Jurnal PAJAR (Pendidikan dan Pengajaran)
Volume 9 Nomor 3 May 2025 | ISSN Cetak : 2580 - 8435 | ISSN Online : 2614 - 1337
DOI : http://dx.doi.org/10.33578/pjr.v9i3.109

The Effect of Game-Based Learning Model Supported by ROMERE Teaching Aids on Elementary School Students' Learning Activity

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ABSTRACT

This study aims to determine the effect of the Game-based Learning model supported by ROMERE teaching aids on student learning activity. This study used a quantitative approach with an experimental method type, namely Quasi-Experimental Design with a Non-equivalent Control Group design form. The research population involved all students at SDN Langensari 02 Ungaran Barat, consisting of class III A students (as a control class) and class III B students (as an experimental class). The data collection technique used was non-test, in the form of questionnaire sheets, observation sheets, unstructured interview sheets, and documentation (photos/pictures). The data analysis techniques used were the Independent Sample T-Test and the Simple Linear Regression Test. The research results revealed an effect of using the Game-Based Learning model supported by the ROMERE teaching aids on student learning activity. This can be proven from the Simple Linear Regression Test with a sig value of less than 0.05, namely 0.001 <0.05. Therefore, it can be concluded that applying the Game-Based Learning model supported by ROMERE teaching aids influences student learning activity. Furthermore, the simple linear regression test revealed an R square $R^2 = 0.401$, or 40.1%, indicating that the variable of the Game-Based Learning model supported by ROMERE teaching aids accounts for 40.1% of the variation in learning activity, with the remainder influenced by other variables.

Keywords*: *game-based learning, learning activity, ROMERE

Submitted	Accepted	Published
01 January 2025	15 February 2025	30 May 2025

Citation	:	Jannah, M., & Hawa, A.M. (2025). The Effect of Game-Based Learning Model Supported by ROMERE Teaching Aids on Elementary School Students' Learning Activity. *Jurnal PAJAR (Pendidikan dan Pengajaran), 9*(3), 299-307. DOI: http://dx.doi.org/10.33578/pjr.v9i3.109.

INTRODUCTION

Education is a process that aims to develop the potential of students so that they are able to adapt to their environment and function optimally in community life (Fina & Putra, 2023). Sigalingging in NK Sianturi et al. (2025) defines education as a conscious and planned effort to create an atmosphere and learning process that allows students to develop intelligence, self-control, and skills needed in social life. Therefore, an effective education system must be able to encourage active involvement of students in the learning process.

Ideal learning does not only focus on the transfer of knowledge from teacher to student, but must also create an atmosphere that encourages creativity and the active participation of students as a whole (Handini, 2023). Learning activity is the main indicator of learning success because active students will find it easier to understand the material, think critically, and develop social skills. However, conditions in the field still show that many students are not yet active in the teaching and learning process, especially due to learning methods that are still dominated by less interactive lecture methods (Zakiah, 2018).

Based on the results of observations conducted at SDN Langensari 02, it shows that the dominant learning method used is lectures, because it is considered easier to apply by teachers. However, this approach has weaknesses in encouraging active student involvement. Based on interviews with grade III teachers on March 15, 2024, it was found that students with high academic abilities were more active in learning, while students with lower understanding tended to be passive and less involved.

Based on the student learning activity sheet, it also shows that the level of learning activity of class III students at SDN Langensari 02 is still low, as shown by the following questionnaire results:

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Table 1. Data on Student Learning Activity of Class III SDN Langensari 02

Indicator	Class III A	Class III B	Average
Visual activities	56.5%	54.5%	55.5%
Listening activities	60.8%	65.9%	63.3%
Writing activities	65.2%	65.9%	65.5%
Oral activities	60.8%	52.2%	56.5%
Drawing activities	67.3%	59%	63.1%
Motor activities	50%	59%	54.4%
Mental activities	73.9%	63.6%	68.7%
Emotional activities(	60.8%	52.2%	56.5%
Total Average Activity	61.9%	59%	60.4%

From the table above, it can be seen that the level of student activity is still at 60.4%, which shows that most students are not fully involved in learning. Writing activities have the highest percentage with an average of 65.5%, which shows that students are more involved in this activity than other activities. Mental activities are also quite high at 68.7%, indicating that students are quite involved in thinking and understanding the material. While motor activities have a lower participation rate of 54.4%, this shows that activities involving physical movement are still underutilized. While listening activities are 63.3% and visual activities are 55.5%, indicating that students are still quite dependent on audio and visual-based learning methods. While emotional activities and oral activities each have a percentage of 56.5%, indicating that verbal interaction and emotional involvement of students in learning still need to be improved. Overall, the level of student engagement was at an average of 60.4%, which indicates that there is still room to improve their engagement in learning.

