



The Effect of Educational Game Use on Mathematics Learning Outcomes of Seventh-Grade Students at UPT SMP Negeri 5 Panca Rijang

Agustan¹, Usman M^{*2}, Madaling³, Muhammad Takdir⁴

¹²³⁴ Department of Educational Technology, Muhammadiyah University of Sidenreng Rappang

**corresponding author* : ucmc548@gmail.com

Receive: 12/06/2025	Accepted: 02/09/2025	Published: 01/10/2025
---------------------	----------------------	-----------------------

Abstract

This study aims to examine the effect of using educational games on the mathematics learning outcomes of seventh-grade students at UPT SMP Negeri 5 Panca Rijang. The background of this research is rooted in the importance of utilizing interactive instructional media to enhance students' interest and understanding of learning materials, particularly in mathematics. The research employed a true experimental design involving two groups: an experimental class that used educational games and a control class that used printed learning materials. Data were collected through post-tests and analyzed using descriptive and inferential statistics (t-test) with the assistance of SPSS version 27.

The results revealed that the average score of the experimental class was 81.17, which was significantly higher than the control class, which had an average score of 60.00. The hypothesis test showed a significance value (2-tailed) of $0.000 < 0.025$, indicating a significant effect of using educational games on students' mathematics learning outcomes. These findings suggest that educational games positively influence students' academic achievement in mathematics. Therefore, the integration of educational games into the learning process is recommended to foster a more interactive and engaging learning environment.

Keywords: educational games, learning outcomes, mathematics, interactive learning media.

Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh penggunaan media game edukasi terhadap hasil belajar Matematika siswa kelas VII di UPT SMP Negeri 5 Panca Rijang. Latar belakang penelitian ini didasarkan pada pentingnya inovasi media pembelajaran interaktif dalam meningkatkan minat dan pemahaman siswa terhadap materi pelajaran, khususnya Matematika. Metode yang digunakan adalah eksperimen murni (true experimental design) dengan dua kelas, yaitu kelas eksperimen yang menggunakan game edukasi dan kelas kontrol yang menggunakan media cetak. Data diperoleh melalui tes hasil belajar dan dianalisis menggunakan statistik deskriptif dan inferensial (uji t) dengan bantuan SPSS versi 27.

Hasil penelitian menunjukkan bahwa nilai rata-rata kelas eksperimen sebesar 81,17 lebih tinggi dibandingkan dengan kelas kontrol yang hanya mencapai rata-rata 60,00. Hasil uji hipotesis menunjukkan nilai signifikansi (2-tailed) sebesar $0,000 < 0,025$, yang berarti terdapat pengaruh yang signifikan antara penggunaan game edukasi terhadap hasil belajar Matematika siswa. Berdasarkan temuan ini, dapat disimpulkan bahwa media game edukasi memberikan kontribusi positif terhadap peningkatan hasil belajar Matematika siswa. Oleh karena itu, penggunaan game edukasi disarankan untuk diintegrasikan dalam proses pembelajaran guna menciptakan suasana belajar yang lebih interaktif dan menyenangkan.

Kata kunci: game edukasi, hasil belajar, matematika, media pembelajaran interaktif.

Introduction

Education plays a vital role in shaping individuals and advancing societies. A high-quality education provides not only basic skills and knowledge but also fosters critical thinking, creativity, and problem-solving abilities. However, many regions still struggle with educational challenges such as limited resources, uneven access, and outdated teaching methods, particularly in developing areas. These issues often result in a gap between educational goals and actual student achievement.

In response to these challenges, innovation in teaching strategies has become a key focus in improving education. One promising approach is the integration of educational technology, including interactive media and educational games, into the learning process. Such tools are designed to engage students actively, making the learning experience more enjoyable and effective. The use of educational games, in particular, has been shown to increase motivation, foster collaboration, and improve students' understanding of complex subjects.

