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Bankboard: Game-Based Learning Media to Improve Learning Outcomes of Banking Fundamentals in Accounting Vocational Schools

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Abstract: Understanding basic banking concepts is one of the key competencies that students in the Accounting program at vocational high schools need to master. The development of board game-based banking learning materials is still rare. Bankboard was developed as a banking-themed board game adapted from Monopoly. This study investigated the use of Bankboard to improve Banking Fundamentals among 10th-grade Accounting students at State Vocational High School 1 Pasuruan. The ADDIE model guided the development process with 36 student participants. Data from expert validation questionnaires and pretest–posttest assessments were analyzed using descriptive statistics, the Shapiro–Wilk test, the paired-samples *t*-test, and the N-Gain test. The content expert evaluation results showed a feasibility score of 95.00% (very valid), while the media expert gave a score of 71.87% with a note that minor revisions were needed before implementation. Normality analysis confirmed that pretest (0.090) and posttest (0.056) scores were normally distributed. Learning outcomes improved significantly after using Bankboard ($p < 0.001$), with a large effect size (Cohen's $d = 3.95$). The N-Gain score of 0.6785 indicated a moderate level of improvement. Overall, these findings indicate that Bankboard is a valid, practical, and effective learning medium for strengthening the Fundamentals of Banking competency among vocational accounting students.

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Introduction

Learning Accounting Fundamentals serves as a foundation for students in the Institutional Accounting and Finance Expertise Program (AKL) because it equips them with the fundamental concepts necessary to learn more complex accounting material. However, improving learning outcomes in basic accounting learning remains a challenge in accounting education. International research shows that introductory financial accounting learning still faces challenges in improving student learning outcomes and retention, necessitating pedagogical innovations that encourage active learning and conceptual understanding (Tsay et al., 2023). Nationally, Amarthia & Aryani (2023) reported that students' initial mastery level in this course was only 18.17%. A similar situation was observed at State Vocational High School 1 Pasuruan, 25 out of 36 students (69.4%) had not achieved the minimum passing grade

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(KKTP) of 80, with a class average of only 69.4. This indicates that students' conceptual understanding of accounting fundamentals is still suboptimal. As a result, students have difficulty solving problems requiring advanced analysis and reasoning (Kholid et al., 2021). This condition is also one of the factors contributing to students' low learning outcomes in advanced accounting. Therefore, mastering accounting fundamentals is an essential foundation before students enter their specialization pathways in grades 11 and 12 (Ristiyani et al., 2023).

The fundamentals of banking is a crucial topic in accounting that remains difficult for students to grasp. This material comprises interrelated concepts, requiring students to thoroughly understand the material, not simply memorize it. However, learning is still dominated by textbooks, PowerPoint presentations, and lectures. This situation suboptimally engages students in learning. This finding aligns with research by Azkiyah & Hendri (2024), which shows that conventional learning media can reduce student motivation and learning outcomes. Wahyuni et al. (2022) also reported that interactive learning media is more effective in improving conceptual understanding and learning activities. Observations in class 10th Accounting 1 at State Vocational High School 1 Pasuruan showed that the fundamentals of banking learning was still teacher-centered. As a result, students received information passively. These results suggest that more interactive learning media are needed to promote student engagement and strengthen conceptual understanding.

Various studies have developed interactive learning media to enhance the quality of learning, but each emphasizes different aspects. Pramesti & Rochmawati (2024) highlight the importance of quality media design, while Bereczki & Kárpáti (2021) argue that the successful implementation of learning media is also influenced by teachers' pedagogical beliefs. From a student perspective, Marfhadella et al. (2025) demonstrate that interactive media promote student motivation and active participation in learning, while Fariq (2023) discusses innovative learning conceptually without empirically testing the media's effectiveness. In addition to interactive media, various studies also show that game-based learning effectively improve learning outcomes in higher education (HajiMoradkhani et al., 2023), vocational high schools (Sitompul et al., 2025), and mathematics learning (Rakasiwi & Muhtadi, 2021). Silva et al. (2021) stated that the effectiveness of game-based learning is determined by the quality of instructional design, while Mafaza et al. (2024) showed that selecting the right media contributes to improving learning outcomes. In the field of accounting, Selamat & Ngalim (2022) developed the Putra Salamanis board game adapted from Monopoly to help students understand recording financial transactions, while Buchory et al. (2022) reported that game-based accounting learning produced higher learning outcomes than conventional learning. The characteristics of previous studies are compared with those of the current study in Table 1.

