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Analysis of the Learning Process for Multiplication and Division Using Flashcard Media Among Third-Grade Elementary School Students

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Abstract
This study addresses the gap between curriculum expectations and classroom practices in learning multiplication and division in elementary school, where students often rely on memorization rather than conceptual understanding. The purpose of this study is to analyze the learning process using flashcard media in facilitating Grade 3 students' conceptual understanding. This study employed a qualitative descriptive approach conducted in a third-grade classroom with 28 students. Data were collected through classroom observations and semi-structured interviews, and analyzed using data reduction, data display, and conclusion drawing. The findings indicate that flashcards support conceptual understanding by encouraging students to use strategies such as repeated addition and equal sharing. Teacher scaffolding and repeated exposure help students correct errors and build connections between operations. The study concludes that flashcards are effective when integrated with structured instruction and guided questioning to support meaningful learning.
Keywords: *Flashcards, Conceptual Understanding, Multiplication And Division, Elementary School*

Abstrak
Penelitian ini dilatarbelakangi oleh kesenjangan antara tuntutan kurikulum dan praktik pembelajaran di kelas, di mana siswa masih cenderung menghafal tanpa memahami konsep perkalian dan pembagian. Tujuan penelitian ini adalah menganalisis proses pembelajaran menggunakan media flashcard dalam memfasilitasi pemahaman konsep siswa kelas III. Penelitian ini menggunakan pendekatan kualitatif deskriptif yang dilaksanakan pada 28 siswa kelas III. Data dikumpulkan melalui observasi dan wawancara semi terstruktur, kemudian dianalisis melalui reduksi data, penyajian data, dan penarikan kesimpulan. Hasil penelitian menunjukkan bahwa flashcard membantu siswa memahami konsep melalui strategi penjumlahan berulang dan pembagian sama rata. Scaffolding guru dan pengulangan membantu siswa memperbaiki kesalahan dan membangun hubungan antar operasi. Simpulan penelitian ini menunjukkan bahwa flashcard efektif jika digunakan dengan langkah pembelajaran terstruktur dan pertanyaan penuntun.
Kata kunci: *Flashcard, Pemahaman Konsep, Perkalian Dan Pembagian, Sekolah Dasar*

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INTRODUCTION

Mathematics learning in elementary school aims to develop conceptual understanding rather than rote memorization (Masitoh & Prabawanto, 2016). In the Kurikulum Merdeka for Phase B, students are expected to perform multiplication and division of whole numbers and to understand the relationships between these operations using concrete objects, pictures, and mathematical symbols (Susilawati et al., 2024). However, classroom practice often does not align with these expectations. Teachers frequently pursue quick answers through repetitive drills, while some students still struggle to grasp the meaning of the operations. Students may state the result of a multiplication or division problem, yet they may not be able to explain the reasoning and steps involved. In such situations, learning media often function only as tools for rapid quizzes rather than as supports for building meaning. Although flashcards are easy to create and use, many discussions and classroom practices focus more on final outcomes than on examining the learning process that actually occurs. This gap highlights the need for studies that closely investigate learning processes, particularly for multiplication and division concepts in Grade 3.

Based on initial classroom observations at the research site (a public elementary school implementing the Kurikulum Merdeka), several concrete problems were identified. Many students experienced difficulty in explaining the meaning of multiplication as repeated addition and division as equal sharing. For example, when given a problem such as 3 × 4, several students were able to state the answer “12” but could not represent it using groups or drawings. Similarly, in division tasks such as 12 ÷ 3, some students tended to apply subtraction procedures incorrectly or guess the answer without clear reasoning. Preliminary data also indicated that only a portion of students could correctly solve and explain multiplication and division problems, while others relied heavily on memorization. Classroom observations further showed that learning activities were dominated by teacher explanations and drill exercises, with limited use of media to support conceptual understanding. This condition reflects a gap between curriculum expectations and actual classroom practice.

National and international data also indicate an urgent need to strengthen numeracy. In PISA 2022, Indonesia’s mathematics score was 366, below the OECD average of 472 (OECD, 2023a). At the national level, the Rapor Pendidikan (2022–2024) shows that the proportion of students achieving minimum numeracy competency increased from 45.24% (2022) to 67.94% (2024). Yet this improvement still leaves significant work to do because achievement remains uneven (Jatnika, 2025). These data signal that numeracy learning must continue to improve from the elementary level. Such improvement should start from core concepts that support later topics, including multiplication and division.

Multiplication and division serve as foundations for subsequent material such as fractions, ratios, factors and multiples, and problem solving (Hidayatullah & Zainil, 2025). Therefore, learning in Grade 3 should emphasize conceptual meanings such as “equal groups,” “repeated addition,” and “sharing equally.” In line with this, mathematics programs also stress understanding operational meaning and relationships between operations, rather than focusing only on computational fluency (Ghoffard et al., 2025). When students memorize facts without understanding, they face a risk of misconceptions. For example, students may confuse division with subtraction, or they may struggle to connect that 3 × 4 = 12 corresponds to 12 ÷ 3 = 4. These issues often appear when students work on word problems and contextual tasks, because such questions require understanding rather than simple recall.