To increase student learning activity, teachers need to apply more interactive and interesting learning strategies. In compiling a learning, the indicators and objectives to be achieved are aspects that cannot be separated. To realize this in learning, the right method or approach is needed (Wiyata, 2021). Trianto in Maulida & Hawa (2024) mentioned that one approach that can be used is to choose the right learning model, because the learning model functions as a guideline for educators in managing the learning process effectively. By choosing the right model, learning strategies can be applied optimally so that learning objectives can be achieved.

According to Abrori & Sumadi (2023) student activity in learning can be increased by creating a fun and innovative atmosphere. One strategy that can be applied is Game-Based Learning (GBL), which according to Hintari (2023) is an effective solution in increasing student engagement because it packages learning materials in the form of interactive and interesting games. Thus, the application of innovative learning models, such as Game Based Learning, can be an effective alternative to increase student learning activity.

Although Game Based Learning has been proven effective in increasing student engagement, its implementation still has limitations. In addition to the use of innovative learning models, the use of teaching aids can also support the increase in student learning activity. Mustika et al. (2022) stated that teaching aids can convey messages effectively and increase student interest and participation. Legiman (2021) added that teaching aids can also arouse students' curiosity, so that they are more motivated to engage in learning. Most previous studies have only focused on the use of digital applications or technology-based media, without integrating physical teaching aids as the main support in the Game-Based Learning model.

Therefore, in this study, ROMERE (Rolling Me and Reading Me) teaching aids were developed as additional media in the Game-Based Learning model. ROMERE is an interactive teaching aid in the form of a rolling ball game, made of plywood and nails, and can be used to increase student activity in learning. This

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teaching aid is designed to create a more active learning experience through cognitive, psychomotor, and affective aspects and interactively through an interesting game approach.

Based on the problems described, this study aims to determine the effect of the Game-Based Learning model on the learning activity of class III students at SDN Langensari 02. By implementing a more interactive and game-based learning approach, it is hoped that students will be more motivated and active in learning and obtain better learning outcomes.

LITERATURE REVIEW

The Game-Based Learning (GBL) model is an innovative approach to learning that utilizes game elements as a tool to achieve educational goals. Winantha in Akifa & Hawa (2024) explains that Gama-Based Learning aims to increase the effectiveness of learning by presenting a more interesting and interactive learning experience. In line with that, Wibawa et al. (2021) defines Game-Based Learning as a game-based learning approach that is designed to be in accordance with the teaching material, supported by technology, and displays certain achievements after students complete an assignment or quiz. Armedianto Putro et al. (2021) also stated that Game-Based Learning integrates learning materials into games, so that students are encouraged to learn more actively and enjoyably through Game-Based Media. This model emphasizes direct interaction between students and learning materials in a more dynamic atmosphere.

According to Maulidina et al. (2018) There are several main characteristics of Game Based Learning, including:

1) Interesting and Fun
2) Experience
3) Challenges That Can Be Solved
4) Interactive with Feedback
5) Collaboration and Social Skills

Thus, Game Based Learning not only makes learning more interesting, but also increases student involvement and activeness in understanding the material more deeply.

In addition to the use of game-based learning models, teaching aids are also an important factor in increasing student activity in the classroom. Kaltsum (2017) states that teaching aids are designed to help students understand concepts concretely, thereby reducing verbalism and increasing their understanding of the material. By seeing, touching, and manipulating teaching aids, students gain a more real and applicable learning experience.

According to Destini & Nasution (2020), educational props are media that can be absorbed by the senses, either through audio or visual, to help teachers deliver material more effectively and efficiently. Meanwhile, Akifa & Hawa (2024) emphasizes that teaching aids are able to clarify learning concepts and reduce students' tendency to learn only verbally without deep understanding.

