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THE IMPLEMENTATION OF CODING LEARNING IMPLEMENTATION TO IMPROVE STUDENTS' PROBLEM SOLVING SKILLS AT PRIMARY SCHOOL 2 RANDUBLATUNG, RANDUBLATUNG SUB-DISTRICT, BLORA DISTRICT

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Abstract

Motivation plays a crucial role in the learning process, as students must have the desire to engage in teaching and learning activities. This study aims to enhance problem-solving skills and introduce coding concepts to elementary school students in an engaging and enjoyable way through board game-based learning. The research was conducted with fourth-grade students at State Elementary School 2 Randublatung, Blora Regency. The results indicate that the implementation of the board game learning model significantly increased student motivation in mathematics. The average post-test score was 56.25% (categorized as "less"), while participation in the board game activities resulted in an average score of 90.63% (categorized as "very good"). Additionally, students' responses to the essay questionnaire showed an average score of 0.8333, also categorized as "very good." These findings demonstrate that board game-based learning effectively enhances student motivation and engagement. It is recommended that educators continue to adopt learning models tailored to classroom conditions to further improve teaching and learning quality.

Keywords: Board game development, numeracy skills

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INTRODUCTION

Learning is essentially an interaction process between students, educators, and learning resources within a learning environment (Law No. 20 of 2003, Chapter I, Article 1, Paragraph 20). According to Gunawan (2022), the effectiveness of the learning process is determined by three main aspects: students (learners), teachers (educators), and learning resources (teaching materials). Teachers, as facilitators, are expected to create a dynamic, enjoyable, and innovative learning atmosphere, while also ensuring that students feel comfortable in understanding the material being delivered. Students, as the subject of learning, are expected to master the lesson content thoroughly so they can apply the knowledge effectively. Learning resources, on the other hand, act as intermediaries for material delivery. These three aspects are interdependent and cannot substitute for one another. The learning process will only run effectively if all components support each other.

However, when these aspects do not function optimally, students may struggle to understand the material. Gunawan (2022) emphasizes that this can also lead to a decline in learning motivation. Students with high motivation typically demonstrate persistence, eagerness to learn, discipline, and compliance with school rules. Motivation serves as an indicator of how well students comprehend and absorb the material. Therefore, to cultivate strong learning motivation, teachers need to provide stimulating activities, such as engaging learning games or manuals, to rekindle students' enthusiasm for learning.

Gunadi and Sudaryana (2021) highlight that to prevent classroom learning from becoming monotonous and to encourage student motivation, teachers can adopt an approach of "learning while playing" through the use of board game learning media. Board games not only make lessons more interesting but also stimulate students' creativity and innovation. In this model, teachers act more as facilitators and guides, while students are encouraged to learn independently, solve problems, and actively participate in the process. Furthermore, board games can serve as a medium for reviewing previously learned material in an enjoyable way, thus strengthening students' motivation and retention.

In line with this, Gunadi and Sudaryana (2021) also note that students desire a learning process that is engaging, non-monotonous, and motivating. This need inspired researchers to design lesson plans that integrate board game–based learning media, combining content delivery with interactive gameplay.

Meanwhile, Rohmah and Bukhori (2020) observe that the rapid development of technology in the Industrial Revolution 4.0 era has brought about new tools to support education, one of which is the smartphone. In Indonesia, smartphones have become an essential part of daily life and education, particularly during the Covid-19 pandemic when remote learning became a necessity. During this period, online learning emerged as an alternative for teachers to continue delivering lessons without face-to-face interaction. Teachers were required to adapt by using digital media—such as documents, images, videos, and audio—to make the learning process accessible and engaging for students at home.

However, as Rigianti (2020) points out, not all teachers were able to maximize the use of technology-based media during online learning. Many simply provided materials for students to study independently, which often led to decreased interest and motivation. Preliminary observations at State Elementary School 2 Randublatung, Blora Regency, revealed that students showed low interest in learning, particularly in mathematics. According to one mathematics teacher, online mathematics learning was less effective because the subject requires detailed and contextual explanations that cannot be adequately delivered through limited digital media. Consequently, students' interest and achievement in mathematics declined.

