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Development of Interactive Snakes and Ladders Media to Improve Student Learning Outcomes in Elementary School

Endah Setyaningsih*, Novanita Whindi Arini

Primary School Teacher Education, Universitas Muhammadiyah Prof. Dr. Hamka, Jakarta, 12130, Indonesia

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* Corresponding author:

E-mail: endahs.0228@gmail.com

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ABSTRACT

Students often struggle with understanding their rights and obligations in various contexts, which negatively impacts their learning outcomes. This study aimed to address this issue by developing an interactive snake and ladder game-based media tool that helps students grasp these concepts through engaging examples in daily life. The research employed the Research and Development (R&D) approach using the ADDIE model, consisting of analysis, design, development, implementation, and evaluation stages. The interactive game was validated by media experts (96%), subject matter experts (98%), education practitioners (84%), and students. The overall validation score was 92%, qualifying it as "highly suitable." In trials, student responses were positive: small-group trials scored 92%, and large-group trials scored 91%, resulting in an overall score of 91.5% ("highly suitable"). Pre-test scores averaged 59.80%, while post-test scores improved to 87.29%, showing a significant increase of 27.49%. This indicates that the interactive snake and ladder game effectively enhances learning outcomes in Pancasila Education for fourth-grade elementary school students. The study demonstrates the potential of gamified educational tools to improve comprehension and engagement in civic education.

1. Introduction

Learning media plays a crucial role in enhancing the quality of teaching and learning. It not only helps teachers deliver content in an engaging and easily understandable manner but also creates an interactive and enjoyable learning environment for students. When used effectively, learning media captures students' attention and focuses them on the well-designed materials created by teachers. This increases students' interest and involvement because the lessons are tailored to their needs (Wijiastuti & Fitrotun Nisa, 2022). According to Hervita & Whindi Arini (2022), learning media is a tool that contains educational material and aids in conveying information or instructional messages. These media serve to increase students' attention, understanding, and knowledge during the learning process, ensuring that learning objectives are achieved. In addition to delivering

information, learning media provides teachers with opportunities to present material creatively and innovatively.

To ensure effective and efficient learning, teachers must continuously learn and develop their skills to understand students' needs. They should also keep up with technological advancements to provide relevant and engaging learning experiences aligned with the demands of the 21st century (Banarsari et al., 2023). While following technological developments, teachers must also enhance their pedagogical competencies. By doing so, they can ensure that students understand the material in an interesting and easy-to-understand way (Harahap, 2025). Thus, teachers become more professional in carrying out their teaching tasks using appropriate instructional methods.

In the learning process, it is not just about delivering material effectively but also helping students become more motivated to learn (Yogi Fernando et al., 2024). Efforts made to create a comfortable and enjoyable learning atmosphere can lead to optimal learning outcomes. Additionally, teachers need to be aware of issues within the school environment that may hinder student engagement and comprehension. One particular challenge occurs in Pancasila education, especially regarding students' understanding of rights and obligations (Apriatama et al., 2022). Many students struggle to grasp these concepts, which makes it difficult for them to apply what they have learned in daily life. Furthermore, students often feel bored during classroom lessons due to a lack of involvement, resulting in low learning outcomes.

This problem arises because students do not fully understand the relationship between rights and obligations. They tend to find it easier to understand rights than obligations, or vice versa. This misunderstanding makes it difficult for students to connect rights and obligations, which will affect how they interact in their daily lives. Students also often experience confusion when giving examples of rights and obligations in various contexts, such as at home, school, or in society. In addition, they often find it difficult to distinguish between rights and obligations because they do not fully understand the meaning of these terms, making it difficult to differentiate between the two. Furthermore, students often lose focus during lessons due to boredom and an excessive amount of material, resulting in poor learning outcomes.

