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The Effectiveness of Using Domino Puzzles as A Learning Medium to Improve Abilities Counting Students

Bogy Restu Ilahi[1], Meilida Eka Sari[2], Edy Susanto[3], Putri Milanda Bainamus[4]

[1]Universitas Bengkulu, Bengkulu, Indonesia.
[2]Universitas Islam Nusantara Al-Azhaar Lubuklinggau, Indonesia.
[3,4]Universitas Pat Petulai, Bengkulu, Indonesia.
Email: bogyrestu@unib.ac.id meilidaekasari@gmail.com edy.susanto722@gmail.com nandamilanda4@gmail.com
Co-authors: bogyrestu@unib.ac.id

Abstract: Mathematics learning at the elementary school level plays a strategic role in developing students' logical, creative, and critical thinking skills. However, many students still face difficulties in understanding number concepts and performing basic operations such as addition, subtraction, multiplication, and division. This study aims to determine the effectiveness of Domino Puzzle-based learning media in improving the arithmetic skills of fifth-grade students at SD Negeri 51 Bengkulu. This research used a pre-experimental design with pre-test and post-test on 30 students using 10 evaluation questions. Data were analyzed using the N-Gain formula. The results show an average N-Gain score of 0.81, which falls into the high category, indicating that this learning media is effective in enhancing students' arithmetic skills. This media not only improves calculation skills but also supports students' motivation, engagement, and conceptual understanding. Therefore, the sustainable application of Domino Puzzle media is recommended to strengthen mathematics learning achievement in elementary schools.

Keywords: Domino Puzzle, Arithmetic Skills, Elementary School.

Abstrak: Pembelajaran matematika di tingkat sekolah dasar memegang peran strategis dalam membentuk keterampilan berpikir logis, kreatif, dan kritis siswa. Namun, banyak siswa masih mengalami kesulitan dalam memahami konsep bilangan dan melakukan operasi dasar seperti penjumlahan, pengurangan, perkalian, dan pembagian. Penelitian ini bertujuan untuk mengetahui efektivitas media pembelajaran berbasis Domino Puzzle dalam meningkatkan kemampuan berhitung siswa kelas V SD Negeri 51 Bengkulu. Metode yang digunakan adalah pra-eksperimen dengan desain pre-test dan post-test pada 30 siswa, menggunakan 10 soal evaluasi kemampuan berhitung. Analisis data dilakukan dengan rumus N-Gain. Hasil penelitian menunjukkan bahwa nilai rata-rata N-Gain sebesar 0,81, termasuk kategori tinggi, yang menunjukkan bahwa media pembelajaran ini efektif dalam meningkatkan kemampuan berhitung siswa. Media ini tidak hanya memperkuat keterampilan berhitung, tetapi juga mendukung motivasi, keterlibatan, dan pemahaman konsep siswa. Oleh karena itu, penerapan media Domino Puzzle secara berkelanjutan dianjurkan untuk memperkuat pencapaian pembelajaran matematika di sekolah dasar.

Kata kunci: Domino Puzzle, Kemampuan Berhitung, Sekolah Dasar.

Introduction

Mathematics learning at the elementary school level has a very important and strategic role in forming logical, systematic, creative, and critical thinking skills for students. Through this learning, students are not only invited to master mathematical concepts theoretically, but are also trained to apply them in daily life and develop analytical and problem-solving skills. One of the basic materials taught in class V is integers, which is the main foundation in understanding various calculation operations, number patterns, and other mathematics

materials at a higher level, so that mastery of this material greatly determines the success of students in facing the next mathematics learning challenges. (Syafila et al., 2024).

However, the reality on the ground shows that many students still have difficulty in understanding the concept of numbers, especially in performing basic counting operations such as addition, subtraction, multiplication, and division. These difficulties not only slow down the learning process, but also affect students' ability to solve more complex math problems. The impact of this condition is clearly seen in the low numeracy ability of students, which is reflected in learning outcomes that do not meet the Minimum Completeness Criteria (KKM), so that more effective and innovative learning efforts are needed so that students can understand the concept of numbers thoroughly and improve their academic achievement. (Ardanari et al., 2024).

