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Permainan Ular Tangga Sebagai Upaya Meningkatkan Kemampuan Operasi Hitung Campuran Siswa SDN Langenharjo 02

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Abstrak

Banyak siswa yang merasa kesulitan dalam mempelajari Matematika. Operasi campuran merupakan salah satu materi yang sulit dipahami. Pendidik harus menggunakan model pembelajaran yang inovatif salah satunya dengan media Permainan Ular Tangga. Oleh karena itu penelitian ini bertujuan untuk mengetahui peningkatan prestasi belajar siswa melalui pembelajaran dengan permainan yaitu ular tangga. Metode pada penelitian ini adalah Penelitian Tindakan Kelas (PTK). Penelitian ini dilaksanakan dengan tiga siklus. Subjek penelitian ini adalah siswa kelas VI SD Negeri Langenharjo 02, Kabupaten Sukoharjo dengan banyak siswa 13 orang. Sebanyak 10 butir soal digunakan dalam penelitian ini untuk mengukur prestasi belajar siswa. Hasil dari penelitian ini menunjukkan bahwa terjadi peningkatan nilai rata-rata pada siklus I ke siklus II. Rerata yang dihasilkan pada siklus I sebesar 27,69, pada siklus II dihasilkan nilai rata-rata sebesar 73,08, dan pada siklus III didapatkan rata-rata 96,92. *Gain score* yang didapatkan sebesar 0,627 dan persentase peningkatan sebesar 62,7% pada siklus I dan siklus II. Kemudian pada siklus II dan siklus III menghasilkan *gain score* sebesar 0,885 dengan persentase 88,5%. Berdasarkan hasil tersebut, terdapat peningkatan rata-rata prestasi belajar siswa kelas VI SD Negeri Langenharjo 02 melalui permainan ular tangga.

Kata Kunci : matematika, permainan ular tangga, prestasi belajar

Snakes Ladders Game as an Effort to Improve Mixed Counting Operation Skills of Langenharjo 02 State Elementary School Students

Abstract

Many students find it challenging to learn Mathematics. Mixed operations are one of the materials that are difficult to understand. Educators must use innovative learning models, including the Snakes and Ladders Game media. Therefore, this study aims to determine the improvement of student learning achievement through learning with games, namely snakes and ladders. The method used in this research is classroom action research (PTK). This research was carried out with three cycles. The subjects of this study were grade VI students of SD Negeri Langenharjo 02, Sukoharjo Regency, with 13 students. A total of 10 items were used in this study to measure student learning achievement. This study's results showed an increase in the average score from cycle I to cycle II. The average produced in cycle I was 27.69. In cycle II, an average score of 73.08 was produced; in cycle III, an average of 96.92 was obtained. The gain score obtained was 0.627, and the percentage increase was 62.7% in cycles I and II. Then, in cycles II and III, there was a gain score of 0.885 with a percentage of 88.5%. These results show an increase in the average learning achievement of SD Negeri Langenharjo 02 grade VI students through the Snakes and Ladders game.

Keywords*: learning achievement; mathematics; snakes ladders game*

INTRODUCTION

Education is one of the essential things in the life of a nation and state. A Good education will lead people in a country to become superior resources. Excellent resources can be one of the references for a country to be recognized as a developed country by other countries. For example, we can note the difference in development in urban and rural areas. Development in urban areas is considered more advanced than in rural areas. This is because, in urban areas, the development system is led by educated people. Education in Indonesia can still be said to be alarming. This is evidenced by the behavior of students in Indonesia who often carry out brawls between students in Indonesia due to trivial problems. People always witness such incidents through mass media or print media. This is also proof of the chaotic education system in Indonesia (Sujarwo, 2015). Student behavior is formed starting from home. Parental guidance is needed for children to get along in society. Parental supervision is the key to children's behavior in society. Children who often play online games without parental supervision will form a lousy character towards their emotions. In line with this (Permana & Tobing, 2019) states that aggressive behavior in children is strongly influenced by permissive parenting. Schools are expected to be able to make changes in students' behavior or views on the importance of education. Apart from where learning takes place, schools are also considered a place to shape student character. A good school environment creates good student interest in learning. Good learning interests can increase student competence in learning.