Table 1. Research Comparison

Researhers	Media	Material	Key Findings	Limitations
Silva et al. (2021)	Game-based learning	Various subjects	Learning design influences the effectiveness of game-based learning	Does not discuss accounting or banking material

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Selamat & Ngalim (2022)	Son of Salamanis	Basic Accounting	Helping students understand recording financial transactions	Focus on basic accounting, not banking basics
Buchory et al. (2022)	Accounting board game	Accountancy	Improve learning outcomes compared to conventional learning	Not developed according to the characteristics of the Accounting Vocational School curriculum
Sitompul et al. (2025)	Game-based learning	Vocational School	Improving student learning outcomes	Different learning materials
This research	Bankboard	Banking Basics	Developing special monopoly game media for basic banking material to improve learning outcomes	Filling the gaps in previous research

Bankboard was developed as a game-based learning tool for the fundamentals of banking. This tool takes the form of a board game adapted from the concept of a game. Monopoly and played in groups, with each group acting as a banking investor. Each group takes turns rolling the dice, moving the pieces, and answering questions about the fundamentals of banking material according to their zone. The group that answers correctly gains the right to purchase a city and establish a bank, while incorrect answers are fined. The winner is determined based on the accumulated final balance, asset value, and accuracy in answering questions. Through this mechanism, Bankboard is expected to create a more active, collaborative, and enjoyable learning atmosphere, thereby improving students' conceptual understanding and learning outcomes.

The development of Bankboard as a game-based learning media is the focus of this research. The media is designed to support the learning of fundamentals of banking for 10th-grade students in the Accounting and Finance Expertise Program. This research also examines the media's feasibility and effectiveness on student learning outcomes. The research findings are expected to support the development of game-based learning media for fundamentals of banking in State Vocational High Schools.

Research Method

This study was undertaken at State Vocational High School 1 Pasuruan and involved 36 students of class X Accounting 1 for the 2025/2026 academic year. This study adopted a Research and Development (R&D) approach, a methodology that emphasizes product development and testing its effectiveness through learning (Siregar, 2023). The product development stages refer to the ADDIE model, which is structured in stages through five stages: (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation (Spatioti et al., 2022). The ADDIE model was selected because its stages are interconnected and systematically organized, from needs analysis to product evaluation. The evaluation results at each stage serve as the basis for product refinement before moving on to the next stage. This

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model was chosen based on its well-organized and flexible structure, as well as its ability to accommodate the needs of diverse learning environments (Spatioti et al., 2022).

Data were collected in five stages: (1) Analysis stage, where learning needs were identified and student learning problems were mapped through in-depth interviews; (2) Design and development stage, product feasibility assessment was carried out by a validator team consisting of media experts and subject matter experts using a asessment questionnaire. This study used instruments in the form of media expert assessment questionnaire, a subject matter expert assessment questionnaire, and pretest and posttest assessments. Before being used, all instruments were first validated by expert media and a subject matter expert in their respective fields of expertise. The validators assessed the content, presentation, language, and media aspects and provided suggestions for improvement, which were used as a basis for refining the Bankboard media before the implementation phase. The media expert was a lecturer at Malang State University with expertise in developing learning materials and learning media. Meanwhile, the subject matter expert was a teacher of Accounting and Financial Institutions Fundamentals at State Vocational High School 1 Pasuruan, with over 10 years of teaching experience in the Accounting and Financial Institutions study program. Both validators assessed the product according to their respective fields of expertise using the developed validation instruments; (3) Implementation stage, the success of the media is assessed using pretests and posttests to see the improvement in student learning outcomes before and after the implementation of Bankboard; (4) Evaluation stage, the assessment focused on students' responses to the use of Bankboard, which were collected through a questionnaire.

