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Development of a Genially-Based Digital Snakes and Ladders Game to Enhance Reading Comprehension among Phase C Learners

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ABSTRACT

Reading comprehension remains a major challenge in Indonesian elementary education, requiring innovative and engaging learning media that integrate digital technology and gamification. This study addresses the need for interactive digital learning tools by developing a Genially-based digital Snakes and Ladders game to support reading comprehension among Phase C students. This research employed a Research and Development (R&D) approach using the ADDIE model. The effectiveness of the developed media was examined through a pre-experimental one-group pretest–posttest design involving 31 Phase C students. Data were collected using reading comprehension tests, expert validation sheets, and student response questionnaires. Data analysis included paired sample t-test and N-Gain to measure learning improvement. The results showed that the digital Snakes and Ladders game was feasible and appropriate based on expert validation. Students responded positively, indicating increased motivation and engagement in reading activities. Statistical analysis revealed a significant difference between pretest and posttest scores ($p < 0.05$), with an N-Gain value of 0.71, categorized as high. This indicates a substantial improvement in students' reading comprehension after using the Genially-based game. The findings demonstrate that integrating interactive storytelling and game-based digital media can effectively enhance reading comprehension among elementary students. The Genially-based digital Snakes and Ladders game provides an engaging learning environment that supports active participation and deeper understanding of reading texts. This media has strong potential to be adapted for other learning materials and broader educational contexts.

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1. INTRODUCTION

Education is fundamental for preparing high-quality human resources by equipping individuals with knowledge, critical thinking, creativity, and problem-solving skills (Siswanti et al., 2022). In the digital era, literacy and critical thinking are increasingly essential as students must evaluate and filter information effectively (Musthafa, 2014). Critical thinking, which involves analysis, problem-solving, and decision-making based on evidence (Heidari & Shahbazi, 2016; Lin et al., 2021), can be fostered through reading comprehension activities (Banditvilai, 2016; Rodríguez Sua, 2021). Global studies such

as PIRLS and OECD reports consistently show that variations in educational policies, teaching quality, and learning resources significantly affect literacy outcomes worldwide (PIRLS, 2022; OECD, 2023; UNESCO, 2023).

Despite global recognition of literacy as a cornerstone for learning, Indonesia continues to face challenges in reading. The 2022 PISA study reported a decline of 12 points, placing Indonesia's reading score at 359 with minimal progress since 2000 (Alam, 2023). Local classroom observations in a private elementary school in Bogor (November 2024) revealed that reading activities relied heavily on textbooks, resulting in low student engagement. Students were often unmotivated, struggled to analyze texts, and found it difficult to summarize key ideas. Interviews with fifth-grade teachers highlighted attempts to diversify methods, including discussions and shared reading, yet challenges persisted, particularly limited vocabulary and lack of interest.

Gamification and digital learning approaches offer promising alternatives to enhance student motivation and literacy outcomes. Research emphasizes that interactive media and game-based learning can promote higher engagement and deeper comprehension (Dzulfikar & Wati, 2024; Mansur et al., 2024). Genially, an interactive platform for creating educational games, quizzes, and animations, enables personalized learning experiences (Rusmining et al., 2024). Integrating Genially into a digital Snakes and Ladders game allows students to engage with reading content interactively, fostering both motivation and comprehension (Barach, 2021; Munoz-Tobar et al., 2017).

Although previous studies have explored digital games in education, limited research has focused on culturally contextualized tools that integrate gamification with Indonesian language learning. Few studies specifically target Phase C learners, where literacy development is crucial for building higher-order cognitive skills. This gap underscores the need for innovative media that combines interactive design, curriculum relevance, and evidence-based validation.

This study aims to develop a Genially-assisted digital Snakes and Ladders game to enhance reading comprehension and critical thinking among Phase C students (aged 10–11, equivalent to fifth grade). The objectives include: (1) identifying the key characteristics of the game; (2) assessing its feasibility through expert validation in media, material, and language; (3) evaluating its effectiveness using pretest–posttest analysis; and (4) exploring student responses in terms of engagement and motivation.

The novelty of this research lies in transforming a traditional board game into a digital, interactive learning tool powered by Genially. By embedding animations, quizzes, and adaptive challenges, the game not only strengthens reading comprehension but also promotes critical thinking, personalized learning, and collaborative engagement. This integration of gamification and digital interactivity contributes to innovative literacy instruction while addressing both national challenges and global educational priorities.