Some students at school think that Mathematics is a complicated and scary subject, and basically, Mathematics is a fun subject if taught by the teacher in an interesting (Nurmala, Sukayasa, & Paloloang, 2016). Some students still experience difficulties and may make mistakes in solving mathematics problems, impacting unsatisfactory learning outcomes (Imelda, Yusmin, & Suratman, 2014). Not all students can solve math problems that can help in everyday life, Cavdini (Rahmatin & Marzuki, 2022)

Learning achievement is one of the essential things in the implementation of learning. Learning achievement can be used as teacher evaluation material in the learning that has been done. The essence of learning achievement is the ability of students to think higher to produce something good. Students must own three aspects, namely the knowledge aspect (cognitive), the attitude aspect (affective), and the skill aspect (psychomotor). These three aspects are fundamental in determining student learning achievement. In line with (Susanto, Hidajat, Hobri, & Jatmiko, 2020), the mental perspective includes students' psychological training consisting of six levels: remembering, understanding, applying, dissecting, assessing, and creating. The consequences of this study are essential references that should emerge when developing thoughts, techniques, or strategies to overcome problems.

(Widiati, Sridana, Kurniati, & Amrullah, 2022) Stated that a strong interest influences learning achievement in learning habits, and both significantly influence learning achievement, which is excellent for student learning achievement. In addition to interest in learning, learning achievement is also influenced by the teacher's learning model. In line with that (Lider, 2022) revealed that learning achievement can be improved through the Problem-Based Learning (PBL) learning model with the help of the Quizizz application in the content of Mixed Counting Operations material. According to Pratama, Susanto, & Exacta (2020), the Think Pair Share cooperative learning model based on Lesson Study can improve student learning achievement in Mathematics subjects.

Indonesia has just recovered from the Covid-19 pandemic. Of course, when the virus hit, learning was done remotely. This may reduce learning achievement. Several things can affect student learning difficulties. According to Angga Putra, Susanto, & Hidajat (2021), two factors can affect student learning difficulties when learning online: internal and external. Learning achievement can also be seen in how the learning method is implemented. For example, teachers must create an enjoyable learning environment when Indonesia is experiencing a pandemic. One way to make learning enjoyable is by making learning videos. In line with this (Elyana, Wulandari, & Mulyani, 2022) revealed increased student learning achievement in video-based distance learning. In addition to using videos, offline learning must be engaging. After experiencing distance learning, education in Indonesia has implemented offline or face-to-face learning. In its implementation, teachers must improve attractive learning models. Research shows that interesting learning methods can increase students' interest in learning. If there is an increase in students' interest in learning, their learning achievement will also

increase. In line with that (Zakiah, Prasetyo, & Astutiningtyas, 2019) revealed that the Make-Match learning method increased students' activities and learning outcomes. Not only one learning method can be used. In line with that (Allathifah, Afghohani, & Wulandari, 2019) revealed the influence of the Numbered head-together learning method on student learning achievement. Apart from using learning methods, the ethnomathematics approach can also be one way to increase interest in learning. In line with that (Astutiningtyas, Wulandari, & Farahsanti, 2017), learning using Ethnomathematics has a higher solution ability score than learning with a direct approach. In addition, mathematical communication also influences learning achievement (Wulandari & Astutiningtyas, 2020) stated that high mathematical communication skills can describe problem situations, while moderate mathematical communication skills and those that need to be improved cannot describe a problem in verbal form.

One of the things that can be done is to combine learning with games. One of the games that can be applied to learning is the Snakes and Ladders game. Snakes and ladders are games that children often play. In addition to its exciting colors and components, this game can also increase the healthy competitiveness of students. The Snakes and Ladders game triggers children to be more active in working. This game can be applied to make learning in the classroom not dull. Learning by using this game can be more active and interactive. His research (Kartikaningtyas, Yulianti, & Pamelasari, 2014) revealed that the Snakes and Ladders game positively influences students' cognitive learning outcomes. This research is the same as that conducted by (Afifah & Hartatik, 2019). The novelty of this research is about the object, subject, and location studied. The previous study was conducted to determine the effect of Ular Tangga learning media on grade II students of Kemala Bhayangkara 1 Surabaya Elementary School. Meanwhile, this study aims to improve students' abilities in learning materials for Mixed Counting Operations in grade VI students of SDN Langenharjo 02 in Sukoharjo.