All collected data were processed through two methods, namely descriptive qualitative analysis and quantitative analysis. Qualitative analysis included input from validators, interview results, and observation notes during the studyQuantitative analysis was based on three data sources: percentage scores from validation questionnaires completed by media and content experts, together with students' learning outcome scores.The calculation of expert validation test results refers to the following formula:

$$P = \frac{f}{N} \times 100\%$$

Information:
P = Percentage Obtained
f = Total Value Obtained
N = Maximum Score

Expert validation results were analyzed descriptively based on percentage scores and complemented by qualitative feedback from the validators, which served as the basis for refining the developed product.

Table 2. Eligibility Standards

Percentage (%)	Category	Information
81-100	Very Valid	Suitable, no further revisions needed
61-80	Valid	Worth revising
41-60	Quite Valid	Worth using but with moderate revision improvements
21-40	Less Valid	Needs major revision
1-20	Invalid	Can not be used

(Sugiyono, 2021)

Assessment of learning outcomes in this study is based on grades pretest and posttest student, not from scores during the game. Prior to analysis, data normality was examined using

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the Shapiro-Wilk test, as it is suitable for samples of less than 50 and has good reliability (Avram & Mărușteri, 2022). The test results showed a normal distribution (Sig. > 0.05), so the analysis continued using Paired Samples.t-Test. Bankboard's effect was analyzed using Cohen's d, while learning effectiveness was determined by the N-Gain category.

Result and Discussion

This research resulted in Bankboard as a learning medium for the subject of Fundamentals of Banking for class X Accounting 1 students. Media development was carried out by referring to the ADDIE model. Each stage of development is explained in the following section.

Analysis Stage

The analysis phase aims to identify learning needs and the conditions under which the teaching and learning process is implemented (Hidayat & Nizar, 2021). The results of the analysis serve as the basis for developing specifications and designing learning media. Researchers obtained data through observations and interviews with teachers and students of class 10th Accounting 1 at State Vocational High School 1 Pasuruan. These activities were conducted to identify student characteristics, the learning process, and the use of learning media. The analysis results showed that the learning process was still dominated by lecture methods. Teachers also used textbooks, PowerPoint presentations, and whiteboards as supporting media. These conditions resulted in suboptimal student engagement and understanding of the material. Therefore, more interactive and innovative learning media were needed to support the learning of fundamentals of banking

Planning and Development Stage

The design stage of the ADDIE model aims to develop the structure and content of the Bankboard media in accordance with student characteristics (Izzaturahma et al., 2021). The development of the material is based on the textbook fundamentals of banking, so that students can understand and explain the concepts they have learned. The development of this teaching aid aims to produce a valid product suitable for use in the learning process (Yanti et al., 2022).

The development stage includes creation of a Bankboard based on on a previously developed design, which is then assessed by experts to obtain input and suggestions for improvement (Muna & Wardhana, 2021). The visual appearance is designed using the Canva application, taking into account the predetermined material types and sizes. The Bankboard consists of several components, namely: (1) a game board as the main component; (2) question cards grouped by regional zone; (3) investor cards and policy cards; and (4) debt cards.

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Product Design



Figure 1. Bankboard



Figure 2. Question cards by zone



Figure 3. Investor Card and Policy

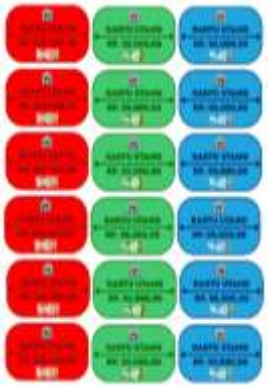


Figure 4. Debit card

Expert Validation

Before classroom implementation, Bankboard was evaluated by media and subject matter experts. The validation process employed questionnaires tailored to each expert's area of expertise. Besides assigning evaluation scores, both experts also provided suggestions to improve the media.

Validation findings indicated that the subject matter expert assigned a score of 95.00%, placing the media in the “very valid” category and confirming its alignment with the learning objectives, content, presentation, and language. In contrast, the media expert awarded a score of 71.87%, classifying the media as “valid but worth revising” category. The media expert evaluation covered aspects such as interactivity, visual presentation, quality of media components, ease of use, design consistency, illustrations, and selection of font types and sizes. Based on the feedback provided, improvements were made to several media components before the implementation phase. As a result, the BankBoard media is considered to meet the eligibility criteria and was deemed suitable for use in teaching the Fundamentals of Banking at Accounting Vocational High Schools.

