

Research Article

Promoting Digital Financial Literacy through the Snakes and Ladders Game

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Abstract

Digitalization has changed various aspects of life, one of which is the financial sector, but low digital financial literacy, especially among teenagers, is still a challenge. Digital financial literacy education needs to be improved through interactive learning methods such as gamification. This study evaluates the effectiveness of the Snakes and Ladders game as a learning medium to improve students' understanding of digital financial literacy. This study adopted the Design and Development method to evaluate and develop the Snakes and Ladders learning method and elaborated the ADDIE development model to design learning media. The results shows that the Snakes and Ladders game obtained an average score of 90, which proves that this media is suitable for use in learning. Students also gave positive responses, representing that game-based learning makes them more enthusiastic and involved. This study contributes to the development of innovative learning methods to improve digital financial literacy among teenagers.

Keywords: digital financial literacy, learning methods, gamification, snakes and ladders

INTRODUCTION

The digitalization has brought significant changes to several aspects of life, including the financial sector. Digital transformation has revolutionized the financial system by increasing accessibility and transaction efficiency (Mavlutova et al., 2022). However, behind this progress, complex challenges arise, such as security risks and the risk of making unwise financial decisions due to minimal digital financial literacy (Bhat et al., 2025). Digital financial literacy is the knowledge, skills, and beliefs that influence individual attitudes and behavior in improving the quality of decision-making and financial management to achieve community financial well-being (OJK, 2023). Digital financial literacy is a basic need for every individual, primarily teenagers who are building their financial mindset amidst the ever-growing digital ecosystem (George & Pathanamthitta, 2020).

The limited understanding of digital financial literacy among teenagers either impacts personal financial management or influences their decisions in making transactions in the digital era (Koskelainen et al., 2023). This problem is complex considering that Indonesia is dominated by Generation Z, which has a low level of financial literacy with an index of 47.88%, lower than the millennial generation which reached 52.12% (Cahyasari & Pahala, 2023). Therefore, digital financial literacy education needs to be provided early on, especially to high school students to drive the

use of financial services (Mancone et al., 2024). Where, a high level of financial literacy can help teenagers in making wise financial decisions (Grohmann et al., 2018). In the context of education, digital financial literacy has been implemented in high schools to improve students' understanding of managing finances in the digital era (Fadilla & Harsono, 2024). However, in its implementation, the effectiveness of providing digital financial literacy materials in high schools still faces various challenges. The aforementioned study stated that even though digital financial literacy has been introduced, students understanding of the concept of digital finance is still not optimal. One of the main causes of students' suboptimal understanding of digital financial literacy is the ineffective learning method, and most schools still use conventional learning methods that are less interactive. Where, conventional teacher-centered learning methods cause students to become passive, so that the understanding of the concepts obtained is less in-depth (Freire, 2020).

To improve students' understanding of digital financial literacy, more interactive learning methods are needed, such as gamification. Gamification in learning has been shown to increase student motivation and engagement, as well as strengthen conceptual understanding through more active interaction (Rivera & Garden, 2021). One form of effective gamification in learning is the use of Snakes and Ladders as an educational medium (Tahir et al., 2025). This game not only makes learning more interesting but also optimizes students' understanding through challenges and strategies. Gamification through the Snakes and Ladders game provides a more engaging learning experience and increases student engagement in understanding concepts in depth (Mulyono et al., 2024).

Research on digital financial literacy has primarily focused on the importance of financial education, especially for younger populations (Lusardi & Mitchell, 2014). However, few studies examine the role of game-based approaches in teaching financial literacy. Some scholars (e.g., Gielen et al., 2019; Hamari et al., 2016) explored the impact of gamified learning on engagement and retention in education. Despite this, their studies often focus on complex digital simulations, which overlook the potential of traditional games like Snakes and Ladders in promoting financial literacy. Concerning Indonesia, Widiana et al. (2019) which showed that the Snakes and Ladders game is effective in science learning but it was overlooked in economics studies. This study seeks to address this gap by exploring how digital adaptations of Snakes and Ladders game can teach financial literacy in an engaging and accessible way.

The rest of paper is provided as follow. The next section is methodology to deal with this development process. The following section is result and discussion. The last section ends with conclusion.

METHOD

This study applied the Design and Development (D&D) method. D&D aims to create or improve products and tools that can be used in the context of learning or outside of learning. In addition, this method is also used to design new models or improve existing models to make them more useful, both for educators and students. D&D is also known as an approach to designing procedures, techniques, and tools that are based on a methodological analysis of a particular case (Mckenney & Reeves, 2018). To design learning media, this study follows the ADDIE development model, which consists of five main stages: analysis, design, development, implementation, and evaluation.

In the analysis stage, researchers identified learning needs, including analysis of student characteristics. Data were collected through interviews with mentor teachers and direct observation during the learning process, which showed that students were more active during group discussions and less responsive to lecture methods. Based on these findings, the gamification learning method was considered the most appropriate, because it was able to increase active student participation and was in line with the principle of student-centered learning in the Merdeka Curriculum. The use of Snakes and Ladders game media was chosen because it can facilitate the understanding of the concept of digital financial literacy, which is closely related to the daily lives of students as generation Z who are accustomed to digitalization and digital financial services. By integrating questions related to the material into the game, students are expected to be more motivated, understand the material more easily, and be able to improve their learning outcomes.

