



The Effect of Game-Based Learning on Financial Literacy and Critical Thinking Skills in Developing Economic Strategies in Junior High School

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Abstract

The importance of financial literacy has become a competency for adolescents as access to online shopping services, digital finance, and e-wallets is growing rapidly. This low literacy often leads to excessive consumptive behavior, failures in future planning, and vulnerability to increasingly sophisticated financial fraud schemes. The purpose of the research is to test the effectiveness of game-based learning on students' financial literacy and critical thinking. In this study, it was designed as an experimental study that aims to explore the effectiveness of the application of game-based learning on students' financial literacy and critical thinking. This is evidenced by the results of the t-test showing a significant difference in the mean posttest score between the experimental class and the control class on both bound variables ($p < 0.05$). Furthermore, the effect size test using Cohen's coefficient d yielded a value of 0.977 for the financial literacy variable and 0.955 for the critical thinking variable, where both achievements were included in the strong effect criterion (large effect). The analysis results indicate that game-based learning influences students' financial literacy and critical thinking, as it enhances conceptual understanding, fosters risk-free financial decision-making skills, and provides an enjoyable learning experience. Thus, this data analysis provides valid and convincing scientific evidence that the implementation of game-based learning can improve financial literacy and critical thinking.

Keywords: game-based learning; financial literacy; critical thinking

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INTRODUCTION

The importance of Financial Literacy has become a competency for teenagers as access to online shopping services, digital finance, and e-wallets is growing rapidly (Nadhar et al., 2025). Junior high school students begin to interact with pocket money management, simple transactions, and consumption choices (Warsono, 2020). However, students' ability to understand the consequences of financial decisions, prioritize settings, and manage money wisely is often still in the development stage (Purba et al., 2025). Inadequate Financial Literacy can lead to consumptive behavior, weak simple financial planning, and poor financial practices. aman (Budiasih et al., 2025).

Although access to digital financial services is increasingly wide-open, the level of financial literacy among the younger generation is still showing alarming numbers (Miftahussalam et al., 2024). Many individuals understand how to use



financial products, but do not have a deep understanding of the long-term consequences of students' financial decisions (Musadat, 2024). This lack of literacy often leads to excessive consumptive behavior, failures in future planning, and vulnerability to increasingly sophisticated financial fraud schemes (Kosasih et al., 2025).

Responding to the weaknesses of conventional methods, there is an urgent need to integrate educational technology innovations, one of which is through Game-Based Learning (Wibawa et al., 2020). GBL offers an interactive learning environment, where the principles of play are used to achieve specific learning objectives (Kurniarta et al., 2025). In creating simulations that resemble the real world, GBL can transform complex economic material into a fun, concrete, and challenging learning experience (Sartika et al., 2026).

The systematic implementation of GBL is believed to significantly improve financial literacy because students learn through experiential learning or direct experience (Rahmawati et al., 2025). Elements such as instant feedback in the game help students understand the cause-and-effect relationship between the decisions made and the financial outcomes obtained (Setyaningrum et al., 2025). This accelerates the internalization of concepts such as risk management, compound interest, and budget allocation (Syalen & Hidayat, 2025). The components of GBL include: 1) challenges, 2) narrative, 3) immediate feedback, and 4) reward system is a key element (Rahmawati et al., 2025).

The main advantage of the Game-Based Learning economic domain lies in its ability to provide students with a "virtual laboratory" (Raudhatunnur & Shaleh, 2025). An educational game with a financial theme, students are given capital, targets, and obstacles that force students to do asset management directly (Risna et al., 2024). In this simulation, students experiment with a variety of economic strategies without fear of incurring real financial losses (Risna et al., 2024). So that in the creation of a safe learning space but still demands high cognitive responsibility (Moffett et al., 2023).

Game-Based Learning is one of the learning approaches that can overcome this challenge (Andika et al., 2025). GBL uses games as the primary instructional medium to achieve learning objectives (Hermawan, 2024). Through Canva's app-based snake and ladder game, students learn in an interactive, fun, challenging, and feedback-rich environment (Rahmawati et al., 2024). Learning economics material, GBL allows students to simulate determining priorities, managing resources, building strategies, and evaluating the consequences of student decisions (Supuwiningsih, 2025).

