Jurnal Pengabdian Nusantara

Vol. 3, No. 4, Desember 2025, pp. 144~148
ISSN: 2987-2413
http://kampungjurnal.org/index.php/JPN/index

The Influence of Educational Games in Problem-Based Learning on Student Learning Outcomes in Informatics Subjects at SMP Negeri 1 Angkola Barat

Alfi Salimah Siregar *, Efrizon, Ika Parma Dewi, Ilmiyati Rahmy Jasril
Fakultas Teknik, Universitas Negeri Padang
Jl. Letnan Jenderal Soeprapto No. 19, Benua Melayu Darat, Kec. Pontianak Selatan, Kota Pontianak, Kalimantan Barat 78122, Indonesia

Article Info

Article history:

Received September 29, 2025
Revised October 22, 2025
Accepted November 3, 2025

Keywords:

Educational Games, Wordwall, Problem-Based Learning, Learning Outcomes, Informatics

ABSTRACT

This research aims to determine the effect of using Wordwall-based educational games in Problem-Based Learning (PBL) on the learning outcomes of Informatics subject at SMP Negeri 1 Angkola Barat. The research method used is a quasi-experimental design with a non-equivalent control group design approach. The research sample consists of two classes: the experimental class using Wordwall educational games in PBL-based learning and the control class using conventional methods. Data collection was carried out through pretest and posttest to measure students' learning outcomes. The analysis results show that the data are normally distributed and homogeneous, so an independent t-test was conducted. The calculated t-value of 3.04 is greater than the t-table value of 2.002 with a significance of 0.004 (<0.05), indicating a significant difference between the two groups. The posttest mean score for the experimental class was 87.83, while for the control class it was 80.63, demonstrating a significant improvement in students' learning outcomes through the use of educational games. The results of this research affirm that integrating interactive learning media such as Wordwall in PBL can enhance students' motivation, engagement, and understanding of Informatics material, serving as an effective alternative in 21st-century learning.

Corresponding Author:

Alfi Salimah Siregar
Universitas Negeri Padang
Email: alfisalimah21@gmail.com

INTRODUCTION

Education is one of the important factors determining the quality of human resources. The higher the quality of education in a nation, the higher the quality of its human resources (Ramadhani & Ahmad, 2022). Therefore, the government's management of education from time to time focuses on improving the quality of education at all levels. In line with the objectives of education in Law No. 20 of 2003 on the National Education System, Article 3 states: "National education functions to develop abilities and form the character and civilization of a dignified nation in order to enlighten the nation's life, aiming to develop the potential of students to become individuals who are faithful and devoted to the One God, of noble character, healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens."

Junior High School (SMP) in accordance with the statement in Law No. 20 of 2003, Article 17 paragraph 2, states that "Basic education is a level of education that lays the foundation for secondary

ISSN: 2654-8127

education. Basic education takes the form of Elementary School (SD) and Madrasah Ibtidaiyah (MI) or other equivalent forms, as well as Junior High School (SMP) and Madrasah Tsanawiyah (MTs) or other equivalent forms." Junior High School (SMP) serves as a container for developing abilities, shaping character, and instilling moral, social, and intellectual values in adolescent students; while also aiming to lay the foundation for intelligence, knowledge, personality, noble morals, and life skills so that students can continue to higher levels of education and become responsible citizens, based on Law Number 20 of 2003 on the National Education System Article 3 and Government Regulation Number 17 of 2010 Article 76.

The Merdeka Curriculum is a curriculum that provides flexibility for educational units and educators to design learning that suits the characteristics of students and the context of each environment. The Merdeka Curriculum itself is implemented at SMP Negeri 1 Angkola Barat, which emphasizes the development of competencies, character, and student-centered learning. The objectives of SMP Negeri 1 Angkola Barat in implementing the Merdeka Curriculum are to provide more flexible learning spaces, accommodate students' interests and talents, and shape the Pancasila Student Profile as a generation that is intelligent, characterful, and competitive. The Merdeka Curriculum emphasizes strengthening competencies, character development, and student-centered learning, including through the Informatics subject. The Informatics subject at the junior high school level should serve as a medium to foster computational thinking skills, digital literacy, and creative and productive use of technology. However, in reality, Informatics learning in schools is still dominated by lecture or simple demonstration methods without support from interactive and innovative learning media. Efforts that must be made to enable students to be active in the learning process include the need for media that can create interactions in the classroom and allow students to know and understand the learning itself (Hardiyani & Zakariya, 2024).

