

Interactive Snakes and Ladders Game as a Learning Media to Foster Student Engagement and Numeracy Skills in Elementary School

Yulianti Jamal^{1,*}, Lili Nurlaili², Yati Suryati³

^{1,2,3}Department of Education Management, University Pamulang, South Tangerang, Banten, Indonesia.
yyulianti807@gmail.com¹, lilynurlaili@unpam.ac.id², yattirosmiati@unpam.ac.id³

Abstract: This study examines how students' activity in the learning process is influenced by their interest in learning; however, in practice, students' interest in learning remains very low. This study aims to develop interactive snake-and-ladder game media to improve students' numeracy skills in grade II at SD Negeri Batutulis 2, Bogor City, South Bogor District, as numeracy is part of mathematics that can develop children's cognitive abilities. This study uses a development research approach with a 4D model (Define, Design, Develop, Disseminate). The study subjects were 45 grade II students at SD Negeri Batutulis 2. Based on the findings of this study, the snake-and-ladder game media have met the eligibility criteria, with 77.5% from media experts and 80% from material experts. Student responses also show that this media is very feasible to use, with a 89.3% agreement. Based on the pre-test and post-test results, there was a very significant increase in students' post-test scores. N-gain analysis shows a high category for 8 students, a medium category for 30 students, and a low category for 7 students. It can be concluded that this interactive snakes-and-ladders game media is suitable for learning and effective in improving the arithmetic skills of class II students at SD Negeri Batutulis 2, Bogor City, South Bogor District.

Keywords: Snakes and Ladders; Interactive Learning; Arithmetic Skills; Elementary School; N-Gain Analysis; Learning Process; Numeracy Skills; Higher Level Education.

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1. Introduction

The first education a child receives comes from the family environment. In the family, children gain knowledge, skills, and attitude formation through parental guidance. According to Law No. 20 of 2003 concerning the National Education System, education is a conscious and planned effort to help students develop their potential in spiritual strength, religion, self-control, personality, intelligence, noble morals, and the skills needed by society, the nation, and the state. In the family, some of the roles of teachers are often taken over by mothers, such as training discipline, helping children understand a concept, and providing guidance in completing school assignments. At the elementary school level, every child is expected to master three basic skills, namely reading, writing, and arithmetic. These three skills are an important foundation for children to continue

*Corresponding author.

their education to a higher level and play a role in everyday life. However, in circumstances like today, parents play an increasingly important role in achieving learning goals, especially when learning is conducted online. Unfortunately, initial observations show that not all parents pay optimal attention to their children's learning process. Some parents do not know their children's lesson schedules, do not provide learning tools, ignore the conditions of their children's learning environment, or do not even provide the encouragement children need to learn. Numeracy, as one of the basic skills, is the ability to analyse information in numerical form [5]. This ability involves applying number concepts, performing arithmetic operations, and explaining or solving problems using mathematics. One of the most basic numeracy skills is counting. Mathematics, as a branch of science, has a significant role in human life. Mathematics is not only used to solve simple problems, but also to solve more complex problems. Therefore, at the elementary school level, numeracy skills are an important foundation in learning mathematics.

Mathematics plays an important role as a school subject. Mathematics also develops the ability to think rationally, critically, accurately, effectively, and efficiently in the learning process [1]. Learning motivation is one of the key factors in the success of mathematics learning. Learning motivation can be understood as a psychological driving force within students that stimulates learning, sustains it, and provides direction toward achieving goals. Students who are highly motivated to learn tend to achieve better learning outcomes. However, based on an interview with grade II teacher Awit Retno Untari at Batutulis 2 Elementary School on July 22, 2024, it was found that grade II students' arithmetic abilities still vary widely. Of the 45 students, 15 had strong arithmetic abilities, namely the ability to solve problems independently with correct results. A total of 20 students had moderate arithmetic abilities, meaning they could solve problems but needed guidance at certain levels of difficulty.