METHOD

This study employs a qualitative approach with a case study method. According to Sukmadinata, a qualitative approach is a research procedure that produces descriptive data in the form of written or oral information from individuals, as well as observable behavior in its entirety. Qualitative research emphasizes processes rather than outcomes, as relationships between the studied components become clearer when observed through ongoing activities.

In this research, manual games are used as a medium to collect data through children's actions and processes in solving coding-related problems. Children are required to select appropriate options that enable the problem to be executed and resolved. The research procedure to observe the development of children's thinking, creativity, and imagination through manual games applies the Basic Research Method. The primary data used are qualitative in nature, focusing on the application of manual games, and are obtained from direct sources. Data collection techniques include: (a) observation, (b) interviews, and (c) documentation.

The study was conducted at Randublatung State Elementary School 2, located in Randublatung District, Blora Regency. The site was chosen based on several considerations: the researcher's familiarity with the school's conditions, its proximity to the researcher's location, and the intention to examine whether coding-based learning methods can enhance students' problem-solving skills.

The indicators of problem-solving used in this study include the ability to demonstrate understanding of the problem, organize data and select relevant information, represent problems mathematically in various forms, and choose appropriate approaches and methods to solve problems.

RESULT AND ANALYSIS

A. Research Result

1. Board Games

Group 1 (Tava, Rika, Azizi)

- **Media 1**: Students were able to work correctly according to the cards used in the board game through active and collaborative discussion.
- **Media 2**: Students could complete the task but some still made mistakes, such as confusing left-turn cards with right-turn cards.
- **Media 3**: Students generally followed the rules correctly, but some errors occurred when using left-turn and forward-move cards. These should have been replaced with right-turn cards and no forward cards.
- **Media 4**: Students successfully followed the game rules and worked correctly according to the cards used.

Group 2 (Safa, Affika, Ica)

- **Media 1**: Students performed correctly but some mistakenly placed the "advance 1 step" card instead of the correct "advance forward" card.
- **Media 2**: Students worked correctly but still confused the "advance 4 steps" card with the correct "advance 3 steps" card.

- **Media 3**: Students followed instructions but some errors were made in using the "advance 3 steps" card, which should have been replaced with the "advance 1 step" card.
- **Media 4**: Students were able to complete the task correctly according to the cards used in the game.

Group 3 (Raka, Arsyad, Riski)

- **Media 1**: Students worked well but some incorrectly used right-turn cards instead of left-turn cards.
- **Media 2**: Students correctly followed the rules and installed the cards appropriately.
- **Media 3**: Students collaborated effectively and worked correctly with the cards provided.
- **Media 4**: Students generally worked correctly, but some mistakes occurred in using left-turn and forward cards. The correct solution should have been right-turn cards only.

Group 4 (Hanan, Afif, Dana)

- **Media 1**: Students participated actively and followed the rules, but some errors occurred when using the "advance 7 steps" card instead of the correct "advance 6 steps" card.
- **Media 2**: Students completed the task but still made mistakes in using left-turn and "advance 2 steps" cards, which should have been right-turn and "advance 3 steps" cards.
- **Media 3**: Students successfully followed the instructions and played correctly according to the cards provided.
- **Media 4**: Students worked correctly overall, but errors were found in the use of "advance 3 steps," right-turn, and "advance 1 step" cards. The correct solution should have been right-turn and "advance 3 steps" cards without the "advance 1 step" card.

Across Groups 1 to 4, students actively and collaboratively participated in the board game activities. In general, they were able to follow the rules and use the cards correctly. However, some errors were still identified, such as confusion in distinguishing between left-turn and right-turn cards, and mistakes in counting the number of steps when moving forward. These findings suggest that while the board game media effectively engaged students in learning activities, additional guidance and practice are needed to minimize mistakes in applying the game rules.