Mathematics, as a core subject in the school curriculum, often presents difficulties for students due to its abstract concepts and problem-solving demands. Traditional teaching methods, which rely heavily on lectures and textbooks, may not be sufficient to support diverse learning styles. Therefore, it is essential to implement more interactive and student-centered approaches, such as using educational games that present mathematical concepts in a fun and engaging way.

Educational games combine elements of play and learning, allowing students to interact with content in a dynamic environment. These games often include

challenges, levels, scores, and rewards that stimulate students' interest and provide immediate feedback. Research has shown that well-designed educational games can improve students' cognitive skills, including reasoning, decision-making, and critical thinking, which are essential for mastering mathematics.

According to the cognitive development theories of Jean Piaget and Lev Vygotsky, students learn best through active engagement and social interaction. Piaget emphasizes learning through stages of cognitive development, while Vygotsky highlights the importance of the Zone of Proximal Development (ZPD), where learners benefit from guided learning. Educational games can support both perspectives by offering tasks matched to students' developmental levels and promoting collaborative learning.

In the context of Indonesian education, the implementation of digital learning tools has gained increasing attention, especially since the release of Government Regulation No. 53 of 2023 concerning the Quality Assurance of Higher Education. This policy supports the use of technology to enhance teaching and learning outcomes. Although many schools have adopted digital media, the use of educational games in classroom instruction remains limited and underutilized.

At UPT SMP Negeri 5 Panca Rijang, preliminary observations suggest that while teachers employ various digital resources, the use of educational games in mathematics instruction is still minimal. This presents an opportunity to investigate the potential impact of educational games on student learning outcomes. By integrating such games into math instruction, educators can create more engaging learning experiences and potentially improve academic performance.

Based on these considerations, this study was conducted to examine the influence of using educational games on the mathematics learning outcomes of seventh-grade students at UPT SMP Negeri 5 Panca Rijang. The results of this study are expected to provide valuable insights for teachers, school administrators, and educational policymakers in enhancing teaching practices and promoting the effective use of educational technology.

Method

This study used a true experimental design, specifically the post-test only control group design, to examine the effect of educational games on students' mathematics learning outcomes. This design was chosen to ensure rigorous comparison between two groups: an experimental group that received the treatment (educational games) and a control group that used conventional learning media (printed materials). By applying random sampling and structured testing procedures, this design aimed to determine whether the observed differences were directly caused by the treatment.

The population of this study included all seventh-grade students at UPT SMP Negeri 5 Panca Rijang, totaling 34 students across two classes: VII.1 and VII.2. As the total number of participants was fewer than 100, the entire population was used as the sample, according to Arikunto's guideline. Class VII.1 was assigned as the experimental group, while class VII.2 served as the control group. Both classes consisted of 17 students.

The independent variable in this study was the use of educational games, while the dependent variable was the students' mathematics learning outcomes. The educational game used in the experimental group was developed using the Wordwall platform, which allowed the teacher to

create interactive quizzes such as multiple-choice, true/false, and short answer formats. This game-based learning tool was designed to make learning more engaging and to improve students' understanding of mathematical concepts.

Data collection techniques included observation, testing, and documentation. Observation was carried out to monitor students' behavior and engagement during the learning process. The post-test was administered after the learning session to both the control and experimental groups to assess their level of understanding. The post-test consisted of 20 multiple-choice questions, each worth one point. Documentation included the collection of test scores and photographs during the teaching process to support qualitative analysis.

Data analysis was conducted using both descriptive and inferential statistics. Descriptive statistics were used to calculate the mean scores and distribution of students' performance in both groups. The scores were calculated using the formula:
$$N = \frac{SP}{SM} \times 100$$
 where SP is the score obtained and SM is the maximum score. These values were used to classify student performance levels.

To determine whether there was a statistically significant difference between the two groups, inferential statistics in the form of an independent samples t-test were used. The t-test was run using SPSS version 27 for Windows. This test compared the post-test mean scores of the experimental and control groups. The result of the test was used to confirm or reject the research hypothesis.

