

## Numeracy Development of Snake and Ladder Games with Canva Media for Grade IV Mathematics Learning at SDN Sukowono 04

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**Abstract.** This study aims to develop snakes and ladders media in grade IV math subjects at SDN SUKOWONO 04. The method used in this research is Research & Development (R&D) with the ADDIE model, namely analysis, design, development, implementation and evaluation. Learning math using snakes and ladders media aims to inspire students to continue learning by inviting them to actively participate in learning. To maintain the effectiveness of learning, teachers can use learning media in Teaching and Learning Activities (KBM). The utilization of learning media can increase students' learning motivation, activate student responses, and improve students' problem-solving skills. Snakes and ladders learning media refers to media that mimics the snakes and ladders game. However, some plots contain questions that must be passed by the player, and answer the question if the player is right on the plot containing the question. This game will be very fun and interest students if applied in the learning process in the classroom.

**Keywords:** Learning Media, Math Learning, Snakes and Ladders.

### 1 Introduction

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential so that they have spiritual religious strength, self-control, personality, intelligence, noble morals, and the skills needed by themselves, society, nation and state [1]. The national education goals must be achieved by all education managers in Indonesia, especially formal education. The main goals of education achieved must be adjusted to the abilities and needs of students. Thus, one of the abilities that students must have is mathematics [2]. The success of the learning process is influenced by the role of school teachers in applying appropriate learning methods to different subjects, so that different methods are needed to improve student learning outcomes. One of the subjects in school is mathematics. Mathematics is one of the most important subjects in the world of education, because mathematics lessons can make students think logically, rationally, critically and broadly, this statement is in line with the goals of national education, namely: Prepar-

ing students to be able to face changes in life and in this ever-changing world, through practice acting on the basis of logical, rational, critical, and careful thinking, also to prepare students to be able to use mathematics in everyday life and in studying various sciences [3].

Learning media is one of the factors that plays a role in the success of the educational process in schools because it can facilitate the process of conveying information from teachers to students or vice versa [4]. Learning media that is used creatively can increase the effectiveness of learning so that learning objectives can be achieved. Learning media is a tool that functions as an intermediary to convey a message in the learning process [5]. The benefits of learning media in the teaching and learning process have a very large influence, because with the existence of learning media, students are more fluent in interacting with teachers so that learning is more effective [6]. With the existence of learning media, it is hoped that students' learning outcomes can be improved during the learning process [7].

One of the alternatives used to improve learning is the snakes and ladders media. The snakes and ladders game is one of the traditional games that has been known for a long time [8]. This game will be very fun and interesting for students if applied in the learning process in the classroom. Snakes and ladders learning media refers to media that imitates the snakes and ladders game [9]. However, some squares contain questions that must be passed by the player, and answer the question if the player is right on the square containing the question. The purpose of this learning media is to make students feel at home following the learning. In addition, this game can help students improve their learning outcomes. With the presence of snake and ladder learning media, it is hoped that students can learn to participate more actively in the learning process.

There are several cases in several schools, especially in elementary schools grade IV who have problems with difficulties in learning mathematics. Several studies have concluded that, even though mathematics material has been taught, there are still many reasons why students have difficulty understanding it. Difficulty in understanding mathematics subjects will cause students to make mistakes in writing and completing practice questions. Several previous studies have stated that many cases of students' difficulties in understanding mathematics learning because mathematics lessons are often considered scary by students, difficult to understand because there are many formulas that make students bored and confused, so students do not like mathematics learning [10]. Even mathematics in the eyes of students is one of the subjects that should be avoided.

The use of Canva-based snake and ladder game media is very relevant for learning mathematics in grade IV because at this stage students are in the concrete-operational phase according to Piaget's theory of cognitive development, so they need visual and contextual media to understand abstract concepts such as calculation operations, fractions, or measurements. The game is designed to accommodate the cognitive characteristics of grade IV students who are happy with the play activity but still need a structured learning stimulus. In addition, this study highlights that grade IV students often have difficulties in learning mathematics because the material is considered complicated, full of formulas, and disconnected from their real world, thus causing

boredom, fear, and even reluctance to participate in mathematics learning. This problem is reinforced by previous studies documenting how traditional teaching methods that are one-way, less interactive, and lack of contextual media are often the cause of students' low understanding and motivation for mathematics.