In supporting more interactive learning, researchers use ROMERE (Rolling Me and Reading Me) teaching aids as an effective solution to increase student learning activity. ROMERE is a teaching aid developed from the rolling ball game, where students actively participate by throwing balls into a glass containing questions or learning materials. This game not only makes students more courageous to speak and participate in class, but also creates a fun and non-boring learning atmosphere.

According to Legiman, (2021) teaching aids such as ROMERE are able to increase students' curiosity and encourage them to be more active in the learning process. In addition, these teaching aids also provide a fun learning experience, thus increasing students' concentration and participation in learning.

Learning activity is also one of the main factors in the success of the learning process. Badriyah (2022) defines activeness as the physical and mental involvement of students in a learning process. In other words, learning activeness reflects the extent to which students participate in academic activities, either through discussions, questions and answers, or involvement in assigned tasks.

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According to Shellai (2020) The higher the students' involvement in learning, the higher the intensity of their activity. Students who not only listen and observe, but are also directly involved in experiments, demonstrations, or displays will have a deeper understanding of the material being taught. This is reinforced by Putri & Purnami (2018) which explains that active learning includes optimizing students' intellectual and emotional aspects through various learning methods.

Learning activity can be increased with various strategies, such as:

1) Giving individual and group assignments to encourage student involvement in discussions.
2) Q&A and reflection sessions to enhance students' understanding and active participation.
3) Implementation of innovative learning models, such as Game Based Learning, to create a more enjoyable learning atmosphere.

From the various definitions that have been explained, it can be concluded that student activity in learning reflects their direct involvement in teaching and learning activities. Students who are involved do not only listen and observe, but also actively participate in experiments, demonstrations, or demonstrations, both in interactions with fellow students and with teachers. Therefore, choosing the right learning strategy, such as Game-Based Learning and ROMERE teaching aids, can play an important role in increasing student learning activity.

METHOD

This study uses a quantitative approach with a quasi-experimental design (Nonequivalent Control Group Design) to measure the effect of Game-Based Learning (GBL) supported by ROMERE teaching aids on the learning activity of grade III students of SD Negeri Langensari 02 with the following structure:

Table 2. Research Design

Group	Pretest	Treatment	Posttest
Experiment	O1	X	O2
Control	O3	Y	O4

Information:

1) **O1, O3**= Pretest results before treatment.
2) **O2, O4**= Posttest results after treatment.
3) **X**= Treatment with Game-Based Learning model supported by ROMERE.
4) **Y**= Learning with Game-Based Learning.

The research population was all students in grade III, with samples of grade III A as the experimental group and grade III B as the control group. Data were collected through questionnaires, observations, interviews, and documentation. The questionnaire was used to measure student learning activity based on Paul D. Deirich's indicators in Sohaya (2017) such as visual, oral, listening, writing, motor, mental, emotional, and drawing activities, while observation is used to observe student involvement directly. Interviews are conducted with teachers to obtain additional information, and documentation is used as supporting data.

Data analysis involves several stages, namely validity and reliability tests to ensure the validity of the research instrument, normality and homogeneity tests to determine the distribution and similarity of data variance, and hypothesis testing using the Independent Sample T-Test and Simple Linear Regression to test the differences and effects of treatment on student learning activity. The results of the study are expected to provide an objective picture of the influence of the Game-Based Learning model assisted by ROMERE teaching aids on student learning activity in elementary schools.

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RESULTS AND DISCUSSION

Normality Test

The normality test is used to determine whether the distribution is normal or not. The test used is the Shapiro-Wilk test. This method is a valid normality test method and is effective for small samples. The Shapiro-Wilk test is used for samples less than 50.