2. Student Research Questionnaire Instrument to Measure Problem-Solving Ability

Location: State Elementary School 2 Randublatung, Randublatung District, Blora Regency

Table 1 Research Questionnaire Instrument to Measure Problem-Solving Ability

No.	Student Name	Response (Essay)
1	Affika	Submitted
2	Hanan	Submitted
3	Riski	Submitted
4	Raka	Submitted
5	Rika	Submitted
6	Tava	Submitted
7	Dana	Submitted

8	Afif	Submitted
9	Azizi	Submitted
10	Arsyad	Submitted
11	Safa	Not Submitted
12	Ica	Not Submitted

Total Respondents: 10 students
Calculation: 1012×100%=83.33%\frac{10}{12} \times 100\% = 83.33\%1210×100%=83.33%

Description:

- **N** : Number of Questions
- **E** : Essay

Based on the analysis of the questionnaire data, it was found that 83.33% of the fourth-grade students at State Elementary School 2 Randublatung (Randublatung District, Blora Regency) filled out the questionnaire related to problem-solving ability.

3. Post-Test Questions

Table 2 Post-Test Questions

No.	Student Name	Student Answer
1	Dana	Correct: 3 false: 0
2	Afif	Correct: 2 false: 1
3	Hanan	Correct: 1 false: 2
4	Rika	Correct: 2 false: 1
5	Tava	Correct: 2 false: 1
6	Safa	Correct: 2 false: 1
7	Azizi	Correct: 2 false: 1
8	Raka	Correct: 3 false: 0
9	Affika	Correct: 1 false: 2
10	Ica	Correct: 1 false: 2
11	Arsyad	Correct: 1 false: 2

No.	Student Name	Student Answer
12	Riski	Correct: 2 false: 1

Analysis of Post-Test Results

Based on the post-test results, only two students were able to correctly complete the questions individually. From the total of 12 participants, only two students succeeded in answering three questions correctly. This indicates that the overall level of mastery demonstrated by the students was still relatively low, and only a small proportion of them were able to meet the expected level of understanding.

B. Research Analysis and Discussion

1. Analysis of Incorrect Answers on Post-Test Questions

Question Number	Student Name	Number of Errors	Conclusion
1	Tava	1	Shows good understanding, with ly minor mistakes.
2, 3, and 4	Safa	3	Demonstrates moderate mprehension but needs improvement on veral questions.
4	Azizi	1	Performs well, making only a small or.
2, 3, and 4	Raka	3	Has some difficulties; understanding partial and needs review.
4	Afif	1	Shows good understanding, with nimal errors.
4	Hanan	1	Answers correctly overall, with a nor lapse.
3 and 4	Rika	2	Demonstrates adequate mprehension but requires clarification on ew concepts.
2, 3, and 4	Arsyad	3	Partial understanding; some estions answered incorrectly.
2, 3, and 4	Riski	3	Moderate performance; needs nforcement on certain topics.