The null hypothesis (H_0) stated that there was no significant effect of using educational games on students' mathematics learning outcomes. The alternative hypothesis (H_1) stated that the use of educational games significantly

influenced the learning outcomes. If the t-test result showed a significance value (p-value) less than 0.05, the null hypothesis would be rejected, indicating that the treatment had a significant effect.

Through this method, the researcher aimed to provide empirical evidence on whether educational games are an effective medium for enhancing students' understanding and performance in mathematics. The controlled experimental approach ensured that other variables were minimized, thus allowing a clearer interpretation of the effect of educational game-based instruction on student learning outcomes.

Results And Discussion

The data in this study were collected through a post-test administered to both the experimental and control groups after the instructional interventions. The experimental group used educational games based on the Wordwall platform, while the control group relied on conventional printed learning materials. The test consisted of 20 multiple-choice questions aimed at evaluating students' understanding of mathematics concepts taught during the lesson.

The descriptive analysis of the control group's scores (class VII.2) revealed that the highest score was 80 and the lowest score was 45. The total score accumulated by all 17 students was 1025, resulting in a mean score of 60.00. Most students in this group scored below 75, indicating a moderate level of understanding and limited mastery of the material presented through traditional methods.

In contrast, the experimental group (class VII.1) achieved higher results. The highest score obtained was 100, and the lowest score was **65**. The total score from the 17

students amounted to 1385, with a mean score of 81.17. This indicates that students who learned through educational games performed significantly better in terms of understanding and applying the mathematical concepts compared to those in the control group.

A further breakdown showed that in the control group, only 3 students (17.65%) scored 75 and above, while 14 students (82.35%) scored below 75. In the experimental group, 13 students (76.47%) scored 75 and above, and only 4 students (23.53%) scored below that threshold. These results reflect a clear performance gap favoring the experimental group, highlighting the potential benefits of using educational games.

The statistical analysis using an independent samples t-test was conducted to test the significance of these differences. The results showed a Sig. (2-tailed) value of 0.000, which is well below the standard threshold of 0.05. This indicates a statistically significant difference between the two groups. Additionally, Levene's Test for Equality of Variances confirmed that the assumption of equal variances was met (Sig. = 0.599), supporting the validity of the t-test results.

The t-test results support the rejection of the null hypothesis (H_0), which stated that there is no significant difference between the two groups. Instead, the alternative hypothesis (H_1) is accepted, confirming that the use of educational games had a positive and significant impact on students' mathematics learning outcomes.

These findings are consistent with prior studies that emphasized the effectiveness of educational games in improving student engagement and performance. The interactive nature of the games, combined with instant feedback, levels, and reward systems, likely contributed to the better

learning outcomes observed in the experimental group.

In summary, the results of this study strongly suggest that educational games can serve as an effective instructional tool in mathematics education. The use of Wordwall games helped increase students' interest, focus, and motivation, which in turn enhanced their performance. These results provide valuable insight for educators seeking innovative methods to improve student achievement in mathematics.

DISCUSSION

The findings of this study reveal that the use of educational games significantly improves students' mathematics learning outcomes. The experimental group, which engaged in game-based learning using Wordwall, achieved a higher average score (81.17) compared to the control group (60.00), which relied on traditional printed materials. This supports the hypothesis that interactive and engaging media such as educational games can enhance students' understanding and retention of mathematical concepts.

One possible explanation for this improvement is that educational games provide an interactive learning environment that stimulates students' cognitive engagement. Unlike conventional teaching methods, games incorporate visual, auditory, and kinesthetic elements, which can accommodate various learning styles. Features like levels, challenges, rewards, and immediate feedback help sustain students' interest and provide a sense of accomplishment, encouraging them to participate more actively in the learning process.

This finding aligns with the theoretical frameworks of Jean Piaget and Lev Vygotsky. According to Piaget, learning

occurs when students interact with their environment and construct knowledge based on experience. Meanwhile, Vygotsky emphasized the importance of social interaction and scaffolding within the Zone of Proximal Development (ZPD). Educational games support both theories by offering challenges tailored to students' developmental levels and opportunities for collaborative problem-solving.

