

THE EFFECT OF PROBLEM-BASED LEARNING METHODS AND THE USE OF KAHOOT GAME APPLICATIONS ON STUDENT LEARNING OUTCOMES IN GRADE IX CIVIC EDUCATION

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INFO ARTIKEL	ABSTRAK
<p><i>Sejarah Artikel: (Diisi Editor)</i> Diterima: 08 September 2025 Direvisi: 10 September 2025 Disetujui: 10 Oktober 2025 Tersedia Daring: 30 October 2025</p> <p>Kata Kunci: Problem Based Learning, Game Kahoot, hasil belajar, Pendidikan Kewarganegaraan</p>	<p>Peran guru sebagai fasilitator, motivator, dan inovator dalam proses pembelajaran sangatlah penting. Oleh karena itu, pemilihan dan penerapan metode pembelajaran merupakan bagian integral dari strategi pengajaran dan peningkatan kualitas pendidikan. Penelitian ini bertujuan untuk menganalisis pengaruh metode Pembelajaran Berbasis Masalah (PBL) dan penggunaan aplikasi Kahoot terhadap hasil belajar siswa pada mata pelajaran Pendidikan Kewarganegaraan (PKn) bagi siswa kelas IX SMP Negeri 1 Pematangsiantar pada tahun ajaran 2025/2026. Latar belakang penelitian ini didasarkan pada rendahnya minat belajar dan keterlibatan siswa akibat metode pengajaran yang monoton dan konvensional. Penelitian ini menggunakan pendekatan kuantitatif dengan desain Quasi-Experimental menggunakan metode Pre-test Post-test Control Group. Populasi terdiri dari 343 siswa kelas IX, dengan sampel 61 siswa yang dibagi menjadi kelas eksperimen dan kontrol. Alat penelitian berupa tes pilihan ganda yang telah divalidasi dan diuji keandalannya menggunakan SPSS. Data dianalisis menggunakan uji normalitas, uji N-Gain, dan uji t. Temuan menunjukkan bahwa penerapan metode Pembelajaran Berbasis Masalah dan penggunaan aplikasi Kahoot memiliki efek signifikan terhadap hasil belajar siswa. Strategi ini meningkatkan motivasi, keterlibatan, dan pemahaman siswa, sehingga menghasilkan prestasi belajar yang lebih baik dibandingkan dengan metode konvensional. Penelitian ini diharapkan dapat menjadi acuan bagi guru dalam memilih metode dan media pengajaran inovatif untuk meningkatkan kualitas proses pembelajaran.</p>
<p>Keywords: Problem Based Learning, Kahoot, learning outcomes, Civic Education</p>	<p>ABSTRACT <i>The role of teachers as facilitators, motivators, and innovators in learning is crucial. Therefore, the selection and implementation of learning methods are integral to teaching strategies and improving the quality of education. This study aims to analyze the effect of the Problem Based Learning (PBL) method and the use of the Kahoot application on students' learning outcomes in Civic Education (PKn) subject for ninth-grade students of UPTD SMP Negeri 1 Pematangsiantar in the 2025/2026 academic year. The background of this research is based on the low learning interest and student engagement caused by monotonous and conventional teaching methods. This study employed a quantitative approach with a Quasi-Experimental design using the Pre-test Post-test Control Group method. The population consisted of 343 ninth-grade students, with a sample of 61 students divided into experimental and control classes. The research instrument was a multiple-choice test that had been validated and tested for reliability using SPSS. Data were analyzed using normality test, N-Gain test, and t-test. The findings indicate</i></p>

that the implementation of the Problem Based Learning method and the use of the Kahoot application have a significant effect on students' learning outcomes. These strategies improve students' motivation, engagement, and comprehension, resulting in better learning achievements compared to conventional methods. This research is expected to serve as a reference for teachers in selecting innovative teaching methods and media to enhance the quality of the learning process.

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1. Introduction

Education in general is a learning process carried out by individuals in a planned, well-structured and carried out with awareness to help students in forming their personalities, developing their potential both from intelligence, knowledge and intellectual, skills, ethics and character in students, for understanding and mastery that occurs in the community, school, nation and state. Education is very important to support the future of students in several activities carried out in the learning process at school (Simatupang et al., 2025).

National education is education implemented based on Pancasila and the 1945 Constitution of the Republic of Indonesia (UUD 1945), which plays a strategic role as the main foundation in national and state development, based on divine values, Indonesian culture, and responsiveness to changing times. It also aims to improve the quality of human resources (HR). In this regard, education and support from the government and society are needed for the implementation of education itself (Hamidah et al., 2022).