Product Revision

The product was revised based on validator feedback by refining visual aspects, design, illustrations, typography, and game components. The revised results indicate that the Bankboard media meets the validator's recommendations and is ready for implementation in the Fundamentals of Banking learning.

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Table 3. Product Revisions

Before Revision		
		
After Revision		
		

Implementation Stage

During the implementation stage, Bankboard was applied as a learning tool in classroom instruction. The purpose of this phase was to examine its contribution to students' understanding of fundamentals banking topics. Changes in learning achievement were identified by comparing students performance before and after the learning activity. The classroom trial involved 36 tenth-grade Accounting 1 students at State Vocational High School 1 Pasuruan and took place over three consecutive sessions.

In the first session, students took a pretest to assess their initial abilities before the lesson began. The teacher then presented the material using PowerPoint and gave students the opportunity to study and discuss the material independently. At the end of the session, students were divided into heterogeneous groups using the Teams Games Tournament (TGT) method, which combines students with high, medium, and low ability levels to encourage collaboration in learning.

In the second meeting, the Bankboard game was implemented, beginning with a hompimpa to determine turn order. The group whose turn it was to roll the dice and advance their pieces was then required to answer questions based on the target city zone through group discussion. Highly skilled students were seen helping members who did not understand the questions, resulting in effective peer learning. Groups that answered correctly received money and were allowed to purchase the city, while those who answered incorrectly were fined. There

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were also investor cards, policy cards, and debt cards that could change the game conditions. Students appeared enthusiastic and understood that the main purpose of the game was to practice understanding the material. The game lasted approximately 90 minutes.



Figure 5. Bankboard implementation



Figure 6. Bankboard implementation

In the third meeting, the activity began with a posttest to measure students' understanding after completing the entire learning series. A reflection session was then held, during which many students stated that the Bankboard game made it easier for them to grasp the fundamentals of banking concepts because the material was presented in a fun way. Innovative learning media has been shown to increase student active participation and learning outcomes (Armiati & Hidayat, 2024).

Evaluation Stage

During the evaluation stage, the effectiveness of Bankboard was determined by analyzing students' pretest and posttest scores. The final product was evaluated in terms of its content, design, and usability to determine its overall suitability (Adeoye et al., 2024).

Normality Test

A normality test was performed to determine whether the research data followed a normal distribution (Wahyuni & Nasution, 2024). The Shapiro–Wilk test was conducted using SPSS.

Table 4. Shapiro-Wilk Normality Test Results

	Shapiro-Wilk		
	Statistic	df	Sig.
Learning Outcome Pretest	.948	36	.090
Posttest Learning Outcomes	.941	36	.056

As presented in Table 4, the Shapiro–Wilk analysis yielded significance values of 0.090 for the pretest and 0.056 for the posttest. Since both values were greater than the significance level of 0.05, the null hypothesis (H_0) was accepted. These findings indicate that both datasets satisfied the assumption of normality, confirming that the data were appropriate for subsequent parametric statistical analyses.

Paired Sample T-Test

To determine the effect of Bankboard on students' learning outcomes in the Fundamentals of Banking course, a paired-samples t-test was performed.

Table 4. Paired Sample T-Test Results

	Paired Differences			
	Mean	t	df	Sig. (2-tailed)
Learning Outcome Pretest Posttest Learning Outcomes	17.194	23.692	35	<.001

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As presented in Table 5, the obtained two-tailed significance value was below 0.001, which was lower than the 0.05 significance threshold. These findings indicate that the null hypothesis (H_0) was rejected, whereas the alternative hypothesis (H_1) was accepted, confirming a statistically significant difference in students' learning outcomes before and after the implementation of the Bankboard learning media. The avarage difference between the posttest and pretest scores was 17.194, indicating an increase in student learning outcomes. To further examine the magnitude of this effect, Cohen's *d* was calculated as the effect size. The analysis producted a Cohen's *d* value of 3.95. According to Cohen (1988), this value is classified as a large effect, indicating that the Bankboard learning media not only produced a statistically significant increase ($p < 0.001$) but also had a strong practical impact in improving students' learning outcomes in the Fundamentals of Banking course.