There are many ways to play the Snakes and Ladders game. Snakes and ladders can be played in both digital and concrete ways. A website and internet are required to access the game in digital form. In concrete form, it can be presented as a small paper or significant metromedia technologies (MMT). Students will be more enthusiastic about participating in learning, making the learning atmosphere enjoyable. From the description above, it can be concluded that students learning mathematics must use game media to accept the material presented more efficiently. In addition, this game is also one of the things that makes the teacher faster in conveying what students must receive.

From the described description, several problems must be resolved regarding students' difficulties in improving their abilities and solving mixed arithmetic operation problems. So, this research aims to improve students' ability to solve mixed arithmetic operation problems with a learning-by-play approach or educational games that use snakes and ladders, following Dienes' theory.

METHOD

This research was conducted using classroom action research (PTK). In the three cycles produced, planning before the learning process in the first cycle was carried out by preparing materials and student worksheets. Then, in cycles II and III, researchers made plans by preparing test questions and using snakes and ladders media. Then, the action was to apply the snakes and ladders in cycles 2 and 3. After that, the researcher observed how students behaved while playing the game. Thus, the results of the cycles are presented in the following explanation. During the observation conducted at SD Negeri Langenharjo 02, the researcher gave a problem in the form of mixed number operations, which students were then asked to answer and solve the problems in the problem. The study results showed a significant increase in learning achievement from cycle I to cycle II and an increase from cycle II to cycle III.

Classroom action research is a study conducted systematically on various actions taken by teachers and researchers, ranging from planning to evaluation in real classrooms in the form of learning activities to improve existing conditions (I Nanda, H Sayfullah, 2021). This class action assessment is often used as an evaluation tool after the learning process. In general, classroom action assessment has two objectives: the main objective and the secondary objective. The main objective is further divided into two: the first main objective and the second main objective. The first main goal is to improve and enhance teachers' professional services to address the teaching and learning process. At the same time, the second main goal is developing teacher skills that are opposite to the needs of teachers to overcome

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various actual problems related to learning. Then, the accompanying goal of classroom action assessment is to develop the habit of conducting research among teachers. This means that when discussing the objectives of classroom action research, it can offer approaches and steps that directly impact improving and developing teacher professionalism in developing learning in the classroom (I Nanda, H Sayfullah, 2021). In another version, classroom action research carried out by teachers has several objectives, including improving and improving the quality of learning, improving the performance carried out by teachers, finding solutions to learning problems in the classroom, making the right decisions for the students they teach, exploring learning innovations, increasing new ideas in learning, exploring learning activities related to research. In addition to having objectives, classroom action research also has benefits. The benefits of conducting classroom action research include being an educational novelty that grows from below, being used as a reference in curriculum evaluation, and being a medium for teachers to know and understand how the learning process occurs.

This research was conducted at SD Negeri Langenharjo 02, in Langenharjo Village, Grogol District, Sukoharjo Regency. This research was conducted in the 2023/2024 academic year. The subjects of this research were grade VI students of SD Negeri Langenharjo 02, totaling 13 students. Data was collected by asking students to answer as many as ten items within 30 minutes. Then, learning was done using the Snakes and Ladders game to obtain the assessment results. Learning with Snakes and Ladders is carried out by giving students as many as ten questions while playing Snakes and Ladders. Students are asked to throw the dice to calculate how many steps to walk from the previous place. Students who answer the wrong question will stop playing in one round of the game. Then, they will return to play if they answer the questions correctly. Data analysis conducted in this study compares the differences in learning without and after using the Snakes and Ladders game. Data were analyzed quantitatively and qualitatively. Quantitatively, the average value of each cycle was compared and calculated using N-Gain. At the same time, qualitative data analysis is done by looking at the phenomenon of learning in the classroom and the methods used. This study aimed to improve student learning outcomes in Mixed Counting Operations subjects. The test used in data collection is an essay. The target in cycle II is an increase from cycle I. After that, in cycle III, to test whether the Snakes and Ladders media is effective, it is targeted that many students get perfect scores.

