



MENINGKATKAN HASIL BELAJAR MURID MELALUI MODEL KOOPERATIF TIPE *MAKE A MATCH* BERBANTUAN KARTU DOMINO PECAHAN MATERI PERKALIAN DAN PEMBAGIAN PECAHAN KELAS V SDN 10 TELAGA

IMPROVING FIFTH-GRADE STUDENTS' LEARNING OUTCOMES IN FRACTION MULTIPLICATION AND DIVISION THROUGH *MAKE A MATCH* ASSISTED BY FRACTION DOMINO CARDS

Alya Djafar¹, Isnanto², Nur Sakinah Aries³, Andi Marshanawiah⁴, Gamar Abdullah⁵

¹⁻⁵ Pendidikan Guru Sekolah Dasar, Universitas Negeri Gorontalo, Indonesia

E-mail: alyadjafar12@gmail.com¹, isnanto@ung.ac.id², nursakinaharies@ung.ac.id³,
andimarshanawiah@ung.ac.id⁴, gamar@ung.ac.id⁵

Submitted

25 May 2026

Accepted

20 June 2026

Revised

4 July 2026

Published

31 July 2026

Kata Kunci:

Hasil Belajar; Model Pembelajaran; Kooperatif Tipe *Make A Match*; Media Kartu Domino Pecahan

Keyword:

Learning Outcomes; Learning Model *Make A Match* Type Cooperative Learning; Fraction Domino Card Media

Abstrak

Penelitian ini bertujuan untuk meningkatkan hasil belajar murid kelas V SDN 10 Telaga pada materi perkalian dan pembagian pecahan melalui model pembelajaran kooperatif tipe *Make a Match* berbantuan kartu domino pecahan. Penelitian tindakan kelas ini dilaksanakan dalam dua siklus dengan subjek 19 murid. Teknik pengumpulan data meliputi observasi, tes tertulis (soal pilihan ganda dan essay), serta dokumentasi. Data pratindakan menunjukkan bahwa hasil belajar murid masih rendah dengan hanya 43% murid yang mencapai ketuntasan. Setelah penerapan tindakan, terjadi peningkatan ketuntasan belajar murid dari 63,2% pada Siklus I menjadi 89,5% pada Siklus II. Aktivitas guru juga meningkat dari 71,0% pada siklus I menjadi 90,1% pada siklus II, dan juga aktivitas murid meningkat dari 71,9% pada siklus I menjadi 89,0% pada siklus II. Dengan demikian, indikator keberhasilan penelitian sebesar 80% telah tercapai pada Siklus II. Berdasarkan hasil penelitian tersebut, dapat disimpulkan bahwa penerapan model pembelajaran kooperatif tipe *Make a Match* berbantuan kartu domino pecahan dapat meningkatkan hasil belajar murid pada materi perkalian dan pembagian pecahan di kelas V SDN 10 Telaga.

Abstract

This study aimed to improve the mathematics learning outcomes of fifth-grade students at SDN 10 Telaga on the topic of fraction multiplication and division through the implementation of the *Make a Match* cooperative learning model supported by fraction domino card media. This classroom action research was conducted over two cycles involving 19 students. Data were collected through classroom observations, written achievement tests consisting of multiple-choice and essay questions, and documentation. The pre-intervention data indicated that students' learning outcomes were relatively low, with only 43.0% of students achieving learning mastery. Following the implementation of the intervention, the percentage of students achieving learning mastery increased from 63.2% in Cycle I to 89.5% in Cycle II. Teacher performance also improved from 71.0% in Cycle I to 90.1% in Cycle II, while students' learning activities increased from 71.9% to 89.0% over the same period. Consequently, the predetermined research success criterion, requiring at least 80% of students to achieve learning mastery, was successfully attained in Cycle II. These findings indicate that implementing the *Make a Match* cooperative learning model supported by fraction domino card media effectively improved students' learning outcomes on fraction multiplication and division among fifth-grade students at SDN 10 Telaga.

Citation :

Djafar, A., et al. (2026). Improving Fifth-Grade Students' Learning Outcomes in Fraction Multiplication and Division Through *Make a Match* Assisted by Fraction Domino Cards. *Jurnal Kiprah Pendidikan*, 5(3), 474-490. DOI: <https://doi.org/10.33578/kpd.v5i3.p474-490>

INTRODUCTION

Education plays a fundamental role in improving the quality of human resources by fostering the development of knowledge, skills, and attitudes. Mathematics is one of the core subjects that cultivates logical, critical, and systematic thinking; therefore, mastery of mathematical concepts from the elementary school level provides an essential foundation for students' cognitive development in subsequent stages of education. Education is an integral component of human life (Maulidawati et al. 2020). Consequently, mathematics instruction should be designed to promote students' creative thinking abilities (Aries, Monoarfa, and Ismail 2024). However, the abstract nature of mathematics continues to pose challenges for many students, leading to difficulties in understanding mathematical concepts and, consequently, reducing their confidence and conceptual comprehension (Magrifah et al. 2021).

One of the mathematics topics that elementary school students commonly find challenging is fractions, particularly fraction multiplication and division. A fraction represents a part of a whole and consists of a numerator and a denominator (Maghfiroh and Hardini 2021). Understanding this topic requires not only knowledge of numerical representations but also comprehension of the relationships between numerators and denominators, as well as the accurate application of arithmetic procedures. Learning difficulties become more pronounced when students are required to simultaneously integrate mathematical concepts, procedures, and symbolic representations. Therefore, effective instruction on fractions requires meaningful learning experiences supported by instructional media that can present abstract concepts in a more concrete and accessible manner.

These challenges were identified in fifth-grade mathematics instruction at SDN 10 Telaga, Gorontalo Regency. Based on classroom observations and interviews conducted on December 3, 2025, students' learning outcomes on the topic of fraction multiplication and division were found to be below the expected standard. Of the 14 students, only 6 students (42.9%) achieved the Minimum Learning Competency Achievement Criteria (MLCAC), while 8 students (57.1%) did not attain the required level of mastery. This situation was associated with students' difficulties in understanding the material, the predominance of teacher-centered lecture-based instruction, and the limited use of instructional media, resulting in low student participation, reduced learning motivation, and inadequate conceptual understanding of fractions. These findings are consistent with those of Magdalena et al. (2021), who argued that unsatisfactory learning outcomes may result from the suboptimal use of instructional media. Instructional media that align with both the characteristics of the subject matter and students' learning needs can enhance students' interest, motivation, and academic achievement.