Table 3. Incorrect Answers on Post-Test Questions

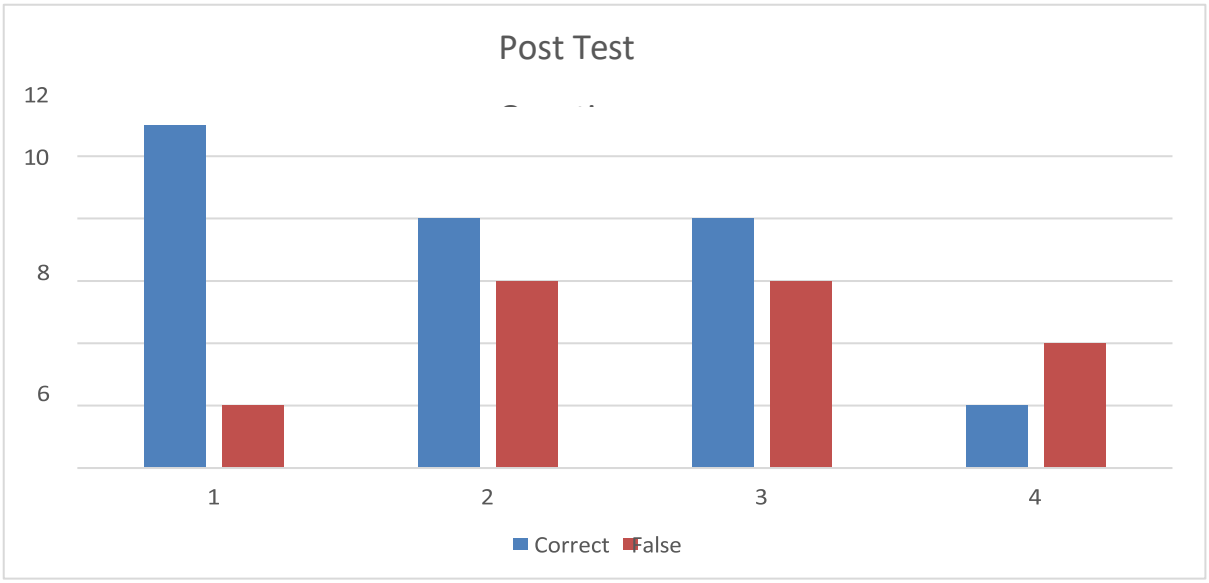
Based on the analysis of the post-test results, 9 students did not complete the post-test successfully, while 3 students were able to answer the questions with a satisfactory level of accuracy.

2. Analysis of Correct Post-Test Answers

Question Number	Student Name	Description	Conclusion
2, 3, 4	Tava	3	The student performed quite well the post-test questions.
1	Safa	1	The student did not perform well the post-test questions.
1, 2, 3	Azizi	3	The student performed quite well the post-test questions.
1	Raka	1	The student did not perform well the post-test questions.
1, 2, 3, 4	Dana	4	The student performed very well the post-test questions.
1, 2, 3	Afif	3	The student performed quite well the post-test questions.
1, 2, 3	Hanan	3	The student performed isfactorily on the post-test questions.
1, 2	Rika	2	The student performed adequately the post-test questions.
1	Arsyad	1	The student did not perform well the post-test questions.
1	Riski	1	The student did not perform well the post-test questions.
1, 2, 3, 4	Ica	4	The student performed very well the post-test questions.

Table 4 Correct Post-Test Answers

Based on the post-test results, most students demonstrated satisfactory to very good performance. Out of the 12 students assessed, 11 completed the post-test questions successfully, showing a good understanding of the material. Only 1 student did not perform well and was unable to complete the post-test questions satisfactorily. This indicates that the majority of students were able to apply their knowledge effectively during the post-test.



Figures 1 Wrong and Correct Answers from Post Test Questions

Based on the analysis of the post-test data, it was found that students' answers varied. Only one student did not achieve the "Completed" criteria, while the rest did. In the post-test cycle, the average student score was 56.25%. Detailed individual student learning outcomes for the post-test questions are presented in the table below.

Figure 2 Board Game

These figures show a board game designed as a manual activity. Each game contains information about the results of each question. Players use cards to play by sorting and pasting them onto answer sheets, allowing the panda to move toward the house.

Figure 3 Student Research Questionnaire Instruments and Post-Test Questions
These figures illustrate the design of manual games combined with research instruments, including post-test questions and questionnaires. The games provide information on problem-solving abilities, with cards used for sorting and pasting on answer sheets to guide the panda to the house.