RESULTS

In the three cycles produced, planning before the learning process in the first cycle was carried out by preparing materials and student worksheets. Then, in cycles II and III, researchers made plans by preparing test questions and using snakes and ladders media. Then, the action was to apply the snakes and ladders in cycles 2 and 3. After that, the researcher observed how students behaved while playing the game. Thus, the results of the cycles are presented in the following explanation. During the observation conducted at SD Negeri Langenharjo 02, the researcher gave a problem in the form of mixed number operations, which students were then asked to answer and solve the problems in the problem. The study results showed a significant increase in learning achievement from cycle I to cycle II and an increase from cycle II to cycle III. This can be seen from the results of student learning achievement, which can be seen in the following table.

1. **Student Learning Achievement Cycle I**

   In cycle I, planning began with making learning materials about mixed operations. After planning the material, make a plan for the learning methods used. After designing the learning method, the researcher made student worksheets. After the planning is complete, the action is carried out by explaining to students the material that has been made. Then, a test of 10 questions was carried out within 90 minutes of the first cycle. The students worked on all the questions available. All students collect assignments with the time and place according to the question command. After completing the questions, the researcher gave scores on the students' worksheets. The results are presented in the following diagram.

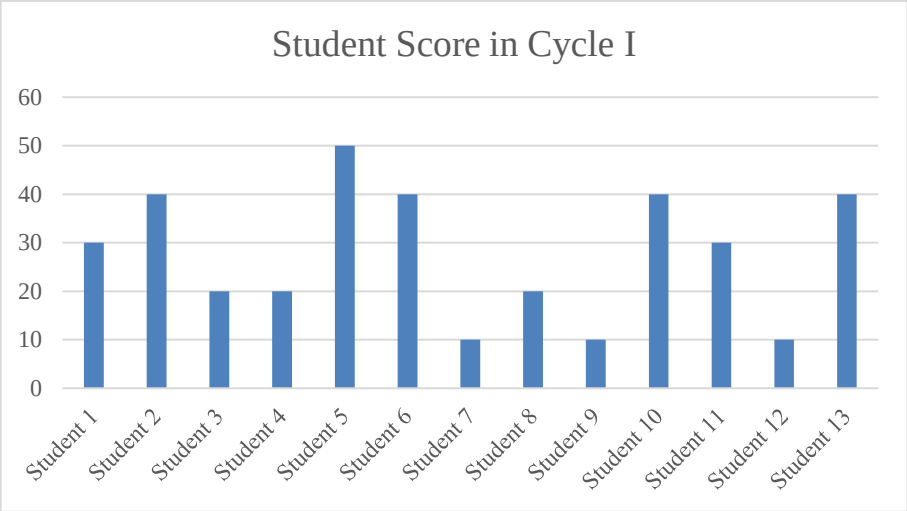

Figure 1. Diagram obtained by students in cycle I

Based on Figure 1, it can be analyzed that many students still get low scores. This can be caused by the fact that educators have not implemented attractive learning models such as snakes and ladders previously.

2. Student Learning Achievement Cycle II

After implementing cycle I, the researcher planned to prepare snakes and ladders media from MMT to continue cycle II. In addition, the researcher also prepared ten questions for the game. After the planning was ready, the action continued. The students were allowed to play snakes and ladders with the questions that had been provided. The rule in this Snakes and Ladders game is that if students answer the wrong question, they are not allowed to play in one game until they answer the question correctly. The students played solemnly during the game and followed the agreed game rules. After the game, the results are presented in the following diagram.