Meanwhile, the other 10 students demonstrated low arithmetic abilities, so they needed intensive teacher guidance to solve problems. Further observations at SD Negeri Batutulis 2 showed that mathematics learning, especially numeracy, requires a more engaging approach to motivate students and involve them more actively in the learning process. One approach to overcoming this problem is to develop interactive learning media, such as the Snakes and Ladders game. Innovative learning media are expected to help students improve their numeracy skills in a fun and effective way. During the observation from August 5 to October 28, 2024, it was found that teaching and learning activities at SD Negeri Batutulis 2, especially in grade II arithmetic, still use limited, less innovative learning media. Teachers tend to use conventional methods, such as writing material on the board and explaining verbally with the help of theme books. Based on these findings, innovation in the use of learning media is needed to improve grade II students' arithmetic skills at SD Negeri Batutulis 2.

One potential learning medium is the Snakes and Ladders game. According to Afifah and Hartatik [2], the snakes-and-ladders game media resembles a conventional snakes-and-ladders game, but each square contains questions that the player must answer. This game aims to make students happy about the learning process, thereby motivating them to learn. The snakes-and-ladders game has various benefits, including providing children with knowledge through the learning process while playing, stimulating their thinking, creativity, and language, and creating an interesting and fun playing environment [9]. In addition, this game also teaches cooperation between players. The advantage of the snakes-and-ladders game is its ability to train students' cognitive skills. This media is also practical, economical, and easy to play. Because Snakes and Ladders is already popular, students do not need much time to learn the rules. By utilising this media, students can learn to count in a fun way without feeling burdened. Based on the problems identified above, this study focuses on students' low interest in learning during instruction and the underutilization of communication technology in mathematics instruction [10]. For example, teachers have not utilised the available multimedia for interactive learning. Therefore, this study aims to increase students' interest in learning by developing interactive learning media based on Snakes and Ladders games. In developing interactive multimedia for learning, it is necessary to consider the objectives, competencies, and indicators to be achieved, as well as the materials' effectiveness and efficiency. This study aims to assess the feasibility of the snake-and-ladder game media developed based on validator and student responses. In addition, this study aims to determine the increase in students' numeracy skills following the application of the snake-and-ladder game media [11].

In line with the identified problems, innovation in learning is needed to increase students' interest in learning. One proposed solution is to develop interactive learning activities based on Snakes and Ladders for mathematics instruction. With this approach, it is hoped that students can learn to count more interestingly and enjoyably [12]. Through this innovation, students' interest in learning is expected to increase significantly during the learning process. In addition, creating conducive learning conditions is expected to help students achieve their learning goals. The use of interactive learning media, such as Snakes and Ladders games, also provides opportunities for students to develop social skills, such as cooperation and communication, through interaction with their friends while playing [13]. This study is also relevant to the need to create more inclusive and enjoyable learning experiences. In the context of basic education, an interesting and interactive approach is very important for building foundational skills, including counting. With innovations like game snake stairs, learning mathematics can become more engaging, positive, and meaningful for participants. Ultimately, the development of interactive learning media, such as the game snake ladder, is expected not only to increase participants' ability to educate but also to help create an environment

supportive of holistic cognitive, emotional, and social learning. Thus, this research can make a real contribution to improving the quality of mathematics learning at Batutulis 2 State Elementary School [14].

2. Literature Review

Mathematics is one of the key lessons taught in elementary school (SD). According to Toni and Sudin [6], mathematics learning aims to develop logical, analytical, systematic, critical, and creative thinking skills. The ability to count is an important basic math skill that elementary school students must master. This is because the ability to count is the foundation for understanding other, more complex mathematical concepts. In addition, elementary school mathematics also plays an important role in everyday life. For example, numeracy skills are used in activities such as buying goods, calculating time, and managing pocket money. Therefore, educators should ensure that students master numeracy skills effectively [1]. Although important, mathematics learning is often considered difficult and boring by students. According to research by Mutiah et al. [5], many students have difficulty understanding basic mathematical concepts, including counting. This difficulty is often caused by less engaging learning approaches, such as lectures or question-and-answer assignments without relevant context. The second-grade teacher at Batutulis 2 Elementary School also reported that students' numeracy skills varied widely. Some students demonstrated strong numeracy skills, while others required intensive support. This challenge was further exacerbated by the limited learning media, such as textbooks and whiteboards, which did not support active student involvement in learning. Interactive learning media has been widely recognised as a solution for increasing student engagement and motivation.