One effort that brings significant changes in learning methods is through innovations in the form of educational games. Educational games can be defined as games aimed at sparking students' interest in learning material while playing, so that with a sense of enjoyment, students are expected to more easily understand the presented learning material (Ramadhani & Ahmad, 2022). The use of educational games not only aims to improve students' understanding of the material but also helps develop cognitive skills, logic, and problem-solving. In the context of technology-based learning, interactive and enjoyable learning media such as digital educational games become an appropriate choice to attract students' interest while improving learning outcomes.

A platform that can be used for educational games is Wordwall. Wordwall is a web-based platform that has been widely used in various learning contexts as an interactive learning medium. With the various features it offers, Wordwall allows educators to create educational games. This medium can be designed to enhance learning activities both in groups or individually, ultimately involving students to be more active during the learning process (Oktafadilla et al., 2024). The use of Wordwall-based educational games in Informatics learning for grade VIII is expected to make a significant contribution to students' learning outcomes. Educational games encourage students to be more active, increase interest in the material, and improve the learning atmosphere that has previously been less engaging. This increase in learning interest supports students to be more focused and enthusiastic, which ultimately impacts learning outcomes.

Based on the description of the background problem and considering the phenomena occurring in the current education world, the author is interested in conducting research titled "The Effect of Educational Games in Problem-Based Learning on the Learning Outcomes of Informatics Subject at SMP Negeri 1 Angkola Barat." This research aims to determine whether the use of Wordwall-based educational games in Problem-Based Learning (PBL) can have a positive effect on students' learning outcomes, as well as provide an innovative learning strategy alternative for teachers in improving the quality of Informatics learning at school.

METHOD

This research is included in the type of quantitative research. The type of research used is Quasi-experimental design. The research design used is non-equivalent control group design, which is one form of quasi-experiment involving two groups (experimental and control), without random assignment, but still conducting pretest and posttest to observe differences in learning outcomes before and after treatment. In this research, the experimental class will receive Informatics learning using Wordwall-based educational game media integrated into PBL, while the control class will follow learning with conventional methods without using Wordwall media. The population in this research consists of all grade VIII students at SMP Negeri 1 Angkola Barat, South Tapanuli Regency, in the odd semester of the 2025/2026 academic year, totaling 120 students spread across four classes, namely VIII A to VIII D. Class VIII A serves as the experimental class, which will receive learning with educational games in Problem-Based Learning (PBL), and class VIII C as the control class, which will receive learning without implementing educational games in Problem-Based Learning (PBL). The data analysis technique uses Normality Test, Homogeneity, and Hypothesis testing.

RESULTS

1. Normality Test

The normality test aims to determine whether the data for each variable is normally distributed or not. Data processing for the normality test was carried out using the Shapiro-Wilk normality test with the help of SPSS version 25 software. In decision-making, the data is considered normally distributed if the significance value (Asymp. Sig) is greater than 0.05. Conversely, if the significance value is less than 0.05, the data is stated to be not normally distributed. The results of the normality test can be seen in the following table.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
PretestKontrol	.132	30	.192	.974	30	.653
PosttestKontrol	.138	30	.153	.935	30	.067
PretestEksperimen	.132	30	.192	.974	30	.653
NewPosttestEskperimen	.109	30	.200*	.967	30	.458

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the normality test results in the Tests of Normality table, it is known that the data from the Pretest Control Class, Posttest Control Class, Pretest Experimental Class, and Posttest Experimental Class are normally distributed. This is indicated by the significance values (Sig.) in the Shapiro-Wilk test, all of which are greater than 0.05, namely 0.653; 0.067; 0.653; and 0.458 respectively. Thus, all data groups in this research meet the normality assumption, especially since the Shapiro-Wilk test is more appropriate for small samples ($n < 50$). Therefore, further analysis can use parametric statistical tests.