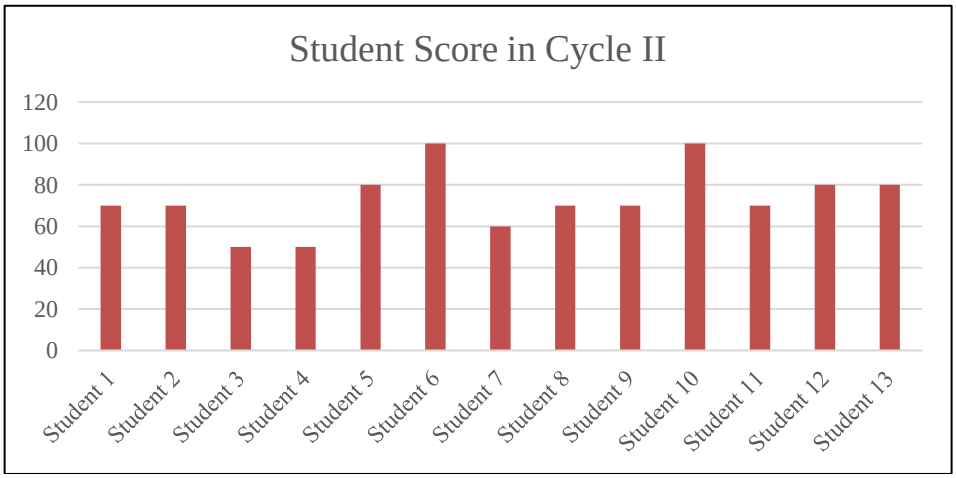

Figure 2. Diagram obtained by students in cycle II

Based on Figure 2, it can be analyzed that some students have experienced increased grades. Currently, learning with the Snakes and Ladders game has been implemented.

3. Student Learning Achievement Cycle III

Cycle III will be carried out after cycles I and II are carried out to validate the results. Like cycle II, planning was carried out by making ten questions in cycle III. Then, the questions were given

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the same way for cycle 2 to 13 students. In this cycle, students can still follow the game according to the agreement. The results of cycle III can be seen in the following table.

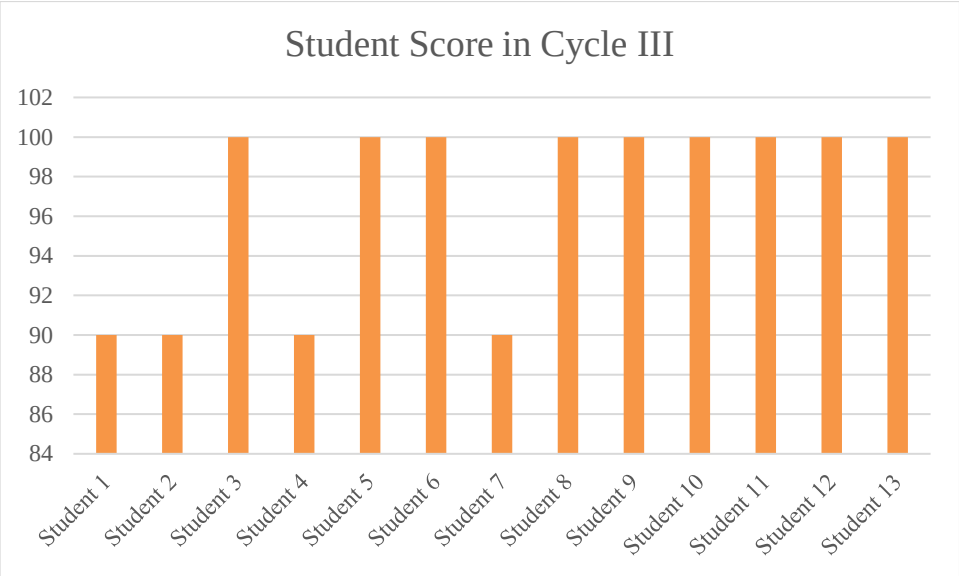

Figure 3. Diagram obtained by students in cycle III

Based on Figure 3, it can be analyzed that as many as nine students have received perfect scores. In this cycle, learning was carried out using snakes and ladders again to determine the effectiveness of the media.

DISCUSSION

This research is based on one of the learning theories that includes games. This learning theory is Dienes' learning theory. According to Dienes (Atiaturrahmaniah, Ibrahim, & Kudsiah, 2017), "the principles of mathematical learning have been an integral part of mathematics education literature and applied both to the teaching and learning of mathematics as well as research on processes such as abstraction and generalization of mathematical structures." Based on this, (Indriani, Anissa Niken Tina Paramitha, 2022) stated that with Dienes theory, a pleasant atmosphere in the classroom can be created, not monotonous, and the learning material presented will be easily understood. In line with this (Atikah & Kuswendi, 2022) stated that Dienes theory positively responds to students because using this theory makes students and teachers more interactive, active, and independent, and students look happy during the learning process.