According to Afifah and Hartatik [2], interactive learning media can create a fun and meaningful learning experience for students. One effective interactive medium is educational games, such as Snakes and Ladders. The snakes and ladders game as an interactive learning medium has several advantages, including: 1) Increasing students' learning motivation through a learning while playing approach. 2) Develop social skills, such as cooperation and communication, through interactions between players. 3) Facilitating the learning of mathematical concepts contextually and enjoyably. According to constructivist theory, effective learning is that which allows students to build their own knowledge through direct experience. Educational games, such as Snakes and Ladders, provide opportunities for students to learn actively and interactively. In the context of learning mathematics, this game can be used to practice counting skills, such as addition, subtraction, multiplication, and division. Several studies have shown the effectiveness of games in learning. For example, a study by Ratnaningsih [4] found that the use of educational games in mathematics learning increased students' motivation and learning outcomes. Students who learned through games showed a better understanding of concepts than those who learned through conventional methods. Snakes and Ladders is a traditional game that has been modified for educational purposes. In this game, participants use a method: they throw dice and move according to the numbers that appear. Each plot that is passed can contain a mathematical question that the player must answer.

If the answer is correct, the player can continue the journey; if wrong, the player must repeat the turn or take many steps back. According to research by Afifah and Hartatik [2], the game of Snakes and Ladders has many benefits for learning, namely: A) increasing motivation for study: Participants are more motivated to study because learning is fun. B) Practice Ability Cognitive: Game. This helps participants develop their counting and problem-solving skills. C) Developing Social Skills: Students learn to cooperate and compete healthily. The development of information and communication technology has opened up opportunities for interactive multimedia-based learning. According to Mutiah et al. [5], interactive multimedia combines elements of text, images, sound, video, and animation to create an interesting and effective learning experience. In the context of the snake-and-ladder game, interactive multimedia can enhance the game's quality by adding engaging visual and audio elements. The use of interactive multimedia in mathematics learning has been proven effective in improving student learning outcomes. For example, a study by Fauziahnur and Baidullah [7] showed that students who learned through interactive multimedia showed a significant increase in understanding of mathematical concepts compared to students who learned through conventional methods. Based on observations at Batutulis 2 Public Elementary School, learning mathematics in class II still requires innovative learning media. A development game, such as a snake ladder interactive, can be a solution for improving participants' counting ability.

This is designed with interactive features, such as: a) Math Questions: Every plot contains questions appropriate for mathematics with a competence base class II. B) Animation and Sound: Add Power pull games and create participants to educate more enthusiastically. C) Direct Feedback: Give bait, come back in the form of an explanation, if the participant answers wrong. To ensure the effectiveness of the interactive game snake ladder, required assessment and evaluation from various parties, such as teachers, participants, educators, and experts in learning media. This assessment includes aspects of the feasibility of the content, design, and technical aspects of the game.

According to Toni and Sudin [6], good learning media must meet the following criteria:

Relevance: Media must align with learning objectives and student needs.

Practicality: Media must be easy for teachers and students to use.

Effectiveness: Media must improve student learning outcomes. The assessment and evaluation can be used to improve the interactive snakes-and-ladders game before it is widely implemented at Batutulis 2 Elementary School. The development of interactive snakes-and-ladders games for grade II students to learn to count at Batutulis 2 Elementary School is driven by the need to improve student motivation and learning outcomes. The game is designed to offer a fun, interactive, and meaningful experience. With support for multimedia technology, games like this can help participants improve their control and counting abilities.

Literature study: This shows that the use of interactive learning media, such as the game Snake Stairs, has the potential to improve the quality of basic mathematics learning in schools significantly. Research more on the carry-on required for measuring effectiveness in the game. This will increase the ability to count participants, educate them, and identify factors that can influence their success.