CONCLUSION

The findings of this study indicate that the application of the board game learning model significantly increased the learning motivation of fourth-grade students in Mathematics at Randublatung State Elementary School 2, Randublatung District, Blora Regency. Post-test results showed an average score of 56.25%, categorized as “less,” whereas the board game activity raised the average score to 90.625%, falling into the “very good” category. Furthermore, responses to the questionnaire revealed an average agreement score of 0.8333, also categorized as “very good.” These results demonstrate that the board game learning model effectively enhances both student performance and motivation.

Based on these outcomes, several recommendations can be made. For schools, it is important to continue improving the quality of learning by implementing instructional models that align with classroom conditions and support active student engagement.

For teachers, the study highlights the value of employing diverse and innovative learning models to stimulate student interest and motivation. Teachers are encouraged to develop and deliver materials effectively while managing classrooms efficiently to ensure continuous improvement in learning outcomes. Specifically, board game-based learning methods can foster active participation and make complex concepts more accessible. Even teachers who have not previously used board games are advised to integrate them into Mathematics instruction, as this can increase student attention, engagement, and achievement. Additionally, teachers should make optimal use of school facilities and resources to support the creation of engaging learning media.

For students, the board game model encourages critical thinking, active participation, and enthusiasm in learning activities. It promotes positive collaboration with teachers and peers while improving communication skills, which in turn enhances self-confidence and prepares students for future challenges. Moreover, students are reminded that learning is not solely dependent on the teacher; information and knowledge can also be obtained from peers, books, and interactive learning tools such as board games.

REFERENCE

Andy Hidayat Jatmika, et al. (2021). Introduction to Programming Logic and Algorithms Using the Scratch Computer Application Program for Primary Age Students at SD Negeri Model Mataram. PEPADU Journal, Jan 2021. Accessed: 30 March 2023. [Online].
Available at: https://jurnal.lppm.unram.ac.id/index.php/jurnalpepadu/article/view/114

E. Maylitha, S. N. Hikmah, and S. Hanifa, "The Importance of Information and Communication Technology for Elementary School Students in Facing the 21st Century," J. Educ. Tambusai, vol. 6, no. 1, pp. 8051-8062,2022.

Gunadi, G., & Sudaryana, I. K. (2021). Analysis of the level of acceptance of the Scratch application using the technology acceptance model (TAM). Infotech Journal of Information Technology, 7(1), 7-18.

Gunawan, I. (2022). Qualitative Research Methods: Theory and Practice. Bumi Aksara. Helaluddin, & Wijaya, H. (2019). Qualitative Data Analysis: A Review of Theory & Practice. Jaffray College of Theology.

Helaluddin and H. Wijaya, Qualitative Data Analysis: A Review of Theory & Practice.
Jaffray College of Theology, 2019.

Hikmah, M. (2020). Application of project-based learning model to increase students' participation and learning outcomes in basic programming. *Technodic journal*, 27- 38.

Isnaini, M., et al. (2021). Utilisation of Scratch Application as an Alternative Learning Media for 'Z Generation' Students for Teachers of Sdn 1 Labuapi. Selaparang Journal of Progressive Community Service, 5(1), 871-875.

Khalil, N. A., & Wardana, M. R. (2022). Development of Mathematics Learning Media Using Scratch Application to Improve Higher Order Thinking Skills of Elementary School Students. Journal of Kiprah Education, 1(3). doi: 10.33578/kpd.v1i3.45. Kumala, R. A. D.,

Laila, I., Marliansyah, I. S., & Wardarita, R. (2022). Prototype curriculum of future paradigm education. Journal of Vision Research and Development in Educational Administration, 10(2), 28-36.

Latif, K. A., Hammad, R., & Muhid, A. (2021). Introduction of Computational thinking at Madrasah Ibtidaiyah Nahdatul Wathan Marcapada West Lombok. JPMB Journal of Community Empowerment with Character, 4(1), 33-40.

Maylitha, E., Hikmah, S. N., & Hanifa, S. (2022). The Importance of Information and Communication Technology for Primary School Students in Facing the Century. 21. Tambusai Journal of Education, 6(1), 8051-8062.