2. METHODS

This study employed the Research and Development (R&D) approach using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The ADDIE model was chosen because it allows systematic development with evaluation and revision at each stage, ensuring a feasible and valid final product (Gustiani, 2019). The research aimed to design and evaluate a Genially-based Snakes and Ladders digital game for improving reading comprehension and critical thinking skills among elementary students.

2.1 Research Procedure

The development research process generally includes an initial product design, expert reviews, product testing, and revisions based on feedback. This study adopts the ADDIE model due to its simplicity, systematic structure, and ease of application. According to Dick et al., (2015), the ADDIE model consists of five stages: analysis, design, development, implementation, and evaluation.

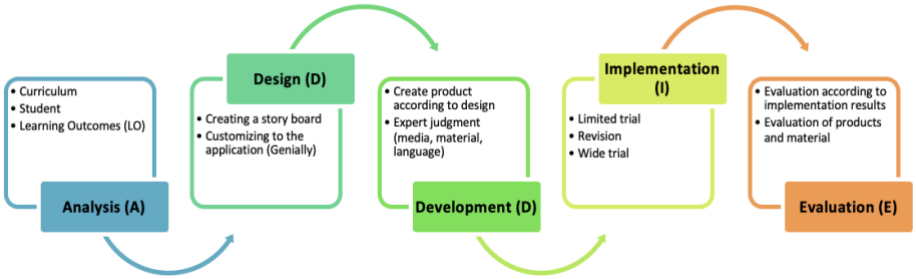


Figure 1. Research Procedure

2.2 Research Design

This study employed a Research and Development (R&D) approach using the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model was selected because it provides a systematic and iterative framework for developing and evaluating instructional media to ensure its feasibility and effectiveness in learning.

To examine the effectiveness of the developed media, this study applied a pre-experimental one-group pretest–posttest design. In this design, students' reading comprehension was measured before (pretest) and after (posttest) the implementation of the Genially-based digital Snakes and Ladders game. This design allows researchers to identify learning improvements resulting from the intervention without using a control group.

The research design can be illustrated as follows:

$O_1 – X – O_2$

Where:

O_1 = pretest score
X = treatment using the Genially-based digital Snakes and Ladders game
O_2 = posttest score

2.3 Participants

The participants were 31 Phase C students (aged 10–11 years, equivalent to Grade 5) from SD Kesatuan Bogor. The selection of participants was based on curriculum consistency and accessibility. All students participated in the same learning activities using the developed media. This sample size was considered adequate for preliminary effectiveness testing in development research.

2.4 Data Collection Instruments

Data were collected using the following instruments:

a) Reading Comprehension Test
b) The test was developed based on Barrett's taxonomy, covering comprehension of main ideas, detailed information, inference, and application. The test was administered as both pre-test and post-test to measure learning improvement.
c) Expert Validation Sheets
Validation sheets were used to assess the feasibility of the media from media, material, and language aspects using a 4-point Likert scale.
d) Student Response Questionnaire
This questionnaire measured students' perceptions of attractiveness, ease of use, interactivity, language clarity, and content relevance of the media.

All instruments were tested for validity and reliability before use. The reading comprehension test obtained a KR-21 reliability coefficient of 0.83, indicating high reliability. The student response questionnaire showed a Cronbach's Alpha value of 0.87, indicating very high reliability.

2.5 Data Analysis Techniques

Data analysis consisted of two main stages:

a. Effectiveness Analysis
   The effectiveness of the media was analyzed using:
   1) Paired sample t-test, to determine whether there was a significant difference between students' pretest and posttest scores.
   2) N-Gain analysis, to measure the magnitude of improvement in students' reading comprehension, classified as:
      a) High: $g > 0.70$
      b) Medium: $0.30 \leq g \leq 0.70$
      c) Low: $g < 0.30$

b. Descriptive Analysis
   Descriptive statistics were used to analyze:
   1) Expert validation results to determine the feasibility of the product.
   2) Student response questionnaire results to describe students' engagement and motivation.

2.6 Research Hypothesis

The hypothesis of this study was formulated as:

1) H_0 (Null Hypothesis):
   There is no significant difference between students' pre-test and post-test reading comprehension scores after using the Genially-based digital Snakes and Ladders game.
2) H_1 (Alternative Hypothesis):
   There is a significant difference between students' pre-test and post-test reading comprehension scores after using the Genially-based digital Snakes and Ladders game.

