

The Application Of Flashcard Media In Improving Students' Initial Counting Abilities In Mathematics Grade II

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Abstract

This study aims to improve students' early numeracy skills in mathematics through the implementation of flashcard media in Grade II at MI NW Lebah Temuan Sari in the 2025/2026 academic year. The study was motivated by the students' low ability to recognize, say, and count basic numbers. This research employed Classroom Action Research (CAR) using the Kemmis and McTaggart model, which consisted of two cycles, each including planning, action, observation, and reflection stages. The subjects of the study were all Grade II students, totaling 16 students. Data were collected through observation, interviews, tests, and documentation. The results showed an improvement in students' early numeracy skills, from 25% in the initial condition with an average score of 52.6, increasing in Cycle I to 68.75% with an average score of 80.93, and further increasing in Cycle II to 81.25% with an average score of 85. Therefore, flashcard media proved effective in improving the early numeracy skills of Grade II students at MI NW Lebah Temuan Sari.

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1. INTRODUCTION

Education is a crucial tool in developing high-quality human resources with optimal potential. Education is also a vital asset in life because it can transform a person's mindset for the better and help them adapt to their surroundings (Khaerum et al., 2025). One way to improve the quality of human resources is through education, particularly from elementary school. In school, mathematics is a frequently encountered subject and is closely related to other subjects. This is because mathematics, as a mathematical science, can help solve various problems in everyday life (Ningrum, 2023).

Mathematics is a universal science and is the basis for the development of modern technology and has an important role in various disciplines. According to Ruseffendi in Heruman (2013), mathematics is a science that has an organized structure and system, starting from undefined elements, then developing into defined elements, axioms or postulates, until producing propositions. Based on Permendikbudristek Number 12 of 2024, the objectives of learning mathematics in elementary schools are for students to be able to: (1) understand mathematical concepts, (2) use reasoning skills, (3) solve problems, (4) communicate mathematical ideas, and (5) have a positive attitude and appreciate mathematics. In phase A of grades, I-II, the focus is on the introduction of whole numbers up to 100, including initial counting from 1-30 as a requirement for lower grade students' operations.

Early numeracy skills are basic mathematical skills that serve as the foundation for subsequent learning. According to Karso et al. (2014), early numeracy includes the ability to

recognize number symbols, understand the concept of more or less, order numbers, and perform simple addition and subtraction operations in a small number space. Heruman (2013) adds that in the early grades of elementary school/Islamic elementary school, numeracy should begin with concrete objects before moving on to the abstract stage of number symbols, so that students truly understand the meaning of numbers. Similarly, the Ministry of National Education (2010) states that early numeracy includes counting activities, comparing many objects, and adding and subtracting with the help of concrete media.

Based on initial observations in class II of MI NW Lebah Riset Sari with 16 students, problems were found in the learning process of basic arithmetic. The results of the diagnostic test showed that only 4 students (25%) were able to count numbers 1-30 correctly, while 12 students (75%) still had difficulty in recognizing and calculating these basic numbers. Interviews with the second-grade teacher also confirmed that students often experienced confusion and difficulty when asked to count numbers written on the board, resulting in inactivity in the learning process. In addition, the teacher had not utilized appropriate learning media in delivering the material, so students were less interested and did not understand the concept of basic arithmetic. This condition indicates that students' basic arithmetic abilities are still low and have not met the target of classical completeness of at least 80% set by the school.

To address these issues, one innovative solution that can be used effectively is to utilize Flashcard media. According to Aprilianti et al. (2010), Flashcards are learning media in the form of cards containing images as visual aids, numbers, writing, or a combination to make it easier for students to remember concepts more quickly, through a more interactive and fun method. Flashcard media has various advantages, namely being easy to carry, effective, easy to remember, and fun (Maryanto, 2018). Several relevant previous studies support the use of flashcards. For example, Asriyati's (2025) research showed an increase in elementary school students' learning outcomes through flashcard media. Sonbai et al. (2023) also proved that the application of flashcard media significantly improved student learning outcomes and motivation. Similarly, Bahri et al. (2025) recorded a drastic increase in students' average grades after learning using flashcard media.

Although these studies confirm the general effectiveness of flashcard media, a closer look reveals an important gap. Most of the cited studies applied flashcards to domains other than early numeracy specifically—for example, letter recognition, English vocabulary, or general learning outcomes at various grade levels (Aprilianti et al., 2010; Maryanto, 2018; Devi et al., 2024)—while studies that did address numeracy, such as Asriyati (2025) and Bahri et al. (2025), did not systematically examine how design variables of the media itself, such as card size and the pairing of flashcards with differentiated instruction, affect learning outcomes across successive action cycles. Few, if any, prior studies have documented how iteratively revising the physical design of flashcards (e.g., enlarging card size and adjusting color contrast) in response to classroom observation data can be combined with differentiated grouping to specifically target the 1-30 number range that constitutes the core early-numeracy competency in Phase A of the Indonesian elementary curriculum. This study addresses that gap by not only testing whether flashcard media improves early numeracy but also by tracing, cycle by cycle, how refinements to the media's physical design and its pairing with differentiated learning strategies contribute to that improvement, thereby offering a more actionable, design-level contribution for practitioners than the general effectiveness claims reported in prior research.