The cognitive development of Grade 3 students also requires attention. At around ages 7 to 11, children are typically in the concrete operational stage. They understand mathematical ideas more easily when teachers provide real objects, pictures, or

representations that can be processed concretely (Agustina, 2024). For this reason, instruction in multiplication and division should provide a bridge from concrete situations to symbolic forms. Flashcards can serve as that bridge if teachers design cards that do not only display the operation and answer, but also include representations such as grouped pictures, simple arrays, or short stories that illustrate equal sharing. This approach aligns with learning outcomes that emphasize gradual use of concrete objects, images, and symbols (Rostikad et al., 2025).

Flashcards also have a strong foundation in learning psychology, particularly when teachers use them to support retrieval practice. Research shows that actively recalling previously learned information strengthens long-term retention more effectively than simply rereading or repeatedly listening (Nurahlina & Aprilia, 2025). In the context of early mathematics, classroom studies have also found that retrieval practice using flashcards can produce stronger gains in multiplication fact fluency than “restudy” strategies such as chanting times tables together (Ophuis-Cox et al., 2023). These findings suggest that flashcards are not merely game tools. They can become a structured learning strategy when teachers manage how they are used, including card sequencing, spacing, and feedback (Akbar, 2022).

Nevertheless, using flashcards in class does not automatically lead to meaningful learning. Many teachers use flashcards to build calculation speed, but do not consistently guide students to explain their reasoning, link answers to visual representations, or connect multiplication and division as inverse operations (Rambe, 2021). As a result, students may respond quickly without truly understanding. The urgency of this study increases because schools need realistic strategies that are easy to implement. Flashcards are relatively low cost, easy to produce, and flexible for both large and small classes. Teachers can use them for question and answer activities, group games, paired practice, and short reflections. Teachers can also adjust difficulty levels, moving from basic facts to reasoning-based prompts such as “three groups of four, how many altogether?” or “twelve divided by three, how many in each group?” When teachers combine flashcards with concrete representations and guiding questions, they can help students move from stating results toward understanding meaning. This effort aligns with ongoing needs to improve numeracy learning quality monitored through the Rapor Pendidikan (Kiriana & Widiasih, 2023).

Previous studies have widely examined the use of flashcards in mathematics learning. Some studies report that flashcards are effective in improving students’ calculation fluency and memorization of multiplication facts (Ophuis-Cox et al., 2023). Other studies highlight the role of retrieval practice in strengthening retention and learning efficiency (Nurahlina & Aprilia, 2025). In addition, research by Rambe (2021) indicates that flashcards are often used only for speed-oriented exercises without emphasizing conceptual understanding. However, these studies tend to focus on learning outcomes rather than exploring in depth how the learning process occurs in the classroom.

Based on this comparison, the research gap can be clearly identified. While previous studies have demonstrated the effectiveness of flashcards in improving learning outcomes, there is still limited research that examines how flashcards function within the actual classroom learning process, particularly in supporting students’ conceptual understanding of multiplication and division. Moreover, studies that explore this issue using a qualitative, process-oriented approach in the context of Indonesian elementary classrooms are still scarce. Therefore, this study aims to fill this gap by analyzing in detail the learning process and classroom interactions when flashcards are used.

The novelty of this study lies in its focus on examining the learning process in detail within a Grade 3 elementary classroom, with particular attention to how flashcards facilitate conceptual understanding of multiplication and division and how teachers

implement instruction using this medium. Many studies treat flashcards as an intervention to improve scores or fluency, whereas this study positions flashcards as part of the broader classroom learning ecosystem. It seeks to capture what actually happens when teachers use flashcards, including how students respond and how teachers provide scaffolding when students encounter difficulties. The findings are expected to offer practical contributions for teachers, especially in the form of learning steps that can be adapted and examples of effective support to strengthen conceptual understanding.

This study focuses on two aspects: (1) how flashcards facilitate Grade 3 students' understanding of multiplication and division concepts, and (2) how multiplication and division instruction is implemented using flashcards in the classroom, including lesson steps, teacher–student interaction, and the feedback provided by the teacher. In line with this focus, the study aims to analyze the role of flashcards in helping students understand multiplication and division through the learning processes that occur, while also describing the implementation of flashcard-based instruction in terms of instructional sequence, interaction patterns, and forms of reinforcement and correction provided during learning activities.

METHOD

This study employed a qualitative approach with a descriptive design. Qualitative research is a method used to examine phenomena in their natural settings (Sugiyono, 2019). This study investigated in depth the learning process of multiplication and division using flashcard media among third-grade elementary school students. It focused on two aspects: how flashcards facilitate students' conceptual understanding and how the learning process unfolds in the classroom.

This study was conducted in a third-grade classroom at a public elementary school, namely SD Negeri 3 Tengiri, Wonogiri Regency, during mathematics lessons on multiplication and division. The class consisted of 28 students. The class consisted of 28 students. The participants included the Grade 3 teacher as the primary informant and Grade 3 students as supporting informants. Informants were selected purposively, meaning that those directly involved in flashcard-based instruction were chosen. A total of 6 students were selected for interviews, representing a range of abilities, including students who appeared to understand quickly, those with moderate understanding, and those who still experienced difficulties, based on classroom observations.