The function of National Education as stated in Article 3 of Law Number 20 of 2003 concerning the National Education System in Indonesia (UU SISDIKNAS), states that:

"National Education functions to develop abilities and shape the character and civilization of a dignified nation in order to enlighten the life of the nation, aiming to develop the potential of students to become human beings who believe in and fear God Almighty, have noble morals, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens."

Education is expected to serve as an effective tool for the next generation of the Indonesian nation to grow and develop into individuals with strong personalities. With strong character, the younger generation is expected to be able to support national development programs. This aligns with the established goals of education, namely to create human resources who are not only academically intelligent but also possess integrity, resilience, and a commitment to national progress. Through quality education, it is hoped that the younger generation of the Indonesian nation can contribute positively to realizing the ideals of sustainable national development (Janson Silaban et al., 2024) .

The learning process takes place in schools, which is the primary aspect of education. The success of a learning process depends on the selection of appropriate and relevant learning methods for the students. Each student has different characteristics, learning styles, social backgrounds, and levels of understanding. Therefore, teachers are required to adapt learning methods and media to the situation, needs, and learning objectives they wish to achieve (Widodo & Amalia, 2020).

The role of teachers as facilitators, motivators, and innovators in learning is crucial. Therefore, the selection and implementation of learning methods are integral to teaching strategies and improving the quality of education. Teachers who are able to apply methods appropriate to students' needs and circumstances will be better able to achieve optimal learning objectives. One such goal is the Regional Technical Implementation Unit (UPTD) of SMP Negeri 1 Pematangsiantar, which also has the same goal: to produce graduates or young people who possess self-competence, in terms of knowledge and good character, competence, creativity, and good learning skills, with intellectual, spiritual, and competitive abilities (Jiang, 2022). To achieve this, one of the important subjects that can be taught to students is Civics Education (PKn) (Ambarwati & Kurniasih, 2021).

Civics Education is closely related to humans and their nature as social beings. Civics Education studies the values of Pancasila, the 1945 Constitution, Bhinneka Tunggal Ika (Unity in Diversity), and the Unitary State of the Republic of Indonesia (NKRI) in everyday life. It aims to shape students' character into intelligent, character-driven, and responsible citizens in the life of the nation and state. The low quality of a learning process can be seen from the achievement of outcomes that do not meet the Learning Competency Standards. In Civics Learning, the learning process is limited to explaining the material and giving exams or tests.

This situation is inconsistent with the principle of more effective learning, which impacts students and contributes to the quality and outcomes of Civics. One way to improve the quality of education in today's ever-changing learning system is to implement these learning reforms. Teachers are responsible for ensuring that the learning material is properly and correctly understood by students. Teachers are the cornerstones and driving forces responsible for teaching. They must always play a role in monitoring and taking responsibility for progress in improving student learning outcomes. One of the things teachers can do is to have the ability to implement learning methods that can be used in the teaching and learning process, especially in Civics (Suryawati et al., 2020).

One method that can be used to improve student learning outcomes is the Problem-Based Learning (PBL) method. The process of enjoyable learning depends on the teacher who teaches so that student learning outcomes can be satisfactory. The influence and use of current technology can also affect student learning outcomes. The use of the Kahoot Game application can be used as a learning medium which is an educational program or learning application that uses the internet that contains skilled and interesting questions. Its use can make students more active directly, learning is also more interesting and not

boring, can improve student learning outcomes compared to learning carried out conventionally (Farida et al., 2018).

This research is motivated by the conditions at the UPTD SMP Negeri 1 Pematangsiantar School, where there are significant challenges in the implementation of less effective learning methods and the use of less interesting media during the teaching and learning process carried out in the classroom. Observations made by the researcher, namely at the beginning of the Field Practice Program (PPL), showed that the learning methods applied were still less varied and the use of methods used by teachers was less interesting, namely still using conventional methods, namely the lecture method, and also student involvement in the learning process was very minimal, thus impacting student interest and learning outcomes, especially in Civics (Panjaitan & Sidabutar, 2022). Many students expressed that Civics learning felt monotonous and boring (Silaban, R., Panggabean, FTM, Hutapea, FM, Hutahaean, E., & Alexander, 2020). In this context, the study aims to explore the influence of the Problem Based Learning (PBL) learning method and the use of the Kahoot game application on student learning outcomes in the subject of Civics Education for Class IX UPTD SMP Negeri 1 Pematangsiantar (Lovisia & Amin, 2025).

The "Problem-Based Learning" (PBL) method is expected to increase student engagement by providing them with opportunities to learn through direct experience and collaborate in learning (Zainal, 2022). Meanwhile, the use of the "Kahoot Game" application as an interactive evaluation tool is expected to create a more enjoyable and engaging learning environment, thereby increasing student motivation, interest, and learning outcomes in participating in learning.