Regarding Dienes' theory, snakes and ladders are two media that can be used to apply the theory. Snakes and Ladders media has been proven influential, effective, positively impacted, and can improve students' math skills (Indah Suciati, 2021). Based on the previous explanation, it can be said that learning using this theory can create a new atmosphere for the class. This theory is realized to increase students' interest in learning Mathematics, especially in Mixed Counting Operations material. From the data that has been obtained above, it will be discussed in this chapter. This chapter will discuss the data obtained during the research to conclude. The discussion includes:

1. **Discussion of Cycle I Results**

   Based on Table 1, it can be seen that grade VI students of SD Negeri Langenharjo 02 have an average score on mixed operations material of 27.69. Then, it can also be seen that 38.46% of students, or as many as five students, get fewer qualifications. Meanwhile, 61.54% of students, or as many as eight, received inferior score qualifications. The qualifications of student scores can be seen in the following table.

Table 1. Classification of Learning Achievement Results Cycle I

Value	Qualification	Many	Percentage
85-100	Very good	0	0
75-84	Good	0	0
65-74	Simply	0	0
40-64	Less	5	38.46
<40	Very Less	8	61.54
	Total	13	100

In this section, many students have not yet received a score of excellent qualification. This is due to the lack of learning methods teachers still use in delivering learning materials.

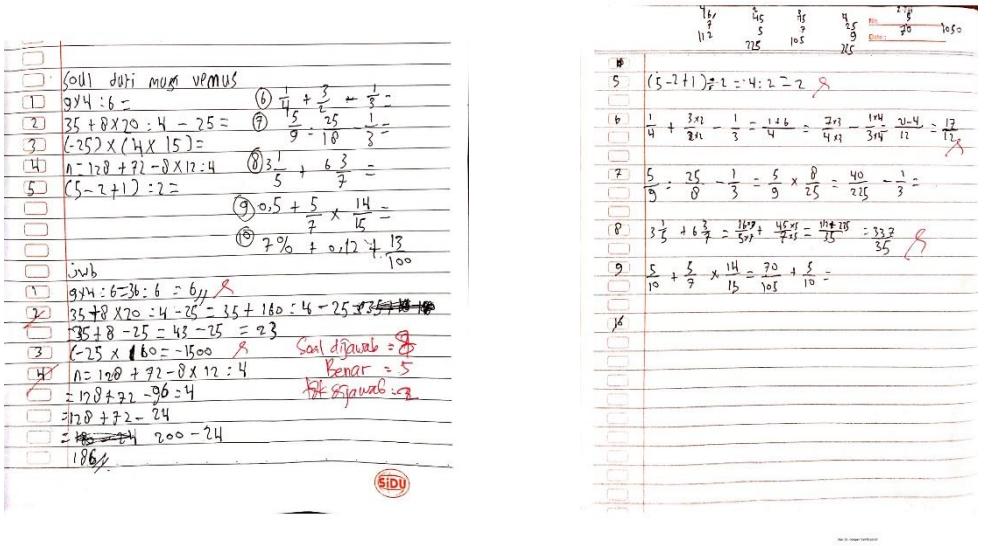

Figure 4. Student work in cycle I

Figure 4 is the work of one of the students before being given the Snakes and Ladders media treatment. It can be seen in the picture above that there are still many mistakes made by students when working on mixed counting operation problems.

2. Discussion of Cycle II Results

From the learning achievement table 2, it can be seen that grade VI students of SD Negeri Langenharjo 02 experienced an increase in average learning achievement from cycle I to cycle II, which was 45.39. Then, it can also be seen that there is an increase in the score qualifications obtained by students. As many as 15.2% of students, or as many as two students, get excellent score qualifications; 38.46%, or as many as five students, get good score qualifications; 23.08%, or three students, get fair and poor score qualifications. The achievement scores can be seen in the following table.