The study was conducted over four meetings, with each meeting lasting approximately 70 minutes, during the period of November 2025. The data consisted of process and response data, including the instructional steps when using flashcards, teacher–student interactions, forms of teacher feedback, students' response strategies, and observable indicators of conceptual understanding of multiplication and division during the activities. Data sources included classroom observations and interviews with the teacher and selected students.

Data were collected through observation and interviews. Observations were conducted directly during lessons to document the sequence of activities, the teacher's use of flashcards, student engagement, students' response strategies, and the overall classroom situation. The researcher used an observation sheet and field notes to record key events during instruction.

The observation sheet was developed based on indicators of conceptual understanding and interactive learning processes derived from relevant literature. The observation indicators included, for example: (1) students' ability to represent multiplication as repeated addition or equal groups, (2) students' ability to explain division as equal sharing, (3) students' ability to connect multiplication and division as inverse operations, (4) teacher's use of guiding questions, and (5) forms of feedback given during learning.

Interviews were semi-structured. The teacher interview explored the objectives of using flashcards, implementation steps, reasons for selecting specific strategies, approaches to reinforcement and correction, and the teacher's perceptions of students' understanding. Student interviews explored their learning experiences with flashcards, which parts supported their understanding, how they responded to the tasks, and the difficulties they encountered. The interview guide was developed based on the research focus and consisted of open-ended questions to allow in-depth exploration of participants' experiences. Data collection instruments included an interview guide, an observation sheet, and an audio recorder to ensure accurate documentation of interview results.

Data analysis followed the interactive and ongoing model proposed by Miles and Huberman, consisting of data reduction, data display, and conclusion drawing (Sugiyono, 2019). In the data reduction stage, the researcher selected and categorized observation and interview data according to the research focus. This process involved initial coding, where meaningful units of data were labeled using codes such as "conceptual explanation," "procedural response," "teacher scaffolding," and "student misconception."

In the data display stage, the researcher organized the data into a thematic narrative that included activity descriptions, interview excerpts, and relevant examples of students' learning behaviors. The initial categories were then grouped into broader themes, such as (1) conceptual understanding development, (2) student response patterns, and (3) instructional strategies using flashcards. In the conclusion drawing stage, the researcher formulated the main findings based on patterns emerging from the data and linked them to the research focus. For example, student responses that initially showed procedural answers without explanation were reduced and categorized as "procedural understanding," then compared with later data showing explanation ability to identify conceptual development.

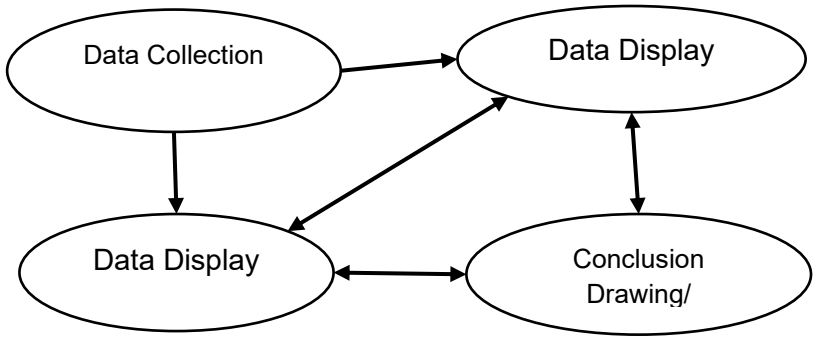

Figure 1. Steps of Data Analysis

To ensure data trustworthiness, the researcher applied methodological triangulation by comparing findings from classroom observations with interview results. The researcher also conducted member checking by confirming the summarized interview results with the primary informant to ensure that the meaning of the data accurately reflected the informant's intended message.

RESULT AND DISCUSSION

Result

This study discusses the use of flashcard media and the importance of understanding its role in facilitating the understanding of basic mathematical concepts for students. The focus of the study is on the implementation of flashcards in teaching multiplication and division in Grade III elementary school, as well as how this media supports students in understanding these concepts. The following presents the results

related to the impact of flashcards on students' understanding of multiplication and division concepts.

1. Flashcards Facilitate Conceptual Understanding of Multiplication and Division

Observation findings indicate that the use of flashcards helped students develop conceptual understanding of multiplication and division through structured activities and rapid responses. When the teacher displayed a card, students did not only try to state the answer, but also began to show thinking strategies such as repeated addition for multiplication and equal sharing for division. The teacher asked guiding questions when students hesitated, which encouraged them to try again using more appropriate steps. Repeated exposure to the same cards also helped students correct errors and recognize patterns across problems. These observation findings are summarized in Table 1.

