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Improving Students' Learning Outcomes in Equivalent Fractions through Potil Kinolis Collage Media in Grade IV of SDN Inpres Luksagu

Sri Yuniarti[1], Nurlaela Sabata[2], Wulandari Indah Lestari[3], Sukna Abidul[4], Dwi Setiyaningsih[5], Lia Nurhayati[6]

[1,2,3,4,5,6]**Program Pascasarjana Universitas Muhammadiyah Gorontalo**

Corresponding Author: Sri Yuniarti, e-mail: sriyuniarti662@guru.sd.belajar.id

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ABSTRACT

Mathematics learning in elementary schools still faces several challenges, particularly in the topic of equivalent fractions, which requires conceptual understanding, visual representation, and active student engagement. Preliminary observation in Grade IV of SDN Inpres Luksagu indicated that students' learning outcomes in equivalent fractions were relatively low. Of the 15 students, only 2 achieved the Minimum Mastery Criteria, with a class average score of 59 and a mastery percentage of 13%. This study aimed to improve students' mathematics learning outcomes in equivalent fractions through the use of potil kinolis collage media, locally known as grated coconut residue. This research employed Classroom Action Research conducted in two cycles. Each cycle consisted of planning, action, observation, and reflection. The research participants were 15 fourth-grade students of SDN Inpres Luksagu, consisting of 10 male and 5 female students. Data were collected through learning achievement tests, student activity observation sheets, and teacher activity observation sheets. The data were analyzed using descriptive quantitative and qualitative techniques. The findings showed that the class average score increased from 59 in the pre-action stage to 71 in Cycle I and 80 in Cycle II. The percentage of learning mastery increased from 13% in the pre-action stage to 67% in Cycle I and 87% in Cycle II. Student learning activities also improved, particularly in attention, enthusiasm, classroom responses, and active involvement in using collage media. Therefore, potil kinolis collage media can be used as a concrete, contextual, and environmentally friendly learning medium to improve students' learning outcomes in equivalent fractions at the elementary school level.

Keywords: Learning Outcomes; equivalent fractions; collage media; potil kinolis; elementary mathematics learning

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INTRODUCTION

Mathematics is a fundamental subject that plays an important role in developing students' logical, systematic, critical, and analytical thinking skills at the elementary school level. However, in classroom practice, mathematics is often perceived by students as a difficult subject. This difficulty is not only related to the abstract nature of mathematical concepts, but also to the way teachers present learning materials, the limited use of instructional media, students' low learning interest, and insufficient student engagement during the learning process.

At the elementary school level, mathematics instruction should be designed in accordance with students' developmental characteristics. Elementary school students still require concrete, visual, and contextual learning experiences. Therefore, the use of instructional media is essential to help students understand abstract mathematical concepts. Instructional media function as a means of delivering learning messages that can stimulate students' thinking, attention, interest, and participation in the learning process (Arsyad, 2019; Hanifah et al., 2023). In mathematics learning, concrete media

can help students connect symbols, images, real objects, and mathematical concepts in a more meaningful way (Van de Walle et al., 2019; Reys et al., 2019).

One mathematical topic that often creates difficulties for elementary school students is equivalent fractions. Equivalent fractions require students to understand the relationship between numerators and denominators, the concept of parts of a whole, and the ability to compare fractional representations. Many students are able to identify forms of fractions but do not fully understand that fractions with different symbolic forms may represent the same value. This condition indicates that fraction learning cannot rely solely on verbal explanation or written exercises. It should be supported by visual media and manipulative activities that allow students to directly observe relationships among fractions.

The Merdeka Curriculum emphasizes student-centered, contextual learning that is responsive to students' learning needs. In mathematics learning, teachers are expected to facilitate students in understanding concepts, reasoning, communicating ideas, and solving problems meaningfully (Kemendikbudristek, 2022; Badan Standar, Kurikulum, dan Asesmen Pendidikan, 2024). This principle is in line with the National Council of Teachers of Mathematics (2014), which states that effective mathematics instruction should develop conceptual understanding, procedural fluency, reasoning, communication, and active student engagement.