One instructional medium that can be utilized to teach fraction multiplication and division is domino cards. This medium presents fraction concepts through paired cards that students must match, thereby actively engaging them in observing, comparing, and identifying relationships between mathematical concepts. Rahmanto et al. (2022) reported that the use of domino cards in teaching fractions positively influenced elementary school students' learning interest and academic achievement. Furthermore, domino card games have been recognized as effective instructional tools (Jannati, Megawati, and Guswita 2025), and one variation that has been successfully implemented is the Smart Domino Card (*Kartu Domino Pintar*) (Setyawati, Rahaju, and Hariyani 2019).

Nevertheless, the use of instructional media alone may not be sufficient to maximize student learning. It should be integrated with an instructional model that actively engages students in the learning process. One such model is the Make a Match cooperative learning model, in which students search for and match corresponding pairs of cards within a specified time limit. This model

encourages students to think critically, move actively, interact with peers, and collaborate in solving learning tasks, thereby creating a more engaging learning environment. Afriani, Erianjoni, and Fauziah (2026) demonstrated that the Make a Match model enhances classroom interaction, collaboration, and learning engagement. Its game-based characteristics also contribute to creating enjoyable learning experiences that can be repeated to reinforce conceptual understanding (Zakiah, Prasetyo, and Astutiningtyas 2019). In addition, Kencono and Harjono (2023) found that this instructional model positively affects students' interest in mathematics as well as their learning outcomes.

Previous studies have consistently demonstrated that both the Make a Match cooperative learning model and domino card media have the potential to improve mathematics learning. However, existing research has generally examined these two instructional components independently. Studies on the Make a Match model have primarily focused on cooperative learning strategies, whereas studies involving domino cards have emphasized their function as instructional media for teaching fractions. Consequently, a research gap remains regarding the integration of the Make a Match cooperative learning model with fraction domino card media in teaching fraction multiplication and division to fifth-grade elementary school students.

From a pedagogical perspective, integrating the Make a Match model with fraction domino cards is expected to address students' learning difficulties because these two instructional components complement one another. The Make a Match model facilitates cooperative learning through interaction, collaboration, and partner-matching activities, whereas fraction domino cards provide visual representations that help students establish concrete connections between mathematical problems and their corresponding solutions. Consequently, these activities function not merely as educational games but also as meaningful learning experiences that promote active conceptual understanding of fraction multiplication and division while reducing reliance on teacher-centered instruction.

The novelty of this study lies in the integration of the Make a Match cooperative learning model with fraction domino card media specifically designed for teaching fraction multiplication and division to fifth-grade elementary school students. Unlike previous studies, which have investigated these instructional components separately, the present study combines them into a unified instructional strategy to enhance students' engagement and learning outcomes. Therefore, this study aims to examine the improvement in the mathematics learning outcomes of fifth-grade students at SDN 10 Telaga following the implementation of the Make a Match cooperative learning model supported by fraction domino card media.

METHOD

This study employed a Classroom Action Research (CAR) design conducted with fifth-grade students at SDN 10 Telaga, Gorontalo Regency, Indonesia. The research site was selected based on preliminary classroom observations and interviews with the classroom teacher, which indicated that fraction multiplication and division remained challenging topics in mathematics instruction. Furthermore, previous instructional practices had not incorporated learning models or instructional media that actively engaged students in the learning process.

Student achievement data from the previous academic year were used solely as supporting information to identify the initial instructional context and were not included as research data. The research participants consisted of 19 fifth-grade students, including 11 boys and 8 girls. The participants were selected because the learning topic corresponded to the objectives of the study, and

preliminary observations revealed considerable variation in students' understanding of fraction multiplication and division, indicating the need for an instructional intervention to improve both student engagement and learning outcomes. The study was conducted over two action research cycles. The researcher served as the instructor responsible for implementing the intervention, whereas the classroom teacher acted as an observer responsible for monitoring teacher performance and students' learning activities. Data were collected through achievement tests assessed using a scoring rubric and observation checklists completed by the observer.

The research procedures followed the Kemmis and McTaggart spiral model, consisting of four stages: planning, action, observation, and reflection. During the planning stage, the researcher prepared lesson modules, student worksheets, instructional materials, fraction domino card media, observation sheets, and learning achievement tests. The instructional intervention was implemented using the Make a Match cooperative learning model supported by fraction domino card media. Cycle I consisted of two instructional meetings addressing fraction multiplication and division sequentially, whereas Cycle II comprised one meeting designed as a follow-up to the reflection findings from Cycle I, emphasizing improvements in the learning difficulties that had been identified.

Classroom observations were conducted throughout the instructional process using structured observation sheets to collect data on teacher performance and students' learning activities. Student learning outcomes were evaluated at the end of each cycle through written achievement tests. Evaluation constitutes an essential component of the educational process and may be implemented using various forms and at different stages of instruction (Abdullah et al. 2024).

The achievement tests administered in Cycles I and II covered comparable content and learning indicators, specifically assessing students' mastery of fraction multiplication and division. Each test consisted of 10 items, including five multiple-choice questions and five essay questions, designed to measure students' ability to perform fraction operations, solve contextual mathematical problems, and present systematic solution procedures. Responses to the essay questions were assessed using an analytic scoring rubric that considered procedural accuracy, problem-solving processes, and the correctness of the final answers.

The research instruments included observation sheets for teacher and student activities, achievement tests, interview guidelines, and documentation records. These instruments were developed based on the objectives of the instructional intervention and the established learning indicators. Rather than undergoing formal statistical validity and reliability testing, the instruments were refined continuously based on reflection at the end of each research cycle. Observation is recognized as a data collection technique involving direct examination of participants' behaviors and activities (Labuem et al. 2025). Achievement tests were used to measure students' mastery of the instructional content, interviews were conducted with the classroom teacher to obtain complementary information regarding the implementation of the intervention, and documentation, including classroom photographs, students' work, and field notes, served as supporting evidence.