3. FINDINGS AND DISCUSSION

3.1 Findings

The results of this study are presented according to the stages of the ADDIE model: analysis, design, development, implementation, and evaluation. Visuals such as tables and graphs are used to support the findings.

3.1.1 Analysis

The preliminary study showed that students experienced difficulties in identifying main ideas and drawing conclusions from reading texts. Although most students expressed interest in reading, classroom observations revealed that learning activities relied heavily on textbooks and slide presentations, which were not interactive. Interviews with teachers confirmed that existing literacy activities had not optimally improved students' reading comprehension.

Furthermore, most students indicated a strong interest in game-based learning media and digital applications. These findings demonstrate the need for an interactive and engaging digital learning medium that integrates reading activities with game-based elements. Therefore, the development of a Genially-based digital Snakes and Ladders game was considered relevant to address both motivational and cognitive aspects of reading comprehension

The following are the findings of a preliminary study in Table 4.

Table 1. Results of Preliminary Study Findings (Source: processed by researchers)

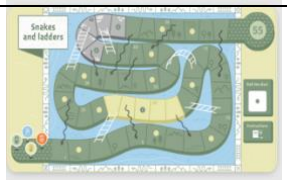
No	Aspect	Findings	Conclusion
1.	Literature Review	The literature review includes books, journals, research reports, and regulations related to game-based media, reading comprehension, and differentiated learning. This review serves as the foundation for developing a digital board game tailored for Phase C students.	Students need interactive media to enhance their reading skills. The development of a Genially-assisted board game is expected to provide a more engaging and meaningful learning experience for Phase C students.
2.	Field Study	90% of students enjoy reading, but only 50% do so responsibly. 75% of students are interested in game-based media, but the school has not yet provided it. 95% of students want educational games to improve their reading skills.	
3.	Classroom Observation	In a private elementary school in Bogor, it was found that: 1) Reading instruction still relies on textbooks and worksheets without supporting media. 2) Some students struggle with reading comprehension. 3) Teachers use slide presentations, but they are not interactive.	
4.	Interviews	Teachers and students stated that reading comprehension skills remain low. Students struggle to identify the main ideas of texts, and weekly literacy activities are not yet effective.	

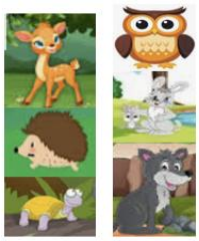
Table 4 presents the field study findings that support the development of this digital board game. The literature review highlights the need for interactive media to improve reading comprehension skills. The field study results show that most students desire educational games as a more engaging learning tool. Classroom observations reveal the limitations of conventional teaching methods, while interviews with teachers and students confirm that reading comprehension remains low. Therefore, the development of the Genially-assisted digital board game is expected to serve as an effective and engaging alternative to enhance students' reading comprehension skills.

3.1.2 Design

The product was developed as a Genially-assisted digital Snakes and Ladders game that integrates several engaging components. The game board was adapted from Genially and equipped with interactive tokens and dice to create an interactive learning environment. A narrative story titled *The Clever Mouse-Deer in the Digital Forest* was embedded within the game, incorporating comprehension questions to enhance students' understanding. Additionally, the game mechanics—such as ladders, snakes, comprehension spaces, and reward cards—were carefully designed to stimulate motivation and encourage active learning throughout the gameplay. Here is the detailed design of the Genially-Assisted Digital Snakes and Ladders Media presented in a structured table format:

Table 2. Digital Snakes and Ladders Media Development Design Assisted by Genially

Stage	Design Description	Picture
Adjusting the Digital Snakes and Ladders Board in Genially	– Using the digital snakes and ladders board available in the Genially application. – Providing four game tokens in red, green, blue, and purple, allowing players to choose their preferred color.	

Stage	Design Description	Picture
	– Utilizing a digital dice in Genially as a random number generator for player movement. – Adding 15 interactive comprehension questions that appear when a player lands on specific board spaces.	
Designing the Fictional Story "The Clever Mouse-Deer in the Digital Forest"	– Characters: The Clever Mouse-Deer, Owl, Wolf, and other supporting characters. – Setting: The story takes place in an interactive digital forest. – Plot: Players follow the adventure of the Clever Mouse-Deer, answering questions to progress toward the finish line.	 Source: https://www.google.com
Designing the Game Rules	– Basic rules: Similar to the traditional snakes and ladders game, players move their tokens according to the number rolled on the dice. – Ladder spaces: Players move up to a higher space following the ladder. – Snake head spaces: Players move down to a lower space as indicated by the snake's tail. – Question spaces: Players must answer a comprehension question. – Bee spaces: Players collect a material card and keep it. – Mouse-deer spaces: Players pick up a reading card and read the content. – Treasure chest spaces: Players gain the right to exchange their accumulated points.	