Table 3. Normality Test Results

	Class	Shapiro Wilk			Information
		Statistics	Df	*Sig.*	
Pretest	Control	.945	22	**.253**	**Normal**
	Experiment	.932	23	**.124**	**Normal**
Posttest	Control	.913	22	**.054**	**Normal**
	Experiment	.937	23	**.157**	**Normal**

The normality test criteria are analyzed at the significance level α = 0.05 according to the requirements, if the sign value. ≥ 0.05, then the research material is normally distributed, whereas if the sign value. < 0.05, then the research material is not normally distributed (Sugiyono, 2018). Based on the data from the Shapiro-Wilk normality test results above, the following conclusions can be drawn:

1. The pretest of the control class has a significant value of 0.253 > 0.05, so it can be said that the data is normal.
2. The pretest of the experimental class has a significant value of 0.124 > 0.05, so it can be said that the data is normal.
3. The control class posttest has a significant value of 0.054 > 0.05, so it can be said that the data is normal.
4. The posttest of the experimental class has a significant value of 0.157 > 0.05, so it can be said that the data is normal.

Homogeneity Test

The homogeneity test is used to determine whether the data is homogeneous or not. The test used in this test is the Levene's test with a sig level of α = 0.05.

Table 4. Homogeneity Test Results

	Levene Statistics	Df1	Df2	Sig	information
Pretest	.036	1	43	.850	homogeneous
Posttest	.121	1	43	.730	Homogeneous

The criteria for drawing conclusions for the homogeneity test are that population data is declared homogeneous if the sign value>α, where α= 0.05. While population data is declared inhomogeneous if the sign value <α. According to the results of the homogeneity test of student learning activity that has been carried out above, by looking at the level of significance, the pretest values of the experimental and control classes have a significance value of 0.850> 0.05. For the posttest results of the experimental and control classes, they have a significance value of 0.730> 0.05. So it can be concluded that the homogeneity test of the experimental and control classes that was carried out can be accepted or has the same variance (homogeneous).

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Hypothesis Testing

After the data obtained shows that it is normally distributed and homogeneous, the data is then reprocessed to test the hypothesis that has been formulated in this study. Hypothesis testing is carried out using the Independent Sample T-Test technique. The decision-making criteria if the sig value is > 0.05 then H_1 is accepted H_0 is rejected, conversely if the sig value is <0.05 then H_0 is accepted and H_1 is rejected. The test results are presented in the following table:

Table 6. Independent Sample T-Test Results

No	Class	Mean	Sig.
1	Control	68.86	0.034
2	Experiment	74.00	0.034

Table 6 shows that the sig value is 0.034 <0.05, so H0 is rejected or H1 is accepted. So, based on the test results, it can be said that the experimental class and the control class have statistically significant differences in the results of using the Game-Based Learning model supported by ROMEREteaching aids on the learning activity of class III students. When viewed based on the average results in the experimental class and the control class, the average obtained for the experimental class is 74.00, which is much greater than the average for the control class of 68.86. So there is an average difference between the quality of learning in the experimental class and the control class of 5.14. So it can be concluded that learning using the Game-Based Learning model supported by ROMERE teaching aids is able to provide significant changes in improvement compared to learning with the Game-Based Learning model on student learning activity.

Table 7. Student Observation Results

Class	The th meeting	Presentation (%)	Criteria
Class III SDN Langensari 02 (Control)	1	71.73%	Good
	2	75.07%	Good
	3	76.52%	Good
Average		**74%**	**Good**
Class III SDN Langensari 02 (Experiment)	1	68.75%	Good
	2	75.67%	Good
	3	83.63%	Good
Average		**76%**	**Good**

Based on the research results that have been obtained, the Game Based Learning model supported by ROMERE teaching aids is effective in increasing student learning activity. This can be proven through table 7 regarding the classical average of students who have been given treatment through face-to-face learning for 3 meetings which shows the difference between the treated and untreated classes. The treated class has a higher average result than the untreated class. In addition, through the average results of the observations that the researcher has conducted, it also shows that there is a difference in the final results of the two groups. In the experimental class that was given treatment, the average was 76% higher than the control class that was not given treatment, which had an average of 74%. Through these results, it can be said that the use of the Game Based Learning model supported by ROMERE teaching aids in the experimental class can increase student learning activity.

To determine the effect of Game Based Learning supported by ROMERE teaching aids on student learning activity, a simple linear regression test was conducted. The results are presented in the following table:

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Table 8. Simple Linear Regression Test Results

Model	R	R Square	Adjusted R Square	Std. Error
1	0.633	0.401	0.372	6.063

Table 8 shows that the R Square value is 0.401, which means that 40.1% of student learning activity is influenced by the use of the Game-Based Learning model supported by ROMERE teaching aids, while the rest is influenced by other factors.