Moreover, these results are consistent with previous studies such as those by Nisa & Susanto (2022) and Anggriany & Rakhmawati (2024), which concluded that educational games increase motivation, participation, and learning achievement. The consistency across different studies reinforces the argument that game-based learning is not only effective but also adaptable across various subjects and educational levels.

Despite the positive outcomes, it is important to note that the successful implementation of educational games depends on several factors, including the quality of the game design, the teacher's ability to integrate it into the curriculum, and the availability of adequate technological resources. Teachers must receive appropriate training to effectively utilize such tools, and schools must ensure that infrastructure supports digital learning. This study confirms that educational games can be a powerful pedagogical tool in improving students' academic performance, particularly in mathematics. Integrating game-based learning into classroom instruction can transform traditional learning environments into more dynamic, motivating, and student-centered experiences. It is recommended that educators and policymakers consider adopting such innovations to enhance the overall quality of teaching and learning.

CONCLUSION

Based on the results of the study, it can be concluded that the use of educational games has a significant and positive effect on students' mathematics learning outcomes. The experimental group, which utilized Wordwall-based educational games, demonstrated higher average scores and better performance compared to the control group that used conventional printed media. These findings confirm that game-based learning is more effective in enhancing students' understanding and engagement in mathematics.

The integration of educational games in the classroom provides an interactive and enjoyable learning environment that motivates students, supports different learning styles, and improves knowledge retention. The structured features of games—such as challenges, rewards, and instant feedback—enable students to learn actively and independently, contributing to better academic achievement.

This research supports the view that innovative teaching methods aligned with technological advancement can significantly improve educational outcomes. Therefore, it is recommended that teachers adopt educational games as complementary tools in mathematics instruction and that schools provide the necessary support and training to facilitate their effective implementation.

REFERENCES

- Anggriany, N., & Rakhmawati, F. (2024a). *Efektivitas Penggunaan Game Edukasi Berbasis*. 10(1), 290–302.
- Anggriany, N., & Rakhmawati, F. (2024b). *Efektivitas Penggunaan Game Edukasi Berbasis Wordwall Dalam Meningkatkan Hasil Belajar Matematis Siswa. JP2M (Jurnal Pendidikan Dan Pembelajaran Matematika)*, 10(1), 290–302.
<https://doi.org/10.29100/jp2m.v10i1.6130>
- Armawati, A., Imron Rosadi, K., & Author, C. (2021). *Faktor Yang Mempengaruhi Manajemen Lembaga Pendidikan Islam: Sistem Pendanaan*. 2(3).
<https://doi.org/10.31933/jimt.v2i3>
- Diharjo, W. (2020). *Game Edukasi Bahasa Indonesia Menggunakan Metode Fisher Yates Shuffle Pada Genre Puzzle Game. INTEGER: Journal of Information Technology*, 5(2), 23–35.
<https://doi.org/10.31284/j.integer.2020.v5i2.1171>
- Dotutinggi, M., Zees, A., & Rahmat, A. (2023). *Pengaruh Pemanfaatan Game Edukasi Wordwall Pada Hasil Belajar Siswa Terhadap Pembelajaran Siswa di Sekolah. Jurnal Pengabdian Masyarakat: DIKMAS*, 363(2).
<https://doi.org/10.37905/dikmas.3.2.354-368.2023>
- Fadhilah, A. M., Bakar, A., & Fahmi, I. (2023). *Penggunaan Media Pembelajaran Edmodo Dalam Meningkatkan Hasil Belajar Pai Di Sekolah Menengah Pertama Negeri 2 Karawang Barat. Al-Ulum Jurnal Pemikiran Dan Penelitian Ke Islaman*, 10(4), 330–341.
<https://doi.org/10.31102/alulum.10.4.2023.330-341>
- Fauzurrohim, M. H. (2023). *Evaluasi Hasil Belajar Peserta Didik di SD Negeri Sumbersari 3. Proceedings Series of Educational Studies*.
<https://doi.org/10.17977/um083.7881>
- Firdaus, A. N., & Ghonim, M. I. (2023). *Pengaruh Penggunaan Media Berbasis Permainan Edukatif Dalam Pembelajaran Bahasa Indonesia Di Sekolah Dasar. J-SES: Journal of Science, Education and*
- Afifah, F. N. (2023). *Peran Pendidik Dalam Pengembangan Efektivitas Evaluasi Hasil Belajar Peserta Didik. Jurnal Pendidikan, Sains Dan Teknologi*, 2(4), 1086–1089.
<https://doi.org/10.47233/jpst.v2i4.1381>

