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The Effectiveness of Interactive Learning Media to Improve Understanding of Fractional Summing in Elementary School Students

Arini Ulfah[1] Muh Syauqi Malik[2*]

[1]Primary Teacher Education, Open University, Indonesia
[2]Primary Teacher Education, State University of Surabaya, Indonesia
*muhmalik@unesa.ac.id

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Primary Teacher Education Program, PSDKU, State University of Surabaya (UNESA), Indonesia

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Abstract

The learning problems that occurred at Bustan El Firdaus Kawunganten Islamic Elementary School, Cilacap Regency, among others, are still centered on teachers and dominated by lecture methods. This condition causes low focus of students during learning and the emergence of boredom which has an impact on low understanding, especially in the subject of Mathematics where the material sums of fractions with different denominators are used. In response to this, the researcher designed improvements through Classroom Action Research using Kahoot interactive learning media. The novelty of this research lies in the integration of competitive and interactive real-time quiz-based digital media into mathematics learning at the elementary school level, which is still rarely applied systematically in the local context. The research was conducted in two cycles, each consisting of two meetings lasting two hours of lessons. The data collection technique uses quantitative instruments in the form of individual tests given at the end of each cycle. The average grade point of the class in the pre-cycle was 68 with a completion rate of 44.4%. In cycle I, the score increased to 77 with 72.2% completeness, and in cycle II it increased significantly to 89 with 83.3% completeness. The specific purpose of this study was to measure the effectiveness of Kahoot interactive media in improving understanding of the concept of fractional summation, increasing student active participation, and creating a more enjoyable and meaningful learning atmosphere. It is hoped that the results of this research can encourage teachers to use similar interactive media to improve the quality of mathematics learning in the classroom.

INTRODUCTION

Mathematics is often considered a difficult and lacking subject in demand by students due to its abstract and complex characteristics. Concepts in mathematics are closely interrelated, so it requires a learning approach that can bridge the abstraction with the concrete experience of students. To overcome this challenge, the use of learning media is important, because it acts as a link between abstract concepts and reality that students can understand. The right media, such as props or concrete objects, will make it easier to understand and increase students' interest in learning mathematics (Agterberg, Oostdam, & Janssen, 2022; Schoenfeld, 2021).

Hamalik said that learning media is an element in supporting the quality of the learning and teaching process. Another opinion states that learning media is an important part of the learning process in the classroom. Because learning media is an innovative, communicative, and creative tool that can help students learn better. Media means intermediary or introduction and has a function to convey information or messages (Yuliansih, Arafat, & Wahidy, 2021; Zaini, Susilawati, & Astuti, 2022).

Dimyati and Mudjiono argue that learning outcomes are the result of the learning process. The learning outcomes obtained by students are everything that shows the results of students' ability to do something in the field of knowledge, skills and attitudes. However, another opinion said that learning outcomes are a change in students' abilities which includes cognitive, affective, and psychomotor aspects. Every student who carries out the learning process certainly hopes to obtain satisfactory results, because good results will support students in achieving the expected goals (Ariestuti, Darsana, & Kristiantari, 2014; Kusumaningrum, 2021).

The results of observations at SD Islam Bustan El Firdaus Kawunganten show that the implementation of learning still uses a teacher-focused approach because teachers continue to choose lecture methods. The result of this learning is that students are easily bored and do not focus on following the learning process. As well as having an impact on students' low understanding of the material. In addition, the teacher only explains the procedure or formula for summing fractions without integrating with the context in real life as the basis for students' understanding. So that the approach applied is still not optimal in facilitating the development of students' conceptual understanding of the topic being studied.

From the results of observations made by the learning outcomes of grade V students of SD Islam Bustan El Firdaus Kawunganten in semester 1 of the 2024/2025 school year in mathematics lessons are still low, it can be seen that from the students of 18 students who got scores above the Learning Goal Achievement Criteria (KKTP) only 8 students in fractional material, this shows that the learning results of class V of SD Islam Bustan El Firdaus in mathematics subjects are still relatively low.