Based on the preliminary observation conducted on Wednesday, November 5, 2025, in Grade IV of SDN Inpres Luksagu, students' learning outcomes in equivalent fractions were still low. Of the 15 students, only 2 students achieved the Minimum Mastery Criteria, while the other 13 students scored below the required standard. The class average score was only 59, with a mastery percentage of 13%. Informal evaluation with several students revealed that they easily became bored because the learning process was still dominated by teacher explanations and had not yet used engaging instructional media. This condition indicated the need for instructional improvement through the use of concrete and contextual learning media.

One medium that can be used is potil kinolis collage media. Potil kinolis is a local term referring to grated coconut residue that can be utilized as collage material. This medium was selected because it is easily found in students' surroundings, economical, environmentally friendly, and has a texture that is attractive for sticking and arranging activities. Collage, as an activity of sticking various materials into a single composition, can train creativity, eye-hand coordination, fine motor skills, and students' attention to learning objects (Padillah et al., 2023). In the context of equivalent fraction learning, potil kinolis collage media can be used to visually represent fractional parts so that students can more easily understand fraction equivalence.

Previous studies have shown that the use of visual and collage media can improve elementary school students' learning activities and learning outcomes, particularly in topics that require visual and concrete understanding (Astuti, 2021; Aryanti, 2023). Therefore, the use of potil kinolis collage media is expected to serve as an alternative innovation in mathematics learning that not only improves learning outcomes but also creates a more active, enjoyable, and contextual learning environment.

Based on the background above, the research question of this study is: Can the use of potil kinolis collage media improve the learning outcomes of Grade IV students of SDN Inpres Luksagu in equivalent fractions? This study aims to improve students' mathematics learning outcomes in equivalent fractions through the use of potil kinolis collage media in Grade IV of SDN Inpres Luksagu.

METHOD

This study employed Classroom Action Research. Classroom Action Research was selected because this study aimed to improve the learning process and students' learning outcomes through planned, implemented, observed, and reflected classroom actions. Classroom Action Research is a form of research conducted by teachers or researchers in the classroom to improve instructional practice directly through action cycles (Arikunto et al., 2015; Kemmis et al., 2014; Sanjaya, 2016).

The research was conducted at SDN Inpres Luksagu in the first semester of the 2025/2026 academic year. The participants were all Grade IV students of SDN Inpres Luksagu, totaling 15

students, consisting of 10 male and 5 female students. The object of the study was students' learning outcomes in equivalent fractions through the use of potil kinolis collage media.

This study was carried out in two cycles. Each cycle consisted of four stages: planning, action, observation, and reflection. In the planning stage, the researcher prepared the teaching module or lesson plan, potil kinolis collage media, learning achievement test instruments, student activity observation sheets, and teacher activity observation sheets. In the action stage, the teacher implemented equivalent fraction learning using potil kinolis collage media. In the observation stage, the researcher and a peer observer observed student activities and teacher activities during the learning process. In the reflection stage, the test and observation results were analyzed to determine the success of the action and to design improvements for the next cycle.

Potil kinolis collage media was used by asking students to arrange or paste grated coconut residue on prepared fraction patterns. Through this activity, students were able to observe the comparison of fractional parts, identify equivalence among fractions, and discuss why several fractions could have the same value despite having different symbolic forms.

Data collection techniques consisted of learning achievement tests and observations. Learning achievement tests were administered in the pre-action stage, at the end of Cycle I, and at the end of Cycle II to identify changes in students' scores. Observations were conducted to identify student learning activities and teacher teaching activities during the learning process. The observed student activity aspects included attention to the teacher's explanation, enthusiasm during learning, giving responses, and active involvement in using potil kinolis collage media. The observed teacher activity aspects included conducting apperception, stating learning objectives, explaining the material, explaining the steps for using the media, guiding students, facilitating student presentations, and drawing learning conclusions.

The learning achievement data were analyzed using descriptive quantitative techniques by calculating the class average score and the percentage of learning mastery. The Minimum Mastery Criteria used in this study was 70. Students were considered to have achieved mastery if they obtained a score of ≥70. The research was considered successful if classical learning mastery reached ≥70% of students obtaining a score of ≥70. Observation data were analyzed descriptively using qualitative and quantitative descriptions based on activity percentages.