GBL's strength in financial literacy lies in its ability to provide a concrete learning experience (Jadmiko & Setiawan, 2024). Students don't just passively receive material; instead, students participate in game situations that require decision-making (Muzakka et al., 2025). Educational games such as Canva-based snake and ladder games, questions and challenges can be aligned with financial literacy and critical thinking indicators (Dinata et al., 2025). Students learn about needs and wants, savings, pocket money management, and simple economic choices through meaningful activities (Pa & Wadu, 2025). As for financial literacy, the knowledge material is 1) basic concepts such as compounding interest, 2) inflation, and 3) risk diversification is the main foundation (Muzakka et al., 2025).

In addition to literacy, GBL also acts as a catalyst in the development of critical thinking skills (Fransisco et al., 2025). Games often present dilemmas that require in-depth analysis and rapid adaptation of strategies (Umroh et al., 2025). In winning games or achieving set economic targets, students must be able to evaluate opportunities, predict simulated market movements, and correct strategy errors independently (Rahmayanti & Hayati, 2023). This mental process is the core of developing students' critical skills in developing economic strategies (Fitriani et al., 2025). As for measuring students' ability to think critically, indicators are used, namely: 1) Problem identification, 2) Analysis, 3) Solving problems, and 4) Drawing conclusions (Fransisco et al., 2025).

Although much research on GBL has been conducted, the focus of research specifically on linking the application of GBL with the synergy of financial literacy and critical thinking skills in one economic strategy framework is still limited (Widiana, 2022). Most studies only partially or focus on aspects of learning motivation alone (Marwati et al., 2024). There is a research gap in the exploration of the extent to which GBL is able to form holistic economic competencies in students (Hasanah et al., 2026).

Based on initial observations, some students still have difficulty understanding simple financial management and are not used to critical thinking in economic decision-making (Karinda & Ambalao, 2025). Therefore, this study was conducted to analyze the influence of Game-Based Learning (GBL) on Financial Literacy and Critical Thinking Skills in developing economic strategies among grade VIII students of SMP Negeri 6 Jember.

METHODS

This study is designed as an experimental study that aims to explore the effectiveness of the application of the Game Based Learning method on students' Financial Literacy and Critical Thinking Skills. The approach used is quantitative, where the researcher seeks to objectively measure the effectiveness of Game Based Learning on students' Financial Literacy and critical thinking skills.

In order to see these changes accurately, the researcher applied the One-Group Pretest-Posttest design. The flow of this research began with the initial data collection through pre-tests. This stage serves as a zero point to map the extent of students' basic understanding of economic strategy formulation before being given any intervention. After the initial data is obtained, the researcher moves on to the core stage, namely the administration of treatment or intervention (Sugiyono, 2019). At this stage, the learning atmosphere is conditioned in such a way that students are not only fixated on the material given. Students are invited to learn material on the preparation of economic strategies using the Game Based Learning method.

This research process ended with the implementation of a post-test. The results of this final test are then juxtaposed with the results of the initial test. Through the comparison of the two data, the researcher can narrate whether there is an effectiveness between the Game Based Learning method on Financial Literacy and Critical Thinking Skills (Arikunto, 2017).

First, analysis of problems and needs of students. This is carried out an in-depth study of the problems in the research object. Second, literature studies, which are conducting problem analysis in learning through theoretical studies of either relevant journals or books. Third, initial observation, synchronization is carried out between the data in the field and the theory that has been obtained. Fourth, pretest testing is applied to students who are the object of research, namely grade VIII. Fifth, post-test, tested after undergoing treatment, namely the Game Based Learning method. Sixth, data analysis. It was conducted to determine the effectiveness of the Game Based Learning method on students' Financial Literacy and Critical Thinking Skills. In testing the effectiveness of this questionnaire was used.

