INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND ANALYSIS

ISSN(print): 2643-9840, ISSN(online): 2643-9875

Volume 08 Issue 05 May 2025

DOI: 10.47191/ijmra/v8-i05-62, Impact Factor: 8.266

Page No. 2793-2798

The Application of Educational Games in Improving Student Learning Outcomes in Grade IV Mathematics Subjects SD Inpres 5 Lolu

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ABSTRACT: This study aims to improve student learning outcomes in Mathematics subjects in grade IV of SD Inpres 5 Lolu with the Application of Educational Games (Monopoly Games) This research method is Classroom Action Research (PTK) using the research design of Kemmis and Mc Taggart. The subject of this study is grade IV students of SD Inpres 5 Lolu which totals 21 students. The research instrument uses final tests, observation sheets, documentation. The data analysis technique uses quantitative data analysis. The learning outcomes of students in the first cycle were obtained 38% and in the second cycle 90.4%. The results of observation of teacher activities in the first cycle were obtained 90.3% and the second cycle obtained 98.5%. The results of the observation of students in the first cycle were obtained 97.7% and the second cycle was obtained 97%. Based on this data, it can be concluded that there is an increase in student learning outcomes through the application of Educational Games in grade IV in the subject of Mathematics of SD Inpres 5 Lolu.

KEYWORDS: Educational Games Monopoly Games, Learning Outcomes, Mathematics.

INTRODUCTION

Education is a deliberate and planned effort to create learning conditions that allow students to develop the academic, moral, life skills, and spiritual potential needed in their lives (Mboa & Ajito, 2024). In the educational process, teachers play an important role as learning designers who are responsible for choosing appropriate learning strategies, methods, and media so that the teaching and learning process becomes effective and meaningful. One of the important indicators of learning success is student learning outcomes. Learning outcomes reflect the extent to which students are able to understand and master the subject matter after going through a structured learning process. According to Wicaksono (2019), learning outcomes include cognitive, affective, and psychomotor abilities acquired by students after participating in the learning process. Therefore, improving learning outcomes is the main focus in efforts to improve the quality of education. But in reality, learning in elementary school is still often carried out conventionally, especially in mathematics subjects. Initial observations at SD Inpres 5 Lolu, Palu City, show that teachers still use one-way lecture and question and answer methods in teaching. This causes low interest in learning students and has an impact on low learning outcomes, especially in mathematics subjects. Students tend to be less focused, less enthusiastic, and more interested in other subjects such as sports or Indonesian. Mathematics as a deductive and systematic science has an important role in shaping logical, critical, and analytical thinking skills in students. Therefore, mathematics learning should be designed with a creative and interactive approach so that students are more actively involved in the learning process. One innovative approach that can be applied is the use of educational game media. Educational games are a means of learning that is designed not only to provide a fun experience, but also to contain educational values. Firdaus (2023), said that educational game tools are able to stimulate the development of all aspects of students' abilities, both cognitive and social. One form of educational game that has the potential to be used in mathematics learning is the math monopoly game. This media is a board game that is modified to present questions according to the teaching material that students must answer in a fun playing atmosphere. Previous research supports the effectiveness of the use of educational games in improving learning outcomes. Afifah et al (2025), showed that the application of the Problem Based Learning model assisted by monopoly media was able to significantly improve the learning outcomes of IPAS. In addition, Eriska et al (2023), proved that the use of digital education games succeeded in increasing students' average mathematics scores by 18.85 points.

Based on this background, this research aims to implement educational games in the form of monopoly as a mathematics learning medium. The goal is to improve the learning outcomes of grade IV students of SD Inpres 5 Lolu on flat building materials through an interactive, collaborative, and fun approach.

LITERATURE REVIEW

Educational games are learning tools designed to provide a fun learning experience to students. Saputra (2019), stated that educational games include all forms of games, both traditional and modern, that are loaded with educational values. The game is designed not only to provide information, but also to instill social values such as togetherness and cooperation. Educational games can be understood as play activities that contain educational elements, where children get fun as well as learning experiences. This activity can consciously or unconsciously contribute to the cognitive and affective development of students. Learning outcomes are an important indicator of the success of the educational process. Gultom (2020), stated that learning is an activity that involves physical and mental aspects, the results of which are reflected in changes in students. Tumulo (2022), explained that student learning outcomes ideally reflect abilities in the cognitive realm that include knowledge and attitudes. Good learning outcomes will be seen through students' ability to complete tasks appropriately and in accordance with the provisions. Therefore, learning outcomes are a reflection of students' cognitive, affective, and psychomotor development obtained through the learning process. Harbi (2021), classifies factors that affect learning outcomes into two main categories, namely internal factors and external factors, Ridho (2022), adding that emotional intelligence also plays a major role in influencing the success of student learning outcomes, both directly and indirectly.