FINDING AND DISCUSSION

3.1 Students' Learning Outcomes in the Pre-Action Stage

The pre-action stage was conducted to identify students' initial learning outcomes before the implementation of potil kinolis collage media. At this stage, learning was carried out conventionally without the use of concrete media. The results showed that most students had not yet understood the concept of equivalent fractions optimally.

Table 1. Students' Learning Outcomes in the Pre-Action Stage

Indicator	Result
Number of students	15
Number of students achieving mastery	2
Number of students not achieving mastery	13
Class average score	59
Mastery percentage	13%
Classical mastery criterion	Not achieved

Table 1 shows that students' learning outcomes in the pre-action stage were still low. Of the 15 students, only 2 achieved the Minimum Mastery Criteria, while 13 students did not. The mastery percentage reached only 13%, far below the success indicator of ≥70%. This finding became the basis for improving the learning process through the use of potil kinolis collage media.

3.2 Students' Learning Outcomes in Cycle I

In Cycle I, the teacher began using potil kinolis collage media in equivalent fraction learning. Students were given opportunities to observe, arrange, and use collage media to understand

relationships among fractions. Students' learning outcomes began to improve compared to the pre-action stage.

Table 2. Students' Learning Outcomes in Cycle I

Indicator	Result
Number of students	15
Number of students achieving mastery	10
Number of students not achieving mastery	5
Class average score	71
Mastery percentage	67%
Classical mastery criterion	Not achieved

Table 2 shows that the students' average score increased to 71 and the number of students achieving mastery increased to 10. The learning mastery percentage reached 67%. Although there was a considerable improvement, this result had not yet met the classical success indicator of ≥70%. Therefore, the action was continued to Cycle II by improving instructional strategies, particularly in guiding students to use the media, strengthening the concept of equivalent fractions, and providing more opportunities for students to explain their work.

3.3 Students' Learning Outcomes in Cycle II

Cycle II was carried out by addressing the weaknesses found in Cycle I. The teacher provided clearer instructions, guided students more intensively, and gave students opportunities to present their collage work. In this cycle, students appeared more enthusiastic and more actively involved in using the media.

Table 3. Students' Learning Outcomes in Cycle II

Indicator	Result
Number of students	15
Number of students achieving mastery	13
Number of students not achieving mastery	2
Class average score	80
Mastery percentage	87%
Classical mastery criterion	Achieved

Table 3 shows that students' learning outcomes in Cycle II met the success indicator. The number of students achieving mastery increased to 13, while 2 students had not yet reached the Minimum Mastery Criteria. The class average score increased to 80 and the mastery percentage reached 87%. Therefore, the action implemented in Cycle II was considered successful because it exceeded the predetermined classical mastery indicator.

3.4 Recapitulation of the Improvement in Learning Outcomes

The comparison of students' learning outcomes from the pre-action stage, Cycle I, and Cycle II showed consistent improvement.

Table 4. Recapitulation of Students' Learning Outcome Improvement

Stage	Average Score	Number of Students Achieving Mastery	Mastery Percentage	Description
Pre-action	59	2 students	13%	Not achieved
Cycle I	71	10 students	67%	Improved but not yet achieved
Cycle II	80	13 students	87%	Achieved

Table 4 shows that the use of potil kinolis collage media had a positive impact on students' learning outcomes. The average score increased by 12 points from the pre-action stage to Cycle I and by 9 points from Cycle I to Cycle II. Overall, the average score increased by 21 points, from 59 to 80.

The mastery percentage increased from 13% in the pre-action stage to 87% in Cycle II, indicating an increase of 74 percentage points.

3.5 Student Learning Activities

In addition to learning outcomes, student activities were also observed during the learning process. Student activities included paying attention to the teacher's explanation, showing enthusiasm, giving responses, and actively using potil kinolis collage media.