This media design follows a game-based learning approach that enhances students' reading comprehension skills in Phase C. The integration of Genially allows for a more dynamic and interactive learning experience, promoting student engagement through an enjoyable and gamified learning method (Prensky, 2019; Gee, 2020).

3.1.3 Development

The developed product was a Genially-based digital Snakes and Ladders game that integrated narrative-based reading texts, comprehension questions, and interactive game mechanics. The feasibility of the media was evaluated through expert validation involving media, material, and language experts.

The Content Validity Ratio (CVR) results showed that almost all aspects achieved values above the minimum criterion, indicating that the media was valid and feasible for use in reading comprehension learning. Minor revisions were suggested, particularly in improving navigation clarity and ensuring information accuracy in several content items.

Overall, the validation results confirm that the developed media met the requirements of instructional quality, usability, and content appropriateness for Phase C students.

3.1.4 Implementation

Before implementation, a validation test was conducted by three experts (media, materials, and language). After revisions, the product proceeded to the implementation stage, where it was tested on 16 students in a limited trial and 31 students in a broader trial. Student responses averaged 3.75/4 in the limited test and 3.84/4 in the broader test, indicating high satisfaction. Teachers also provided positive evaluations (3.85/4), highlighting its motivational value and alignment with the curriculum. Minor suggestions included improving navigation and interactivity. The validation results were further supported by the CVR analysis.

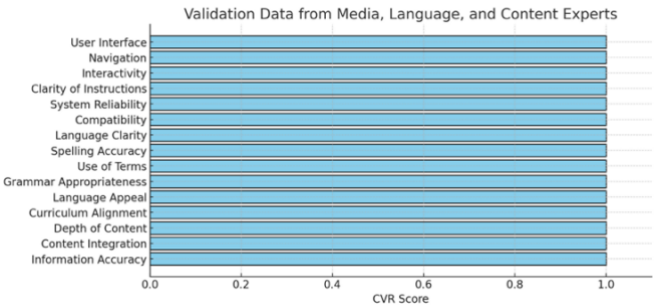


Figure 2. CVR Calculation Results (Source: processed by researchers)

The following graph presents the validation results from media experts, language experts, and learning material experts based on the Content Validity Ratio (CVR). Almost all aspects received a CVR score of 1.00, indicating that the experts considered these aspects important and validated the digital snakes and ladders media assisted by Genially. The validated aspects include user interface design, navigation, interactivity, clarity of instructions, system reliability, compatibility, language clarity, spelling accuracy, terminology usage, grammatical appropriateness, language appeal, curriculum alignment, content depth, and content integration. However, one aspect—information accuracy—received a CVR score of 0.00, reflecting differences of opinion among content experts. This indicates the need for further revision or discussion to ensure the accuracy and reliability of the information presented in the media.

To improve the media, it is recommended to review and refine the accuracy of the content based on feedback from experts. In addition, conducting further trials with end users, such as teachers and students, is essential to evaluate the effectiveness of the media in the learning process. The results of this validation serve as a basis for refining the media before it is implemented more widely, to ensure its optimal use in improving student understanding.

After the product revision is carried out, the next step is to carry out limited testing and extensive testing. Small group trials aim to identify weaknesses in the developed product before testing it on a larger scale (field trials). This trial was conducted in Class VA, involving sixteen randomly selected students. These students were then divided into four groups to test the developed media. During this trial, the researcher also distributed a media evaluation questionnaire to students, assessing five aspects: The design is attractive and not boring, Navigation is easy to use, Interactivity is engaging and encourages active learning, The language is easy to understand, The content is relevant to learning needs. The results of the small group trial evaluation are summarized as follows:

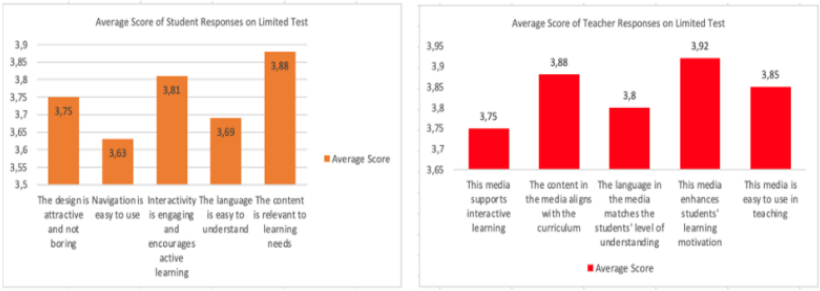
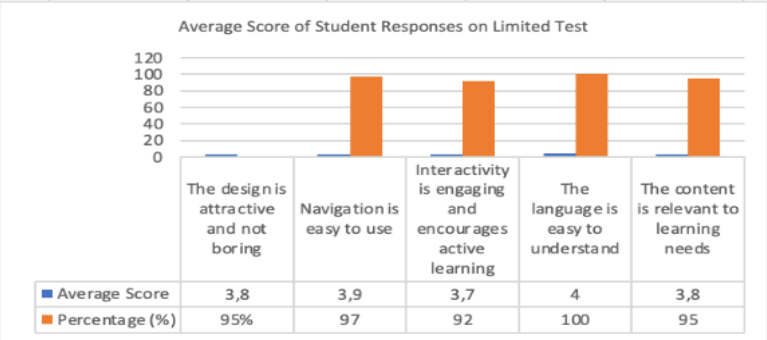


Figure 3. Limited Test Result Graph

The graph above show the implementation results showed that students and teachers gave positive responses to the digital snakes and ladders media using Genially. The average student response score was 3.75, indicating that the media was valid and appropriate for use. Students felt that the content was relevant (3.88) and the interactivity was interesting (3.81), but the navigation (3.63) needed to be improved. The language (3.69) was understandable but could be clearer. Meanwhile, teachers gave an average score of 3.85, indicating that the media was very appropriate for use. They appreciated its ability to increase student motivation (3.92) and its alignment with the curriculum (3.88). The media was also easy to use in teaching (3.85), although its support for interactive learning (3.75) could be improved. Overall, the media was effective, with minor improvements needed for better usability and engagement.

The extensive trial was conducted in classes VA and VB. In the implementation of this trial, the researcher involved 31 students. From the 31 students, eight groups were then formed to try using the developed media. Of the eight groups, seven groups each consisted of four people, and one group consisted of three people. Based on the results of the student assessment in the extensive trial, a recapitulation was obtained, which is shown in the following graph.



	The design is attractive and not boring	Navigation is easy to use	Interactivity is engaging and encourages active learning	The language is easy to understand	The content is relevant to learning needs
Average Score	3,8	3,9	3,7	4	3,8
Percentage (%)	95%	97	92	100	95

Figure 4. Results of Student Responses to the Area Test

The overall results show a high level of student satisfaction, with an average rating of 3.84 out of 4 and 95% satisfaction. Most students found the design visually appealing (3.8) and easy to navigate (3.9), indicating a user-friendly experience. The language used was highly praised for its clarity (4.0), ensuring accessibility for all students. While the interactivity (3.7) was generally appreciated for promoting active learning, there is potential for further enhancement. Additionally, the material was found to align well with students' learning needs (3.8), demonstrating its relevance and effectiveness in supporting their educational goals. Overall, the feedback suggests that the learning experience was engaging, clear, and well-structured.

The following is a photo of a learning activity with the implementation of a digital Snakes and ladders media product assisted by Genially.

Figure 5. Product Implementation Photo

3.1.5 Evaluation

Media that have gone through the implementation stage are then evaluated. At this stage, an evaluation is carried out to determine the effectiveness of the development of digital snakes and ladders media assisted by Genially in improving students' reading comprehension. Improvement in students' reading comprehension can be seen from the measurement of reading comprehension before and after learning using a questionnaire with a Likert scale. The questionnaire contains 20 statements that are considered valid with details of 17 positive statements and 3 negative statements. The questionnaire has gone through empirical testing with a Cronbach's Alpha value of 0.840 with instrument reliability criteria ≥ 0.600.