Table 1. Observation Results on Students' Conceptual Understanding of Multiplication and Division

Observed Focus	Classroom Observation Findings	Observable Behaviors
Understanding the meaning of multiplication	Some students stated the counting steps before giving the result.	Students said "4 + 4 + 4" when answering 3 × 4.
Understanding the meaning of division	Students tried to split into several parts before deciding the answer.	Students said "divide into 3 groups" and then counted how many in each group for 12 ÷ 3.
Relationship between multiplication and division	Some students could answer related paired problems.	After 3 × 4 = 12, students answered 12 ÷ 3 = 4 without hesitation.
Strategies used by students	Strategies varied, with step-by-step counting and grouping as the most common.	Some students counted on their fingers, while others grouped orally.
Answer accuracy	Correct answers increased on repeated cards.	When the same card appeared again, students corrected their answers.
Explaining answers	Some students began to provide simple reasoning when prompted by the teacher.	Students explained, "because there are 3 groups, each has 4."
Focus and engagement	The class stayed more focused when cards were shown in turns.	Students raised their hands, waited for their turn, and remained attentive.
Responses to errors	Students were willing to try again after teacher prompts.	Students repeated the task with a new approach after the teacher asked guiding questions.

To strengthen these findings, the observed behaviors were also analyzed based on their frequency across four meetings. Conceptual explanation appeared in three to four meetings, indicating frequent occurrence when students began to explain answers using grouping and repeated addition. Procedural responses appeared in all meetings, especially at the beginning of instruction, showing that students initially relied on direct answers without explanation. Teacher scaffolding was consistently present in all meetings, while misconceptions such as confusion between division and subtraction appeared in two to three meetings. Improvement

after repeated exposure to flashcards was observed in three meetings, suggesting that repeated practice contributed to gradual conceptual development.

The observation findings were reinforced by the Grade 3 teacher interview. The teacher explained that flashcards help students understand concepts because they allow the teacher to guide students' thinking processes, not only their final answers. When students answered incorrectly, the teacher did not immediately provide the correct answer but guided them using simple questions. This is reflected in the teacher's statement: "When students answer incorrectly, I do not directly give the answer. I guide them to think again using simple questions." The teacher also emphasized that "flashcards make it easier to repeat concepts, especially for students who still do not understand," highlighting the role of repetition and structured practice.

Student interview findings also supported these results. Several students reported that flashcards made learning easier because the problems were clear and allowed immediate responses. Students described using step-by-step strategies, such as repeated addition for multiplication and equal sharing for division. This is reflected in students' statements: "If I see 3 × 4, I count 4 + 4 + 4 so I understand," and "For division, I try to share equally first, then I count." Another student stated, "If the card appears again, I remember my mistake and fix it," indicating that repetition supports both memory and understanding. Students who initially felt unsure reported increased confidence when the teacher provided simple guidance and allowed them to retry the task.

Figure 2. The learning process using flashcard media

Figure 3. The teacher provides reinforcement and feedback

Figure 4. Question and answer discussion activity

The classroom images (Figures 2–4) further support these findings. The images show that students were actively engaged, raising their hands and focusing

on the flashcards presented by the teacher, which indicates high levels of attention and participation. In addition, the teacher's interaction with students reflects active scaffolding, where feedback is provided immediately after student responses. This suggests that flashcards function not only as visual media but also as tools that support interactive and responsive learning environments.

These findings differ from studies that emphasize flashcards primarily as tools for improving memorization and response speed (Ophuis-Cox et al., 2023). In this study, flashcards also supported conceptual understanding through teacher-guided interaction and structured questioning. This finding also contrasts with Rambe (2021), which reported that flashcards were often used without encouraging explanation. The difference suggests that the effectiveness of flashcards depends not only on the media itself but also on how teachers integrate it into the learning process.

However, it is important to consider potential sources of bias. One possible bias is the teacher effect, where the effectiveness of flashcards is influenced by the teacher's ability to provide scaffolding and feedback. In this study, the teacher actively guided students using questions, which may enhance the effectiveness of the media. Additionally, students' active participation may be influenced by the observer effect, as they were aware of being observed during the study.

This study also has limitations. The research was conducted in a single classroom with a limited number of participants and within a relatively short duration of four meetings. Therefore, the findings may not fully represent long-term conceptual development or be generalized to other classroom contexts.

Overall, observation and interview data indicate that flashcards facilitate conceptual understanding of multiplication and division by directing students toward thinking strategies, clarifying differences between operations, and providing structured repeated practice with immediate teacher feedback.

2. Implementation of Multiplication and Division Instruction Using Flashcards

The implementation of multiplication and division instruction using flashcards in the Grade 3 classroom followed a clear and structured sequence. The teacher began with a brief apperception activity to review basic concepts, then introduced the rules for using flashcards so students understood how to respond and take turns. During the main activity, the teacher presented flashcards gradually from easier to more challenging items, using rapid question-and-answer routines and simple games to keep students engaged. The teacher managed turn-taking, provided reinforcement for correct answers, and corrected incorrect answers through guiding questions. In the closing stage, the teacher conducted a brief evaluation to check students' understanding and ended with a summary of the lesson. This instructional sequence is reflected in the observation results summarized in Table 2.