Observation data and achievement test results were analyzed to evaluate the implementation of the instructional activities, teacher performance, student engagement, and students' learning mastery. The findings from each cycle formed the basis for the reflection stage, during which instructional improvements were identified and incorporated into the subsequent cycle. The study was considered successful when at least 80% of the students achieved the school's Minimum Learning Competency Achievement Criteria (MLCAC) score of 75. In Cycle II, 17 of the 19 students (89.4%) achieved learning mastery, indicating that the predetermined success criterion had been attained.

Four data collection techniques were employed: observation, achievement tests, interviews, and documentation. Observation was used to examine teacher performance and students' learning activities during the implementation of the Make a Match cooperative learning model supported by fraction domino card media. Achievement tests measured students' learning outcomes based on the predetermined learning indicators, whereas interviews and documentation provided complementary qualitative evidence supporting the research findings.

Teacher performance and students' learning activities were evaluated using structured observation sheets. Activity scores were calculated by dividing the total score obtained by the maximum possible score and multiplying the result by 100%.

$$\text{Teacher/Student Activity Score} = \frac{\text{Total Score Obtained}}{\text{Maximum Possible Score}} \times 100\%$$

The resulting percentages were interpreted according to the assessment criteria presented in Table 1.

Table 1. Assessment Criteria for Teacher and Student Activities

Average Score (%)	Category
86–100%	Excellent
75–85%	Good
61–74%	Fair
0–60%	Poor

Source: Astuti (2021)

These criteria were used to evaluate the quality of instructional implementation and the level of student engagement throughout the learning process. Observation data were subsequently compared across meetings and research cycles to identify changes in classroom activities following the implementation of the instructional intervention.

Students' learning outcomes were analyzed through data reduction followed by percentage analysis to determine the level of learning achievement. Students who obtained scores of 75 or higher, in accordance with the school's Minimum Learning Competency Achievement Criteria (MLCAC), were classified as having achieved learning mastery. Individual achievement scores were calculated using the following formula:

$$\text{Final Score} = \frac{\text{Score Obtained}}{\text{Maximum Possible Score}} \times 100$$

Classical learning mastery was subsequently determined by calculating the percentage of students who achieved scores of 75 or above, in accordance with the Minimum Learning Competency Criteria (KKTP) established by the school.

Table 2. Learning Mastery Criteria

No	Score	Mastery Status
1.	≥ 75	Mastery Achieved
2.	< 75	Not Yet Achieved

Source: Astuti (2021)

The resulting percentage of classical learning mastery was then compared with the predetermined research success criterion, which required at least 80% of the students to achieve the Minimum Learning Competency Criteria (KKTP) score of 75. Given a total of 19 participants, the instructional intervention was considered successful if at least 16 students obtained a score of 75 or above. In Cycle II, 17 students (89.4%) achieved the minimum competency criterion, whereas 2 students (10.6%) did not attain the required level of mastery.



Table 3. Research Success Criteria

Average Score (%)	Performance Category
86–100%	Excellent
75–85%	Good
61–74%	Fair
0–60%	Poor

Source: Astuti (2021)

RESULTS AND DISCUSSION

Results

a. Preliminary Observation

During the preliminary observation stage, the researcher conducted an interview with the collaborating teacher, namely the fifth-grade teacher at SDN 10 Telaga. The interview findings indicated that mathematics instruction on the topics of fraction multiplication and division continued to encounter several challenges. The teacher explained that some students experienced difficulties in understanding the concepts of fraction multiplication and division because classroom instruction was still predominantly based on direct instruction, with limited variation in the use of instructional media. Furthermore, the implementation of learning models capable of actively engaging students had not yet been optimized, resulting in low levels of student attention and participation during the learning process. Consequently, these conditions contributed to students' unsatisfactory learning outcomes in fraction multiplication and division.

The interview findings were further supported by documentation of students' mathematics achievement from the previous academic year, obtained from the classroom teacher and presented in Appendix I. These data were not part of the research participants but were used as baseline data to identify that fraction multiplication and division remained among the mathematical topics that presented considerable learning difficulties. According to the documented records, only 6 of the 14 students (43%) met the Minimum Learning Competency Criteria (KKTP), while the remaining 8 students (57%) failed to achieve the required standard. These findings indicate that students' learning outcomes in fraction multiplication and division require further improvement, thereby emphasizing the need for instructional enhancement through the implementation of a learning model that is more appropriate for the characteristics of the subject matter.

Based on these findings, the researcher implemented the Make a Match cooperative learning model assisted by fraction domino card media as an instructional intervention to improve students' learning outcomes. The participants in this classroom action research consisted of 19 fifth-grade students at SDN 10 Telaga during the year in which the study was conducted. Meanwhile, the students' achievement data from the previous academic year were used solely as supporting evidence to demonstrate the existence of the initial instructional problem.

b. Implementation of Cycle I

The intervention in Cycle I was conducted over two instructional meetings on 9 and 10 February 2026, with each meeting lasting 2×35 minutes. The first meeting focused on fraction multiplication, whereas the second meeting addressed fraction division. All instructional activities involved the 19 fifth-grade students who participated as the research subjects.

The instructional process began with preliminary activities, including greeting the students, praying, checking attendance, conducting an apperception session, and communicating the learning objectives. During the core learning activities, the teacher explained the lesson content, demonstrated

examples of problem-solving procedures, and subsequently implemented the Make a Match cooperative learning model supported by fraction domino card media. The students were divided into several groups, each consisting of four to five members, and were assigned to match question cards with their corresponding answer cards. Throughout the activity, the teacher facilitated group discussions and provided guidance to groups encountering learning difficulties.

Upon completing the card-matching activity, each group presented the outcomes of its discussion, followed by comments and feedback from the other groups. Subsequently, the students collaboratively completed the Student Worksheet (LKPD) as a reinforcement activity and presented their work. At the end of the lesson, the teacher and students jointly reflected on the learning process, summarized the lesson content, and concluded the session with an individual achievement test to assess students' mastery of the instructional material.