Given these challenges, teachers must develop creative and innovative learning approaches by utilizing technology to help students better understand the material being taught (Aulia, 2025). One such method is online game-based learning, which offers a promising solution. By using this approach, teachers can create a fun environment that supports active student engagement, thus enabling them to understand concepts more effectively and reach their full potential in learning. According to Aminah et al. (2022), game-based learning allows children to acquire different types of knowledge while providing opportunities to manipulate, repeat, explore and practice. It can create a comfortable atmosphere that stimulates students' interest in learning and facilitates the learning process. Learning through this medium can enhance the experience by deepening students' understanding and

increasing their engagement, as well as providing opportunities for teachers to create innovative learning processes (Harlin & Arini, 2023).

An innovative alternative is the use of traditional snakes and ladders games adapted into digital learning media. Snakes and ladders games can make the learning atmosphere more fun (Anggraeni et al., 2023), prevent students from feeling bored and help them to refocus on the lesson. In addition, students more easily understand the concept of rights and obligations in various contexts. The game also encourages collaboration, so students feel comfortable to ask questions, share opinions, and discuss during learning (Puspita, 2023). Snakes and ladders-based learning is a suitable media to increase students' involvement in the learning process (Fauziyah et al., 2024).

This media can be adapted to meet the needs and characteristics of students to achieve learning objectives. As a learning tool in the classroom, snakes and ladders games are very effective in delivering material to students. According to Sabila (2021), the snakes and ladders game is a board game that can be played by two or more people. It is expected that this game can increase students' interest in learning because it is easy to play, has simple rules, and can educate if given a positive theme. Snakes and ladders games can now be played without the need for physical components such as boards, dice, and pieces that are traditionally used (Solihin & Yamasari, 2023).

Several relevant studies have been conducted on the use of the snake and ladder game across different levels of education. For example, research conducted by Juny et al. (2024) shows that digital-based snake and ladder games can help teachers implement innovative, creative, and active learning in the classroom. This medium received a “very suitable” qualification for use during classroom instruction. Additionally, Wati (2021) found that game-based learning media increases students' motivation and interest in learning, thereby improving learning outcomes as students become more active and involved in the learning process. While there are similarities such as the use of the snake and ladder game and the aim to improve learning outcomes there are also differences in the subjects, classes, and development models used in previous studies.

This development research on the snake and ladder game media will be developed with the assistance of the Genially website, making it visually appealing. The popular game will be modified or creatively adapted into a digital learning medium that teachers can use to deliver information or material through games favored by students, particularly in elementary schools. Using the interactive features of Genially, teachers can incorporate material or questions related to rights and obligations. This will enhance students' learning outcomes in Pancasila education in Grade IV.

Based on the problems outlined above, an online snake and ladder game learning medium has been developed to simplify the learning process by applying the concept of learning while playing. This study aims to develop and validate an interactive snake and ladder media that improves students' understanding of rights

and obligations, thereby enhancing their learning outcomes in Pancasila education for fourth-grade elementary school students.

2. Methodology

This research uses the Research and Development (R&D) method using the ADDIE model. According to Maydiantoro (2021), the ADDIE model consists of five stages: analysis, design, development, implementation, and evaluation. First, analysis is carried out by identifying what teachers and students need to be developed and designing media that suits these needs. Second, design involves planning the initial product according to the needs of teachers and students, which is an interactive snake and ladder game media. Third, development is conducted by creating the interactive snake and ladder media in accordance with the material on rights and obligations and carrying out product validity testing. Fourth, implementation is done by testing the effectiveness of the interactive snake and ladder media in improving student learning outcomes on Pancasila education material in Grade 4 elementary school. Fifth, evaluation involves providing feedback and making corrections based on evaluation results and unmet requirements of the product, such as assessing or measuring the success of the media in achieving its development objectives and analyzing the improvements achieved by the students.