Table 2. Observation Results on the Implementation of Flashcard-Based Instruction

Lesson Stage	Teacher Activities	Student Activities	Observation Findings
Opening	The teacher stated the learning objectives and conducted a brief apperception activity.	Students answered opening questions and prepared for the lesson.	The teacher directed students' attention to multiplication and division concepts before using flashcards.

Introduction of the media	The teacher explained the rules and demonstrated how to respond to flashcards.	Students paid attention and asked questions if anything was unclear.	Turn-taking rules and response procedures made the class more orderly during the main activity.
Main activity 1	The teacher presented flashcards gradually and used rapid question-and-answer.	Students raised their hands and answered in turns.	Students responded actively, and the teacher managed the pace so all students had opportunities.
Main activity 2	The teacher used simple game variations (group or pair work).	Students discussed briefly and then answered.	Engagement increased, and students who were usually passive began to participate.
Feedback	The teacher reinforced correct answers and corrected incorrect answers through guiding questions.	Students revised their answers and tried again.	The teacher did not provide answers immediately and instead guided students' reasoning steps.
Classroom management	The teacher managed time, turns, and classroom conditions.	Students followed the rules and waited for their turn.	The lesson remained conducive even with a competitive atmosphere during games.
Closing	The teacher gave a brief evaluation and a summary.	Students completed a quick exercise and stated conclusions.	The teacher checked final understanding and restated key concepts.

To strengthen these findings, the implementation process was also analyzed based on its consistency across four meetings. The opening stage, including apperception and goal setting, was observed in all meetings, indicating a consistent effort to connect prior knowledge with new material. The introduction of flashcard rules appeared clearly in the first meeting and was reinforced briefly in subsequent meetings. The main activities, including rapid questioning and game-based variations, were consistently implemented in all meetings and showed increasing student engagement over time. Feedback through guiding questions was also consistently observed in all sessions, while classroom management strategies ensured that turn-taking and participation remained balanced. The closing stage, including short evaluation and summary, appeared in all meetings, indicating a complete instructional cycle.

Students were observed raising their hands, waiting for their turns, and focusing on the cards, which reflects effective classroom management and engagement. In addition, interaction patterns between teacher and students

demonstrate that feedback was given immediately after responses, reinforcing the role of flashcards in supporting interactive learning rather than passive participation.

The observation findings were reinforced by interviews with the Grade 3 teacher. The teacher explained that the lesson intentionally began with an apperception activity to connect new material with students' prior experiences. The teacher then introduced clear rules for using flashcards so the activity could run effectively and the class would remain orderly. The sequencing of flashcards from easier to more difficult items was designed to maintain students' confidence and willingness to participate. Feedback was emphasized as a key component, where incorrect answers were addressed through guiding questions rather than direct correction. This approach allowed students to reconstruct their understanding independently. The teacher also highlighted that simple game variations contributed to maintaining attention and ensuring more equal participation, including from students who were usually less active.

Student interviews also supported these findings. Students reported that the lesson was easier to follow because the teacher explained the rules and procedures clearly at the beginning. They indicated that turn-based activities and simple games increased their motivation and encouraged them to pay attention throughout the lesson. Students also reported that they were more willing to try again after making mistakes because the teacher provided guidance instead of direct correction. In addition, the short evaluation at the end of the lesson helped students confirm their understanding and recall the steps used in solving problems.

These findings show similarities and differences compared to previous studies. Some studies suggest that flashcard-based instruction tends to focus on speed and repetition. However, in this study, the implementation combined structured stages, interactive questioning, and feedback, which supported not only fluency but also conceptual understanding. This finding differs from studies that report limited interaction during flashcard use, indicating that the effectiveness of flashcards depends on how they are integrated into instructional design and classroom interaction.

However, it is important to consider potential sources of bias. One possible bias is the teacher effect, where the structured implementation and effective classroom management may be influenced by the teacher's competence and experience. The success of the instructional sequence may therefore not be solely attributed to the flashcards themselves. In addition, the observer effect may have influenced students' behavior, as students may have been more attentive and participative due to being observed during the research process.

This study also has limitations. The implementation was observed in a single classroom and within a limited number of meetings, which may not fully represent variations in instructional practices across different contexts. In addition, the findings focus on short-term implementation and may not fully capture long-term impacts on students' conceptual understanding. Overall, the observation and interview data indicate that flashcard-based instruction was implemented through clear and structured stages, combined rapid questioning with simple games, and was strengthened by teacher feedback that guided students to understand problem-solving steps.

Discussion

1. Flashcards Facilitate Conceptual Understanding of Multiplication and Division

The findings show that flashcards facilitate conceptual understanding because students do not only aim for the final answer. Students begin to show their thinking when they respond. They connect multiplication to repeated addition and equal

groups. They also connect division to equal sharing. This pattern indicates a shift from procedural to conceptual understanding. Students start to explain why an answer makes sense, not only what the answer is.