Teacher Activity in Cycle I: Meeting I

The implementation of the instructional process was observed using a teacher observation checklist consisting of 28 performance indicators. Teacher performance was evaluated using a four-point rating scale, where 4 = Excellent, 3 = Good, 2 = Fair, and 1 = Poor. The percentage of teacher activity was calculated by comparing the total score obtained from the observation with the maximum possible score and then multiplying the result by 100%. The percentage was calculated using the following formula:

$$\text{Percentage} = \frac{\text{Total Score Obtained}}{\text{Maximum Possible Score}} \times 100\%$$

Accordingly, the following results were obtained

$$\frac{71}{112} \times 100\% = 63,4\%$$

Table 4. Observation Results of Teacher Activities in Cycle I, Meeting I

Performance Category	Number of Indicators	Percentage
Excellent	6	21.4%
Good	8	28.6%
Fair	9	32.1%
Poor	5	17.9%
Total	28	100%
Overall Average		63.4%

Source: Observation Data on Teacher Activities in Cycle I, Meeting I.

Based on the observation results presented in Table 4, of the 28 performance indicators assessed, 6 indicators were classified as Excellent, 8 as Good, 9 as Fair, and 5 as Poor. The cumulative observation score yielded a teacher activity percentage of 63.4%, which falls within the Fair category. These findings indicate that the instructional process was generally implemented in accordance with the planned learning activities. Nevertheless, several aspects require further improvement, particularly in classroom management, the provision of guidance during group activities, and the reinforcement of key learning concepts.

Student Activities in Cycle I: Meeting I

Student activities were observed using an observation checklist consisting of 16 performance indicators. The same four-point rating scale was applied, where 4 = Excellent, 3 = Good, 2 = Fair, and 1 = Poor. The percentage of student activity was calculated by dividing the total score obtained by the maximum possible score and multiplying the result by 100%.

$$\frac{42}{64} \times 100\% = 65,6\%$$

Table 5. Observation Results of Student Activities in Cycle I, Meeting I

Performance Category	Number of Indicators	Percentage
Excellent	4	25.0%
Good	5	31.2%
Fair	4	25.0%
Poor	3	18.8%
Total	16	100%
Overall Average		65.6%

Source: Observation Data on Student Activities in Cycle I, Meeting I.

Based on the observation results, 4 indicators were classified as Excellent, 5 indicators as Good, 4 indicators as Fair, and 3 indicators as Poor. The cumulative observation score yielded a student activity percentage of 65.6%, which was categorized as Fair. These findings indicate that some students had begun to participate actively in the learning process. However, several students had not yet participated optimally in group discussions and classroom presentations. Teacher Activities in Cycle I: Meeting II The percentage of teacher activity was calculated by dividing the total score obtained from the observation by the maximum possible score and multiplying the result by 100%, as follows:

$$\frac{88}{112} \times 100\% = 78,6\%$$

The improvements identified during the reflection following the first meeting were subsequently implemented in the second meeting. The teacher provided clearer instructions regarding the game procedures, increased the level of guidance provided to each group, and ensured more equitable opportunities for all students to participate actively throughout the learning activities.

Table 6. Observation Results of Teacher Activities in Cycle I, Meeting II

Performance Category	Number of Indicators	Percentage
Excellent	9	32.1%
Good	15	53.6%
Fair	3	10.7%
Poor	1	3.6%
Total	28	100%
Overall Average		78.6%

Source: Observation Data on Teacher Activities in Cycle I, Meeting II.

The observation results indicated that, of the 28 performance indicators assessed, 9 indicators were classified as Excellent, 15 as Good, 3 as Fair, and 1 as Poor. The cumulative observation score yielded a teacher activity percentage of 78.6%, which falls within the Good category. Compared with the first meeting, these findings demonstrate an improvement in the quality of instructional implementation.

Student Activities in Cycle I: Meeting II

The percentage of student activity was calculated by dividing the total observation score by the maximum possible score and multiplying the result by 100%, as follows:

$$\frac{50}{64} \times 100\% = 78,1\%$$

Table 7. Observation Results of Student Activities in Cycle I, Meeting II

Performance Category	Number of Indicators	Percentage
Excellent	6	37.5%
Good	7	43.8%
Fair	2	12.5%
Poor	1	6.2%
Total	16	100%
Overall Average		78.1%

Source: Observation Data on Student Activities in Cycle I, Meeting II.

The observation results showed that 6 performance indicators were classified as Excellent, 7 as Good, 2 as Fair, and 1 as Poor. Based on the cumulative observation score, the percentage of student activity reached 78.1%, placing it within the Good category. This improvement indicates that students had become increasingly familiar with the instructional procedures of the Make a Match cooperative learning model supported by fraction domino cards. Consequently, their engagement in group discussions and classroom presentations improved noticeably.

Summary of Teacher Activities in Cycle I

Based on the observation of teacher activities throughout the instructional process, a total of 28 performance indicators were assessed. Each indicator was rated on a four-point scale ranging from 1 to 4, resulting in a maximum possible score of 112. This maximum score was obtained by multiplying the total number of observed indicators by the highest possible score assigned to each indicator, as follows:

$$\text{Meeting 1 Percentage} = \frac{71}{112} \times 100\% = 63,4\%$$

$$\text{Meeting 2 Percentage} = \frac{88}{112} \times 100\% = 78,6\%$$

To determine the average teacher activity for one cycle, the percentages obtained from each meeting were summed and divided by the total number of meetings. The average percentage was calculated using the following formula:

$$\text{Average Percentage} = \frac{\text{Meeting 1 Percentage} + \text{Meeting 2 Percentage}}{2} \times 100\%$$

$$\text{Average Percentage} = \frac{63,4\% + 78,6\%}{2} \times 100\% = 71,0\%$$

Table 8. Summary of Teacher Activities in Cycle I

No.	Meeting	Percentage (%)	Category
1	Meeting 1	63.4%	Fair
2	Meeting 2	78.6%	Good
Cycle I Average		71.0%	Fair

Source: Summary Data of Teacher Activities in Cycle I.

The summary results indicate that teacher activity improved from 63.4% in the first meeting to 78.6% in the second meeting. Overall, the average teacher activity for Cycle I reached 71.0%, which was classified as Fair according to the established assessment criteria. This improvement suggests that the quality of instructional implementation increased across successive meetings, although several aspects still require refinement in the subsequent cycle.