Table 1. Initial Conditions of Mathematics Learning Outcomes

Yes	Description	Sum Student	Learning outcomes Not completed		Complete learning outcomes	
			Frequency	%	Frequency	%
1.	Initial Conditions	18	10	55,5%	8	44,4%

In following up on these problems, researchers try to use the most effective method, namely using interactive learning media. The focus of this study is the use of interactive media, one of which is the use of kahoot. It is hoped that after the use of these media, students can actively participate in learning, try to dig up information, and collaborate with peers. The reason for choosing the solution is because the researcher sees a connection between mathematics, interactive media, and fraction summation materials with different denominators that are quite relevant in creating a deep understanding in students.

METHODS

The researcher chose the Classroom Action Research (PTK) method in this study. Heris stated that PTK is a type of professional and reflective scientific activity that is carried out through certain actions to improve the practice and implementation of learning. PTK is cyclical and continuous, which allows continuous improvement of competencies, systems, methods, content, and learning processes (Agustinova, Wulansari, & Fitriana, 2025; Silvia, Fitrianna, & Hendriana, 2023).

This research was carried out in grade V of SD Islam Bustan El Firdaus Kawunganten, with the population of all grade V students at the school. The sample was one class consisting of 18 students, which was chosen purposively because it had characteristics that were in accordance with the focus of the research, namely experiencing difficulties in understanding the concept of fraction summation.

To obtain accurate data, several research instruments were used in the form of: (1) a test of understanding the concept of fraction summation as a measure of learning success, (2) an observation sheet of teacher and student activities during learning, and (3) a questionnaire sheet of students' responses to the use of interactive learning media. These instruments are used to support the analysis of the effectiveness of interactive media in improving student understanding.

This research was carried out in 2 cycles, each cycle lasted for two meetings with a duration of two hours each. Planning, implementation, observation, and reflection are stages that must be carried out in each cycle. The researcher uses quantitative data,

quantitative data will be obtained from test scores in the pre-cycle, cycle I test and cycle II test. In addition, qualitative data was also obtained through observations recorded by students during the learning improvement process with the help of supervisors (Zhou et al., 2022).

The individual test scores given at the end of each cycle are used as a quantitative data collection method. The individual test aims to find out how well the learning outcomes are in each cycle, by looking at the percentage of students who have completed the lessons in each cycle. Qualitative data was obtained from the results of observation of student and teacher activities during the learning process. The results are used as a guide to reflect on the learning process. The observation method used is a blank or observation sheet.

The value of the test result is quantitative data that is the source of data analysis. Learning is said to be successful if there is an increase in the percentage of students who complete their studies. An important aspect that underlies the success of learning can be seen from the completeness of students in the first cycle is higher than in the Pre-Cycle. And the completeness in Cycle II is higher than in Cycle I. Calculation of the percentage of completion of learning in students can be used using the following formula.

$$P = \frac{T}{N} \times 100\%$$

Information:

P = Percentage of students who complete their studies.

T = Number of students who have completed their studies.

N = Total number of students.

In addition to an increase in the percentage of learning completion, students must also meet the classical learning completeness, which is > 80% of learning completion.

RESULTS AND DISCUSSION

Based on observations made by researchers on learning outcomes in the classroom, class V obtained an average score of 68 and there were 10 out of 18 students who had not reached the KKTP. This is due to the use of learning models that are still not interesting. Learning is still focused on teachers, causing student activity to be low in learning activities. Because the results of grade V students of SD Islam Bustan El Firdaus Kawunganten, Cilacap Regency are still very low. So, researchers need to make improvements in the material of adding fractions with different denominators in mathematics subjects using *kahoot* interactive media. After the implementation of cycle I, it showed a good improvement. We can see the score in cycle I in the graph image.