3. Methodology

Study this use approach, research and development, also known as Research and Development (R&D). According to Sugiyono [8], research development is the method used to produce product-specific information and test the effectiveness of products. This aligns with the view of Fauziahnur and Baidullah [7] that research and development aim to produce a product and test its feasibility and effectiveness. With this approach, the research aims to develop an effective, interactive snake-and-ladder game learning media to improve participants' counting skills and educate grade II students in elementary school. Study. This was implemented at Batutulis 2 Public Elementary School, located in South Bogor District, Bogor City, in 2024. The selection location is based on considerations that schools have adequate numbers of participants, supportive teachers, and the use of innovative learning media. Research was conducted over six months, from January to June 2024, covering the product's stage planning, development, testing, and evaluation. Subject study: This is the participant education class II at Batutulis 2 Elementary School, with a total of 45 participants. The selection of the subject is based on the consideration that the participant is educated in class II, at a medium stage of development, and cognitive concrete operational, according to Piaget's theory, so that the game media is interactive and considered in accordance with their help in understanding draft counting pleasantly. Object study: This is a game media snake ladder interactive developed as a tool to help learning counting. Game This game is designed with consideration of the characteristics of participants in education class II, namely Simple, interesting, and capable. The game integrates educational elements, especially to improve counting skills, such as addition and subtraction. This research was conducted through several systematic stages, namely:

- **Needs Analysis Stage:** At this stage, a needs analysis was conducted to understand the problems of learning arithmetic faced by grade II students. Data was collected through interviews with class teachers, observations of learning activities, and analysis of learning documents. Results of the analysis. This becomes the basis for designing an appropriate interactive game media snake ladder.
- **Stage Design Product:** Based on analysis needs, games, snake ladder, interactive design with many components, namely:
 - **Game Board:** Contains numbers and mathematical operation symbols.
 - **Question Card:** Containing questions on addition and subtraction that must be answered in a participant-educator moment play.
 - **Game Guide:** Containing rules and methods of play designed to be easy to understand by participants.
- **Development Product:** After the design was complete, the game snake ladder was developed as a prototype. This process involves graphic design, game board creation, and question card printing. The prototype is then revised based on input from learning material experts and learning media experts.
- **Preliminary Field Testing:** The preliminary field test involved 10 grade II students to assess the product's feasibility and understandability. At this stage, students were asked to try the game, and researchers collected data through observation, interviews, and questionnaires. The trial results were used to revise the product before it was used in a wider trial.
- **Field Testing Phase:** The field test was conducted with all grade II students of Batutulis 2 Elementary School. The interactive snakes-and-ladders game was used for several learning sessions. Data on the game's effectiveness in improving students' numeracy skills were collected through pretests and posttests, as well as observations of the learning process.

- **Evaluation and Refinement Stage:** Data from the field trial were analysed to evaluate the effectiveness of the interactive snakes-and-ladders game. The results of the analysis are used to improve products, making them more optimal.

3.1. Data Collection Technique

- **Observation:** Conducted to assess participant education during the snake ladder interactive play and observed aspects covering participation, participant education, understanding of rules, and abilities, including moment-to-moment play.
- **Interview:** Interview conducted with the class teacher to get input on the advantages and disadvantages of the learning media developed, as well as suggestions for improvement.
- **Questionnaire:** Given to participants to educate them on measuring the level of understanding and enjoyment of the interactive game Snake Ladder.
- **Test:** Test done in pretest and posttest forms. To measure improvement in counting ability, participants were educated before and after using the interactive game Snake Ladder. Test This covers addition and subtraction in accordance with the curriculum for grade II of elementary school.

Data obtained and analysed qualitatively and quantitatively:

- **Analysis Qualitative:** Data from observation, interviews, and questionnaires, analysed in a way that provides descriptive information about participants' responses to the interactive game Snake Ladder. Analysis results were used to refine the product.
- **Quantitative Analysis:** Data from pretest and posttest were analysed using simple statistical tests, such as the t-test, to determine whether there is a significant improvement in the ability to count participants educated after using the learning media.