This finding aligns with the Mathematics learning expectations for Phase B in the *Kurikulum Merdeka*. The learning outcomes emphasize that students perform multiplication and division up to 100 using concrete objects, pictures, and mathematical symbols (Rizqina & Witanto, 2025). Flashcards support this expectation when teachers use them as prompts for representation. Teachers can link a card to groups, pictures, or equal-sharing situations. Visual and concrete support also fits Grade 3 students' cognitive characteristics. At this age, children are in the concrete operational stage. Children understand mathematical ideas more easily through concrete objects and situations, while abstract ideas remain challenging (Saputra, 2024).

From a learning theory perspective, flashcards work well because they encourage retrieval practice (Arnas et al., 2025). Students practice recalling information from memory each time a card appears. Research on the testing effect shows that recall activities through tests or quizzes improve long-term retention compared to passive learning (Ummah, 2023). In basic mathematics, classroom-based studies also report that retrieval practice using flashcards supports multiplication fact fluency more effectively than repeated chanting (Fitrianingsih, 2021). This evidence helps explain why students in the observations responded faster after repeated exposure to the same cards and showed more confidence when answering paired problems that were conceptually connected.

The findings also align with guidance for teaching multiplication and division that prioritizes meaning and strategy before fluency. NCTM emphasizes that, in Grade 3, students should focus on understanding operations, identifying patterns and strategies, and gradually building fluency with basic facts (NCTM, 2010). When students interpret multiplication as "equal groups" and division as "equal sharing," they apply conceptual models recommended in multiplicative reasoning instruction, such as equal groups and arrays (Selawati & Syamsuri, 2025). Therefore, flashcards do not function only as memorization tools. They can trigger conceptual models when teachers direct student responses toward appropriate representations.

The teacher's role determines whether flashcards truly support understanding. The teacher interview confirms that the teacher guided students with prompting questions when they answered incorrectly. This approach reflects scaffolding practices that encourage students to explain steps and correct errors through targeted questioning (Selawati & Syamsuri, 2025). When the teacher asked, "how many groups" and "how many in each group," the teacher helped students map the operation to its meaning. These questions also helped the teacher identify whether students understood the concept or were guessing.

Student interviews supported this pattern. Students felt that the cards made problems clear and allowed them to try immediately. Students also felt more confident to try again after the teacher provided hints. The cycle of "try, make a mistake, receive guidance, try again" made learning more active. This pattern matches the principle that retrieval practice with feedback helps students strengthen correct knowledge and repair misconceptions (Dunlosky et al., 2013).

These findings offer a practical message. Flashcards work best when teachers use them to elicit strategies and meaning, not only speed (Mareza, 2022). Teachers should repeat cards that students often miss and ask students to state their steps. Teachers should also connect tasks to equal-group models and equal-sharing division models (Witasari & Rahma, 2022). This approach allows flashcards to function as learning media that support conceptual understanding of multiplication

and division, in line with curriculum expectations and learning research (Kemdikbud, 2026).

2. Implementation of Multiplication and Division Instruction Using Flashcards

The findings show that flashcard-based instruction works effectively when the teacher organizes the lesson in clear stages. The teacher begins with an apperception activity and states the lesson objectives. The teacher then explains the rules for using flashcards. Next, the teacher presents cards from easier items to more challenging ones. The teacher ends the lesson with a brief evaluation and a summary. This sequence aligns with the Mathematics Learning Outcomes for Phase B in the *Kurikulum Merdeka*, which expect students to perform multiplication and division up to 100 using concrete objects, pictures, and mathematical symbols (Kemdikbud, 2026). When the teacher structures the lesson from introduction to focused practice, students move from initial understanding toward using symbols shown on the cards (Krisna, 2022).

The opening phase and rule explanation provide clear direction for students. The teacher communicates the goals and the activity procedures. This step matters because effective feedback requires clear goals and success criteria that both teacher and students understand (Akbar, 2022). The teacher also emphasized turn-taking rules and classroom order in the interviews. These rules help the flashcard practice run smoothly and create more equal opportunities for students to participate.

During the main activity, the teacher sequences questions gradually and provides repeated practice through recurring cards. This gradual progression matches NCTM guidance for Grade 3, which prioritizes understanding operations, identifying patterns and strategies, and then developing fluency with basic facts (NCTM, 2010). Repeating cards that students often miss also supports targeted practice. This practice aligns with retrieval practice research showing that repeated recall, especially with spacing and review, strengthens fluency and long-term retention (Arnas et al., 2025).

Activity variation, such as rapid questioning and simple games, keeps students engaged. It also creates many response opportunities in a short time. This supports active practice because students do not only watch examples. They repeatedly attempt to answer. Research in elementary settings also suggests that flashcard-based retrieval practice can be more effective than oral repetition without explicit recall demands (Hesti & Nuryanti, 2020). Student interviews, which highlighted increased enthusiasm and willingness to try, support the role of these activity variations.

Teacher feedback plays a central role in implementation. Observations show that the teacher provided reinforcement for correct answers and used guiding questions to correct incorrect answers. This practice aligns with Hattie and Timperley's feedback model, which emphasizes information about performance and specific improvement steps rather than general praise (Muhidin & Doriza, 2026). When the teacher prompts students with guiding questions, the teacher directs students toward appropriate reasoning processes. This approach prevents flashcards from functioning only as quick quizzes. It turns them into learning tools that shape students' thinking (Nurmala & Nugraheni, 2024).