Table 5. Recapitulation of Student Learning Activities

Student Activity Aspect	Cycle I	Category	Cycle II	Category
Paying attention to the teacher's explanation	67%	Good	100%	Very good
Showing enthusiasm during learning	67%	Good	87%	Very good
Giving responses	53%	Good	87%	Very good
Actively using collage media	73%	Good	94%	Very good

Table 5 shows that student learning activities increased from Cycle I to Cycle II. In Cycle I, some students had begun to participate actively, although several students were still passive in responding to the teacher's questions. In Cycle II, student activities improved significantly. All students paid attention to the teacher's explanation, most students showed enthusiasm and gave responses, and 94% of students actively used the collage media. This improvement indicates that potil kinolis collage media could create a more engaging learning atmosphere and directly involve students in the learning process.

3.6 Teacher Teaching Activities

Teacher teaching activities were observed to ensure that the instructional actions were implemented according to the lesson plan. The observed aspects included apperception, stating learning objectives, explaining the material, explaining the use of the media, guiding students, facilitating student presentations, and drawing conclusions.

Table 6. Teacher Teaching Activities during Learning

Teacher Activity Aspect	Cycle I	Cycle II
Conducting apperception according to the material	Implemented	Implemented
Stating the learning objectives	Implemented	Implemented
Explaining equivalent fraction material	Implemented	Implemented
Explaining the steps for using collage media	Implemented	Implemented
Guiding students in using the media	Implemented	Implemented more intensively
Facilitating student presentation of work	Implemented	Implemented more actively
Drawing learning conclusions	Implemented	Implemented

Table 6 shows that teacher activities in Cycle I and Cycle II were implemented according to the instructional design. In Cycle II, the teacher provided more intensive guidance, clearer instructions, and more opportunities for students to present their work. These improvements contributed to increased student activities and learning outcomes.

3.7 Reflection on Each Cycle

Reflection was conducted to identify the strengths and weaknesses of the action in each cycle.

Table 7. Reflection on the Implementation of Classroom Actions

Stage	Main Findings	Challenges	Improvement
Pre-action	Learning outcomes were low, students were passive, and learning had not used concrete media	Students were bored and had difficulty understanding equivalent fractions abstractly	Preparing potil kinolis collage media
Cycle I	Learning outcomes improved, and students began to actively use the media	Some students were still confused and lacked confidence in giving responses	Providing more intensive guidance and clearer instructions in using the media
Cycle II	Learning outcomes and student activities improved, and classical mastery was achieved	Two students had not yet achieved mastery	Providing individual assistance and additional practice

Table 7 shows that learning improved from one stage to the next. In Cycle I, the use of media began to increase student engagement, but not all students understood the concept well. Improvements made in Cycle II helped students become more active, more confident, and better able to understand equivalent fractions. Nevertheless, two students had not yet achieved mastery, indicating the need for further individual support.

Discussion

The findings of this study indicate that the use of potil kinolis collage media improved students' learning outcomes in equivalent fractions. This improvement was shown by the increase in the class average score from 59 in the pre-action stage to 71 in Cycle I and 80 in Cycle II. The percentage of learning mastery also increased from 13% to 67% and finally to 87%. These findings indicate that the use of concrete media can help students understand the concept of equivalent fractions more effectively.

The low learning outcomes in the pre-action stage suggest that learning without concrete media was not sufficient to help students understand equivalent fractions optimally. Fractions are relatively abstract mathematical concepts for elementary school students. Students need visual representations to understand that two fractions with different symbolic forms can represent the same value. This finding is consistent with Van de Walle et al. (2019) and Reys et al. (2019), who emphasize that mathematics learning at the elementary level should provide concrete and visual experiences to build conceptual understanding.

The improvement in Cycle I occurred because students began to be directly involved in the learning process through potil kinolis collage media. This medium allowed students not only to listen to the teacher's explanation but also to observe, arrange, and use concrete materials to represent fractions. Arsyad (2019) states that instructional media can clarify information, attract students' attention, and increase student interaction with learning materials. In this study, collage media helped students observe relationships among fractional parts more concretely.

In Cycle II, the improvement in learning outcomes became more significant because the teacher revised the instructional process based on the reflection from Cycle I. The teacher provided clearer instructions, guided students more intensively, and gave students opportunities to present their work. This improvement is consistent with the principle of Classroom Action Research, which emphasizes reflection and continuous improvement in each action cycle (Arikunto et al., 2015; Kemmis et al., 2014). Through instructional improvement in Cycle II, students were able to better understand the learning steps and became more actively involved in using the media.