Validity of Data to ensure data validity, research uses data triangulation, namely, comparing data from various sources (observation, interviews, questionnaires, and tests). In addition, product validation is carried out through expert judgment by learning material experts and learning media experts.

3.2. Research Limitations

This research has several limitations, including:

- The research subjects were second-grade students at one school, so the results may not be generalizable to other contexts.
- Limited research time can affect the product's test results.
- The game media snake ladder interactive is only designed to increase ability and count basic, so it is not enough for drafting more complex.

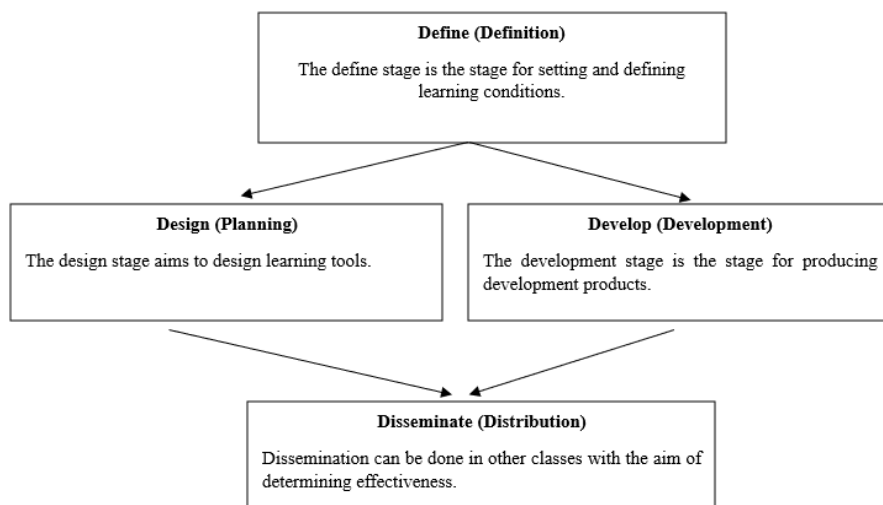


Figure 1: The 4-D model of instructional design

The research process began with a needs analysis to identify the problems students and teachers face in learning content. Based on the results analysis, design a media prototype that integrates interactive, visually attractive elements to motivate student learning. The development stage includes media creation, validation by media experts and material experts, and revisions to perfect teacher innovation and creativity. After that, the media is tested on students to measure their response and effectiveness through the R&D approach, this study aims to develop learning media in the form of an interactive snake and ladder game that is effective in improving the numeracy skills of grade II students of Batutulis 2 Elementary School and the research process involves the stages of needs analysis, design, development, testing, and evaluation. With various data collection techniques and systematic analysis, this study aims to produce products that are useful and relevant to learning at the elementary school level. Procedure for game media development: Snakes and Ladders in the study. This uses a 4D (Four-D) development model comprising four stages: define, design, develop, and disseminate, as presented in Figure 1. Research results show that game media products developed a ladder to increase the participants' ability in parcate Class II of Batstudents Atulis 2 Elementary School through a feasibility test involving a media expert, expert materials, and participant responses. To measure improvement in ability, participants are educated, and a pre-test and a post-test are conducted.

3.3. Media Member

Game media products, Snake Ladder, were validated by media experts, namely Awit Retno Untari. The results of the validation data analysis stage 1 showed that media experts pointed to a percentage of 52.5% in the category 'Enough worthy.' In contrast, validation stage 2 showed a 77.5% rate in the worthy category (Figure 2).