In the closing stage, the teacher conducted a brief evaluation and delivered a summary. This stage checks students' understanding and reinforces concepts practiced during the lesson. Short end-of-session evaluation also aligns with formative feedback practices that help students recognize their current progress and next steps (Suhendar, 2025; ERIC). Overall, flashcard-based instruction becomes stronger when the teacher designs the lesson flow, sequences item difficulty,

provides frequent response opportunities, and delivers guiding feedback. This confirms that the effectiveness of flashcards depends more on classroom implementation design than on the medium itself (Nurmala & Nugraheni, 2024).

CONCLUSION

This study shows that flashcards facilitate third-grade elementary students' conceptual understanding of multiplication and division when the teacher uses the cards as prompts for students to explain their thinking steps. Students did not only state answers. They began to connect multiplication with repeated addition or equal groups, and division with equal sharing. Repetition of cards and the teacher's guiding questions helped students correct errors and strengthen connections between the two operations. The instruction was effective because the teacher organized the lesson in clear stages, starting with apperception, explaining the rules, conducting rapid questioning or simple games, providing immediate feedback, and ending with a brief evaluation and summary.

The implications of these findings confirm that the value of flashcards lies not only in the medium itself, but in how the teacher designs the lesson steps and manages classroom interaction. Teachers need to sequence cards from easy to difficult, ensure equal opportunities for students to respond, ask students to verbalize their steps, and provide feedback through guiding questions so students understand the meaning of the operations. Future research should expand to different school contexts and a larger number of sessions, compare different flashcard designs such as number-only cards versus picture-based cards, and examine links between flashcard use and problem-solving skills, including word problems, to provide a more comprehensive picture of its impact on numeracy competencies.

REFERENCES

Agustina, D. T. (2024). *Pendekatan CPA (Concret Pictorial Abstrak) dan Matematika Realistik Bagi Siswa SD*. Maghza Pustaka.

Akbar, M. R. (2022). Flash card sebagai media pembelajaran dan penelitian. *Haura Publishing*.

Arnas, Y. M., Humaira, M. A., & Fiirmansyah, W. (2025). Penerapan Media Flashcard dalam Meningkatkan Kemampuan Kosa Kata Bahasa Inggris Siswa Kelas III SDN 3 Selajambe. *Karimah Tauhid*, *4*(9), 6644-6662.

Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest, 14*(1), 4–58. https://doi.org/10.1177/1529100612453266

Fitrianingsih, W. (2021). *Pengaruh Media Flashcard Terhadap Kemampuan Siswa Dalam Menghafal Fakta Dasar Perkalian Pada Muatan Pelajaran Matematika Kelas Iii Sekolah Dasar Negeri 024 Tarai Bangun* (Doctoral Dissertation, Universitas Islam Negeri Sultan Syarif Kasim Riau).

Ghoffar, M., Wiryanto, W., & Rahaju, E. B. (2025). Profil Belajar Siswa dalam Memahami Operasi Hitung Bilangan Bulat Kelas VI Sekolah Dasar. *Edukasi: Jurnal Penelitian dan Artikel Pendidikan*, *17*(1), 633-646.

Hidayatullah, D. A., & Zainil, M. (2025). Analisis Kesulitan Pemahaman Konsep Pecahan dalam Pembelajaran Matematika pada Siswa di Sekolah Dasar. *Jurnal Teknologi Pendidikan Dan Pembelajaran*| *E-ISSN: 3026-6629*, *2*(4), 967-973.

Hesti, R. M., & Nuryanti, L. (2020). *Efektivitas Media Flashcard Terhadap Keterampilan Menulis Kosakata Bahasa Inggris Siswa Sekolah Dasar (SD)* (Doctoral dissertation, Universitas Muhammadiyah Surakarta).

Jatnika, Y. (2025, March 19). *Kemendikdasmen terbitkan Raport Pendidikan 2022–2024*. Pusat Layanan Pembiayaan Pendidikan.

https://puslapdik.kemendikdasmen.go.id/kemendikdasmen-terbitkan-raport-pendidikan-2022-2024/

Kementerian Pendidikan Dasar dan Menengah Republik Indonesia. (n.d.). *CP & ATP Matematika: Fase B*. Retrieved January 11, 2026, from https://guru.kemendikdasmen.go.id/kurikulum/referensi-penerapan/capaian-pembelajaran/sd-sma/matematika/fase-b/

Kiriana, I. N., & Widiasih, N. N. S. (2023). Implementasi Rapor Pendidikan dalam meningkatkan kualitas pendidikan nasional. *Widya Accarya*, *14*(2), 156-164.

Krisna, D. A. (2022). *Implementasi Media Kartu Kata Pembelajaran Membaca Dalam Mata Pelajaran Bahasa Indonesia Di Sd Negeri 4 Selakambang Purbalingga* (Doctoral Dissertation, Uin Prof. Kh Saifuddin Zuhri).

