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The Influence of Learning Interest in the Game Based Learning (GBL) Model Assisted by Kahoot Media on Students' Mathematical Problem-Solving Ability

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Abstract

Low interest in learning and mathematical problem-solving ability is one of the problems in mathematics learning based on the results of interviews and observations conducted at the school where the study was conducted. This study aims to determine whether there is an influence of interest in learning in the Game Based Learning (GBL) model with the help of Kahoot media on mathematical problem-solving ability with the population in this study being grade XI PPLG students of SMK PGRI 2 Taman Pemalang. Sampling used a cluster random sampling technique consisting of a trial class, an experimental class, and a control class. Data collection techniques used a questionnaire on learning interest, a mathematical problem-solving ability test, and documentation. Data analysis used a simple linear regression test. The results of the study stated that there is an influence of interest in learning the Game Based Learning (GBL) model assisted by Kahoot media on mathematical problem-solving ability by 27.5% while the other 72.5% is influenced by factors other than interest in learning.

Keywords: *Interest in Learning; Game-based Learning Model; Kahoot; Mathematical Problem-solving Ability*

A. Introduction

Education is something that every child must have because education is an effort to develop a child's abilities according to their interests and talents (Peratiwi and Adzima, 2024:1). One of the branches of knowledge taught in Indonesian education is mathematics. Mathematics aims to improve skills in counting, measuring, and applying formulas in daily life (Siregar and Sitepu, 2023:263). According to the National Council of Teachers of Mathematics (NCTM), a professional organization that supports and advances mathematics education worldwide, several criteria for mathematical abilities that students must master include (1) problem-solving, (2) reasoning, (3) proof, (4) communication, (5) connections, and (6) representation (Hanggara et al., 2022:190).

Problem-solving skills are a crucial element in mathematics learning activities. Through these activities, students have the opportunity to strengthen their self-confidence in solving mathematical problems (Laia and Harefa, 2021:465). However, to this day, the mathematical problem-solving skills of Indonesian students are still categorized as weak. This is proven by the results of international studies such as the Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA), which aim to evaluate and compare the quality of education in various countries, showing that mathematical problem-solving skills in Indonesia remain at an inadequate level with a score of 397. Meanwhile, the average score set by TIMSS is 500 (Hanggara et al., 2022:190).

One of the aspects that influences students' mathematical problem-solving skills is their interest in learning. Learning interest is an internal drive that motivates individuals to achieve educational goals (Nurhayati and Nasution, 2022:107). The level of learning interest that students have can be influenced by the use of models and media in the learning process. Therefore, innovative learning models are needed, one of which is the Game-Based Learning (GBL) model. GBL is a learning activity designed by utilizing gaming applications to help achieve learning objectives (Permana, 2022:316).

As time progresses, so does technology. Educators are expected to be able to utilize technology in learning activities, including mathematics learning. Among the several media that can be used in learning activities, one is Kahoot. Kahoot is a game-based learning platform that combines interactive quizzes and competitive elements (Darwan and Saleh, 2023:125). Unlike common quiz media, Kahoot provides quiz games that can be played individually or in groups. With an application interface similar to online games that students often play, they can easily adapt to the Kahoot media in learning activities.

Based on the results of observations and interviews with a mathematics teacher at SMK PGRI 2 Taman Pemalang, most mathematics learning still relies on conventional models, including lectures, discussions, and assignments, with

minimal use of learning aids. As a result, many students feel that mathematics learning is monotonous, which leads to low learning interest and potentially affects the success of mathematics learning in class. It is proven that students who are less enthusiastic tend not to focus during the learning process, thus experiencing difficulty in understanding the material and solving problems given by the teacher. In addition, the low ability of students to solve mathematical problems is proven by the essay answer sheets of the ASAS mathematics subject in the odd semester of the 2024/2025 academic year.

Based on the problems above, this research aims to examine the effect of learning interest on the GBL model with Kahoot media on students' mathematical problem-solving skills.