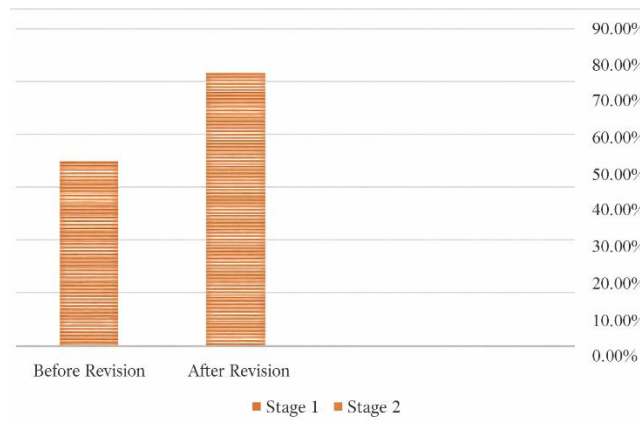


Figure 2: Diagram result media expert validator assessment level 1 and level 2

3.4. Material Expert

This study aims to develop a snake-and-ladder game as an interactive learning medium for participants in class II education at Batutulis 2 Elementary School. Subject study: This is a 45-participant education class for Class II—validation expert material conducted by Irma Fitriyanti. The results of the validation data analysis for the expert material in stage I show a 71.4% rate in the feasible category. In contrast, in stage II, media validation shows a 80% rate in the worthy category. Comparison results validation is shown in Figure 3.

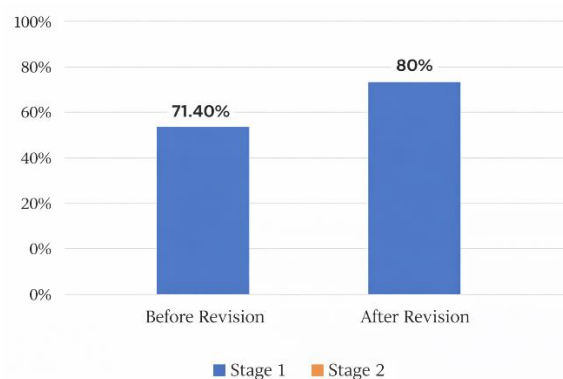


Figure 3: Result diagram evaluation expert validator material stage I and stage II

3.5. Product Trial

Trials product aiming to educate Class II students at Batutulis 2 Elementary School about the game media snake the stairs, developed by researchers, and to evaluate the suitability of the media that has been made. In the trial product, all participants are from the participant education class II at Batutulis 2 Elementary School, totalling 45 people. The results of the response participants show a 89.3% response rate, which is very high (Table 1). To see improvement ability, count the participants educated, analyse the difference between pre-test and post-test results (N-gain) using the following formula:

$$g = \frac{Sf - Si}{100 - Si} \times 100\%$$

Information:

- Normalised Gain (N-Gain)
- Sf= Posttest score
- Si= Pretest score

Table 1: Response participant educate

No.	Indicator	Evaluation			
		1	2	3	4
1	Presentation of easy material was understood	0	1	9	18
2	Use of clear and easy-to-understand language	0	0	17	11
3	The material is explained in detail	0	1	11	16
4	Compliance with the rules of the Snakes and Ladders game	0	0	18	6
5	Clarity of font size and type	0	0	18	6
6	Attraction media view	0	0	8	19
7	Instructional Media support for understanding the material	0	1	9	16
8	Like the study using the game media snake ladder	0	0	8	18
9	Game media snake ladder is safe to use	0	0	8	16
10	Ease of using the Snakes and Ladders game media	0	0	8	19
Amount Frequency			8	336	656
Total Score		1000			
Percentage Value		89.3%			

The results reveal that all participants' scores increased from the pre-test to the post-test, and that all had positive N-gain values, indicating that the educational intervention worked. The highest N-gain was 0.66, and the lowest was 0.12. This shows that different individuals made different amounts of progress in their learning (Table 2).