One of the causes of low student learning outcomes in numbers is the lack of variety of learning methods and media used by teachers. Learning in the classroom is still dominated by monotonous lecture methods and practice problems, which tend to make students feel bored, passive, and less interested in Math lessons. This condition causes students to have difficulty understanding the concept of decimal numbers in depth, lack skills in performing calculation operations, and cannot relate the material to everyday situations. In addition, the lack of use of interactive and creative learning media, such as educational games, teaching aids, or digital technology, further strengthens boredom and reduces students' motivation to learn. As a result, the understanding of basic mathematical concepts becomes less optimal, and students' ability to solve more complex problems is also hampered. (Diyana & Hidayati, 2024).

However, in reality in the field, even children aged 10 to 13 still have difficulty in operating addition, subtraction, multiplication, and division. This difficulty does not only occur in positive numbers, but also in negative numbers, both integers and integers, which are often encountered in various mathematics learning materials. This condition shows that the existing learning methods are not fully able to help students understand the basic concepts of counting operations thoroughly. Therefore, various learning strategies or alternatives are needed that can help students improve their numeracy skills significantly. One approach that can be applied is to utilize interactive and interesting mathematics learning media, so that the learning process becomes easier to understand and fun for students.

To overcome these problems, various innovations are needed in the learning process, especially through the application of interactive, creative, and fun learning media. This innovation is very important considering that monotonous learning and relying only on lecture methods tends to make students feel bored, less interested, and less actively involved. One approach that is considered effective is the use of game-based learning media. This type of media not only serves as a means of delivering material, but is also able to create a fun learning atmosphere, stimulate curiosity, and motivate students to actively participate in every learning activity (Material, 2024). By utilizing game-based learning media, students can develop logical, creative, and critical thinking skills, while improving concentration and problem-solving skills. In addition, this method can also strengthen cooperation between students, build confidence, and foster a positive attitude towards lessons. This more interactive and fun learning approach is expected not only to increase students' understanding of academic concepts and skills, but also foster a higher interest in learning, so that learning goals can be achieved more optimally and comprehensively. (Ali et al., 2025).

The domino puzzle game is one of the innovative and effective educational media in learning Mathematics (Syria, 2024). This media combines elements of games and education so that the learning process becomes more interesting, fun, and interactive for students. In its use, students are required to match domino cards based on the correct answers from various math problems, ranging from addition, subtraction, multiplication, to division. This activity not only demands students' cognitive abilities in logical thinking, analysis, and problem-solving, but also

involves psychomotor skills through hand movements when composing and composing domino cards. Thus, this media is able to present a comprehensive learning experience, where the cognitive, psychomotor, and affective aspects of students develop simultaneously.

In addition to improving numeracy skills and understanding of mathematical concepts, domino puzzle games also have an important role in building students' character. This medium can increase students' concentration, rigor, patience, and confidence when they successfully complete the given challenges. In addition, this game encourages social interaction and cooperation between students, so that the learning atmosphere becomes more dynamic and collaborative. With this fun learning approach, students not only gain knowledge of mathematics theoretically, but are also able to apply it practically, while also fostering higher motivation and interest in learning Mathematics. (SAGALA, 2025).

Through the use of domino puzzle games, students are invited to learn while playing in an interactive, fun, and challenging way. This learning method is designed not only to entertain, but also to actively engage students in the thinking process, so as to improve various important skills, such as concentration, focus, cooperation between peers, as well as logical and analytical thinking skills. With a more relaxed and fun learning atmosphere, students become more motivated to participate, experiment with numbers, and find solutions independently, so that the learning process becomes more meaningful and effective (Rambe, 2023).

This learning approach that uses game media is expected to make it easier for students to understand the concept of numbered numbers, recognize patterns, and improve basic numeracy skills in a more in-depth and comprehensive manner. In addition, with repeated exercises and a pleasant learning atmosphere, students' numeracy skills are expected not only to improve significantly in the short term, but also to be permanently embedded, thus building a strong foundation for more complex mathematics learning in the future (Arsi, 2025).