B. Research Methods

The approach applied in this research uses a **quantitative approach**. According to Syahroni (2022:44), a quantitative approach is a scientific approach that relies on data in the form of numbers, graphs, and tables, with data processing carried out statistically or quantitatively to test previously formulated hypotheses. The method applied in this research is the **true experimental design** method. According to Sugiyono (2013:75), a true experimental design is a research design that can control all external variables that may determine the research results, so that the quality of the implementation of the research design can be well maintained. The specific design applied in this study is the **pretest-posttest control group design**. According to Sugiyono (2013:74-75), a pretest-posttest control group design is a research design for an experimental group and a control group selected randomly.

The population in this study were students from class XI PPLG (Software and Game Development) at SMK PGRI 2 Taman Pemalang. The sample for this research was chosen using a **cluster random sampling technique**. The sampling resulted in two samples: 1) class XI PPLG 2 as the trial class, 2) class XI PPLG 3 as the experimental class, and 3) class XI PPLG 1 as the control class. The instruments used to collect data included 1) a **learning interest questionnaire instrument**, and 2) a **mathematical problem-solving ability test instrument**. The instruments in this study were grouped into 3 categories: moderate, high, and low. The criteria for grouping learning interest and mathematical problem-solving ability are shown in the following table.

Table 1. Learning Interest Grouping Criteria

Criteria	Category
$MB \geq \bar{X} + s$	High Learning Interest
$\bar{X} - s < MB < \bar{X} + s$	Medium Learning Interest
$MB \leq \bar{X} - s$	Low Learning Interest

Sources : (Nugraha and Aini, 2023:45)

Table 2. Criteria for Grouping Problem-Solving Ability

Criteria	Category
$MB \geq \bar{X} + s$	High
$\bar{X} - s < MB < \bar{X} + s$	Medium
$MB \leq \bar{X} - s$	Low

Sources : (Nugraha and Aini, 2023:45)

The data analysis technique used is **simple linear regression analysis** with the following steps: 1) determining the linear regression model, 2) performing classical assumption tests as a prerequisite for simple linear regression analysis, 3) conducting a simple linear regression test to check for the presence of an effect, and 4) calculating the coefficient of determination to measure the magnitude of the effect.

C. Results and Discussion

This research was conducted in May 2025 on students of class XI PPLG at SMK PGRI 2 Taman Pemalang, with each class consisting of 29 students. The study applied a GBL model with Kahoot media to generate students' interest in learning mathematics. This learning interest was measured using a questionnaire instrument compiled based on indicators of learning interest according to Fitri et al. (2021:92), which are: (1) attention, (2) student interest, (3) feelings of enjoyment, and (4) student involvement. The student learning interest data obtained from the questionnaire instrument are shown in the following table.

Table 3. Learning Interest Data

Description	Questionnaire Results
Mean	77,402
Standard Deviation	8,011
the highest score	91,00
the lowest score	60,00
Median	78,333
Mode	75,00

Based on Table 3 above, the student learning interest data obtained an average score of 77.402 with a standard deviation of 8.011. The highest score was 91, the lowest was 60, the median was 78.33, and the mode was 75.

Student learning interest can be classified into high, moderate, and low categories. This categorization uses the mean and standard deviation values in accordance with Table 1. The results of the categorization are shown in the following table.

Table 4. Classification of Learning Interests

Value	Category	Frequency	Persentase
$MB \geq 85{,}413$	High	5	17,241 %
$69{,}391 < MB < 85{,}413$	Medium	21	72,414 %
$MB \leq 69{,}391$	Low	3	10,345 %

Based on Table 4 above, the students' learning interest in the GBL model assisted by Kahoot media shows that the level of learning interest is in the high

category with 5 students (17.241%), the moderate category with 21 students (72.414%), and the low category with 3 students (10.345%).

The object of this research is students' mathematical problem-solving ability in the topic of probability. This ability is measured using a written test instrument in the form of essay questions structured according to Polya's indicators of mathematical problem-solving ability. Polya's indicators for mathematical problem-solving ability include: 1) understanding the problem, 2) making a plan, 3) carrying out the plan, and 4) looking back. The data on mathematical problem-solving ability obtained from the test instrument are shown in the following table.