Summary of Student Activities in Cycle I

Based on observations of student activities throughout the instructional process, a total of 16 performance indicators were assessed. Each indicator was rated on a four-point scale ranging from 1 to 4, with 4 representing the highest possible score. Accordingly, the maximum attainable score for student activity was 64, obtained by multiplying the total number of observed indicators by the highest score assigned to each indicator. To determine the percentage of student activity during the instructional process, calculations were performed based on the observation scores for each predetermined indicator. The percentage of student activity was calculated by dividing the total score obtained by the maximum possible score and multiplying the result by 100%.

$$\text{Meeting 1 Percentage} = \frac{42}{64} \times 100\% = 65,6\%$$

$$\text{Meeting 2 Percentage} = \frac{50}{64} \times 100\% = 78,1\%$$

To determine the average student activity for one cycle, the percentages obtained from each meeting were summed and divided by the total number of meetings. The average percentage was calculated using the following formula:

$$\text{Average Percentage} = \frac{\text{Meeting 1 Percentage} + \text{Meeting 2 Percentage}}{2} \times 100\%$$

$$\text{Average Percentage} = \frac{65,6\% + 78,1\%}{2} \times 100\% = 71,9\%$$

Table 9. Summary of Student Activities in Cycle I

No.	Meeting	Percentage (%)	Category
1	Meeting 1	65.6%	Fair
2	Meeting 2	78.1%	Good
	Cycle I Average	71.9%	Fair

Source: Summary Data of Student Activities in Cycle I.

The summary of student activities indicates an improvement from 65.6% in the first meeting to 78.1% in the second meeting. Overall, the average level of student activity during Cycle I reached 71.9%, which was classified as Fair. These findings suggest that the implementation of the Make a Match cooperative learning model supported by fraction domino cards began to enhance students' engagement in the learning process. However, the improvement in student participation had not yet fully met the predetermined success criteria of the study.

Student Learning Outcomes in Cycle I

The percentage of student learning outcomes was calculated by comparing the number of students in each achievement category (achieved and not achieved) with the total number of students, and then multiplying the result by 100%, as follows:

$$\text{Students Achieving Mastery} = \frac{12}{19} \times 100\% = 63,2\%$$

$$\text{Students Not Achieving Mastery} = \frac{7}{19} \times 100\% = 36,8\%$$

Table 10. Student Learning Outcomes in Cycle I

No.	Student Learning Outcomes	Number of Students	Percentage
1	Achieved Mastery	12	63.2%
2	Did Not Achieve Mastery	7	36.8%
	Total	19	100%

Source: Student Learning Outcomes Data for Cycle I.

The analysis of student learning outcomes revealed that, of the 19 students, 12 students (63.2%) achieved the Minimum Learning Competency Criteria (KKTP), whereas 7 students (36.8%) did not meet the required standard. The mastery percentage was calculated by rounding to one decimal place; thus, the value of $12/19 = 63.16\%$ was rounded to 63.2%. This level of learning mastery did not satisfy the study's predetermined success criterion, which required at least 80% of students to achieve mastery. Therefore, the intervention was continued to Cycle II, with improvements implemented based on the reflection findings from the implementation of Cycle I.

c. Implementation of Cycle II

The implementation of the intervention in Cycle II was based on the reflection findings from Cycle I. The reflection revealed that several aspects of the instructional process still required

improvement, including creating a more conducive classroom environment, providing clearer instructions for the game procedures, ensuring more equitable guidance for each group, and enhancing students' active participation and self-confidence in group discussions, asking questions, and presenting their group work. In addition, the teacher reinforced the concepts of fraction multiplication and division before the core learning activities to strengthen students' conceptual understanding.

Cycle II was conducted in a single instructional meeting focusing on solving contextual problems involving fraction multiplication and division. All 19 fifth-grade students participated in the learning activities. The lesson began with greetings, prayer, attendance checking, an apperception activity, and the communication of the learning objectives. The teacher then reviewed the concepts of fraction multiplication and division and explained the procedures of the Make a Match cooperative learning model supported by fraction domino cards.

The students were divided into several groups, each consisting of four to five members. Each group was assigned to match question cards with their corresponding answer cards using the fraction domino card media. Throughout the activity, the teacher provided more balanced guidance to each group. After all groups had completed the task, each group presented the results of its discussion and received feedback from the other groups. The lesson continued with collaborative completion of the Student Worksheet (LKPD) and concluded with a reflection session, the formulation of a joint summary of the lesson, and an individual achievement test.

Teacher Activities in Cycle II

Teacher activities during the implementation of the intervention were observed using an observation checklist consisting of 28 performance indicators. Teacher performance was evaluated using a four-point rating scale, where 4 = Excellent, 3 = Good, 2 = Fair, and 1 = Poor.

The percentage of teacher activity was calculated by dividing the total observation score by the maximum possible score and multiplying the result by 100%, as follows:

$$\frac{101}{112} \times 100\% = 90,1\%$$

Table 11. Observation Results of Teacher Activities in Cycle II

Performance Category	Number of Indicators	Percentage
Excellent	17	60.8%
Good	11	39.2%
Fair	0	0.0%
Poor	0	0.0%
Total	28	100%
Overall Average		90.1%

Source: Observation Data on Teacher Activities in Cycle II.

Based on the observation results, of the 28 observed indicators, 17 were classified as very good, while the remaining 11 were classified as good. No indicators fell into either the fair or poor categories. Based on the cumulative observation score, the teacher's instructional performance achieved a percentage of 90.1%, which was categorized as very good. These findings indicate that the learning process was implemented in accordance with the planned stages of the instructional model and demonstrated improvement compared with its implementation in Cycle I.

Student Activities in Cycle II

Student activities were observed using an observation sheet consisting of 16 indicators with the same four-point rating scale: 4 = very good, 3 = good, 2 = fair, and 1 = poor. The percentage of

student activity was calculated by dividing the total observation score by the maximum possible score and multiplying the result by 100%, as follows:

$$\frac{57}{64} \times 100\% = 89,0\%$$

Table 12. Observation Results of Student Activities in Cycle II

Classification	Number of Indicators	Percentage
Very Good	9	56.2%
Good	7	43.8%
Fair	0	0%
Poor	0	0%
Total	16	100%
Average	89.0%	

Source: Observation Data on Student Activities in Cycle II.