Table 2: Difference pre-test and post-test results of participant education (N-Gain)

No.	Participant Name Educate	Pre-test Score	Post-test Value	N-Gain
1	Abiyu Aprillio Muftadz	43	70	0.47
2	Alvian Arjuna Jakim	33	68	0.52
3	Arkhan Putra Hidayat	19	37	0.22
4	Hanifah's Women	47	82	0.66
5	Citra Selvia Putri Nopianti	12	42	0.34
6	Dafa Ibn Hafidz	25	36	0.15
7	Earlyta Maharani Azhar	43	72	0.51
8	Ibrahim The Final Son	23	60	0.48
9	Jasmine Aqillah Kidita	27	51	0.33
10	Kinanti	15	52	0.44
11	Meyssha Aqilla Subandi	15	31	0.19
12	Muhammad Aldan Alonsso	28	49	0.29
13	Muhammad Alliando Gunawan	40	78	0.63
14	Muhammad Azka Alexi Danish	44	61	0.30
15	Muhammad Nuzuludin	28	52	0.33
16	Muhammad Rafa Azka Son	7	19	0.13

17	Muhammad Rasyid Khairan	26	49	0.31
18	Nopan Indra Putra	6	32	0.28
19	Raysa Moura Radja Lodo	28	41	0.18
20	Reyhan Anugrah Jakim	48	75	0.52
21	Rm Rayyan Ibrahim Firdaus	34	51	0.26
22	The Day Of Ramadan	42	55	0.22
23	Aelfadlan Syauqi Akhtar	6	17	0.12
24	Albian Rizky Januar	25	64	0.52
25	Aleandra Tryguna Nissyaban	37	52	0.24
26	Arbi Pradana Son	16	47	0.37
27	Azwan Son of Rahmansyah	26	45	0.26
28	Devandra Saputra	48	61	0.25
29	Hani Nabilah	29	60	0.44
30	Kheiza Maulana Zaelan	31	69	0.55
31	Mikayla Rafa Adila	46	73	0.50
32	Muhammad Azka Pratama	32	67	0.51
33	Muhammad Danish Faeyza Azfar	20	41	0.26
44	Muhammad Ridho Firmansyah	19	30	0.14
35	Muhammad Syauqi Dirgantara	48	67	0.37
36	Nabilah Naurisa Nazaha	7	46	0.42
37	Noela Eka Natania Chrissy	41	54	0.22
38	Raiza Ramadhan	11	34	0.26
39	Rajsyahneza Ariendra El Fatih	25	50	0.33
40	Rayhan Ardani	13	37	0.28
41	Saffana Maulidina	43	60	0.30
42	Tjut Safeya Kirani	22	45	0.29
43	Jericho Izala	8	40	0.35
44	Zafran Al Faridzi	29	66	0.52
45	Abiel Rasya Kusuma	18	52	0.41
Highest Score		0.66		
Lowest Score		0.12		

Table 3 shows how participants are distributed according to N-gain criteria. Most of them (31) are in the moderate ("Currently") category, followed by 8 in the high ("Tall") category and 6 in the low category. This means that most of the participants made moderate progress in their learning, according to the N-gain classification.

Table 3: Criteria acquisition N-gain score

No.	Limitation	Criteria	Amount
1	$N\text{-Gain} > 0.7$	Tall	8
2	$0.3 < N\text{-Gain} \leq 0.7$	Currently	31
3	$N\text{-Gain} \leq 0.3$	Low	6
Amount			45

The development of the snakes-and-ladders game media aims to produce learning media that can capture students' attention during the learning process and improve the numeracy skills of class II students at Batutulis 2 Elementary School. To achieve this goal, the snakes-and-ladders game media was developed using a 4D model comprising the following stages: Define, Design, Develop, and Disseminate. The following outlines the development of the media exposure stage. At the analysis stage, there is a problem with the basis for learning in the school process, especially regarding the learning media. The in-class learning process uses less media, which leads participants to be less engaged in follow-up learning and to have a lower understanding of the material delivered. Delivery materials tend to use methods such as lectures and books to support learning. According to Kustandi and Darmawan [3], the use of learning media in the learning process can foster participants' interest and motivation, educate them, and stimulate learning activities, even influencing their psychological states. Therefore, participants need more innovative learning media to increase the quality of learning and study results.