Mathematics has high flexibility and dynamics and strong relevance to technological developments. In addition, mathematics has also become the foundation for various other sciences and is dubbed the "queen of science". (Sugiyamti, 2018). Siagian (2016), explained that mastery of mathematics is a non-negotiable need in facing the challenges of the times. The general purpose of mathematics learning at the elementary school level is to equip students with logical, analytical, systematic, critical, creative, and cooperative thinking skills.

RESEARCH METHODS

This study uses the Classroom Action Research (PTK) method because it aims to improve student learning outcomes through the application of educational games in mathematics learning. PTK allows teachers or researchers to make direct improvements to the learning process in the classroom through a continuous cycle of action, observation, and reflection. The class action model used in this study refers to the Kemmis and McTaggart model which consists of four stages: planning, acting, observing, and reflecting. This research was carried out at SD Inpres 5 Lolu, which is located at Jalan Tanjung Tada, South Palu District, Palu City, Central Sulawesi. The time for the research is planned for April 2025. The subjects of the study were 21 grade IV students, consisting of 12 male students and 9 female students.

The research was conducted in two cycles, each consisting of four stages: 1. Planning: The researcher compiled learning tools such as teaching modules, mathematics monopoly game media, teacher and student observation sheets, and evaluation instruments. 2. Implementation of Actions: Teachers carry out learning according to plan, using monopoly games as the main medium. 3. Observation: Researchers and collaborators observe the learning process, student involvement, and teacher activities during the implementation of the action. 4. Reflection: The results of observation and evaluation are analyzed to identify successes and obstacles, which are used as the basis for improvement in the next cycle.

Data collection techniques are carried out through: Tests are given at the end of each cycle to measure the achievement of students' cognitive learning outcomes, observation is carried out using teacher and student observation sheets to record student activeness, engagement, and response to learning, documentation is used to collect administrative data such as the number of students and documentation of learning activities. The instruments used in this study include an evaluation test in the form of description questions (5 questions) in cycle I and multiple choice (5 questions) in cycle II, student observation sheets, used to record student activities at the preliminary, core, and closing stages of learning, teacher observation sheets, used to evaluate the implementation of learning by teachers during the process. Data analysis was carried out using a quantitative approach using the $KI = \frac{\sum SP}{\sum SM} \times 100$ formula Students are declared complete if they obtain a minimum score of 70 according to the Minimum Completeness Criteria (KKTP). $KK = \frac{\sum PD}{\sum SI'D} \times 100\%$ Classes are said to be classically complete if ≥70% of students get a score of ≥70.

Classes are said to be classically complete if ≥70% of students obtain a score of ≥70, the success criteria based on percentages are determined as follows:

Percentage	Criterion
90–100%	Excellent
70–89%	Good
50–69%	Enough
30–49%	Less
<30%	Very Less

The research is said to be successful if there is an increase in the average score of student learning outcomes in each cycle and classically ≥70% of students achieve a minimum score of 70.

RESULT

This research was carried out with the aim of improving the mathematics learning outcomes of grade IV students of SD Inpres 5 Lolu through the use of educational game media in the form of Monopoly Mathematics. The research process was conducted in two cycles in April 2025 and involved 21 students as research subjects. Each cycle consists of the stages of planning, implementation of actions, observation, and reflection. The following are the results of the research from the pre-action stage to cycle II. In the pre-action stage, teachers still use conventional learning methods in the form of lectures and questions and answers. The results of the initial evaluation showed that out of 21 students, only 7 students achieved scores above the Minimum Completeness Criteria (KKM), while the other 14 students had not achieved completeness. The average grade point of the class is only 49.7. In addition, the activities of teachers and students have not been systematically recorded because structured observations have not been carried out.