The observation results revealed that, among the 16 observed indicators, 9 were classified as very good and 7 as good. None of the indicators were categorized as fair or poor. Based on the cumulative observation score, student activity reached 89.0%, placing it in the very good category. These findings indicate that the majority of students actively participated throughout the learning process, including matching fraction domino cards, engaging in group discussions, delivering presentations, and completing the student worksheets (Lembar Kerja Peserta Didik [LKPD]).

Recapitulation of Teacher Activities in Cycle II

Based on the observation of teacher activities during the learning process, a total of 28 aspects were assessed. Each aspect was rated on a four-point scale ranging from 1 to 4, resulting in a maximum possible score of 112. This maximum score was obtained by multiplying the number of observed aspects by the highest possible score for each aspect.

The percentage of teacher activity during the learning process was calculated by comparing the total score obtained with the maximum possible score and multiplying the result by 100%, using the following formula:

$$\text{Percentage} = \frac{\text{Obtained Score}}{\text{Maximum Score}} \times 100\%$$

$$\text{Percentage} = \frac{101}{112} \times 100\% = 90,1\%$$

Table 13. Recapitulation of Teacher Activities in Cycle II

No.	Meeting	Percentage (%)	Category
1	Meeting 1	90.1%	Very Good
Cycle II Average		90.1%	Very Good

Source: Recapitulation Data of Teacher Activities in Cycle II.

Based on the recapitulation results, teacher activity in Cycle II achieved a percentage of 90.1%, which falls into the very good category. Compared with the average teacher activity in Cycle I (71.0%), this represents an increase of 19.1 percentage points. This improvement indicates that the instructional revisions implemented based on the reflection findings from Cycle I successfully enhanced the quality of the learning process in accordance with the stages of the Make a Match learning model supported by fraction domino card media.

Recapitulation of Students' Learning Activities in Cycle II

Based on observations of students' learning activities during the instructional process, a total of 16 activity indicators were assessed. Each indicator was evaluated using a four-point rating scale ranging from 1 to 4, with 4 representing the highest possible score. Consequently, the maximum

attainable score for students' learning activities was 64, calculated by multiplying the number of observed indicators (16) by the maximum score for each indicator (4).

The percentage of students' learning activities was calculated by comparing the total score obtained with the maximum possible score and multiplying the result by 100%. The formula used is presented as follows:

$$\text{Percentage} = \frac{\text{Obtained Score}}{\text{Maximum Score}} \times 100\%$$

$$\text{Percentage} = \frac{57}{64} \times 100\% = 89,0\%$$

Table 14. Recapitulation of Students' Learning Activities in Cycle II

No.	Meeting	Percentage (%)	Category
1	Meeting 1	89.0	Very Good
	Average (Cycle II)	89.0	Very Good

Source: Recapitulation Data of Students' Learning Activities in Cycle II.

The recapitulation results indicate that students' learning activities in Cycle II reached 89.0%, which is categorized as very good. Compared with the average student activity in Cycle I (71.9%), this represents an increase of 17.1 percentage points. These findings suggest that the implementation of the Make a Match cooperative learning model assisted by fraction domino card media effectively enhanced students' engagement throughout the learning process, particularly during group discussions, collaborative activities, classroom presentations, and task completion.

Students' Learning Outcomes in Cycle II

The percentage of students achieving learning mastery was calculated by comparing the number of students in each category (mastery and non-mastery) with the total number of students, and then multiplying the result by 100%.

The calculations are as follows:

$$\text{Students Achieving Mastery} = \frac{17}{19} \times 100\% = 89,5\%$$

$$\text{Students Not Achieving Mastery} = \frac{2}{19} \times 100\% = 10,5\%$$

Table 15. Students' Learning Outcomes in Cycle II

No.	Learning Outcome	Number of Students	Percentage (%)
1	Achieved Mastery	17	89.5%
2	Did Not Achieve Mastery	2	10.5%
	Total	19	100%

Source: Students' Learning Outcomes Data in Cycle II.

Table 15 shows that the majority of fifth-grade students achieved learning mastery in Cycle II. Of the total 19 students, 17 students (89.5%) met the mastery criterion, whereas 2 students (10.5%) did not. This mastery percentage exceeded the predetermined success criterion of the study, which required at least 80% of students to achieve learning mastery.

The two students who did not achieve mastery still required additional instructional support. Classroom observations revealed that these students experienced difficulties in solving problems involving the multiplication and division of fractions, particularly those requiring higher-order problem-solving skills. Therefore, their lack of mastery cannot be attributed solely to insufficient attention during classroom instruction but may also be associated with an incomplete understanding of the underlying mathematical concepts.

In addition to the increase in the mastery percentage, improvements in students' learning outcomes were also reflected in their evaluation test scores. The average class score increased by

20.53 points, rising from 65.58 in Cycle I to 86.11 in Cycle II. Furthermore, the range of students' scores also improved considerably. The lowest score increased from 24 in Cycle I to 72 in Cycle II, while the highest score increased from 92 to 96. These findings indicate that the instructional improvement was reflected not only in the increased number of students achieving learning mastery but also in the overall enhancement of the class's academic performance.

Based on the evaluation results, it can be concluded that implementing the Make a Match cooperative learning model supported by fraction domino card media was associated with improved student mastery of fraction multiplication and division concepts. The increase in the class average score, together with the substantial improvement in the minimum score, suggests that students who previously experienced learning difficulties demonstrated better conceptual understanding following the instructional revisions implemented in Cycle II. An analysis based on the assessment indicators further revealed that the majority of students successfully completed tasks aligned with the established learning objectives. If detailed indicator-level data are available, the achievement percentage for each indicator may be presented to provide a more comprehensive description of students' conceptual development.

Overall, the findings indicate that the implementation of the Make a Match cooperative learning model supported by fraction domino card media made a positive contribution to improving the learning outcomes of fifth-grade students at SDN 10 Telaga. Since the predetermined success indicators of the study had been achieved, the classroom action research was concluded at the end of Cycle II. A comparison of students' learning outcomes across the preliminary observation, Cycle I, and Cycle II is presented in Figure 1.