Kustandi and Darmawan [3] also emphasise the importance of effective learning media in increasing understanding and participant involvement in education. Study. This study aims to develop a game media snake ladder, interactive use, increase

ability, counting, and participant education in class II of Batutulis 2 State Elementary School. According to Kustandi and Darmawan [3], media in learning offer several benefits, such as increasing motivation to learn, making materials easier to understand, and enhancing participants' interest and engagement in the learning process. Based on this matter, the researcher developed a game media snake ladder to increase participants' ability to count in the education class II of Batutulis 2 State Elementary School. Stage design is designing game media snake stairs that are interesting and interactive. Game snake ladder. This is designed to attract attention, educate participants through an attractive appearance, and be easy to play. Game media design snake ladder. This uses 15 colour combinations in each series column: pictures, cartoons, popular in some boxes, and a picture snake with 4 colour combinations and stairs with 8 colour combinations. The numbers in the box snake ladder use clear, easy-to-read type and size. How to play snake ladder: easy to understand, where the game starts with a dice throw, and pawns move in accordance with the amount shown on the dice. If the piece lands on a box containing an end ladder, the player will go up the stairs and add the numbers in both boxes.

On the other hand, if the piece lands on the head snake, the player must go down to the tail snake and reduce the numbers on both boxes. The box containing question A must tell a story that the player answers in accordance with the teacher's instructions. Ratnaningsih [4] explains that Snakes and Ladders is a game that uses dice to determine the player's step at each stage. This design uses the CorelDRAW X7 application, with material addition and subtraction numbers. The materials and images used were sourced from various sources, including Google, journals, and books. Stage development aiming to produce game media snake stairs that can capture participants' attention, educate, and improve counting ability.

The first step is to determine the size and materials needed to make this media, as well as determine the form of the media display. The media will be developed according to the prepared design, then validated by material and media experts. According to Sugiyono [8], expert testing is conducted to ensure that the assessment instruments developed are appropriate and to minimise weaknesses or inconsistencies in appearance and content. Product trials are conducted to collect data that serve as a basis for product improvement, to achieve an optimal level of learning media feasibility. Based on the assessment of media experts, 77.5% indicated that this media was "feasible" to use. The assessment from material experts obtained a 80% rating, which also stated that this media was "feasible". The data obtained consisted of quantitative assessment scores from questionnaires and qualitative data in the form of criticisms and suggestions for improving the Snakes and Ladders game media. Input from media experts included suggestions to increase the media's appeal and the quality of the materials used. In contrast, material experts suggested adding more varied sample questions and a more detailed explanation of how to use this media. A trial of the snakes-and-ladders game media product was conducted with grade II students at Batutulis 2 Elementary School. This trial involved 45 students, and the results showed that the snakes-and-ladders game media achieved a 89.3% success rate, which was deemed very feasible. Based on the assessment of student responses related to the media and materials tested, the results were very positive. Each component of the statement indicator was in accordance with the media and materials used. The media and materials used actively involved students in the classroom learning process and made learning more enjoyable.

4. Conclusion

The development of an interactive snake-and-ladder game media for learning to count for grade II students at Batutulis 2 Elementary School was implemented using the 4D development model, comprising the Define, Design, Develop, and Disseminate stages. This process can be carried out systematically to maximise the quality of the media produced. At the Define stage, students carry out a needs analysis to formulate development objectives. The Design stage includes creating a prototype of learning media. And at the Develop stage, this media is validated by media and material experts and improved based on their suggestions. Finally, the Disseminate stage is carried out to test the effectiveness of the media in the classroom environment. This research validation results show that this media has a good level of feasibility. So that media experts give a feasibility score of 77.5% and a feasible category, while material experts give a score of 80% and a feasible category. In addition, students' responses to this media are very positive, with a score of 89.3%, indicating that this media is very feasible to use in learning process activities. The effectiveness of this highly interactive snakes-and-ladders game media is demonstrated through an analysis of pre-test and post-test results. These results show a significant increase in the students' arithmetic ability. Of the total 45 students, 8 are in the high N-gain category, 30 in the medium category, and 7 in the low category. Thus, the results of this media are very effective in improving the arithmetic ability of grade II elementary school students and can be used as an innovative and creative alternative in mathematics learning.

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