Based on these problems and potential solutions, the researcher is interested in learning more through a study entitled "The Effectiveness of Domino Puzzle-Based Learning Media on Numeracy Materials to Improve the Numeracy Ability of Grade V Students of SD Negeri 51 Bengkulu"

Method

This study uses a pre-experimental design method to determine the effectiveness of Domino Puzzle-based learning media on numerical materials. The effectiveness test was carried out with a pre-test and post-test using 10 questions, which were carried out by 30 students in grade V of SD Negeri 51 Bengkulu starting with a pre-test and then a post test was carried out. The subjects of the study were 30 students of class V who were involved in a limited trial. Sample selection was carried out by purposive sampling, taking into account the availability of students and readiness to take part in learning media trials. The instruments used were in the form of 10 calculation ability evaluation questions that were tested before and after the use of Domino Puzzle media. The purpose of this instrument is to measure differences in students' abilities before and after media use.

Research Procedure: 1) Pre-test: Students conduct 10 evaluation questions to measure their initial abilities., 2) Intervention: Students use Domino Puzzle-based learning media and 3) Post-test: Students conduct the same 10 evaluation questions to find out the improvement of their abilities after the use of media. Data Analysis Technique, Data is analyzed using the N-Gain formula to determine the level of improvement in students' abilities. By classification

(Hake, 1998), the N-Gain value > 0.7 is in the high category, so that Domino Puzzle-based learning media shows high effectiveness in improving students' numeracy skills.

Result and Discussion

Result

The effectiveness test was carried out using 5 pre test and posttest questions done by 30 students for 50 minutes. The purpose of this test is to determine the effectiveness of domino puzzle-based learning media using the N-Gain formula. The research data showed that the Ngen_Score variable had a sample of 30 respondents with a minimum value of 3.6, a maximum value of 11.6, a mean value of 7.6, and a standard deviation of 3.0. Meanwhile, the Ngen_Persen variable also consisted of 30 respondents with a minimum score of 36.0, a maximum score of 126.0, an average score of 81.0, and a standard deviation of 30.0. Overall, the number of data valid for analysis (Valid N listwise) was 30 respondents.

The average N-Gain value of 0.81 belongs to the high category according to the N-Gain classification (Hake, 1999), the N-Gain value can be categorized into three categories, namely, > 0.7 high, 0.3 < g < 0.7 moderate, and ≤ 0.3 low, while the N-Gain score value of 0.81 or 81% is in the High category. So it can be concluded that the Learning Media product is based on the Domino Puzzle game on number material to improve the numeracy skills of grade V students at SD Negeri 51 Bengkulu. Has high effectiveness on students' numeracy skills.

Discussion

Based on the results of the effectiveness test of domino puzzle-based learning media on numbered materials at SD Negeri 51 Bengkulu, an average N-Gain value of 0.81 (81%) was obtained, which was included in the high category according to the classification (Hake, 1998). This shows that this learning medium is effective in improving the numeracy skills of grade V students. Previous research supports this finding, for example research (RAMLAH, 2022) shows that domino card media can improve student learning outcomes in social studies subjects.

Moreover (Rakhmawati et al., 2019) Shows that numerical dominoes are effective in helping early childhood recognize numbers 1–10 with an average score of 0.84, which is categorized as high. (Wang et al., 2022) added that digital game-based education in the field of STEM can improve student learning outcomes, while (Jääskä & Aaltonen, 2022) It shows that game-based learning methods improve motivation and learning outcomes in higher education. (Khorammakan et al., 2023) Proving puzzle-based training can improve students' knowledge and cognitive function. Research (Lai & Hu, 2025) and (Sun et al., 2024) highlighting the great potential of the integration of game-based learning in improving understanding of learning concepts and outcomes in various fields of education.

Thus, domino puzzle-based learning media is not only effective in improving numeracy skills, but also supports student motivation, engagement, and concept understanding. These findings are in line with recent literature showing that game-based learning approaches are an effective and enjoyable strategy for improving the quality of learning. Therefore, the wider and sustainable application of this media is highly recommended to strengthen the achievement of mathematics learning goals in elementary schools.

Conclusion

Domino puzzle-based learning media on number material at SD Negeri 51 Bengkulu has proven to be effective in improving the numeracy skills of grade V students, with an average N-Gain score of 0.81 (high category). This medium not only improves numeracy skills, but also supports students' motivation, engagement, and understanding of concepts. The continuous application of this media is recommended to strengthen the achievement of mathematics learning in elementary schools.