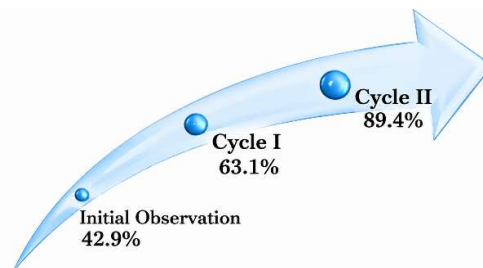


Figure 1. Comparison of Students' Learning Outcomes Across the Preliminary Observation, Cycle I, and Cycle II

Discussion

This classroom action research aimed to improve the mathematics learning outcomes of fifth-grade students at SDN 10 Telaga on the topic of fraction multiplication and division through the implementation of the Make a Match cooperative learning model supported by fraction domino card media. The study was conducted over two action research cycles involving 19 students as participants, while the classroom teacher served as the observer. The findings demonstrated consistent improvements in teacher performance, student learning activities, and students' academic achievement across the two cycles. The percentage of students achieving learning mastery increased from 63.3% in Cycle I to 89.5% in Cycle II, thereby exceeding the predetermined research success criterion requiring at least 80% of students to achieve learning mastery.

The improvement in students' learning outcomes was accompanied by substantial enhancement in the quality of the instructional process. Teacher performance increased from an average of 71.0% (fair category) in Cycle I to 90.1% (very good category) in Cycle II, while students' learning activities improved from 71.9% to 89.0% (very good category). These findings indicate that

the instructional revisions implemented following the reflection stage of Cycle I successfully enhanced both the quality of classroom instruction and students' engagement throughout the learning process.

Interviews with the classroom teacher further revealed that implementing the Make a Match cooperative learning model supported by fraction domino card media increased students' enthusiasm, encouraged more active participation in group discussions, and enhanced their confidence in expressing ideas during classroom activities. The teacher also reported that the fraction domino cards helped students understand the relationships between mathematical problems and their corresponding solutions, thereby facilitating comprehension of fraction multiplication and division concepts. These findings were corroborated by classroom documentation showing students actively matching cards, engaging in collaborative discussions, and presenting the outcomes of their group work. Therefore, the improvement in learning outcomes was evidenced not only by achievement test results but also by observational, interview, and documentation data.

The observed improvement in students' learning outcomes can be explained by the instructional mechanisms embedded in the intervention. The Make a Match cooperative learning model provides students with opportunities to engage actively in learning through card-matching activities, collaborative discussions, and immediate feedback. Repeated engagement in these learning activities reinforces conceptual understanding while reducing errors in solving fraction multiplication and division problems. The use of fraction domino card media further strengthened this process by providing visual representations that enabled students to establish meaningful connections between mathematical problems and their corresponding solutions. Moreover, the instructional media promoted peer interaction, collaboration, and mutual assistance among students. Consequently, the improvement in learning outcomes appears to result from the integration of the cooperative learning model and instructional media, supported by continuous teacher guidance and systematic instructional refinement throughout each action research cycle.

The findings of this study are consistent with those reported by Fauhah and Rosy (2020), who concluded that the Make a Match learning model promotes active and enjoyable learning, strengthens collaboration among students, and positively influences learning outcomes. The similarity between the two studies lies in the application of the Make a Match cooperative learning model. However, the present study extends previous research by integrating the model with fraction domino card media, thereby providing more varied and interactive learning experiences.

The present findings also support those of Hilimi (2022), who reported an increase in learning mastery from 37.5% to 83.4% following the implementation of the Make a Match learning model. Both studies employed the same instructional model and adopted a Classroom Action Research design. However, unlike the previous study, the present research integrated the cooperative learning model with fraction domino card media specifically for teaching fraction multiplication and division, demonstrating the potential of combining cooperative learning strategies with instructional media tailored to the characteristics of the learning content.

Furthermore, the findings are consistent with those reported by Rahmanto et al. (2022), who found that the use of domino card media improved students' learning mastery from 57.7% to 80.0%. The primary distinction between Rahmanto et al.'s study and the present research lies in the instructional intervention employed. Whereas Rahmanto et al. focused primarily on the instructional media, the present study integrated domino card media within the Make a Match cooperative learning model. Accordingly, fraction domino cards functioned not only as visual instructional aids but also as essential components of a cooperative learning strategy that fostered student interaction and collaborative learning.

Comparison with previous studies indicates that earlier research generally investigated either the Make a Match cooperative learning model or domino card media independently. In contrast, the present study integrated both instructional components into a unified learning strategy for teaching fraction multiplication and division. This integration constitutes the principal contribution of the study, as it provided students with meaningful and active learning experiences through card-matching activities, collaborative discussions, idea sharing, and continuous conceptual reinforcement. Nevertheless, the findings should be interpreted in light of the study's limitations. As a Classroom Action Research conducted in a single classroom without a comparison group, the results are context-specific and should not be generalized beyond the research setting. Therefore, the findings indicate that implementing the Make a Match cooperative learning model supported by fraction domino card media was associated with improved mathematics learning outcomes among fifth-grade students at SDN 10 Telaga within the context of this study and may serve as an alternative instructional approach in similar educational settings. |

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this classroom action research, the implementation of the Make a Match cooperative learning model supported by fraction domino card media improved the mathematics learning outcomes of fifth-grade students at SDN 10 Telaga on the topic of fraction multiplication and division. This improvement was evidenced by an increase in the percentage of students achieving learning mastery from 63.2% in Cycle I to 89.5% in Cycle II. Teacher activity also improved from 71.0% in Cycle I to 90.1% in Cycle II, while students' learning activities increased from 71.9% to 89.0% over the same period. Accordingly, the predetermined research success criterion, requiring at least 80% of students to achieve learning mastery, was successfully attained in Cycle II. It should be emphasized, however, that these findings are specific to the context of the investigated classroom, as the study was conducted in a single class without a comparison group.