Expert validation was carried out by subject matter experts, media experts, and educational practitioners using a validation instrument in the form of a questionnaire. The results of the validation consist of criticism and suggestions used as the basis for improving the media before it is tested on students. In the instrument there is an indicator used to assess the effectiveness of the media using a Likert scale. Therefore, instrument validation was carried out by subject matter experts, media experts, educational experts, and also through a trial of the media on students. After validation by the validators, the next step was to implement it with students by conducting a small group trial involving 4 students and a large group trial involving 28 students. The product validation that has been carried out is then analyzed using descriptive percentage techniques. According to Juny et al., (2024), the formula used is as follows, The following is the Likert scale assessment scoring table, as shown in Table 1:

Table 1. Likert Scale Scores

Score	Description
5	Strongly Agree
4	Agree
3	Fairly
2	Disagree
1	Strongly Disagree

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

Description:

P = Final score

f = Total score obtained

N = Maximum score

Next, calculate the percentage that indicates the quality of the product based on the level of suitability and product revision. The following are the criteria for the percentage of media suitability, as shown in Table 2:

Table 2. Percentage of Media Suitability

No	Percentage	Criteria
1	80% - 100%	Highly Suitable
2	60% - 80%	Suitable
3	40% - 60%	Fairly Suitable
4	20% - 40%	Less Suitable
5	0% - 20%	Very Unsuitable

3. Results and Discussion

Results

The purpose of developing this interactive snake and ladder game-based media is to improve student learning outcomes in Grade 4 using the ADDIE model. The results of each stage in the research are as follows: During the analysis stage, data was collected through observation and interviews with Grade 4 teachers. The analysis revealed that students tend to become bored due to a lack of interest and insufficient interaction, leading to passive participation. This lack of engagement results in poor understanding of the material, which in turn leads to low learning outcomes. The use of learning media is expected to make it easier for students to understand the material taught by the teacher during the learning process.

In the design stage, an interactive snake and ladder media product was created by designing the snake and ladder layout to suit its intended use. With the help of the Genially website and Canva application, the framework of the media was designed to capture students' attention during learning. In the development stage, the focus was on achieving the goal of improving students' understanding of Pancasila education in Grade 4. The cover design and snake and ladder board were created using the Canva application to make them more visually appealing, incorporating elements such as snakes, ladders, examples of rights and obligations, and pawns.

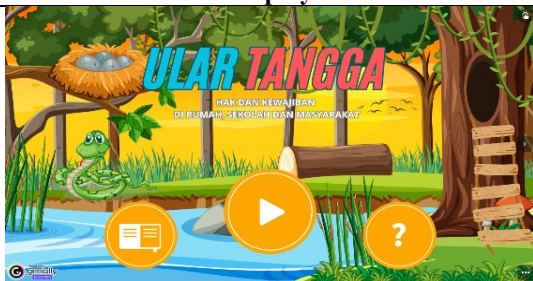
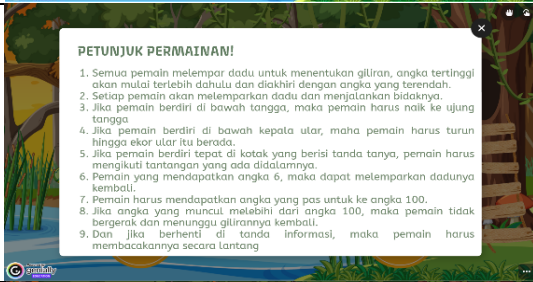
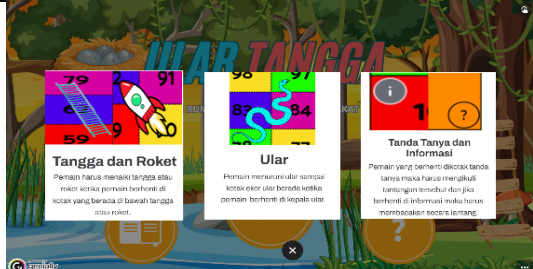
After completing these designs, they were integrated into the Genially website to combine all previously designed materials from the Canva application. Once everything was combined, instructions, information, content, and questions were added to the snake and ladder game. After the interactive snake and ladder media was completed, it was validated by experts, including media experts, subject matter experts, and educational practitioners. The following is a summary of the validation activities that have been carried out, which we can see in Table 3:

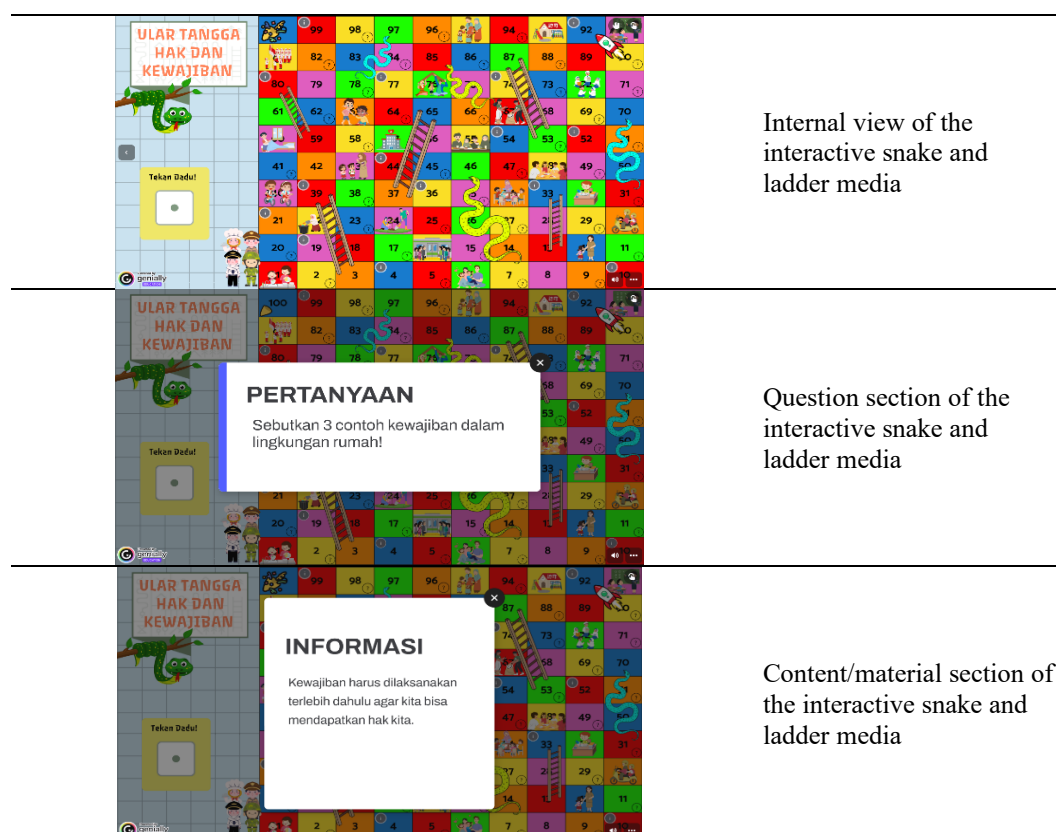
Table 3. Summary of Expert Validation

Validator	Score Obtained	Max Score	Average Percentage
Media Expert	48	50	96%
Subject Matter Expert	49	50	98%
Educational Practitioner	21	25	84%
		Total	92%
		Qualification	Highly Suitable

After obtaining the results from the experts, the next step was to conduct a small group trial and a large group trial. The small group trial involved 4 students and resulted in a score of 92%. Based on this score, it can be concluded that the interactive snake and ladder media on the topic of rights and obligations is highly suitable for use and can proceed to the large group trial stage. The large group trial, which involved 28 students, resulted in a score of 91%. Based on this final score, it can be concluded that the interactive snake and ladder media is highly suitable for use and can be tested for its effectiveness in improving learning outcomes on the topic of rights and obligations at home, school, and in society for Grade 4 students. The following is the display of the developed media, as shown in Table 4:

Table 4. Interactive Snake and Ladder Media

Display	Description
	Front view of the interactive snake and ladder media
	Game instructions section of the interactive snake and ladder media
	Information section of the interactive snake and ladder media



The implementation involved validation activities conducted by media experts, subject matter experts, educational practitioners, and students. Following this, the effectiveness of the interactive snake and ladder media was tested in Grade 4 by administering pre-tests and post-tests to determine whether the interactive snake and ladder media could improve student learning outcomes. The pre-test and post-test were given to students in the form of test sheets containing essay questions about rights and obligations at home, school, and in society. Based on the data obtained from the pre-test and post-test activities, there was an improvement in students' learning outcomes regarding the material on rights and obligations. The pre-test results showed a score of 59.80%, while the post-test results reached 87.29%. This indicates an increase of 27.49%. Therefore, it can be concluded that the interactive snake and ladder media for rights and obligations is an effective learning medium for improving student learning outcomes.

Discussion

The analysis results show that the game-based interactive snake and ladder media has a "very suitable" qualification for use in classroom learning. Several factors contribute to this, as follows: First, the interactive snake and ladder media provides meaningful experiences for students by engaging them actively and helping them better understand the learning material, thereby improving learning outcomes. This is supported by previous research stating that learning media is a tool used to capture students' attention, containing instructional content that helps deliver information or teaching materials. Such media serves to enhance students' focus,

understanding, and knowledge during the learning process, enabling the achievement of learning objectives (Hervita & Whindi Arini, 2022). To achieve learning goals, the snake and ladder media was modified using the Genially website, as this version of the game can be played without physical components such as pawns, dice, or a board (Solihin & Yamasari, 2023). The benefits of using this media include improving learning outcomes, enhancing teacher creativity, being playable anywhere, and not requiring significant costs (Siti et al., 2024), making it highly advantageous for teachers who wish to use media during classroom instruction.

Second, the interactive snake and ladder media can increase students' interest in Pancasila education topics, as found in previous studies (Sabila, 2021). The game makes learning enjoyable, eliminating boredom and encouraging students to play repeatedly. Additionally, it fosters a sense of competition and improves teamwork to reach the finish line. These features make the interactive snake and ladder media very suitable for improving student learning outcomes. However, it is important to note that this study has certain limitations. Specifically, the interactive snake and ladder media is designed only for Pancasila education on the topic of rights and obligations for Grade IV elementary school students. The learning content included in the media has been adapted to the Merdeka curriculum, which may limit its applicability to other subjects or grade levels.

4. Conclusion

Based on the findings and discussions presented in this study, it can be concluded that the developed interactive snake and ladder game-based media has been highly effective in enhancing students' understanding of rights and obligations. The media was validated by experts (media experts, subject matter experts, and educational practitioners) and received positive feedback from students during both small group and large group trials. This indicates that the media is well-suited for its intended purpose and aligns with the needs of Grade 4 elementary school students. The development of this media not only improves learning outcomes but also actively engages students in the learning process. By incorporating elements such as interactive gameplay, meaningful content, and relatable examples, the media manages to make the learning experience more enjoyable and engaging. This active involvement helps students better understand complex concepts related to rights and obligations, ultimately leading to a more meaningful and effective learning process.

Furthermore, the use of digital tools like Genially and Canva ensured that the media was visually appealing and easy to use, which contributed significantly to its overall effectiveness. The integration of these tools allowed for flexibility and adaptability, making the media suitable for various classroom settings and learning styles. The interactive snake and ladder game-based media serves as an innovative and effective tool for teaching Pancasila education, particularly on the topic of rights and obligations. Its ability to engage students, improve learning outcomes, and foster active participation highlights its potential as a valuable resource for

educators aiming to enhance student engagement and comprehension in the classroom. Future studies could explore the application of similar media in other subjects or grade levels to further evaluate its broader impact on education.

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