Participants in this study consisted of students and teachers at SMAN 1 Boyolangu, Tulungagung, who were selected purposely based on their relevance and direct involvement in the Economics learning process. The main participants were 195 grade XI students taking the Economics subject. They were spread across several parallel classes and were in the context of the Merdeka Curriculum, which emphasized an active and student-centered learning approach. These students became the main subjects in the development and implementation of the Snakes and Ladders game-based learning media, which was designed to improve understanding of digital financial literacy materials.

In addition to students, other participants were class XI Economics teachers who acted as observers and feedback providers during the implementation process of learning media. Teachers were involved from the needs analysis stage, learning implementation, to evaluating the effectiveness of the media in increasing student involvement and understanding. The selection of participants was carried out by considering their strategic roles in the learning context that was the focus of the research, so that the data obtained was relevant and contextual.

RESULT

Stage 1: Analysis

The analysis stage is the initial step taken to examine various aspects before the process of creating learning media begins, including: First, is the needs analysis. The indicators in this needs analysis are focused on the obstacles experienced by students during the learning process and how it is implemented. The analysis stage was carried out through interviews with class XI economics teachers and all class XI students at SMAN 1 Boyolangu, Tulungagung. Based on the interview results, it was found that the digital financial literacy learning process was still dominated by lecture and question and answer methods. The majority of students felt that the learning was less interesting, tended to be boring, and difficult to understand. In addition, digital learning media has not been optimally utilized in delivering the material. Therefore, both students and teachers are enthusiastic and support the development of learning media based on the Snakes and Ladders game on digital financial literacy material.

Second is analysis of student characteristics. Based on the results of interviews with grade XI economics teachers, who assessed the characteristics of students, it is known that in general students are active and like group learning. These activities play a role in clarifying thought structures and promoting the formation of more logical thought

Stage 3: Development

After determining the learning media that suits the characteristics of the students, namely using the snakes and ladders game media, the researcher prepared teaching materials that are relevant to the digital financial literacy material. The first step that must be taken is to design 30 questions on the financial literacy material through Microsoft Word in the form of a box shape with numbers above it (see Figure 1). The next step is to create or compile the rules of the Snakes and Ladders game. The rules in this game are used to provide clear guidelines to students in playing the game, ensure that the game runs fairly and in a structured manner, and integrate learning elements into playing activities. With the rules, students can understand how to play, the purpose of each step, and the consequences of each square they step on, especially those related to the digital financial literacy questions that have been prepared (see Figure 2).

Figure 2

Snakes and ladders game rules



The next step is to determine the visual components of the snakes and ladders game. Visual components in the Snakes and Ladders game are very much needed for the continuity of the game so that it can run smoothly. The components needed in the snakes and ladders game include:

Banner

The banner or game board is the main component in Snakes and Ladders. This banner is a square measuring 210 x 150 cm, consisting of boxes numbered sequentially, from 1 to 100. Inside the boxes are several such as snake and ladder images. This design was made on the Canva website (see Figure 3).

Dice and Pawns

Dice function as a move determinant in Snakes and Ladders (Figure 4). This component is in the form of a cube with six sides, each numbered from 1 to 6, in the form of dots. In this learning, two dice are used which will be thrown alternately. Meanwhile, pawns are markers for each player's position on the game board. Pawns are available in 5 colors, namely red, yellow, green, blue and purple to distinguish one group from another. The size of the pawn is adjusted so that it can be placed in the boxes of the snake and

that will stop at a certain number after being spun. In this snakes and ladders game, the web *wheelofnames.com* is used.

Figure 6
Spinner



Sound

Sound or sound effects are additional elements used to add excitement and appeal to the snakes and ladders game. Sound effects can be in the form of encouraging songs that make the game more lively and interactive. The sound used is a bluetooth speaker that is tethered to a cellphone or laptop.

Stage 4: Implementation

This stage is the process of implementing the previously prepared learning media design into learning activities. The implementation that has been carried out involves grade XI students at SMAN 1 Boyolangu and economics teachers as participants. Teachers are actively involved as facilitators in accompanying the game so that the learning process continues to run in a directed manner and in accordance with the objectives that have been previously designed. In implementing this media trial, a series of activities are followed according to the lesson plan that has been prepared by the teacher. Starting from praying to open the lesson, explaining the purpose of the activity, to implementing the Snakes and Ladders game.

Figure 7
Implementation of games in the classroom



The purpose of the implementation phase is to test the feasibility, effectiveness, and acceptability of the modified Snakes and Ladders game-based media with digital financial literacy material. During the implementation process, students are divided into 5 groups with 7 to 9 members each. Each class is given a set of Snakes and Ladders games complete with pawns, dice, spinners, question cards, rule sheets, and prizes. The game begins by throwing the dice and each group that stops at a pictured square must answer questions about digital financial literacy material.