Pre-Action Results Table

Information	Value
Number of Students	21 students
Number of Students Completed	7 students
The Number of Students Is Incomplete	14 students
Presentation of Completeness	33,3%
Grade Point Average	49,7
Teacher Activities	–
Student Activities	–

Preliminary data showed only 7 students (33.3%) achieved KKM (70), confirming the urgent need for intervention (Mboa & Ajito, 2024)

Cycle I

After actions were taken in the first cycle by implementing educational games in the form of a mathematical monopoly, there was an increase in learning outcomes. A total of 8 students (38%) were declared to have completed their studies with an average score of 59.7. Teacher and student activities are also actively monitored. Teachers obtained an activity score of 90.3%, while students reached 97.7%, both of which are included in the very good category. However, there are still several obstacles, such as the lack of class management during group division and the lack of optimal guidance for students who experience difficulties. Therefore, the action is continued to cycle II to make improvements.

Cycle I Results Table

Information	Value
Number of Students	21 students
Number of Students Completed	8 students
The Number of Students Is Incomplete	13 students
Presentation of Completeness	38,0%
Grade Point Average	59, 7
Teacher Activities	90, 3%
Student Activities	97, 7%

Reflection Cycle I:

The implementation of learning in cycle I showed quite positive development when compared to the initial or pre-action conditions. This can be seen from the increase in student learning completeness, from the previous 33.3% to 38%. The average student score also increased from 49.7 to 59.7. In addition, the activities of teachers and students during the learning process were included in the very good category, with scores of 90.3% and 97.7%, respectively. However, there are still several obstacles that need to be considered. Teachers are still not fully able to manage the classroom optimally, especially when dividing students into groups, which causes the classroom atmosphere to become a bit noisy. In addition, guidance for students who are in difficulty is still not optimal. On the other hand, there are still some students who lack discipline and have not shown the courage to actively participate in discussions. Seeing these conditions, improvements are needed in the next cycle. The focus on improvement is directed at better classroom management, more intensive guidance to students who experience difficulties, and affirmation of rules during the game process so that learning can take place more orderly and effectively. The need to strengthen group mentoring and the use of visual media (PPT) to clarify concepts (Oktavia, 2024)

Results of Cycle II

In cycle II, teachers make learning improvements based on reflections from the previous cycle. These improvements include more effective classroom management, improved guidance to students, and the creation of a more enjoyable learning atmosphere. The results show a significant improvement. A total of 19 students (90.4%) managed to achieve complete learning, and the average grade point increased to 88.5. Teacher activity also increased to 98.5%, and student activity remained high at 97%. This shows that the application of educational games not only improves learning outcomes, but also makes the learning process more lively and meaningful. The effectiveness of monopoly games is in line with the findings of Eriska et al. (2023), that game-based learning increases motivation and understanding of mathematical concepts (N-gain 0.7)

Table of Results of Elbow II

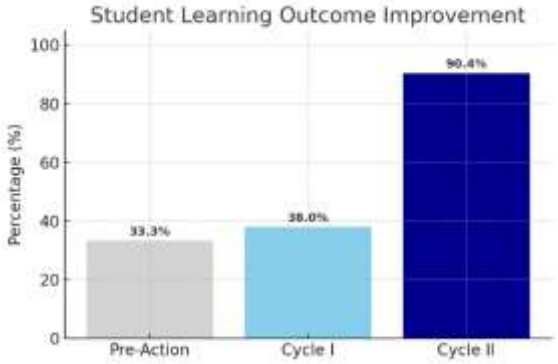
Information	Value
Number of Students	21 students
Number of Students Completed	19 students
The Number of Students Is Incomplete	2 students
Presentation of Completeness	90, 4%
Grade Point Average	88, 5
Teacher Activities	98, 5%
Student Activities	97, 0%

Key findings: A 52.4% spike in completeness proves the effectiveness of monopoly games (Eriska et al., 2023). Effect size 1.8 shows a large impact of the intervention

Reflection Cycle II

The implementation of learning in cycle II showed very encouraging results. Student learning completeness increased sharply to 90.4%, with an average score of 88.5. Almost all students managed to achieve the Minimum Completeness Criteria (KKM), which shows that learning using educational games really helps them in understanding the material. The improvements made from cycle I proved effective. Teachers are calmer in managing the classroom and are able to guide students more optimally, especially during group activities. The learning atmosphere is also much more orderly and fun. Students look more active, cooperate with their group friends, and dare to express their opinions when asked to discuss or explain the results of the group's work. Learning activities ran smoothly from start to finish, and there were no more significant interruptions as in the previous cycle. This shows that the method used is in accordance with the needs of the students in the class. Looking at the results that have been achieved, it can be concluded that learning with educational games has run optimally. Because the success target has been met, this research is considered sufficient until the second cycle.