This research was carried out at SMP Negeri 6 Jember which is located at Jalan Hayam Wuruk No. 39, Sempusari Village, Kaliwates District, Jember Regency, East Java. This research is planned to last for approximately four months, starting from February to May 2026 in the Even semester of the 2025/2026 Academic Year. As for the use of samples, it is purposive sampling, which means that samples are used with certain considerations (Sugiyono, 2019). The sample in this study is grade VIII students, for which there are 3 classes 8A, 8B, 8C, and a total sample of 100 students. The test subjects were selected based on the suitability between the problem and the subject matter that was used as the object of research, namely the preparation of economic strategies.

The study uses primary research data, namely the results of pre-test and post-test students using the Game Based Learning method. Also, to find out the significant effectiveness of the Game Based Learning method on Financial Literacy and Critical Thinking Skills using a questionnaire. In addition, primary data is in the form of observation results before conducting research to determine the limitations of the students of the research object. Before being tested on samples, pre-test and post-test questions and questionnaires are tested for validity and reliability first. Also included are the two tests carried out on questionnaires for the variables of Game Based Learning, memory and critical thinking of students. The meaning of validity test is to measure according to what is measured (Sugiyono, 2019). The formula used to determine the validity of the test uses Product Moment.

If the measurement results show a correlation coefficient between $0.4 < r_{xy} \leq 0.6$, then the validity level is quite good, meaning that the instrument can be said to be valid for use as a measuring tool (Azwar, 2019). Second, the reliability test uses Cronbach's Alpha formula. The formula used to determine the reliability of the test uses Cronbach Alpha. If the measurement results show a reliability index of ≥ 0.70 , then the reliability level is quite good, meaning that the instrument can be used to make measurements. In this case, the validity and reliability test was used using IBM SPSS software.

The research instruments used in this study consist of test and non-test instruments that are prepared to measure research variables, namely the Game Based Learning method on students' Financial Literacy and Critical Thinking Skills. The test instruments are in the form of pre-test and posttest questions which aim to measure the level of effectiveness of Game Based Learning before and after being given treatment. The form of test used is multiple choice and/or description prepared based on the life cycle material of living beings. As for the questionnaire,

it uses the Likert scale. Where it functions to assess the attitude, opinion, or perception of a person or group towards a social phenomenon (Sugiyono, 2019).

The process of data analysis techniques in this study is carried out in stages to obtain comprehensive and accurate results. The initial stage is a descriptive analysis that aims to provide an overview of the characteristics of the research data, including pre-test and posttest scores, as well as data on the use of Game Based Learning methods. Descriptive analysis was carried out by calculating the mean value, maximum and minimum values, and standard deviation. The results of the analysis are presented in the form of tables and/or diagrams to facilitate data interpretation.

The normality test and the homogeneity test are two prerequisite test requirements for data analysis that must be met before moving to the hypothesis testing stage using parametric statistics, such as the t-test (t-test) and Cohens d. The normality test serves to find out whether the data from the bound variables, namely the students' Financial Literacy and Critical Thinking Ability scores, are normally distributed so that they can be considered to represent the characteristics of the population objectively. The normality test can be done using several methods, such as the Kolmogorov-Smirnov test and the Shapiro-Wilk test (Creswell, 2014).

Meanwhile, the homogeneity test aims to ensure that the variance of data from two or more groups being compared has uniform or equal properties (homogeneous). Through the fulfillment of these two classic assumptions, the results of the estimation of the effectiveness of the learning method calculated in the research at SMP Negeri 6 Jember can be accounted for their validity and avoid analytical bias. In this case, normality and homogeneity test using IBM SPSS software.

Next, the hypothesis test with the t-test and Cohen's d. These two tests are a combination of statistical analysis that is used sequentially to test hypotheses while measuring the success rate of treatments in experimental studies. The t-test (Paired Sample t-test) serves to find out whether or not there is a statistically significant difference in average scores between students' abilities before and after being given treatment, or between the experimental group (Game Based Learning) and the control group. The testing criteria are as follows.

- a. If t calculates $> t$ table, then the independent variable has a strong relationship to the dependent variable.
- b. If t is calculated $< t$ table, then the independent variable does not have a significant relationship to the dependent variable.