Questions cover topics such as the definition of digital financial literacy, the use of e-wallets, and digital financial services available in the community. If the group can answer the question correctly, the group can advance 1 square. Meanwhile, if the answer is wrong, the group must retreat 3 squares. The game lasts for one meeting with a game duration of around 75 minutes. During the Snakes and Ladders game, the classroom atmosphere is seen to be more active and interactive. Students show high enthusiasm during the activity. Group discussions also appear effective because group members participate in exchanging ideas and discussing well. The implementation of this learning media shows that game-based learning is able to create a fun and active learning atmosphere.

From the average score of the snakes and ladders game obtained from 5 classes, namely 90, this shows that the snakes and ladders learning media is included in the category of being suitable for use in the learning process. Students also gave a positive response that they were very happy with the Snakes and Ladders game-based learning.

Stage 5: Evaluation

At this stage, the researcher conducted a review to assess the effectiveness and feasibility of the learning media that had been implemented. The evaluation stage was carried out to determine the extent to which the Snakes and Ladders learning media with the digital financial literacy chapter could improve students' understanding and foster their interest in learning digital financial material.

Based on the results of interviews with economics teachers at SMAN 1 Boyolangu, it was explained that digital financial literacy material is new material that will be taught to grade XI students, so there are minimal textbooks with digital financial literacy material for students to access. This condition shows that game-based learning media such as Snakes and Ladders are needed to increase student participation and understanding in digital financial literacy material.

The results of the implementation of the game in the classroom show that students tend to be active, enjoy discussing with groups, and are more interested in interactive and fun learning methods. The teacher considered that this media was a little complicated to use, because they had to focus while the game was in progress. On the other hand, this media is also suitable for use in learning, because it can increase student interaction during the learning process. In addition, it plays a role in developing critical thinking skills and student cooperation in groups. The Snakes and Ladders learning media improves students' readiness to face financial challenges in the digital era. Thus, the Snakes and Ladders learning media is suitable for use in digital financial literacy learning activities at SMAN 1 Boyolangu.

DISCUSSION

This study shows that the Snakes and Ladders game is an effective tool for enhancing students' understanding of digital financial literacy. The student achievement score of 90 indicates that this game-based learning approach is engaging, interactive, and contextual, leading to improved learning outcomes. Previous research supports the positive impact of Snakes and Ladders in educational settings. For instance, a recent study found that using the game improved post-test scores in civic education, increasing from 59.80% to 87.29% (Sari & Rahayu, 2025). Another study reported that a smart version of Snakes and Ladders designed for Mathematics education improved first-grade students' performance (Sujiono & Rahmawati, 2023). A systematic review also confirmed that Snakes and Ladders fosters greater student engagement and better learning outcomes in elementary school mathematics (Gumala, 2023). Furthermore, in science education, Snakes and Ladders helped students move from incomplete to complete learning, increasing both their motivation and mastery (Widodo, 2022).

This study supports the idea that learning innovations should align with the characteristics of today's students, who are familiar with technology and games. Using the ADDIE model, the development of this learning media proceeds in a systematic manner that addresses students' needs. The analysis and evaluation stages of the model ensure that the media is both effective and aligned with the learning objectives. According to Kasanah et al. (2020), the Smart Snakes and Ladders learning media, developed using the Borg and Gall model, was found to be valid and appropriate for enhancing English vocabulary mastery. This aligns with the findings of Artaninda et al. (2025), who demonstrated that Smart Snakes and Ladders is a valuable tool for achieving educational goals in language learning.

This study contributes to education by presenting creative learning media that address the challenges of the digital era. The use of gamification models, such as Snakes and Ladders, enhances students' understanding of material in an engaging way. These learning models help students master content while fostering a collaborative and enjoyable learning environment. Through interactive and game-based methods, the study encourages students to actively engage with the material, making learning more meaningful. In practice, this research provides educators with a relevant and practical tool for integrating digital media into their teaching methods. The gamified learning model supports not only academic mastery but also the development of skills such as teamwork and problem-solving. As education adapts to the digital age, gamification provides a valuable approach to improving student engagement and academic performance. This study highlights the potential of digital tools in creating a more interactive and effective classroom atmosphere, preparing students for future challenges.

CONCLUSION

This study concludes that the development of Snakes and Ladders learning media effectively improves students' understanding of digital financial literacy at SMAN 1 Boyolangu. The study used the Design and Development method based on the ADDIE model, consisting of analysis, design, development, implementation, and evaluation. Integrating game elements made students more active, enthusiastic, and engaged during the learning process. Both students and teachers responded positively to the use of the learning media, and the students' scores were high. Although some challenges arose

during implementation, the media was considered suitable for enhancing the learning atmosphere. However, limitations include the small sample size and the focus on a single school, which can limit the generalizability of the results. Future research could explore the use of this learning model in other educational settings or with larger, more diverse samples. Additionally, further studies could investigate the long-term impact of game-based learning on students' financial behavior and decision-making.

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Competing interests

The author has declared that there are no conflicts of interest

Data availability

The data were provided upon request to corresponding author

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