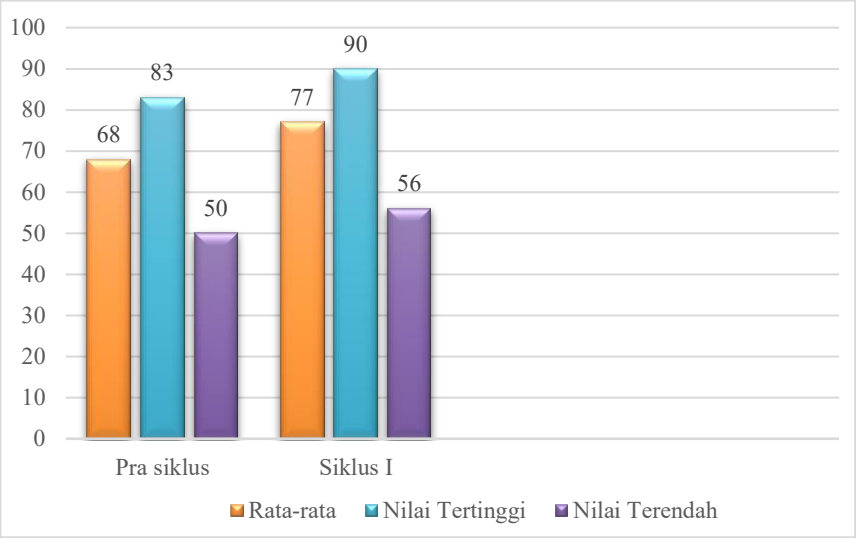

Figure 1.
Achievement of Student Learning Outcomes in Cycle I

The comparison chart of learning outcomes in the pre-cycle with cycle I above shows a fairly good improvement in learning outcomes, as outlined below:

1. The average grade point in the pre-cycle was 68, while in the first cycle it was 77, so that the learning outcomes in the pre-cycle and the first cycle increased by 9.
2. The highest pre-cycle score was 83, while in the first cycle it was 90, then the pre-cycle and cycle I of the highest score increased by 7.
3. As well as the result of the lowest score in the pre-cycle is 50, while in the first cycle it is 56, the lowest value from the pre-cycle and cycle I increases by 6.

In the first cycle, there has been an increase in the evaluation value of mathematics learning, but because the researcher feels that it is not optimal and is still below the set classical completeness criterion of 80%, then the researcher plans to improve learning in the second cycle. After the implementation of cycle II, there is an increase in value and an increase in the achievement of KKTP from cycle I. We can see the acquisition of scores in cycle II from the following graph.

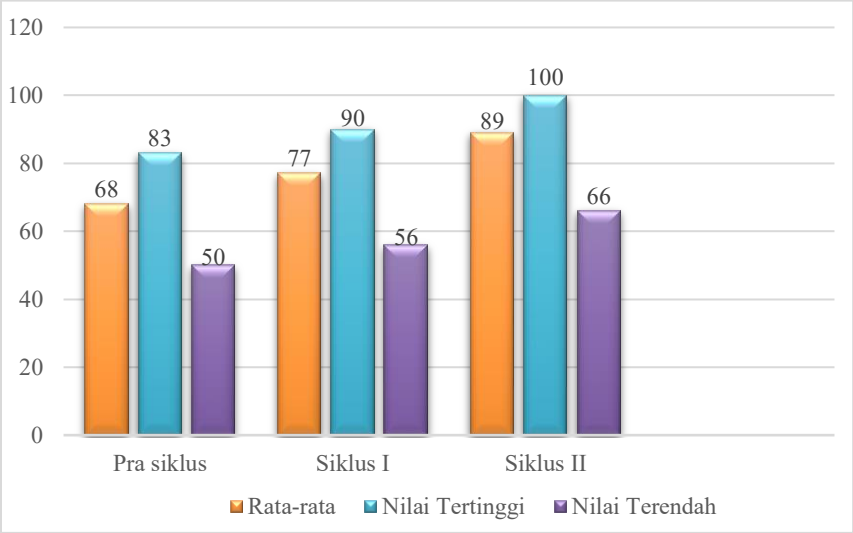

Figure 2.
Achievement of Student Learning Outcomes in Cycle II

Based on the comparison chart of learning outcomes in cycle II above, there has been a significant increase in learning outcomes.
Here are the details of the increase that can be outlined below:

1. In the pre-cycle, the average grade score was 68, in the first cycle it was 77, while in the second cycle it was 89. The average grade point in pre-cycle and cycle I increased by 9, and from cycle I to cycle II increased by 12.
2. The highest score in the pre-cycle was 83, the first cycle was 90, while the highest score in the second cycle was 100. The highest score in pre-cycle and cycle I increased by 7. Meanwhile, in cycle I and cycle II it increased by 10.
3. The lowest score in the pre-cycle is 50, in the first cycle it is 56, while the lowest score in the second cycle is 6. The lowest score in the pre-cycle with cycle I increased by 6. Meanwhile, cycle I and cycle II increased by 10.

Kahoot is an attention-grabbing learning tool, helping students focus more while studying. It is one of the visual media that is very preferred by the digital generation. Kahoot is able to facilitate the learning way of the digital generation. The purpose of using Kahoot is to increase interest and support learning in the digital era. With *the Kahoot! application, it is hoped that students will become more enthusiastic and motivated in participating in learning mathematics. The Kahoot application* is also able to provide a fun, engaging learning experience and does not make students feel bored (Akkuş, Özhan, & Çakır, 2021; Lubis & Ulfah, 2024).

Next, we will explain the procedure for using Kahoot, including how teachers register for accounts and create questions (Licorish & Lötter, 2022; Wibowo, Nurliana, Aryanis, & Nugroho, 2022). Here are the steps:

1. Register on *kahoot.com site*, then click *sign up* in the upper right corner.
2. Then, select the Teacher's Column .

3. Then register using *an active* email.
4. Fill in data such as school name and username. If the following question *arises, Have you played Kahoot! before* Click *No*. Next, tick the question *I have read and agree...* Then click Join.
5. The *Kahoot*! account was created successfully.
6. Next, click *create* on the dashboard page.
7. On the *Create* page, you can start designing your own quizzes or you can use templates.
8. Next, you choose the type of quiz to be created (quiz, true or false, answering questions, puzzles, *polls*, *slides*, and *word cloud*).
9. On the *Create* page, you can create questions, add images, set a time to answer, answer options, and add questions.
10. When you're done creating the quiz, press the *done* button at the top right. On the quiz settings page, then select *Classic* or *Team Mode.*
11. Then the PIN page appears.

In addition, there are procedures that teachers and students can do to run the quiz:

1. For participants, the first step is to log in to *kahoot.it page* of the browser (Chrome, Firefox, Opera).
2. Next, students enter the Game PIN provided by the teacher.
3. After the game starts, students can answer questions from the teacher using a laptop.
4. Students choose answers from the choices that appear on the laptop screen.
5. If the student answers correctly, the student will get a score. But if you answer incorrectly, then you don't get a score.
6. Students can answer questions until the quiz is completed.

At the end of the quiz, students will see the three winners on the podium with the highest scores.

CONCLUSION

This study proves that the use of Kahoot interactive learning media is effective in improving the understanding of grade V students of SD Islam Bustan El Firdaus Kawunganten on the material of summing fractions with different denominators. The results showed an increase in the average grade of the class from 68 in the pre-cycle with 44.4% learning completeness, to 77 in the first cycle with 72.2% completeness, and a significant increase in the second cycle to 89 with 83.3% completeness. This shows that learning has reached the set success indicator, namely learning completeness above 80%. Based on these findings, it is recommended that researchers continue to develop interactive and fun learning models by utilizing relevant digital media, as well as improving classroom management skills to keep students focused and motivated. For teachers, the use of

media such as Kahoot has been proven to increase students' activeness and understanding, so it should be integrated into learning activities, especially in materials that are considered difficult. Students are expected to experience a more engaging, interactive, and challenging learning experience, while developing critical thinking and problem-solving skills. Meanwhile, schools are expected to support the use of interactive media in learning as an effort to improve the quality of education and create a more effective and fun learning atmosphere.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author(s)

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