Graph of Improving Learning Completeness



Overall, the results of the study show that the use of educational games in the form of mathematical monopolies has a positive impact on student learning outcomes. Learning completeness increased drastically from 33.3% in pre-action to 90.4% in cycle II. In addition, teacher and student activities are also in the very good category. Thus, it can be concluded that educational game media is very effective in improving the quality of mathematics learning in grade IV of SD Inpres 5 Lolu.

DISCUSSION

Mathematics learning using educational games in the form of monopoly has been proven to improve the learning outcomes of grade IV students of SD Inpres 5 Lolu. This can be seen from the comparison of student learning completeness values between pre-action, cycle I, and cycle II. Before the implementation of educational games, the percentage of student learning completeness only reached 33.3%. After the action was taken in cycle I, completeness increased to 38%, and in cycle II it jumped significantly to 90.4%. The improvement suggests that fun, interactive, and contextual learning approaches such as math monopoly games can encourage students to be more actively involved in the learning process. In cycle II, teachers are better able to create a safe and conducive classroom atmosphere, which has an impact on increasing students' concentration and motivation. Students are seen to be more active in solving problems, discussing, and participating in groups, which contributes to improving their learning outcomes.

This finding is in line with the opinion of Sulastri et al. (2014), that evidence of learning success can be seen from behavioral changes, from not knowing to knowing, and from not understanding to understanding. Educational games facilitate the learning process, are fun, and encourage active student engagement. This research is also strengthened by the results of the study showing that the use of the Project-Based Learning model assisted by digital education games can significantly improve students' mathematics learning outcomes, with an increase in learning completeness from 34.37% in the pre-cycle to 87.5% in the second cycle (Eriska et al., 2023).

Teachers' activities in the learning process have also increased significantly. Based on the results of observations by observers, in the first cycle, teachers' activities obtained a percentage of 90.3% with the very good category. However, there are still drawbacks such as difficulties in managing classes during group divisions and limitations in guiding students who are having difficulties. Improvements were made in cycle II, and the results showed an increase in teacher activity to 98.5%, still in the very good category. Teachers demonstrate improved ability to manage the classroom, actively guide students, and create a fun learning atmosphere by involving ice breaking and rewarding students. This shows that teachers are able to make effective reflections and improvements from the previous cycle, which has a direct impact on improving the quality of learning.

Student activities in mathematics learning also showed positive results. In the first cycle, student activity reached 97.7% (very good category), although there were still obstacles such as lack of discipline, students often going in and out of class, and lack of courage from students in expressing opinions. In cycle II, there was an improvement in all these aspects. Student activity was recorded at 97%, remaining in the very good category. Students look calmer when the teacher delivers the material, are more active in group activities, and are able to convey the results of the discussion with confidence. Their enthusiasm in participating in learning increased significantly. This increase is very likely to occur because it is supported by the increase in the quality of teacher activities, as emphasized by Warni (2022), that the effectiveness of learning is greatly influenced by the active involvement of teachers and their ability to manage the classroom. Thus, it can be concluded that student activities in mathematics learning through monopoly educational games have increased significantly in cycle II.

CONCLUSION

Based on the results of the research and discussions that have been carried out, it can be concluded that the use of educational games is able to improve the learning outcomes of grade IV students in Mathematics subjects at SD Inpres 5 Lolu. Learning that involves students directly through play activities has been proven to make it easier to understand concepts, increase learning motivation, and make material easier to remember. This is shown by the data obtained over two cycles. In the first cycle, student activity reached 97.7%, teacher activity 90.3%, classical completeness was 38%, and the average learning outcome score was 59.7. After improvements were made in cycle II, there was a significant increase: student activity reached 97%, teacher activity 98.5%, classical completeness 90.4%, and the average score of learning outcomes increased to 88.5. Thus, the application of educational games, especially monopoly games, is effective in improving student learning outcomes in mathematics learning.

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