Table 5. Mathematical Problem Solving Ability Data

Description	Mathematical Problem Solving Ability
Mean	78,552
Standard Deviation	11,057
the highest score	100
the Lowest score	54
Median	80
Modus	80

Based on Table 5, the students' mathematical problem-solving ability data obtained an average score of 78.552 with a standard deviation of 11.057. The highest score was 100, the lowest was 74, the median was 80, and the mode was 80.

Students' mathematical problem-solving ability can be classified into high, moderate, and low categories. This categorization uses the mean and standard deviation values in accordance with Table 2. The results of the categorization are shown in the following table.

Table 6. Classification of Mathematical Problem-Solving Ability

Value	Category	Frequency	Persentase
$x \geq 89{,}609$	High	4	13,793%
$67{,}495 < x < 89{,}609$	Medium	20	68,966%
$x \leq 67{,}495$	Low	5	17,241%

Based on Table 6 above, students' mathematical problem-solving ability shows that the level of mathematical problem-solving ability is in the high category with 4 students, or 13.793%; the medium category with 20 students, or 68.966%; and the low category with 5 students, or 17.241%.

The data from the questionnaire and the test were analyzed using simple linear regression to see if there was any influence of learning interest on mathematical problem-solving ability. The results of the analysis are as follows:

1. Determining the Linear Regression Model Equation

The regression model equation was determined by calculating the values of **a** and b from the learning interest questionnaire data and the mathematical problem-solving ability test. The simple linear regression calculation results

obtained a value of **a** and a value of **b**. Therefore, the regression equation between the learning interest variable in the Kahoot media-assisted GBL model (X) and the students' mathematical problem-solving ability variable (Y) is as follows:

$$\hat{Y} = a + bX$$

$$\hat{Y} = 22{,}291 + 0{,}726X$$

This linear regression equation can be interpreted as follows: a constant of 22.291 means that the consistency value of sudents' mathematical problem-solving ability is 22.291. The regression coefficient of X, which is 0.726, means that if the learning interest variable in the Kahoot media-assisted GBL model increases by one point, the mathematical problem-solving ability variable increases by 0.726.

2. Classical Assumption Test

The classical assumption test is used as a prerequisite to determine whether the data used meets the basic assumptions or not. The results of the classical assumption tests are as follows:

a. Residual Normality Test

According to Yusuf et al. (2024:13333), the residual normality test in a regression model is used to determine whether the residual values generated from the regression are normally distributed or not. A regression model is considered good if its data is normally distributed. This residual normality test uses the Liliefors test. The hypotheses for the residual normality test are as follows:

H_0: The residual values of the regression model are normally distributed.

H_1: The residual values of the regression model are not normally distributed.

The results of the residual normality test using the Liliefors test are shown in the following table.

Table 7. Results of the Residual Normality Test

Data	L_{hitung}	L_{tabel}	Conclusion
Residual Model Regresi	0,099	0,165	Normal

The decision criterion for the residual normality test is that H_0 is accepted if $L_o < L_t$, and vice versa. The results of the residual normality test obtained an Lo value of 0.099 and an Lt value of 0.165. Since 0.099 < 0.165, H_0 is accepted, and it can be concluded that the residual values generated by the regression model are normally distributed.

a. Linearity Test

According to Yusuf et al. (2024:13334), a **linearity test** is used to determine whether the relationship between two variables is linear or not. This study's linearity test uses a one-way ANOVA test. The hypotheses for the linearity test are as follows:

H_0: The regression is linear.

H_1: The regression is not linear.

The results of the linearity test using a one-way ANOVA test are shown in the following table.