References

Ali, A., Venica, S. D., Aini, W., & Hidayat, A. F. (2025). Efektivitas media pembelajaran interaktif dalam meningkatkan minat dan motivasi belajar siswa sekolah dasar. *Journal of Information System and Education Development*, *3*(1), 1–6.

Ardanari, M. S., Wantoro, J., Riyanti, R. F., Siswanto, H., & Lazwardi, A. (2024). Model Problem Based Learning (PBL) untuk meningkatkan kompetensi materi pengurangan mata pelajaran Matematika bagi siswa sekolah dasar kelas rendah. *Jurnal Ilmiah Kampus Mengajar*, 1–13.

Arsi, A. N. (2025). Peran Media Domino dalam Membangun Pemahaman Konseptual Perkalian. *Elementary School: Jurnal Pendidikan Dan Pembelajaran Ke-SD-An*, *12*(2), 928–942.

Diyana, R. N., & Hidayati, F. (2024). PENERAPAN MEDIA KANTONG BILANGAN PADA MATERI OPERASI HITUNG BILANGAN CACAH UNTUK MENINGKATKAN HASIL BELAJAR SISWA KELAS 4 SEKOLAH DASAR. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, *9*(04), 789–798.

Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics*, *66*(1), 64–74.

Jääskä, E., & Aaltonen, K. (2022). Teachers' experiences of using game-based learning methods in project management higher education. *Project Leadership and Society*, *3*, 100041.

Khorammakan, R., Omid, A., Mirmohammadsadeghi, M., & Ghadami, A. (2023). Puzzle game-based learning: a new approach to promote learning of principles of coronary artery bypass graft surgery. *BMC Medical Education*, *23*(1), 241.

Lai, C.-H., & Hu, P.-Y. (2025). The Gaming Revolution in History Education: The Practice and Challenges of Integrating Game-Based Learning into Formal Education. *Information*, *16*(6), 490.

Mea, F. (2024). Peningkatan efektivitas pembelajaran melalui kreativitas dan inovasi guru dalam menciptakan kelas yang dinamis. *Inculco Journal of Christian Education*, *4*(3), 252–275.

Rakhmawati, N. I. S., Hasibuan, R., & Lutfiyah, E. (2019). Study of Domino Number Game Development for Early Children's Ability to Recognize Numbers. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, *3*(2), 578–584.

Rambe, S. (2023). *Peningkatan kemampuan pemahaman konsep pecahan dengan menggunakan media permainan domino matematika pada siswa Kelas IV UPTD SDN 04 Hajoran*. UIN Syekh Ali Hasan Ahmad Addary Padangsidimpuan.

RAMLAH, R. (2022). Penerapan Media Kartu Domino Untuk Meningkatkan Hasil Belajar Siswa Kelas VI Pada Pelajaran IPS Di SDN Jango Tahun Pelajaran 2020/2021. *JUPE: Jurnal Pendidikan Mandala*, *7*(1), 136–146.

SAGALA, R. T. (2025). *PENGEMBANGAN MEDIA KARTU DOMINO PADA MATA PELAJARAN MATEMATIKA UNTUK KEMAMPUAN NUMERASI SISWA DIKELAS III*

SD NEGERI 060950 MEDAN TP 2024/2025. UNIVERSITAS QUALITY.

Sun, L., Kangas, M., & Ruokamo, H. (2024). Game-based features in intelligent game-based learning environments: A systematic literature review. *Interactive Learning Environments*, *32*(7), 3431–3447.

Suriani, A. (2024). EFEKTIVITAS MEDIA PUZZLE MATEMATIKA TERHADAP PEMAHAMAN KONSEP PENJUMLAHAN SISWA KELAS 2 SD. *Journal Central Publisher*, *2*(5), 2064–2071.

Syafila, A. E., Islami, S. M., & Siswoyo, A. A. (2024). Integrasi Model Pembelajaran Inkuiri Terbimbing Dan Instrumen Tes Pada Materi Bilangan Matematika Di Sekolah Dasar. *Jurnal Media Akademik (JMA)*, *2*(12).

Wang, L.-H., Chen, B., Hwang, G.-J., Guan, J.-Q., & Wang, Y.-Q. (2022). Effects of digital game-based STEM education on students' learning achievement: A meta-analysis. *International Journal of STEM Education*, *9*(1), 26.