Although using the same individual from the first treatment and data from the second treatment. The hypotheses in this study are:

- a. H0: There is no effect of the use of the Game Based Learning Method on Financial Literacy and Critical Thinking Skills of junior high school students.
- b. H1: There is an effect of the use of the Game Based Learning Method on Financial Literacy and Critical Thinking Skills of junior high school students.

However, because the t-test only shows whether the difference is real or mere coincidence without showing how much of a concrete impact it is, Cohen's d-test is used as an effect size measurement. Through the value of Cohen's coefficient d, researchers can calculate and categorize exactly the extent of the effectiveness of the Game Based Learning method in influencing the memory and critical thinking

of students at SMP Negeri 06 Jember, whether it is included in the category of weak, medium, or strong effects. The interpretation of Cohen's d value is categorized into three main levels:

- a. The value $d = 0.2$, indicating a weak effect (small effect)
- b. The value $d = 0.5$, indicates a medium effect
- c. A value of $d \geq 0.8$, indicates a large effect

RESULTS & DISCUSSION

Instrument Validity and Reliability Testing

Before the financial literacy (multiple choice) and critical thinking (essay) test instruments were used to collect research data at SMPN 6 Jember, the instrument was first tested to determine the level of validity and reliability. This trial was conducted on students outside the research sample but still in the equivalent population.

First, the validity test of the question item was carried out using Pearson's Product Moment correlation formula. The question item is declared valid if the value of r is calculated $> r$ of the table at a significance level of 5%. To maintain the effectiveness of the evaluation in elementary school-age children, the number of questions made is as much as according to the indicators. The initial instrument trial was carried out with strict selection so that exactly 10 items of multiple-choice questions were obtained that were valid to measure memory, and 10 items of essay questions that were valid to measure critical thinking skills. Question items that do not meet the requirements or exceed the limit of the childwork quota are immediately eliminated, so that only these 10 selected questions are used in the collection of pretest and posttest data.

The reliability test is carried out to determine the determination or consistency of the 10 questions that have been declared valid. The reliability criteria of multiple-choice instruments were calculated using the Cronbach Alpha formula, while the essay instruments used the Alpha Cronbach formula. An instrument is said to be reliable if the value of the reliability coefficient is > 0.60 .

Table 1. Results of the Reliability Test of Research Instruments

Variable	Cronbach's Alpha	N of Items
Game Learning	.864	10
Financial Literacy	.937	10
Critical Thinking	.968	10

The results of the analysis in Table 1 show that the value of the reliability coefficient for 10 financial literacy instruments and critical thinking instruments. Because these two values exceed the minimum limit of r table 0.60, it can be concluded that the question has high consistency and meets the eligibility requirements as an accurate and reliable measurement tool in this experimental study.

Pre-test and Posttest Test Results

Based on the results of the final evaluation, the experimental class showed superior memory retention performance compared to the control class can be seen in table 2 below.

Table 2. Student Pretest-Posttest Data Test Results

Variabel	Groups	Track-to-Track Posttest
Financial Literacy	Pre-test	62.16
	Post-test	87.40
Critical Thinking	Pre-test	62.16
	Post-test	88.20

The financial literacy test managed to obtain a posttest average score of 87.40. This difference in achievement indicates descriptively that game-based learning can provide an increase in financial literacy.

Second, the variable of critical thinking ability, obtained an average posttest score of 88.20. Through essay instruments, students in the experimental class were shown to be more skilled in constructing arguments, comparing financial variations as an indicator of understanding the material.

Analytical Prerequisite Testing

After the final test data (posttest) from the experimental class and the control class were obtained through the 10 valid question items, an analysis prerequisite test was carried out which included a normality test and a variance homogeneity test as the basis for parametric statistical decision-making.

Table 3. Normality and Homogeneity Test Results

Variabel	Normality Test	Homogeneity Test
Financial Literacy	0.078	.358
Critical Thinking	0.200	.779

According to the data in Table 3, the significance value of the normality test (p) for the entire data group is above 0.05, which indicates normally distributed data. Similarly, the significance values of the homogeneity test valued at 0.358 (financial literacy) and 0.779 (critical thinking) were greater than 0.05, which means that the data variance of the two classes was uniform.