Based on this background, this study aims to describe the application of flashcard media and its effectiveness in improving students' initial arithmetic skills in mathematics in grade II of MI NW Lebah Riset Sari. It is hoped that this research can enrich basic mathematics learning theory and serve as a practical guideline for educators.

2. RESEARCH METHOD

The type of research used in this study was Classroom Action Research (CAR). According to Susilowati (2018), action research is a form of research conducted by teachers in the classroom

through reflective activities on the ongoing learning process. The goal is to improve the quality of teacher performance and student learning outcomes.

This study adopted the PTK model from Kemmis and McTaggart, which consists of four stages in each cycle, namely: (1) planning, (2) implementation (acting), (3) observation, and (4) reflection. In the planning stage, the researcher and the classroom teacher collaboratively developed the lesson plan (RPP), prepared the flashcard media, and constructed the observation sheets and the descriptive evaluation test for the cycle. In the implementation stage, the teacher delivered the lesson according to the prepared plan, introducing and drilling the target numbers using the flashcards through structured games as the core learning activity. In the observation stage, the researcher and a collaborating teacher simultaneously recorded teacher and student activity using the observation sheets while the action was taking place, focusing on student engagement, media usage, and classroom management. In the reflection stage, the researcher and the collaborating teacher jointly reviewed the observation notes and test results to identify weaknesses in the implemented action, and used these findings to decide whether the success indicator ($\geq 80\%$ classical completion) had been met or whether a further cycle with a revised action plan was required. This study was planned and implemented in two learning cycles. The research was conducted in the even semester of the 2025/2026 academic year, located at MI NW Lebah Riset Sari, Bayan District, North Lombok Regency. The subjects of this study were all 16 second-grade students, comprising 9 boys and 7 girls aged 7-8 years, with heterogeneous initial numeracy abilities as indicated by the pre-cycle diagnostic test. All students in the class were included as research subjects, using a total sampling technique rather than selecting a subset, for two reasons: first, the class as a whole, not a sample of individual students, constituted the unit of intervention in this classroom action research, since the flashcard-based action was delivered to the entire class simultaneously; and second, the relatively small class size (16 students) made it feasible to observe and evaluate every student's learning outcome across both cycles, thereby avoiding the risk that a partial sample would misrepresent the classical completion rate used as the study's success indicator.

The data collection techniques used in this study included observation, interviews, written tests, and documentation. The instruments used consisted of teacher and student activity observation sheets, interview guidelines, and a 10-item descriptive evaluation test sheet. Data analysis was conducted by calculating individual learning completion ($\text{KKM} \geq 75$) and the percentage of classical learning completion. This study was considered successful if at least 80% of all students had achieved the KKM score or were declared complete (Trianto, 2015).

3. RESULTS AND DISCUSSION

Description of Initial Conditions (Precycle)

Before implementing the action, the researcher conducted initial observations and a pre-cycle test to determine the level of students' initial numeracy skills. The results of the diagnostic test on 16 students showed that only 4 students (25%) were able to achieve the completion criteria ($\text{KKM} \geq 75$) with a class average score of only 52.6. Meanwhile, 12 students (75%) had not yet completed the task. Students often experienced confusion when asked to calculate numbers written on the board and were passive during the learning process. This condition became the basic foundation for implementing learning improvements through Cycle I using flashcard media.

Number of Students	Average Value	Completed	Percentage (%)	Not Completed	Percentage (%)
16 Students	52,6	4 Students	25%	12 Students	75%

Table 1. Recapitulation of Pre-Cycle Test Results

Implementation of Cycle I

The actions in Cycle I were carried out in two meetings. During the implementation phase, the teacher used 10x15 cm flashcards to introduce the numbers 1-20. The teacher shuffled the stack of flashcards and asked students to find the missing number and play a "Jump Number" game on the floor.

Observation results in Cycle I showed that students were quite enthusiastic, but there were several weaknesses, including: the size of the flashcards was considered too small so that students in the back row had difficulty seeing; the game rules were not clear enough so that there was a fight for turns; and teacher guidance was not evenly distributed. The test results at the end of Cycle I showed that 11 out of 16 students (68.75%) had achieved learning completion with an average score of 80.93. Although there was an increase from the initial conditions, this percentage did not meet the classical success target ($\geq 80\%$). Therefore, the study was continued to Cycle II.

Implementation of Cycle II

Based on the reflection of Cycle I, in Cycle II the researcher increased the size of the flashcards to 20x30 cm with contrasting colors, enforced strict game rules, and implemented a differentiated learning strategy by dividing students into two groups (complete and incomplete) for more intensive guidance. The material focused on strengthening the numbers 1-20 for those who had not completed, and introducing the numbers 21-30 classically.

The results of Cycle II observations showed a more orderly classroom atmosphere, more focused students, and increased participation thanks to clear media sizes and structured rules. The results of the final test in Cycle II showed a significant improvement; namely, 13 students (81.25%) completed with an average score of 85. This achievement exceeded the 80% success indicator, so the action cycle was stopped.