2. Homogeneity Test

After determining that the data is normally distributed, the next step is to conduct a homogeneity test. This test serves as a basis for accepting or rejecting the research hypothesis, based on the significance value (Sig.) from the Levene test. If the Sig. value is greater than 0.05 (Sig. > 0.05), the data is considered homogeneous or has uniform variance. The results of the homogeneity test can be seen in the following table:

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Nilai	Based on Mean	2.360	1	58	.130
	Based on Median	2.464	1	58	.122
	Based on Median and with adjusted df	2.464	1	55.460	.122
	Based on trimmed mean	2.437	1	58	.124

Based on the Tests of Homogeneity of Variances (homogeneity test) results using the Levene Test method, the significance values for all approaches (Based on Mean, Median, Median and adjusted df, and Trimmed mean) are greater than 0.05. The highest Sig. value is 0.130 (Based on Mean). This indicates that the data has homogeneous variance between groups, thus meeting the homogeneity assumption for parametric statistical analysis. Therefore, one of the requirements for the independent t-test is fulfilled.

3. Hypothesis Test

After passing the normality and homogeneity tests, the results show that both sample classes are normally distributed and have homogeneous variance. Therefore, the analysis can proceed using parametric statistical tests, namely the independent sample t-test, to determine whether there is a significant difference between the two groups. The hypothesis proposed in this average comparison test is whether there is an effect

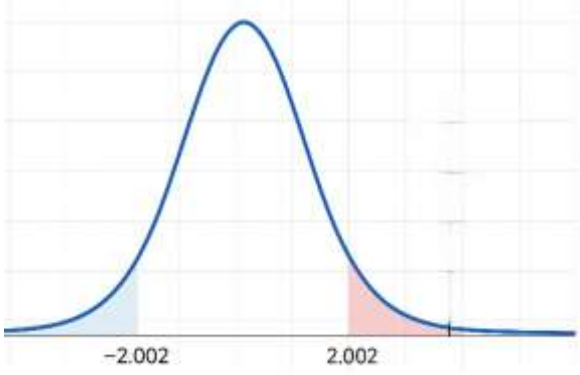
ISSN: 2654-8127

of educational games in problem-based learning on the learning outcomes of the Informatics subject at SMP Negeri 1 Angkola Barat. The hypothesis test in this research is a two-sample hypothesis test (Two Sample) aimed at comparing whether the two variables are the same or different. Furthermore, to determine whether the difference is meaningful (significant or not), interpretation is carried out on the following test results table.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Nilai	Equal variances assumed	2.360	.130	-3.039	58	.004	-7.200	2.369
	Equal variances not assumed			-3.039	53.717	.004	-7.200	2.369

Based on the t-test results, it was found that the t-count value = 3.04 with degrees of freedom (df) = 58, and the significance value (Sig. 2-tailed) was 0.004. The t-table value at a 5% significance level ($\alpha = 0.05$, two-tailed) with df = 58 is 2.002. Since the t-count (3.04) > t-table (2.002) and the significance value is less than 0.05, the null hypothesis (H_0) is rejected, and the alternative hypothesis (Ha) is accepted. This indicates that there is a significant difference between the learning outcomes of the experimental class and the control class. This is also evident from the comparison of learning outcomes between the two research samples. The experimental class, which was given treatment using Wordwall educational games, had a higher average score compared to the control class, which was not given treatment during learning. The difference in average learning outcomes between the groups was -7.20, indicating that the treatment given in this study had an impact on student learning outcomes. Below is the t-distribution curve with the H_0 rejection area shaded in red. It can be seen that the t-count value = 3.04 is outside the t-table limit = 2.002, thus H_0 is rejected, and Ha is accepted.



DISCUSSION

This study was conducted to compare student learning outcomes between an experimental class that used Wordwall educational games in problem-based learning and a control class with problem-based learning. The learning process can be considered successful or not based on student learning outcomes. Learning outcomes are obtained by students after the teaching and learning process is carried out, and this study also used learning outcomes to measure the level of success of the learning process that has been done in two different treatments. This study is an experimental research with a quasi-experimental design. The procedure carried out by the researcher in this study was to provide teaching using Wordwall educational games in the experimental class. The researcher taught computer system material in the experimental and control classes, each for 3 meetings. At the beginning of the learning activity, the researcher opened the lesson by greeting the students, then asked the class leader to lead the prayer and attendance. Next, the researcher prepared the physical and psychological conditions for the students to follow the learning. Before the learning began, students were given a pretest of 30 items to measure their initial ability to understand Informatics learning, especially related to computer system elements.