Table 9. ANOVA Test Results

Model	*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
Regression	516.152	1	516.152	14.043	0.001
Residual	771.848	21	36.755		
Total	1288.000	22			

The ANOVA test in Table 9 shows a sig. value (0.001) < 0.05, which means that there is a significant influence between the implementation of Game-Based Learning assisted by Romere teaching aids on student learning activity.

Discussion of Findings

Based on the research results, the Game-Based Learning model supported by ROMERE teaching aids has a significant influence on student learning activity. Observation data shows that student activity indicators increase in various aspects, including:

1) Visual Activities (pay attention to pictures, experiments, and friends' work results).
2) Listening Activities (listening to the teacher's discussion and explanation).
3) Writing Activities (write reports and note down important points).
4) Oral Activities (ask, discuss, and express opinions).
5) Drawing Activities (drawing diagrams and creating visual concepts).
6) Motor Activities (conducting experiments and manipulating teaching aids).
7) Mental Activities (analyzing and making decisions in learning).
8) Emotional Activities (showing confidence and enthusiasm).

This shows that the Game Based Learning (GBL) model has proven to be an effective solution in increasing student learning activity. Kusuma et al. (2022) stated that GBL allows students to actively participate in learning by packaging materials in the form of games that are in accordance with learning objectives. This method not only encourages student involvement but also trains them to think educationally and cooperatively in discussing and solving problems (Nur'Aini, 2018).

In addition, Asmaka (2019) emphasized that Game Based Learning has various advantages, such as improving student communication, clarifying understanding of the material, and creating a more interactive and collaborative learning atmosphere.

Furthermore, Payon et al. (2021) emphasized that student learning activity is greatly influenced by various supporting factors, including the learning models and media used by educators. The use of learning models supported by learning media can increase students' interest and enthusiasm in the learning process. One of the media used in this study is ROMERE's teaching aids, which are designed to make learning more active. The implementation of the use of these teaching aids allows students to be more directly involved in classroom activities.

Therefore, teachers need to choose interesting learning models and media that are able to involve all students in teaching and learning activities. Choosing an interesting learning model, such as Game-Based Learning supported by ROMERE teaching aids, can be one of the strategic choices in increasing active student participation and creating a more enjoyable and meaningful learning experience.

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CONCLUSIONS AND RECOMMENDATION

The results of the study indicate that the Game-Based Learning (GBL) model supported by ROMERE teaching aids has a significant effect on the learning activity of grade III elementary school students. This is proven through the Independent Sample T-Test, which shows a significant difference between the experimental class and the control class, with an average learning activity value of 74.00 in the experimental class and 68.86 in the control class, and a significance value of 0.034 <0.05 which indicates a real difference. In addition, the observation results also showed that the experimental class using ROMERE teaching aids experienced an increase in learning activity of 76%, higher than the control class which only reached 74%. Simple linear regression analysis also revealed that Game-Based Learning supported by ROMERE teaching aids contributed 40.1% to the increase in student learning activity, with a significance value of 0.001 <0.05 indicating a significant influence.

The increase in students' learning activity can be seen from their involvement in various aspects, such as visual activities, listening, writing, speaking, drawing, motor activities, critical thinking, and emotional involvement in learning. This activity reflects that students are more focused, ask more questions, and are more courageous in expressing their opinions during learning. Thus, it can be concluded that the Game-Based Learning model assisted by ROMERE teaching aids is an effective strategy to increase student learning activity, create a more innovative, interactive learning environment, and support student involvement in the learning process.

Based on the research results, it is suggested that teachers implement Game-Based Learning supported by teaching aids as a learning strategy to increase student learning activity, and develop variations of other teaching aids that follow the teaching material so that learning is more interactive and interesting. Meanwhile, for further research, it is suggested that research be conducted with a wider scope, both in terms of the number of samples, education levels, and subjects, and to examine the long-term impact of using Game-Based Learning supported by teaching aids on student learning outcomes.

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