Number of Students	Average Value	Completed	Percentage (%)	Not Completed	Percentage (%)
16 Students	85	13 Students	81,25%	3 Students	18,75%

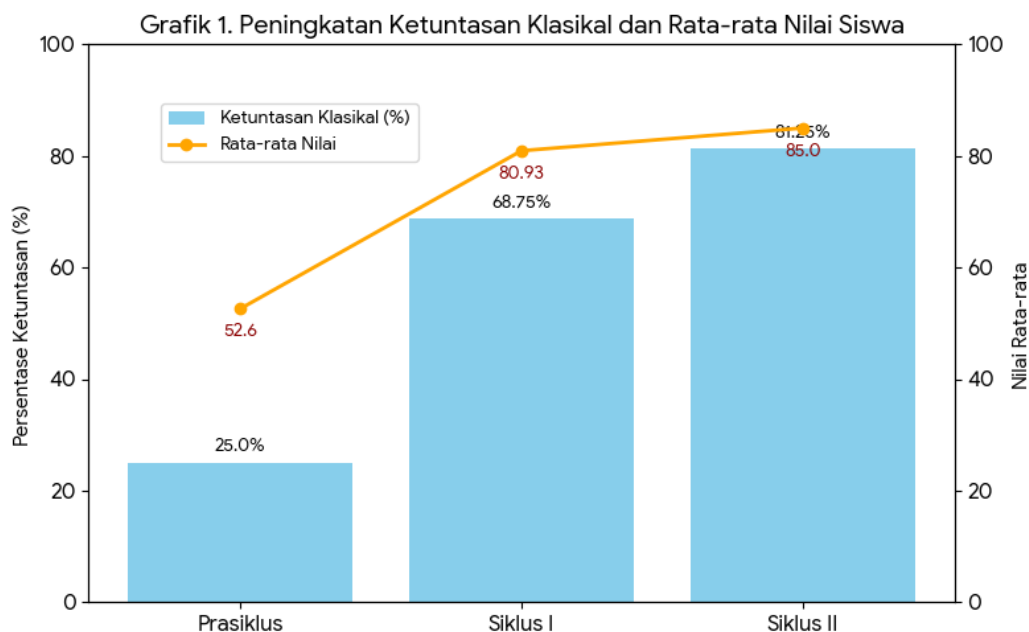
Table 2. Recapitulation of Cycle II Test Results

Inter-Cycle Discussion

The application of flashcards in mathematics learning has been shown to improve the initial numeracy skills of second-grade students at MI NW Lebah Riset Sari. At the beginning of the pre-cycle, the completion rate was only 25%. After the implementation of flashcards in Cycle I, students' numeracy skills increased to 68.75%. Despite this improvement, the imperfections in the media size and classroom management were evaluated for Cycle II.

In Cycle II, optimizing the flashcard size to 20x30 cm and implementing differentiated learning proved highly effective, increasing classical mastery to 81.25%. Clearer visualization through larger flashcards allows students' cognitive memory processes to work more efficiently (Wahyuni, 2020).

The following is a graph of the increase in student learning completion from Pre-cycle, Cycle I, to Cycle II:



This improvement is highly relevant to the theory that during the concrete operational stage (elementary school age), children greatly need physical or visual objects to understand mathematical concepts (Sumarni, 2010). Flashcards bridge the abstract process of numbers into a fun visual, encouraging active participation and alleviating learning anxiety (Farihah, 2017; Hasanah, 2021). These results support research by Asriyati (2025) and Bahri et al. (2025), which also concluded that number cards significantly increase the percentage of mathematics learning completion.

4. CONCLUSION

Based on the results of classroom action research conducted in two cycles, it can be concluded that the application of flashcard media can effectively improve the initial arithmetic skills on the number 1-30 material for second-grade students of MI NW Lebah Riset Sari. This is evident from the gradual increase in the percentage of student learning completion. In the initial conditions (pre-cycle), the completion rate was only 25% with an average value of 52.6. After being given action in Cycle I, the percentage of completion increased to 68.75% with an average value of 80.93. In the action improvement in Cycle II, student learning outcomes again increased drastically, reaching 81.25% with an average value of 85. Thus, the application of flashcard media with the right size (20x30 cm) combined with game methods and differentiated approaches has proven effective in overcoming basic arithmetic learning difficulties in lower grade students.

These conclusions should nonetheless be interpreted within the limitations of the study. As a classroom action research conducted with a single intact class of 16 students at one school, without a comparison or control class, the improvement in completion percentage cannot be attributed to flashcard media alone with statistical certainty, since it may also reflect a general testing or teacher-attention effect common to CAR designs. The two-cycle intervention was also limited to a short period within a single semester, so the durability of the improved numeracy skills beyond the immediate posttest was not examined. In addition, learning outcomes were measured primarily through a 10-item descriptive test, which, while adequate for tracking classical completion, may not capture the full range of early numeracy competencies. Consequently, the findings should be understood as evidence of what worked in this specific classroom context rather than as a generalizable claim about flashcard media's effectiveness across other schools, grade levels, or numeracy topics.

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