N-Gain Test

To determine the improvement in students' learning outcomes after implementing Bankboard in the Fundamentals of Banking course, the Normalized Gain (N-Gain) test was employed. Using this analysis provides more accurate estimates of learning gains while minimizing potential interpretation biases associated with variations in students' initial achievement levels (Ramdani et al., 2021).

Table 5. N-Gain Test Results

	N	Minimum	Maximum	Mean	Std. Deviation
N-Gain Score	36	.43	1.00	.6785	.16897
N-Gain Percent	36	43.33	100.0	67.8486	16.89688

The results in Table 6, the average N-Gain score of 36 students reached 0.6785, or 67.85%, with the lowest score of 0.43 and the highest score of 1.00. This figure is included in the moderate category based on the reference interval of $0.3 \leq g < 0.7$, indicating that the Bankboard learning media is quite effective in strengthening students' learning outcomes in the Fundamentals of Banking material.

Compared with conventional instruction, Bankboard provided a more active learning experience, which may explain the improvement in students' learning outcomes. During implementation, students actively engaged in group discussions, answered questions, and collaborated to solve challenges presented through the game. These activities helped students connect prior knowledge with new information, making their understanding of banking fundamentals more meaningful. This finding is consistent with Game-Based Learning this theory argues that game components including challenges, rules, feedback, and social interactions increase student engagement while supporting the construction of new knowledge (Plass et al., 2015). In Bankboard, these elements are realized through question cards, a reward system, penalty mechanisms, and intergroup competitions that encourage students to actively discuss and evaluate their understanding throughout the learning process.

The findings can also be interpreted from the perspective of a social constructivism perspective, which views knowledge as something constructed through social interaction and collaboration during the learning process (Powell & Kalina, 2009). The implementation of Team Game Tournaments (TGT) in Bankboard provided students with opportunities to discuss, exchange ideas, and support one another in understanding the learning materials. The formation of heterogeneous groups supported peer learning, while the teacher acted as a facilitator, guiding the game, facilitating discussions, and providing clarification when necessary. This

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interaction allowed students to collectively construct conceptual understanding through a collaborative process, rather than simply passively receiving information from the teacher.

The present findings reinforce the conclusions of Buchory et al. (2022), who showed that game-based learning produces better learning outcomes than conventional learning, and are consistent with the research of (Selamat & Ngalim, 2022), who reported that board games are effective in improving understanding of accounting concepts. However, this study makes a distinct contribution by developing game-based learning media specifically designed for the banking fundamentals curriculum for vocational high school students majoring in accounting. Thus, this study not only strengthens the evidence regarding the effectiveness of game-based learning but also expands its application to teaching banking fundamentals in vocational education, where its use is still relatively limited.

However, the N-Gain test results indicate that the improvement in learning outcomes remains in the moderate level. This is believed to be influenced by several factors, namely the implementation of Bankboard which was only carried out in one session so that students needed time to adapt to the game mechanism, the complexity of the Fundamentals of Banking material consisting of interrelated concepts, and differences in prior knowledge and learning speed of students. The observed learning outcomes were influenced by a combination of instructional conditions, including the limited implementation period, the complexity of the banking concepts, and differences in students' prior knowledge and learning pace, rather than by the learning media alone. Therefore, implementing Bankboard across multiple learning sessions is expected to result in greater improvements in student learning outcomes.

Conclusion

Development of learning media Bankboard in this study, the ADDIE model was applied to the material of fundamentals of banking. Based on the expert assessment, the media was declared suitable for use. Bankboard in learning activities also has a positive impact on improving student learning outcomes. Thus, game-based learning media designed through systematic development stages has the potential to be an effective choice for learning in vocational schools.

The use of Bankboard helps teachers conduct more interactive and student-centered instruction. This media also reduces reliance on lecture-based methods, making it better suited to the learning characteristics of vocational schools. From an educational technology perspective, this study contributes to the development of game-based learning media using the ADDIE model. The results of this study can serve as a reference for educators and media developers in creating learning innovations for the material fundamentals of banking as well as other subjects with similar characteristics.

Future researchers are strongly recommended to assess the validity and reliability of the bankboard items before applying them, given that the questions used in this study were drawn from a teacher's reference book and had not undergone empirical testing. Furthermore, future researchers are advised to increase the duration and frequency of bankboard use to ensure students receive more adequate learning time and achieve more optimal results.

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