In this study, a difference test analysis was carried out to analyze the effectiveness of the development of digital snakes and ladders media assisted by Genially in improving students' reading comprehension. The hypothesis proposed in the difference test of this study consists of an alternative hypothesis (Ha), namely "There is a difference in reading comprehension between the experimental class and the control class" and a null hypothesis (H0) which states "There is no difference in reading comprehension between the experimental class and the control class". To test this hypothesis, the researcher used an independent sample t-test with the SPSS 26 program. However, before conducting the hypothesis test, the researcher conducted a prerequisite analysis test.

The analysis prerequisite test is intended to determine whether the collected data meets the requirements for analysis using statistical techniques. This analysis prerequisite test includes the normality test and the homogeneity test.

The results of the analysis prerequisite test and hypothesis test in this study are presented as follows:

1. **Normality Test**; Based on the results of data processing with SPSS 26 regarding the normality test with Kolmogorov-Smirnov, the calculation of KS was 1.253., and P was 0.086, Because P> 0.05, the data is normally distributed.
2. **Homogeneity Test**; Based on the data from the t-test processing using the SPSS 26 program on Levene's Test, it appears that the F value = 7.205 with p = 0.009, because p < 0.05, there is a difference in variance in the reading comprehension data of the experimental class and the control class (data is not homogeneous).
3. **Hypothesis Test**: In this study, the researcher conducted a hypothesis test with an independent sample t-test. Based on the results of processing independent sample t-test data using the SPSS 26 program, a summary of the data is obtained as shown in the following table:

Table 3. Summary of Data Processing Results

	Levene's Test for Equality of Variances		t-test for Equality of Means		
	F	Sig.	T	Df	Sig. (2-tailed)
Equal variances assumed Gain	7.205	.009	5.808	66	.000
Equal variances not assumed			5.808	60.42	.000

Based on the homogeneity test in point 2, the research data on reading comprehension is not homogeneous. Because the data above is not homogeneous, the researcher reads the data in the row where equal variances are not assumed. In the table above, it is known that t count = 5.808 with sig p = 0.000. Based on the calculation of the t table, the t table value with N = 68-2 = 66 is 1.997. Because t count = 5.808> t table = 1.997 and p <0.05, H0 is rejected, and Ha is accepted (there is a difference in increasing reading comprehension between the experimental class and the control class). Thus, the digital snakes and ladders media developed by Genially is effective in improving students' reading comprehension.

Furthermore, to see the magnitude of the increase in students' reading comprehension results, the pretest and posttest results are seen using the N-Gain formula. The results of the increase in pretest and posttest scores can be seen in Table 8 below.

Table 4. Results of Pretest and Posttest Calculations

Indicator	Pretest	Postest	N-Gain	Percentage Increase
Students	31	31	-	-
Average Score	65.3	91.21	0.71	39.7%
Highest Score	-	-	-	-
Lowest Score	-	-	-	-

The results showed a significant improvement in reading ability among 31 students after using the intervention media. The average pretest score was 65.3, reflecting students' initial understanding before the intervention. After using the media, the average posttest score increased to 91.21, indicating a significant improvement in reading ability. The N-Gain value of 0.71 indicates a high level of improvement, in accordance with Hake's (1999) classification, indicating that the intervention had a strong positive effect on student learning outcomes. Furthermore, the percentage increase of 39.7% further supports the effectiveness of the media in improving student performance. An independent samples t-test also confirmed a significant difference between the experimental and control groups ($t = 5.808$, $p < 0.001$), indicating that the Genially-based Snakes and Ladders digital game was effective in improving reading ability. Overall, these findings suggest that the media used in this study played a significant role in improving students' reading skills, resulting in substantial academic improvement.

3.2 Discussion

The development of digital snakes and ladders game media using the Genially platform follows the ADDIE development model, which consists of five stages: analysis, design, development, implementation, and evaluation. This aligns with the model proposed by Dick et al., (2015), which emphasizes a structured and systematic approach to developing learning media. In this study, development covers all stages of ADDIE, including the final evaluation to assess the effectiveness and sustainability of the media in learning. Previous research by Novita et al., (2024), which used a similar model, only covered the implementation stage, while this study covers all five stages, providing a comprehensive picture of the success of the development and implementation of digital snakes and ladders game media in learning. Research by Bali & Zsido, (2024); Hasanah Lubis et al., (2023) also highlights that a comprehensive media development model ensures optimal learning outcomes by combining the development and evaluation phases. In addition, the importance of including feedback during the evaluation stage is emphasized by Watts, (2017); Wynn & Maier, 2(022), ensuring that the