Based on the description above, the researcher is interested in seeing the influence of the Problem Based Learning (PBL) method and the use of the Kahoot Game Application on Learning Outcomes in the Civics subject of Class IX UPTD SMP Negeri 1 Pematangsiantar.

2. Method

The type of research used by the researcher is a quantitative method. This research method is presented using numbers. Quantitative research can be defined as a research approach used to examine specific populations and samples, and data collection uses research instruments. Data analysis is quantitative/statistical in nature with the aim of testing the researcher's hypotheses. According to Sugiyono (Rahman et al., 2024) Quantitative research methods are called traditional methods because they have been used enough to become a tradition as research methods. This method is called positivistic because it is based on the philosophy of positivism. This method is considered scientific *because* it meets scientific principles: concrete/empirical, objective, measurable, rational, and systematic. This method is also called *discovery*, and this method is called quantitative research because the research data is in the form of numbers and the analysis uses statistics.

According to Arikunto (Panggabean et al., 2025), quantitative research, as the name suggests, requires a lot of numbers, from data collection, interpretation of the data,

and presentation of the results. This research design uses *Pre-Experimental/quasi-experimental*. *Pre-Experimental* is an experimental study with a relationship between independent and dependent variables. *Quasi-Experimental* is measuring conditions before and after intervention in the treatment group and the control group. At the time the pretest (initial test) was given before learning began, while the Posttest (final test) was given after using the PBL method and the use of Kahoot .

To facilitate research and obtain the necessary information for data collection, the school locations used for the research are:

The population in a study is explicitly stated, including the size of the population and the research area covered. This is done to determine the sample size to be taken from the population and to limit the scope of generalizations. According to Arikunto (Licorish et al., 2018) , the entire research subjects. Based on the research above, the population in this study were grade IX students of UPTD SMP 1 Negeri Pematangsiantar, there are 5 grade IX classes with a total of 345 people.

In quantitative research, a sample is a truly representative and relevant portion of the population. If the sample is not representative, conclusions cannot be drawn about the population. According to Sugiyono (Kohnke & Moorhouse, 2022), a sample is a subset of the population's size and characteristics. If the population is large, it is impossible for researchers to use all of it. The purpose of the sample is to obtain information from the researched object, which is part of the population.

According to Arikunto (Basuki & Hidayati, 2019), a sample is a portion of the population's number and characteristics. If the number of subjects is less than 100, the entire population becomes the research sample. However, if the number of subjects is more than 100, 10-15% or 15-25% or more are taken, depending on the researcher's capabilities. Based on the experts mentioned above and in relation to the size of the observation area, the researcher determined the sample using random sampling, namely 20% of the population or 20% multiplied by 345 people, which is 69 people. Due to the limited number of students in the class who did not reach the specified sample, the researcher decided to take a sample of 61 people (Hidayah, 2019) .

According to Ary, et al. (Quiroz et al., 2021) stated that random sampling is divided into 3 types, namely simple random sampling, stratified sampling, and cluster sampling, because the population of Class IX UPTD SMP Negeri 1 Pematangsiantar is divided into several groups IX 1- IX 11. From several classes, researchers randomly selected one experimental class and one control class. Researchers chose class IX (Nine) 2 as the control class and Class IX 5 as the experimental class

3. Result and Discussion

Description of Research Results

This research is a *Pre-Experimental research* (quantitative) using a *Quasi-Experimental design* conducted in class IX-2 and class IX-5 at the UPTD SMP Negeri 1 Pematangsiantar school with a total of 63 students. The questions given, namely the *pre-test* and *post-test* in this study have been tested for their validity to teachers who teach Civics subjects at the UPTD SMP Negeri 1 Pematangsiantar school, after the validation of the questions is carried

out, the researcher can continue the implementation of the research in class IX-2 and IX-5 with the material "The Relationship between Pancasila and the 1945 Constitution", then the first thing the researcher did was give an initial test, namely *the Pre-test*, to students in class IX-2 to find out their learning outcomes, after that the researcher started learning and conducted a final test, namely *the Posttest*, to students, where the control class did not use the *Problem Based Learning Method* and the Use of the *Kahoot Game Application*. The researcher then gave a *pre-test* to students in class IX-5 as an *experimental class* that used the *Problem Based Learning Method* and the Use of *Kahoot Games*, after being given treatment, the researcher gave a *post-test* to students, the aim was to find out the students' learning outcomes after being given treatment (Rosyida et al., 2022).