- Studies*, 2(3).
<https://doi.org/10.30651/jses.v2i3.20912>
- Hartati, Y. L. (2023). Analisis Dampak Pendidikan Karakter Terhadap Perkembangan Sosial Dan Emosional Siswa. *Jurnal Multidisiplin Indonesia*, 2(7), 1502–1512.
<https://doi.org/10.58344/jmi.v2i7.310>
- Jailani, Ms., Jeka, F., & Negeri Sulthan Thaha Saifuddin Jambi, U. (2020). *Populasi dan Sampling (Kuantitatif), Serta Pemilihan Informan Kunci (Kualitatif) dalam Pendekatan Praktis*.
- Maritsa, A., Hanifah Salsabila, U., Wafiq, M., Rahma Anindya, P., & Azhar Ma'shum, M. (2021). Pengaruh Teknologi Dalam Dunia Pendidikan. *Al-Mutharahah: Jurnal Penelitian Dan Kajian Sosial Keagamaan*, 18(2), 91–100. <https://doi.org/10.46781/al-mutharahah.v18i2.303>
- Muhaimin, M. R., Ni'mah, N. U., & Listryanto, D. P. (2023). Peranan Media Pembelajaran Komik Terhadap Kemampuan Membaca Siswa Sekolah Dasar. *Jurnal Pendidikan Dasar Flobamorata*, 4(1), 399–405.
<https://doi.org/10.51494/jpdf.v4i1.814>
- Muslimin, T. A., & Kartiko, A. (2021). Pengaruh Sarana dan Prasarana Terhadap Mutu Pendidikan di Madrasah Bertaraf Internasional Nurul Ummah Pacet Mojokerto. *Munaddhomah: Jurnal Manajemen Pendidikan Islam*, 1(2), 75–87.
<https://doi.org/10.31538/munaddhomah.v1i2.30>
- Ningsih, A. D., Zakiyah, A., & Andriyanto, A. (2022). Pengaruh Metode Problem Based Learning Terhadap Hasil Belajar Mata Kuliah Dokumentasi Keperawatan. *Jurnal Keperawatan*, 20(4), 76–85.
<https://doi.org/10.35874/jkp.v20i4.1080>
- Ningtyas, A. F., Tisngati, U., & Ardhyantama, V. (2024). Pengembangan *Game* Edukasi Sebagai Media Pembelajaran Matematika Untuk Meningkatkan Pemahaman Konsep Matematis Siswa Kelas IV. (*Doctoral Dissertation, STKIP PGRI PACITAN*), 13–56.
- Nisa, M. A., & Susanto, R. (2022). Pengaruh Penggunaan *Game* Edukasi Berbasis Wordwall Dalam Pembelajaran Matematika Terhadap Motivasi Belajar. *JPGI (Jurnal Penelitian Guru Indonesia)*, 7(1), 140.
<https://doi.org/10.29210/022035jpgi0005>
- Nurfadhillah, S., Wahidah, A. R., Rahmah, G., Ramdhan, F., Maharani, S. C., & Tangerang Universitas Muhammadiyah. (2021). Penggunaan Media Dalam Pembelajaran Matematika Dan Manfaatnya Di Sekolah Dasar Swasta Plus Ar-Rahmaniyah. *EDISI: Jurnal Edukasi Dan Sains*, 3(2), 289–298.
- Oktary, D., Khairiyah, K., Mariah, K., Yakub, E., Studi, P., & Riau, U. (2024). *Pelatihan Game Edukasi Untuk Meningkatkan Kompetensi Guru Sekolah Dasar (SD) Di Desa Pantai Raja Kecamatan Perhentian Raja Kabupaten Kampar*. 4(4), 135–143.
- Pedersen, R. E. (2003). *Game Design Foundations*. In *Igarss 2014* (Issue 1).
- Priadana, M. S., & Sunarsi, D. (2021). *Metode-Penelitian-Kuantitatif*.
- Putra, A. D., & Salsabila, H. (2021). Pengaruh Media Interaktif Dalam Perkembangan Kegiatan Pembelajaran Pada Instansi Pendidikan. *Inovasi Kurikulum*, 18(2), 231–241.
<https://doi.org/10.17509/jik.v18i2.36282>
- Qomaria, E., Sumarno, S., Roshayanti, F., & Utami, S. (2024). Pengaruh Penggunaan *Game* Edukasi Berbasis Wordwall dalam Pembelajaran IPAS terhadap Hasil Belajar Siswa. In *Ainara Journal* (Vol. 5, Issue 4). <http://journal.ainarapress.org/index.php/ainaj>
- Ririn Puspita Tutiasri, Niko Kurniawan Laminto, & Karim Nazri. (2020). Pemanfaatan Youtube Sebagai Media Pembelajaran Bagi Mahasiswa di Tengah Pandemi Covid-19. *Jurnal Komunikasi, Masyarakat Dan Keamanan*, 2(2), 1–15.
<https://doi.org/10.31599/wqb46v14>
- Sunaryati, T., Zahra, A., Zhafira, A., Fazriah, I. L., Kunci, K., Kewarganegaraan, P., & Siswa, K. (2024). Menyemai Generasi Penerus Bangsa Melalui. *SAP (Susunan Artikel Pendidikan)*, 8(3).
- Usman, M., Hartati, H., & Subiyantoro, S. (2021). Efektivitas Penggunaan Google