media is used effectively for educational purposes. The application of the ADDIE model in educational media development has been discussed by Anane, (2024); Rajendran et al., (2024); Smiderle et al., (2020), who argue that implementing a structured evaluation phase is crucial for measuring media effectiveness and providing useful feedback for refinement. Research by Gan et al., (2015; Novita et al., (2023) shows that the success of digital learning media development, including educational games, highly depends on the integration of in-depth analysis and design phases with continuous evaluation during implementation. Moreover, according to Arum et al., (2025); Romualdi et al., (2023), the development of educational media using digital platforms like Genially, with the ADDIE approach, has proven to enhance student interactivity and provides teachers with the opportunity to make adjustments during the learning process.

The feasibility of learning media in this study was assessed by various experts, including media experts, computer science lecturers, two subject matter experts, and a language expert. Based on the CVR results, a value of 1 was obtained, indicating that it was suitable for use in reading comprehension learning for Phase C students. According to Husnadi et al., (2024); Novita et al., (2020), the feasibility of learning media can be assessed based on how well the media is aligned with the desired learning objectives. The assessment by these experts is also in line with the findings of Hung & Yen, (2022) who emphasized that feasibility evaluation must involve various perspectives to obtain optimal media to support learning. Furthermore, Mutia et al., (2020) stated that feasible media must also increase student involvement during the learning process. Research by Chen et al., (2018)found that a collaborative evaluation approach by various experts significantly improved the quality and usefulness of learning media. These findings further emphasize the need for expert involvement in ensuring the suitability of media for learning.

In the implementation stage, student assessment of the digital snakes and ladders media assisted by Genially is very important to determine its feasibility and success. The assessment results showed that the digital snakes and ladders game media assisted by Genially was considered very interesting, made it easier to understand the material, and motivated students to learn. This shows that the use of game-based media in learning can increase student engagement and understanding, as well as add fun to their learning process. Researchers such as Adipat et al., (2021); Ke et al., (2015); Leaning, (2015)argue that the use of game-based media increases student engagement and makes learning more interactive. Also supports this finding Anastasiadis et al., (2018); Y.-C. Chen, (2017), which shows that game-based digital media can make students more active and focused on learning. Furthermore, Novita & Sundari, (2020) showed that interactive media can foster an active learning environment, thereby increasing student engagement and knowledge retention. One of the main objectives of this study was to measure the improvement in reading comprehension skills of phase C students after using the digital snakes and ladders game media assisted by Genially. This study is in line with the results of research by Novita et al., (2020) which also showed that game-based media such as digital snakes and ladders can significantly improve student learning outcomes. According to Angelelli et al., (2023); Antonopoulou et al., (2022), interactive learning environments and gamification contribute significantly to cognitive development, especially in subjects that require high-level thinking skills. In addition, research by Ke et al., (2015); Nguyen et al., (2024)strengthens these findings, showing that game-based media integration improves students' reading comprehension and overall cognitive engagement.

4. CONCLUSION

This study demonstrated that the Genially-assisted digital Snakes and Ladders game effectively integrated interactive storytelling and comprehension-based tasks to foster student motivation and active learning. The combination of narrative elements and game mechanics provided a meaningful learning experience that enhanced engagement. However, the research was limited to a small-scale implementation, which may affect the generalizability of the findings. Future studies are recommended to test the product with larger and more diverse samples, explore its long-term impact on learning outcomes, and adapt the design for different subject areas to broaden its applicability.

Although this study demonstrated that the Genially-based digital Snakes and Ladders game was effective in improving students' reading comprehension, several limitations should be acknowledged. This research was conducted with a relatively small sample and in only one elementary school, which limits the generalizability of the findings to broader educational contexts. In addition, the use of a one-group pretest–posttest design does not allow strong causal conclusions because there was no comparison group. The study also measured learning outcomes only immediately after the intervention, so the long-term impact on students' reading comprehension and retention remains unknown. Furthermore, students' high motivation and engagement may have been influenced by a novelty effect, in which the attractiveness of new digital media temporarily increases interest. Finally, this study focused solely on reading comprehension among Phase C students. Therefore, future research is recommended to involve larger and more diverse samples, apply experimental or quasi-experimental designs, examine long-term learning effects, control for novelty effects through longer implementations, and explore the application of this media to other literacy skills, subject areas, and educational levels.

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