Researchers conducted a study entitled "The Effect of *Problem Based Learning Method* and the Use of *Kahoot Game Applications* on Student Learning Outcomes in Civic Education Subjects" in Grade IX at UPTD SMP Negeri 1 Pematangsiantar Jl. Merdeka, Pardomuan. Siantar Timur District., Pematangsiantar City, North Sumatra, on August 19, 2025. Where the number of students was 61 people with an experimental class and a control class (CHRISTIANA, 2022).

Validity Test is a tool to measure how accurate or valid a tool used is, namely an instrument in the research process. In testing the validity of each question item that has been worked on by respondents, the researcher uses the SPSS 21 application. After the researcher corrects each question worked on by students, the researcher inputs the data first from SPSS 21. Each question item can be said to be valid if the value is $r_{hitung} > r_{tabel}$ with a significance level of 5% or 0.05, and vice versa if $r_{hitung} < r_{tabel}$ then the question item can be said to be invalid.

Based on the trials that have been conducted with the number of students $N = 28$ and a significance level of 5%, it was found that $r_{tabel} = 0.373$.

N-Gain Test

The N-Gain test is to measure the increase in student understanding after participating in learning both in the control class and the experimental class, the N-Gain test aims to see the effectiveness of a learning method or media in improving student learning outcomes. Researchers input data about learning outcomes from the learning using the SPSS21 application to obtain the N-Gain value. The results of the N-Gain will be a benchmark for the extent to which the effectiveness of the problem Based Learning learning method and the use of the Kahoot game application on student learning outcomes in the Civics subject with the material The relationship between Pancasila and the 1945 Constitution at UPTD SMP 1 Pematangsiantar TA 2025/2026. The level of effectiveness in the N-Gain value is based on percentages and values, which can be seen with $N\text{-Gain} > 0.7$ (70%) including High, $0.3 < N\text{-Gain} < 0.7$ (30% -70%) including moderate and $N\text{-Gain} < 0.3$ (less than 30%) (Perdana et al., 2020).

The results of the N-Gain test in this study were with a mean in the experimental class of 65.31 and the control class was with a mean value of 64.14. Therefore, the effectiveness of the *problem-based learning method* and the use of the *Kahoot game application* in the Civics subject of class IX on the learning outcomes of students of UPTD SMP Negeri 1

Pematangsiantar in the 2025/2026 academic year, the N-Gain test of the two classes can be said to be quite effective.

Table 1. N-Gain Test

Descriptives				Statistic	Std. Error
N_Gainpersen	kelas eksperimen	Mean		65.31	3.010
		95% Confidence Interval for Mean	Lower Bound	59.14	
			Upper Bound	71.47	
		5% Trimmed Mean		65.72	
		Median		65.91	
		Variance		262.829	
		Std. Deviation		16.212	
		Minimum		31	
		Maximum		89	
		Range		58	
		Interquartile Range		28	
		Skewness		-.257	.434
		Kurtosis		-.950	.845
	kontrol	Mean		64.13	2.197
		95% Confidence Interval for Mean	Lower Bound	59.64	
			Upper Bound	68.63	
		5% Trimmed Mean		64.68	
		Median		67.26	
		Variance		144.833	
		Std. Deviation		12.035	
		Minimum		38	
		Maximum		79	
		Range		42	
		Interquartile Range		18	
		Skewness		-.648	.427
		Kurtosis		-.624	.833

(Data Source: SPSS 21)

Test (t)

The test aims to test the hypothesis about the influence of one independent variable on the dependent variable. This test is used to determine whether there is a significant difference between two groups. This is done to compare two classes: the experimental class and the control group.

Table 2. Independent Sample Test

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	95% Confidence Interval of the Difference	
									Lower	Upper
hasilbelajar	Equal variances assumed	1.877	.176	3.051	57	.003	4.267	1.398	1.466	7.067
	Equal variances not assumed			3.037	52.352	.004	4.267	1.405	1.448	7.085

Based on Table 4.12, the Sig value (Sig.2-tailed) is 0.003, because the Sig.(2-tailed) value of 0.003 < 0.05 indicates that there is a statistically significant difference in the average learning outcomes of the experimental group and the control group (Langgar, 2022). The difference between the averages (mean difference) is 4.267, meaning that the learning outcomes of the experimental group are higher than those of the control group, with a 95% confidence interval in the average difference not including zero (ranging

from 1.466-7.067) (Nursyifa, 2019) . Therefore, it can be concluded based on table 4.12 above that the significant value (Sig) and t_{hitung} , then the hypothesis H_1 is accepted, namely that there is a positive and significant influence in the *problem based learning method* and the use of the *Kahoot game application* in the Civics subject for class IX on student learning outcomes at UPTD SMP Negeri 1 Pematangsiantar (M et al., 2021) .