Table 2.Classification of Cycle II Learning Achievement Results

Value	Qualification	Many	Percentage
85-100	Very good	2	15.2
75-84	Good	3	23.08
65-74	Simply	5	38.64
40-64	Less	3	23.08
<40	Very Less	0	0
	Total	13	100

In this section, many students experienced increased scores with moderate qualifications. This is because learning using snakes and ladders media has been implemented for the first time.

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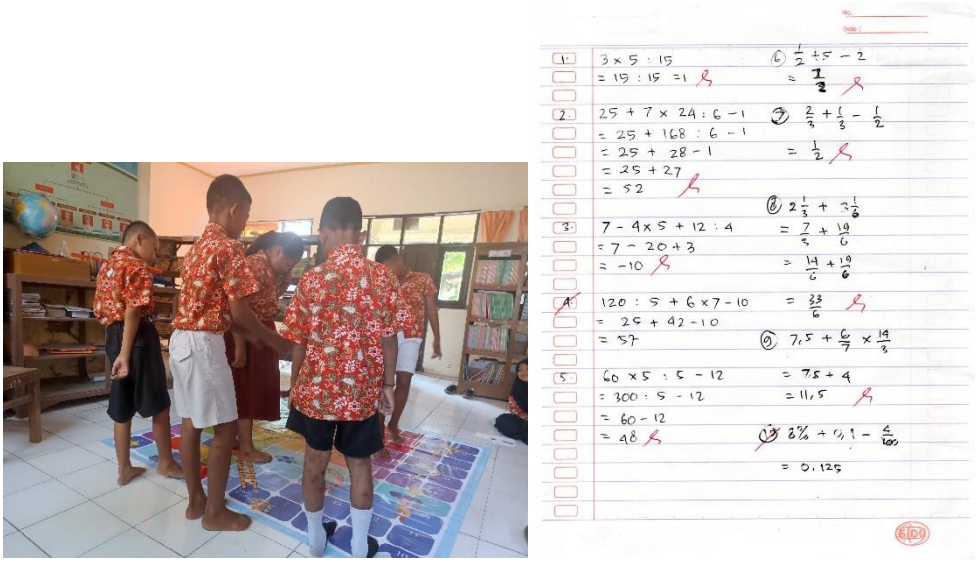

Figure 5. Snakes and Ladders Game in Cycle II and Student work in Cycle II

Figure 5 is a learning activity combined with the Snakes and Ladders game and the results of student work that was applied to Snakes and Ladders media. It can be seen that there are students who make fewer calculation errors in Mixed Counting Operations.

3. Discussion of Cycle III Results

From the learning achievement table 3, it can be seen that grade VI students of SD Negeri Langenharjo 02 experienced an increase in average learning achievement from cycle II to cycle III, which was 23.84. Then, it can also be seen that there is an increase in the value of qualifications obtained by students. A total of 13 students have received excellent grade qualifications. The acquisition of these values is noted in the following table.

Table 3. Classification of Cycle III Learning Achievement Results

Value	Qualification	Many	Percentage
85-100	Very good	13	100
75-84	Good	0	0
65-74	Simply	0	0
40-64	Less	0	0
<40	Very Less	0	0
	Total	13	100

In this section, many students experienced an increase in scores with Very Good qualifications. This is because learning using snakes and ladders media has been applied for the second time. Learning methods associated with games can improve student learning achievement. (Kartikaningtyas et al., 2014) It is revealed that the Snakes and Ladders game positively influences students' cognitive learning outcomes.

Figure 6. Snakes and Ladders Game in Cycle III and Student work in Cycle III

Figure 6 is the learning activity combined with cycle III's Snakes and Ladders game and the results of student work after implementing learning with snakes and ladders in cycle III. It can be seen that there are students who have not made mistakes in calculating Mixed Counting Operations.

4. Increase in Student Learning Achievement Score Cycle I to Cycle II

Based on the explanation of the data above, it can be noted that in cycle I, students get an average score of 27.69, and in cycle II, students get an average score of 73.08. Therefore, it can be seen that the gain score value of both is 0.627 with a percentage of 62.7.