Teachers are encouraged to implement this instructional approach by gradually increasing the difficulty level of the domino cards, forming heterogeneous student groups, providing clear instructions for the learning activities, and offering additional guidance to students who continue to experience learning difficulties. Students are encouraged to participate actively and consistently throughout the learning process while strengthening collaboration within their groups. Future researchers are recommended to examine the effectiveness of this instructional model using larger and more diverse samples, different educational levels, or experimental research designs that compare the Make a Match cooperative learning model with other instructional approaches. Such studies would provide more comprehensive empirical evidence regarding the effectiveness and generalizability of this instructional strategy.

BIBLIOGRAPHY

- Abdullah, Gamar, Apriyanto, Askar Patahuddin, Roikhatul Janah, Eva Eri Dia, Retnoningsih, I. Nyoman Indhi Wiradika, and Vidya Setyaningrum. 2024. *Buku Ajar Evaluasi Pembelajaran*. Jambi: PT. Sonpedia Publishing Indonesia.
- Afriani, Ranti, Erianjoni, and Dary Nasmi Fauziah. 2026. "Enhancing Conceptual Understanding through Cooperative Learning: The Make a Match Approach with Doremi Media in Education." *International Journal of Elementary Education* 10(1):115–24. doi: 10.23887/ijee.v10i1.111396.
- Aries, Nur Sakinah, Fidyawati Monoarfa, and Reska Putri Ismail. 2024. "Teori Belajar Van Hiele

- Dalam Penyajian Materi Geometri Terhadap Kemampuan Berpikir Matematis Siswa Sekolah Dasar Ditinjau Dari Gaya Kognitif.” *Cokroaminoto Journal of Primary Education* 7(2):782–94. doi: 10.30605/cjpe.7.2.2024.4841.
- Astuti, Puji. 2021. “PENINGKATAN HASIL BELAJAR MELALUI MEDIA KOLASE PADA PEMBELAJARAN TEMATIK SISWA KELAS IV SEKOLAH DASAR.” *Perspektif Ilmu Pendidikan* 35(1):45–52. doi: 10.21009/PIP.351.5.
- Fauhah, Homroul, and Brillian Rosy. 2020. “Analisis Model Pembelajaran Make A Match Terhadap Hasil Belajar Siswa.” *Jurnal Pendidikan Administrasi Perkantoran (JPAP)* 9(2):321–34. doi: 10.26740/jpap.v9n2.p321-334.
- Hilimi, Hian Rachmat. 2022. “Penerapan Model Pembelajaran Kooperatif Tipe Make a Match Dalam Meningkatkan Pemahaman Konsep Penjumlahan Bilangan Bulat Di Kelas VI SDN 6 Tolinggula.” Pp. 81–85 in *Prosiding Seminar Nasional Pendidikan Dasar*.
- Jannati, Salsabillah, Megawati Megawati, and Reni Guswita. 2025. “Peningkatan Proses Dan Hasil Belajar IPAS Menggunakan Model Pembelajaran Kooperatif Tipe Make A Match Berbantu Media Kartu Domino Pada Siswa Kelas IV SDIT Al-Akhyar.” *Master of Pedagogy and Elementary School Learning* 1(2):132–41. doi: 10.63461/mapels.v12.22.
- Kencono, Melati Retno, and Nyoto Harjono. 2023. “Model Pembelajaran Kooperatif Tipe Make A Match Untuk Meningkatkan Minat Dan Hasil Belajar Matematika Siswa.” *Jurnal Educatio FKIP UNMA* 9(3):1190–97. doi: 10.31949/educatio.v9i3.5038.
- Labuem, S., I. Rahmawati, A. Marshanawiah, M. Muhammadun, Y. A. U. Ansya, G. M. W. Tangka, and H. Subakti. 2025. *Statistik Pendidikan: Teori Dan Aplikasi*. Medan: Yayasan Kita Menulis.
- Magdalena, Ina, Alif Fatakhatus Shodikoh, Anis Rachma Pebrianti, Azzahra Wardatul Jannah, Iis Susilawati, and Universitas Muhammadiyah Tangerang. 2021. “Pentingnya Media Pembelajaran Untuk Meningkatkan Minat Belajar Siswa Sdn Meruya Selatan 06 Pagi.” *EDISI : rahn*
- Maghfiroh, Yuli, and Agustina Tyas Asri Hardini. 2021. “Pengembangan Modul Pembelajaran Matematika Materi Pecahan Kelas V Sekolah Dasar.” *Jurnal Educatio FKIP UNMA* 7(2):272–81. doi: 10.31949/educatio.v7i2.997.
- Magrifah, Irma, Nur Fadhillah Amir, Wa Malmia, and Taufik. 2021. “Relationship Between Self-Trust and Anxiety and Learning Results.” *Uniqbu Journal of Exact Sciences (UJES)* 2(1):92–99. doi: <https://doi.org/10.47323/ujes.v2i1.121>.
- Maulidawati, Maulidawati, Iryana Muhammad, Rohantizani Rohantizani, and Mursalin Mursalin. 2020. “The Implementation of Make A Match Type Cooperative Learning Model to Improve the Mathematical Connection Ability.” *International Journal for Educational and Vocational Studies* 2(11). doi: 10.29103/ijevs.v2i11.3319.
- Rahmanto, Maulana Irfan, Lina Nur Azizah, Aulia Puspitarini, and Galih Istiningasih. 2022. “Penggunaan Kartu Domino Untuk Meningkatkan Hasil Belajar Materi Pecahan SD Di Era New Normal.” *Prosiding Konferensi Ilmiah Dasar* 3:1–10.
- Setyawati, Aulia, Rahaju Rahaju, and Sri Hariyani. 2019. “Pembelajaran Operasi Pecahan Dengan Model Make a Match Dan Permainan Kartu Domino Pintar.” *AKSIOMA : Jurnal Matematika Dan Pendidikan Matematika* 10(2):162–71. doi: 10.26877/aks.v10i2.4597.
- Zakiah, Ifa Roselina, Krisdianto Hadi Prasetyo, and Erika Laras Astutiningtyas. 2019. “MENINGKATKAN AKTIVITAS DAN HASIL BELAJAR MELALUI PEMBELAJARAN KOOPERATIF TIPE MAKE A MATCH.” *Absis: Mathematics Education Journal* 1(2):41–48. doi: 10.32585/absis.v1i2.362.