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As for when the data undergoes normality and homogeneity tests. This classic assumption compliance indicator provides legitimacy to continue hypothesis testing using parametric statistical analysis of the t-test (Independent Sample t-test). Next, the t and cohen's d tests were performed, these results can be seen in Table 4.

Table 4. Results of the t-test and Cohen's d

Variabel	T Count	Sig. (2-tailed)	Cohen's d
Financial Literacy	4.213	0	0.977

Critical Thinking	3.895	0	0.955
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Hypothesis testing was conducted to analyze the significance of differences in academic performance between post-intervention groups, followed by effect size analysis using Cohen's formula d to assess the concrete effectiveness of the tested method. Referring to the results of the inter-group analysis in Table 4, it was found that the t_{hitung} values for memory (4.213) and critical thinking (3.895) instruments far exceeded the critical limit value of t_{tabel} (1.994) with a significance value of $0.000 < 0.05$. This output provides a strong empirical basis for rejecting H_0 and accepting H_a , which confirms a statistically significant difference in mean achievement scores between the experimental class and the control class.

The evaluation of the impact strength (magnitude) of the intervention is calculated precisely through Cohen's index d . The calculation results showed an effect size of 0.977 on the financial literacy variable and 0.955 on the critical thinking ability variable. Based on the standardization criteria of Cohen's securities size, the two values were above the threshold of large effects ($d > 0.80$). Thus, this data analysis provides valid and convincing scientific evidence that the implementation of game-based learning can improve financial literacy and critical thinking.

On the other hand, other research reveals that game-based approaches are less effective in addressing the dangers of lost PPE. raise awareness of these impacts. These findings support game-based learning as a promising approach to improving the effectiveness of safety training, but underscore the importance of disruption management strategies in high-risk environments (Kanade et al., 2025). This is also supported by other results, where these findings emphasize the need to increase the availability of resources and teachers' previous pedagogical experience with games to reinforce scaffolding practices during game-based learning. The study contributes to theoretical advances by providing validated instruments and uncovering the relationship between teacher mentoring practices, school resource availability, and previous game-based pedagogical experiences, ultimately supporting the effective integration of play in Education (Kacmaz & Dubé, 2025).

Another opinion reveals that the escape room approach is an effective tool for game-based learning in nursing education followed by more comprehensive and experimental studies to improve the application of this method in the future (Esmailzadeh & Aygün, 2025). The results of other studies also revealed that overall, all of the studies reviewed consistently reported that educational games had a positive impact on students' motivation to learn (Wali et al., 2025).

Second, related to financial literacy, teacher-led teaching fosters a greater willingness to delay immediate rewards (patience) among younger students and supports disadvantaged students in developing more future-oriented saving preferences. Overall, the results of this study highlight the central role of schools and teachers in providing effective and equitable financial education (Agasisti et al., 2025). This includes that lecturers can influence student learning outcomes by incorporating ethical and environmental considerations into financial education, as well as fostering a culture of responsible consumption and sustainable financial practices (Leong & Cheng, 2025).

Other research also implies that the science literacy and critical thinking skills of students in Indonesia still need to be improved, which can be achieved by considering the use of learning media. With positive results on pre-test and post-test scores, this media has the potential to improve students' science literacy and critical thinking skills (Fatih et al., 2024). Finally, the results of this study are also supported by the finding that extroverted students are more focused on acquiring new information in learning, while introverts feel that games are more helpful in improving critical thinking skills (Indra Lim et al., 2025).

CONCLUSION

Based on the results of data analysis and discussion in this study, it can be concluded that the application of game-based learning is significantly effective in improving students' financial literacy and critical thinking skills in the material of developing economic strategies at SMP Negeri 6 Jember. This is evidenced by the results of the t-test showing a significant difference in the mean posttest score between the experimental class and the control class on the two bound variables ($p < 0.05$). Furthermore, the effect size test using Cohen's coefficient d yielded a value of 0.977 for the financial literacy variable and 0.955 for the critical thinking variable, where both achievements were included in the strong effect criterion (large effect). Thus, this data analysis provides valid and convincing scientific evidence that the implementation of game-based learning can improve financial literacy and critical thinking.

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