The improvement in student activities also supported the improvement in learning outcomes. In Cycle I, student activities were generally in the good category, while in Cycle II they improved to the very good category in almost all aspects. Students paid more attention to the teacher's explanation, showed greater enthusiasm, became more willing to give responses, and were more actively involved in using the media. Student activity is important because meaningful learning occurs when students are directly involved in the learning process. NCTM (2014) emphasizes that effective mathematics instruction should engage students in reasoning, representation, communication, and problem solving.

Potil kinolis collage media also has contextual value because it utilizes materials that are easily found in students' surroundings. The use of local materials makes learning closer to students' daily lives and can foster environmental awareness through the reuse of household waste. Padillah et al. (2023) explain that natural-material collage can train creativity, fine motor skills, and visual composition. In this study, these benefits were reflected in students' involvement when using grated coconut residue as collage material to represent fractions.

The findings of this study are in line with Astuti (2021), who found that collage media can improve elementary school students' learning outcomes. The findings also support Aryanti (2023), who showed that visual media help students understand fraction material. Thus, the use of potil kinolis collage media can be viewed as a local-material-based mathematics learning innovation that supports concrete, active, and contextual learning.

Although this study showed improved learning outcomes, two students had not yet achieved the Minimum Mastery Criteria in Cycle II. This finding indicates that the use of collage media did not completely overcome all students' learning difficulties. Some students may require individual assistance, additional practice, or simpler explanations. Prerequisite knowledge, learning interest, and home learning support may also influence students' learning outcomes (Slameto, 2015; Susanto, 2016).

Overall, the findings indicate that potil kinolis collage media was effective in the context of Grade IV of SDN Inpres Luksagu because it improved both learning outcomes and student activities. However, the effectiveness of this medium depends heavily on the teacher's ability to design learning, provide clear instructions, guide students, and reflect on the learning process. Therefore, instructional media should not be understood merely as teaching aids but as an integral part of a pedagogical strategy that needs to be systematically designed.

CONCLUSIONS

Based on the Classroom Action Research conducted in two cycles, it can be concluded that the use of potil kinolis collage media improved students' mathematics learning outcomes in equivalent fractions in Grade IV of SDN Inpres Luksagu. This improvement was indicated by the increase in the class average score from 59 in the pre-action stage to 71 in Cycle I and 80 in Cycle II. The percentage of learning mastery increased from 13% in the pre-action stage to 67% in Cycle I and 87% in Cycle II.

The use of potil kinolis collage media also improved student learning activities. Students became more attentive to the teacher's explanation, more enthusiastic, more willing to give responses, and more actively involved in using the instructional media. This medium helped students understand equivalent fractions concretely and visually through sticking and arranging activities.

Therefore, potil kinolis collage media can be used as an alternative mathematics learning medium that is simple, economical, environmentally friendly, and suitable for elementary school students' characteristics. This medium can help teachers create mathematics learning that is more active, engaging, and meaningful.

RESEARCH IMPLICATIONS

This study has practical implications for elementary school teachers. Teachers can utilize local materials that are easily found in the surrounding environment as mathematics learning media. The use of potil kinolis collage media shows that mathematics learning does not always require expensive media. Simple materials can be designed creatively and aligned with learning objectives.

For schools, the findings highlight the importance of encouraging teachers to use concrete media in classroom instruction, particularly for abstract topics such as fractions. Schools can facilitate teacher-sharing sessions on best practices in using environment-based instructional media.

For future researchers, this study can be developed further using experimental or mixed-method designs to examine the effectiveness of potil kinolis collage media with larger student samples or in other mathematics topics.

RESEARCH LIMITATIONS

This study has several limitations. First, the participants consisted of only 15 fourth-grade students in one school, so the findings cannot be generalized broadly. Second, the study was conducted in only two cycles, so it does not describe the long-term effect of using potil kinolis collage media on students' conceptual understanding of fractions. Third, the study focused more on cognitive learning outcomes and student activities, while affective and psychomotor aspects were not analyzed in depth.

Therefore, future research is recommended to involve more schools, use more varied instruments, and examine the impact of the media on conceptual understanding, creativity, motivation, and students' mathematical communication skills.

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