Table 4. Improvement of Student Learning Achievement

Action	Average	Qualification	Gain Score	Per cent
Cycle I	27.69	Ineffective	0.627	62.7%
Cycle II	73.08	Moderately Effective		

From the table above, it can be seen that there is an increase in learning achievement from cycle I to cycle II. Thus, we can conclude that learning by using snakes and ladders games is effective in learning mixed operations in grade VI students of SD Negeri Langenharjo 02. In addition, this can also be because, during the cycle II treatment, learning was carried out using snakes and ladders media. This can stimulate students' interest in learning mixed arithmetic operations.

Enjoyable learning can make students enthusiastic to participate in learning. One of the things that can be done to make learning fun is to combine learning with games. Many teachers still use conventional learning methods or lectures. This makes students bored and lazy when learning. Thus, the teacher must switch to 0making other learning methods. In line with this (Sustiyono, 2021) revealed differences in the effectiveness of learning using the lecture learning method and the learning method with video assistance.

5. Increase in Student Learning Achievement Cycle II to Cycle III

The average student achievement was increased after experimenting again in cycle III. In cycle II, students got an average score of 73.08, while in cycle III, students got an average score of 96.92. Then, it can be known that the average gain score is 0.885 or 88.5%.

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Table 5.Improvement of Student Learning Achievement

Action	Average	Qualification	Gain Score	Per cent
Cycle II	73.08	Moderately Effective		
Cycle III	96.92	Effective	0.885	88.5%

From the table above, it can be seen that there is an increase in the average student learning achievement from cycle II to cycle III. This shows that snakes and ladders learning can improve student learning achievement. In addition, this can also be because, during the cycle III treatment, learning was carried out using snakes and ladders media for the second time to test its effectiveness. This can stimulate students' interest in learning mixed arithmetic operations. In addition, in this cycle, students' competitive spirit began to be honed, causing students to try harder to obtain significant scores.

The first step taken in this lesson is for students to be given written questions to be completed within 30 minutes. Afterward, the students were asked to play Snakes and Ladders using the printed MMT. Then, every student who stops at one place must do one question to continue to the next. In this game, the competitive spirit of students will arise. So that all students will try to answer all the questions correctly to continue and win this game. Thus, there will be many students who can answer more questions correctly. In line with this (Lestari, Hariyani, & Rahayu, 2018) revealed that learning models like this can train students' social spirit. Students who have high abilities do not dominate and will provide opportunities for students with medium or low abilities.

In all three cycles, there was an increase in student learning achievement. Qualitative analysis can be done by looking at the learning methods used. In cycle I, students were only treated using the lecture method. In cycle II and cycle III, students were treated with game-based learning. This can undoubtedly stimulate students' competitive spirit so that students compete to be able to answer questions and win the game. Overall, this research contributes to helping teachers in carrying out learning, especially on Mixed Counting Operations material. This research can be used as a reference for teachers to create an exciting classroom atmosphere by combining games with learning so that students have a higher interest in learning, which will improve their ability to solve Mixed Counting Operation problems.

CONCLUSION

Based on the exposure described in the results and discussion, it can be concluded that learning with snakes and ladders games can improve student learning achievement. It can be seen from the increase in the average student learning achievement in cycle I, which has an average learning achievement of 27.69. In cycle II, which has an average learning achievement of 73.08, and in cycle III, which has an average of 96.92. Then, the gain score from cycle I and cycle II was 0.672 with a percentage of 62.7%, while in cycle II and cycle III, the gain score was 0.885 with a percentage of 88.5%. This means there is an increase in the gain score value from cycle I and cycle II to cycles II and III. The gain score value of 0.672 in cycle I and cycle II is relatively practical in qualification for learning. The gain score in cycle II and cycle III of 0.885 is a very effective qualification for learning. Thus, it can be concluded that there is an increase in students' mixed counting operation skills as a reflection of learning. This is shown at the beginning when students only get scores below normal. Then, after playing games with snakes and ladders, students can get scores that slowly increase. This is due to students' competitive spirit in the game, which makes them more active in learning mixed arithmetic operations. Based on the results that have been presented, this research has achieved its objectives. The students were able to solve problems related to mixed arithmetic operations. This is shown by the students' learning outcomes, which increase from one cycle to another.

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