the NHT model is recommended as an effective instructional strategy to improve mathematical problem-solving skills in elementary schools.

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