Table 8. Results of the Linearity Test

Source of Variation	df	Sum of Squares	Mean Square	F_{Value}	P_{Value}
Total	29	182364	182364		
Coefficient a	1	178940,8	178940,8		
Regression (b)	1	941,235	941,235	0,762	4,210
Residual	27	2482	91,924		
Lack of Fit	20	1701	85,030		
Pure Error	7	781,333	111,619		
Conclusion			**Linear**		

The decision criterion for the linearity test is that H_0 is accepted if $F_{calculated}<F_{table}$, and vice versa. The calculation results obtained values for $F_{calculated}$ = 0.762 and F_{table} = 4.210. Since $F_{calculated}<F_{table}$, H_0 is accepted, and it can be concluded that the regression model equation is linear.

a. Heteroscedasticity Test

According to Yusuf et al. (2024:13334), a **heteroscedasticity test** is used to determine whether the residual variance is the same across each variable in the regression model. This study uses the **Glejser test** for heteroscedasticity. The hypotheses for the heteroscedasticity test are as follows:

H_0: There is no heteroscedasticity.

H_1: There is heteroscedasticity.

The results of the heteroscedasticity test using the Glejser test are shown in the following table.

Table 9. Results of the Heteroscedasticity Test

Source of Variation	Sum of Squares	Mean Squares	t_{Value}	$p-value$
Total	704,498	-		
Regression	941,235	-	-0,556	0,583
Lack of Fit	781,333	25,797		
Conclusion	**No Heteroscedasticity**			

1. Simple Linear Regression Test

This hypothesis test is used to determine whether there is an influence of learning interest on mathematical problem-solving ability using simple linear regression analysis. The hypotheses to be tested are as follows:

H_0: There is no influence of learning interest in the Kahoot media-assisted Game Based Learning (GBL) model on students' mathematical problem-solving ability.

H_1: There is an influence of learning interest in the Kahoot media-assisted Game Based Learning (GBL) model on students' mathematical problem-solving ability.

The results of the hypothesis test using simple linear regression are shown in the table below.

Table 10. Results of Simple Linear Regression Test

Variable	$Sig.$	$t_{Calculate}$	t_{table}	Conclusion
Learning interest and mathematical problem-solving ability	0.524	3.200	2.052	Significant Influence

The results of the hypothesis test obtained a tcalculated value of 3.200 and a t_{table} value of 2.052. Since 3.200 > 2.502, H_0 is rejected. Therefore, it can be concluded that learning interest in the Kahoot media-assisted GBL model has an influence on students' mathematical problem-solving ability.

2. Calculating the Coefficient of Determination (R^2)

The coefficient of determination is used to see the magnitude of the influence of learning interest on mathematical problem-solving ability. The calculation results obtained a coefficient of determination value of R^2=0.275 or 27.5%.

From the results of the coefficient of determination, it can be concluded that learning interest in the GBL model has a contributory influence of 27.5% on students' mathematical problem-solving ability, and the other 72.5% is influenced by other factors outside of learning interest.

D. Conclusion

The results of the student learning interest questionnaire showed an average score of 77.402, which is in the medium category. In addition, the results of the student mathematical problem-solving ability test showed an average score of 78.552, also in the medium category. The fact that the average scores for both the questionnaire and the test fall into the medium category suggests that the higher the learning interest, the higher the students' mathematical problem-solving ability. In other words, learning interest has a positive influence on mathematical problem-solving ability. This is consistent with the opinion of Darwan and Saleh (2023:124), who state that students with a high interest in a subject tend to be more enthusiastic about learning, participate actively in class, and achieve better academic results, and vice versa.

The regression coefficient value of 0.726 indicates that every one-point increase in learning interest will increase mathematical problem-solving ability by 0.726, with a consistency of mathematical problem-solving ability of 22.291. Furthermore, the analysis shows that learning interest contributes 27.5% to students' mathematical problem-solving ability, and the remaining 72.5% is influenced by other variables. This is in line with research conducted by Khofifah (2022), which states that an interest in learning mathematics has a significant

influence on students' mathematical problem-solving ability. The positive regression coefficient indicates that student learning interest has a positive influence on their mathematical problem-solving ability, with an influence of 43% and the remaining 57% influenced by other factors.

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