Classroom pada Masa Pandemi Covid-19 terhadap Hasil Belajar Pendidikan Kewarganegaraan. *Edudikara: Jurnal Pendidikan Dan Pembelajaran*, 6(3). <https://doi.org/10.32585/edudikara.v6i3.251>

- Utami, L. W. S. (2021). Penggunaan google form dalam evaluasi hasil belajar peserta didik di masa pandemi covid-19. *TEACHING: Jurnal Inovasi Keguruan Dan Ilmu Pendidikan*, 1(3), 150–156. <https://doi.org/10.51878/teaching.v1i3.453>
- Walidah, G. N., Mudrikah, A., & Saputra, S. (2022). Pengaruh penggunaan game edukasi wordwall terhadap motivasi dan hasil belajar matematika peserta didik. *UJMES (Uninus Journal of Mathematics Education and Science)*, 7(2), 105–115. <https://doi.org/10.30999/ujmes.v7i2.2140>
- Widyadari, I. D. A. E., Sumual, H., & Mewengkang, A. (2023). Penerapan Model Pembelajaran Problem Based Learning untuk Meningkatkan Hasil Belajar Dasar Desain Grafis Siswa SMK. *Edutik: Jurnal Pendidikan Teknologi Informasi Dan Komunikasi*, 3(1), 107–117. <https://doi.org/10.53682/edutik.v3i1.6861>
- Wulandari, A. P., Salsabila, A. A., Cahyani, K., Nurazizah, T. S., & Ulfiah, Z. (2023). Pentingnya Media Pembelajaran dalam Proses Belajar Mengajar. *Journal on Education*, 5(2), 3928–3936. <https://doi.org/10.31004/joe.v5i2.1074>