The questions given had been tested outside the sample used. In the learning process, students were then divided into small groups to play educational games that matched the material being taught. The material covered included hardware, software, brainware, and the relationship between the three computer systems. Next, students, together with their groups, discussed the game results, classified them according to the material learned, and at the end of the activity, the teacher gave reflective questions to measure students' understanding, recorded the results, and provided brief feedback. During the learning process using Wordwall educational

games, students seemed very enthusiastic and excited to follow each stage of the activity. Students were also seen to be actively involved in learning while playing the Wordwall educational game and competing to get the highest score. The high involvement of students in learning with this media had a positive impact on increasing students' understanding of the learning material, especially computer systems.

The descriptive data of learning outcomes after learning and posttest showed that the experimental class had an average ability of 87.83, while the control class had an average ability of 80.63. Thus, it can be concluded that the experimental class had a higher average score than the control class, with a standard deviation of 7.773 for the experimental class and 10.391 for the control class. The normality test results from both sample groups showed significance values of 0.653 for the control pretest, 0.067 for the control posttest, 0.653 for the experimental pretest, and 0.458 for the experimental posttest, all of which were greater than 0.05, indicating that the data was normally distributed. For the homogeneity test, the Sig. Based on Mean value was 0.130, which is greater than 0.05, indicating that the variance of the posttest data for the experimental class and the control class was the same or homogeneous.

The hypothesis test results showed that the t-test value was 3.04 with df = 58 and a significance value (Sig. 2-tailed) of 0.004. Since the t-count (3.04) > t-table (2.002) and the significance value was less than 0.05, H_0 was rejected, and Ha was accepted. This means that there was a significant difference between the learning outcomes of the experimental class and the control class. Therefore, there was a positive and significant effect of using Wordwall educational games in problem-based learning on student learning outcomes in Informatics subjects at SMP Negeri 1 Angkola Barat. Based on the research conducted in class VIII of SMP Negeri 1 Angkola Barat on Informatics subjects, it can be concluded that learning using Wordwall educational games in problem-based learning was able to improve student learning achievement. Overall, the study successfully proved that the use of Wordwall educational games in problem-based learning can improve student learning outcomes in Informatics.

CONCLUSION

There is an effect of using Wordwall educational games in problem-based learning (PBL) on student learning outcomes in Informatics subjects at SMP Negeri 1 Angkola Barat. This is evidenced by the research results and data analysis, which obtained a t-count value of 3.04, greater than the t-table value of 2.002, with a significance value of 0.004, which is less than 0.05. Thus, the research hypothesis Ha is accepted, while H0 is rejected. The use of Wordwall educational games has been proven to increase student motivation, engagement, and understanding of learning material, especially on the topic of computer systems. The descriptive analysis results show that the average posttest score of the experimental class was 87.83, while the control class was 80.63, with a difference of 7.20 points. This difference shows that the experimental class, which was given the treatment of Wordwall educational games in PBL, had higher learning outcomes compared to the control class that used PBL without educational games. Therefore, learning based on educational games makes a significant contribution to improving student learning outcomes in Informatics subjects.

REFERENCES

[1] Hardiyani, L., & Zakariya, Y. (2024). Implementasi Generative Learning menggunakan Wordwall untuk Meningkatkan Hasil Belajar Siswa pada Mata Pelajaran Informatika Kelas VIII. Ainara Journal (Jurnal Penelitian dan PKM Bidang Ilmu Pendidikan), 5(4), 391–397. https://doi.org/10.54371/ainj.v5i4.583

[2] Oktafadilla, R., Wijaya, I., & Arsyah, R. H. (2024). Pengaruh Penggunaan Media Wordwall Berbasis Game Edukasi Terhadap Hasil Belajar Siswa Pada Mata Pelajaran IPA Kelas VIII di SMP Negeri 1 Padang Ganting. 1.

[3] Ramadhani, A. R., & Ahmad, M. I. S. (2022). Media Pembelajaran Kontekstual Learning Berbasis Game Edukasi Pengaruhnya Terhadap Hasil Belajar.

[4] Sormin, R. C. P., Nasution, S. W. R., & Zainy, A. (2024). PENGARUH PEMBELAJARAN PBL BERBASIS GAMES TERHADAP HASIL BELAJAR SISWA PADA MATA PELAJARAN TEKNOLOGI INFORMASI DAN KOMUNIKASI. JURNAL VINERTEK (Vokasional Informatika Edukasi Riset dan Teknologi), 4(1), Article 1.

[5] Sugiyono. (2023). Metode Penelitian Kuantitatif, Kualitatif dan R&D. ALFABETA, cv.