Hypothesis Testing

This study used a *sample test* to determine the significant influence of the *problem-based learning method* and the use of the *Kahoot game application* on student learning outcomes (Nugraha, 2020) . This can be seen in the following table:

Table 3. Hypothesis Testing

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-13.602	8.451		-1.610	.113
kelasEksperimen	1.065	.115	.779	9.301	.000

a. Dependent Variable: Kelaskontrol

Based on table 4.13 above, it can be seen that the Sig (2-tailed) value is 0.000 and is smaller than 0.005. To find t_{tabel} the researcher uses the t-statistic table with a significant rate of $\alpha = 0.05$. With DF = N = 2 = 26 (Experimental class) After obtaining t_{hitung} 9,301 and t_{tabel} = 0.373, it is obtained $t_{hitung} > t_{tabel}$, from these data it shows that there is a significant influence between student learning outcomes in *the pre-test* and *post-test* (Muthmainnah et al., 2021) . It can be concluded that in the study H_a it was accepted and H_0 rejected, which means that there is an influence of the *problem-based learning method* and the use of the *Kahoot game application* on the learning outcomes of class IX students of UPTD SMP Negeri 1 Pematangsiantar TA 2025/2026 (Gumelar et al., 2021) .

Discussion of Research Results

This research was conducted at the UPTD SMP Negeri 1 Pematangsiantar school in the academic year of 2025/2026. The population used was all ninth grade students and a sample of 61 students. This research used an *experimental* (quantitative) research type using a *quasi-experimental design* . The research that has been carried out obtained several data results that have been collected by the researcher. The purpose of this research is to determine the effect of the *problem-based learning method* and the use of the *Kahoot game application* on the learning outcomes of ninth grade students at the UPTD SMP Negeri 1 Pematangsiantar with a sample size of 63 people . The researcher used two classes, namely the experimental and control classes. Before conducting the research, the researcher first tested the instruments that would be distributed to the students. The instrument test was given to the Civics study program lecturers and teachers at the school where the research took place, aiming to see whether the

instruments used were suitable for testing on the students. Then the researcher conducted a validity test and the questions were in the form of multiple choices, namely the number of questions tested was 25 valid questions. (Dea Lita Salsabila et al., 2020) .

Based on the test given by the researcher, namely *pre-test* and *post-test* to the two classes, the average value of learning outcomes in the control class, namely the *pre-test value* of 45.93 and *the post-test value* of 81.73 where in the control class no treatment was given (conventional), the average value in the experimental class, namely the *pre-test value* of 58.21 and *the post-test value* of 86 in the experimental class was given treatment, namely using the problem based learning method and the use of the Kahoot game application. (Siregar & Junita, 2016) .

Then, a normality test was conducted on *the pre-test* and *post-test* and a hypothesis test. From the test results, the sig (Significant) value was obtained $t_{hitung} > t_{tabel}$, namely $9.302 > 0.373$, which means H_0 it was rejected and H_a accepted and indicates the influence of the *problem-based learning method* and the use of *game applications. Kahoot Class IX Civics Subject on Student Learning Outcomes*

4. Conclusion

Based on the results of the analysis and data management carried out in this study, a conclusion can be drawn entitled "The Effect of Problem Based Learning Methods and the Use of Kahoot Game Applications on Learning Outcomes in Civics subjects for class IX UPTD SMP Negeri 1 Pematangsiantar. In the study, the results showed that the use of the PBL method was proven to significantly improve student learning outcomes and student participation in the learning process, where students could think critically as seen from the differences in the pre-test and post-test and could also be compared with the control class that did not receive treatment.

Kahoot game application as a learning medium has been proven to enhance the learning atmosphere, making it more enjoyable and competitive. Students enjoy learning more, and it's easier for them to understand the material presented by the teacher. The Kahoot game application can also improve learning outcomes because it facilitates questions, evaluation, and feedback, thus assisting teachers in developing the learning process. In the hypothesis test that has been carried out in a combination of the influence of the PBL learning method and the use of the Kahoot game application on student learning outcomes, seen from the results of the average post-test score in the experimental class reached 86.00 compared to the average score of the control class of 81.73. The test (t) with a significant value of $0.003 < 0.05$, while the hypothesis obtained that is H_a accepted H_0 is rejected, namely $9.302 > 3.373$. In this case, it can be concluded that there is an influence of the PBL method and the use of the Kahoot game application on student learning outcomes in the Civics subject of class IX UPTD SMP Negeri 1 Pematangsiantar TA 2025/2026.

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