Mareza, H. (2022). *Strategi Guru Kelas Mengajar Pembelajaran Membaca Menggunakan Media Flash Card Pada Siswa Syndrome Short Memory Loss Di Mi Al-Islam Kota Bengkulu* (Doctoral Dissertation, Uin Fatmawati Sukarno Bengkulu).

Masitoh, I., & Prabawanto, S. (2016). Peningkatan Pemahaman Konsep Matematika dan Kemampuan Berfikir Kritis Matematis Siswa Kelas V Sekolah Dasar Melalui Pembelajaran Eksloratif. *EduHumaniora| Jurnal Pendidikan Dasar Kampus Cibiru*, *7*(2), 186-197.

National Council of Teachers of Mathematics. (2010). Focusing on multiplication and division. Dalam *Focus in Grade 3: Teaching with curriculum focal points* (hlm. 7–14). National Council of Teachers of Mathematics.

Nurahlina, N., & Aprilia, A. (2025). Analisis Peran Pengalaman Belajar dalam Membangun Memori Jangka Panjang pada Siswa Tingkat Sekolah Dasar: Penelitian. *Jurnal Pengabdian Masyarakat dan Riset Pendidikan*, *3*(4), 1750-1758.

Nurmala SR, D., & Nugraheni, N. (2024). Pemanfaatan Media Flash Card Untuk Meningkatkan Kemampuan Kognitif Siswa Kelas I Sdn Sindang Mulya 03 Pada Materi Penjumlahan Dan Pengurangan Bilangan Sampai 20. *Jurnal Ilmiah Pendas: Primary Educational Journal*, *5*(1), 33-45. Muhidin, A., & Doriza, S. (2026). Belajar Membelajarkan Siswa: Praktik Baik Pembelajaran Mendalam, Bermakna, Dan Gembira.

OECD. (2023a). PISA 2022 Assessment and Analytical Framework. OECD. https://doi.org/10.1787/dfe0bf9c-enOphuis-Cox, F. H. A., Catrysse, L., & Camp, G. (2023). The effect of retrieval practice on fluently retrieving multiplication facts in an authentic elementary school setting. *Applied Cognitive Psychology, 37*(6), 1463–1469. https://doi.org/10.1002/acp.4141

Rambe, D. S. (2021). *Upaya meningkatkan hasil belajar siswa pada mata pelajaran matematika materi pecahan dengan menggunakan media flash card di Kelas IV-A SD Negeri 100101 Simatorkis Kecamatan Angkola Barat Kabupaten Tapanuli Selatan* (Doctoral dissertation, IAIN Padangsidimpuan).

Rizqina, E., & Witanto, Y. (2025). Pengembangan Media “Koper Hitung”(Kotak Permainan Berhitung) Untuk Meningkatkan Hasil Belajar Matematika Siswa Materi Perkalian dan Pembagian Kelas III SD 3 Menawan Kudus. *Journal of Classroom Action Research*, *7*(4), 1702-1711.

Rostika, S., Rohmiati, R., Idhayani, N., Fatimah, W. S., & Baen, F. (2025). Peningkatan Numerasi Awal Anak Usia Dini melalui Media Gambar Berbasis Lintasan Belajar Enaktif–Ikonik–Simbolik. *Diniyah: Jurnal Pendidikan Dasar*, 77-93.

Saputra, H. (2024). Perkembangan berpikir matematis pada anak usia sekolah dasar. *JEMARI (Jurnal Edukasi Madrasah Ibtidaiyah)*, *6*(2), 53-64.

Selawati, S., & Syamsuri, S. (2025). Identifikasi Jenis Kesalahan Siswa Sma Dalam Menyelesaikan Masalah Materi Matriks Dan Strategi Scaffolding Yang Efektif. *Wilangan: Jurnal Inovasi Dan Riset Pendidikan Matematika*, *6*(2), 115-124.

Sugiyono. (2019). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Bnadung: Alfabeta.

Suhendra, S. (2025). *Penerapan Metode Umpan Balik Pada Pembelajaran Pai Dalam Membentuk Etika Siswa Di Mts Nurul Amaliyah Tanjung Morawa Kabupaten Deli Serdang* (Doctoral Dissertation, Universitas Islam Sultan Agung Semarang).

Susilawati, L., Apriani, I. F., & Suryana, Y. (2024). Analisis Bahan Ajar Matematika Materi Perkalian Bilangan Cacah pada Kurikulum Merdeka Kelas IV SD. *ELSE (Elementary School Education Journal): Jurnal Pendidikan dan Pembelajaran Sekolah Dasar*, *8*(2).

Ummah, F. S. (2023). Psikologi Pendidikan. Sumatera Barat: Cv. Hei Publishing Indonesia.

Witasari, R., & Rahma, T. A. (2022). Strategi Guru Kelas dalam Meningkatkan Kemampuan Membaca Anak melalui Media Flash Card: Classroom Teacher Strategies in Improving Children's Reading Ability via Media Flash Card. *Absorbent Mind*, *2*(2), 87-98.