This research integrates constructivism learning theory with a game-based learning approach and the principle of multiple intelligence to strengthen the pedagogical foundation of the use of this snake and ladder media. In the constructivist approach, students are positioned as active subjects in building knowledge through hands-on experience, while snake and ladder games provide a motivating and fun learning context, supporting students' interpersonal, logical-math, and visual-spatial intelligence. The selection of Canva as a media development platform was based on strong pedagogical considerations: Canva has interactive design features that are easily accessible, flexible to modify to suit material needs, and can produce an attractive and professional visual look. Thus, the use of Canva supports the creation of learning media that is adaptive, aesthetically pleasing, and able to increase student engagement in the math learning process, which is ultimately expected to significantly improve learning outcomes.

One way for teachers to overcome this problem is to use learning media to help students improve their skills [11]. Teachers can use learning media to facilitate the learning and teaching process [12]. For example, the development of mathematical media with snakes and ladders based on canva, which is ideal for use in learning. Snakes and ladders game media can be applied in mathematics learning in the classroom, because this media is very fun and attracts students' attention. In addition, using this learning media can improve students' understanding of mathematical concepts, principles, and procedures and leave an impression that will always be remembered for a relatively long period of time.

Thus, the explanation of the background above, the need for the development of learning media for mathematics subjects in grade IV. The existence of learning media is also expected not to make students feel bored in participating in learning, and to attract students' interest in participating in the learning. The purpose of this study is to develop snakes and ladders media in mathematics subjects in grade IV. Therefore, this study discusses the development of snakes and ladders game numeracy with canva media for mathematics learning.

The purpose of this research is to develop a learning media in the form of a Canva-based snake and ladder game designed specifically for grade IV elementary school mathematics subjects, with the hope of having a significant pedagogical impact in improving the understanding of mathematical concepts, principles, and procedures in a fun and meaningful way. This media aims not only as a visual and interactive tool, but also as an innovative learning strategy that can foster students' interest in learning, reduce fear of mathematics, and encourage active participation during the learning process. By integrating elements of traditional games with digital technology such as Canva, it is expected that students will be more motivated, emotionally engaged, and have a fun and memorable learning experience, so that their math learning outcomes will be significantly improved.

## 2 Methods

This research is a type of development research that will later produce a product. In this study using the type of development research method or Research and Development (R&D), the product is developed with the aim of increasing productivity in teaching and learning activities. This method was chosen because it can provide a structured framework in developing effective and relevant learning products or devices with research objectives [13].

The product developed is a learning media for numeracy games snakes and ladders based on Canva media in the subject of mathematics for grade IV. The model used by the author is the ADDIE development model. ADDIE is a more rational and comprehensive research and development model and can be applied to various forms of product development, such as models, learning strategies, learning methods, media, and teaching materials based on product development steps. The stages in the ADDIE model with 5 stages, namely: (analysis, design, development, implementation, evaluation) [14].

With the ADDIE development model based on the consideration that this model is arranged systematically in an effort to solve problems in teaching and learning activities related to learning media that are in accordance with the character of students. The target product used by researchers is the snake and ladder game numeracy media based on Canva for 24 fourth grade students at SDN SUKOWONO 04. The validators in the study were media expert teachers and material experts in mathematics. The data collection techniques used by the author were observation, documentation, and tests. The instruments in data collection used by researchers were instruments for media experts and material experts.

This study uses the ADDIE (Analysis, Design, Development, Implementation, Evaluation) development model which was chosen because it provides a systematic, rational, and comprehensive framework in designing learning media that is effective and in accordance with the characteristics of students. The ADDIE model is considered appropriate for this study because each stage is able to answer the need to develop contextual and structured media, starting from the stage of analyzing student needs and curriculum, designing media based on the results of analysis, product development using the Canva platform, media implementation in grade IV mathematics learning, to the evaluation stage to assess the feasibility and effectiveness of media. The advantage of the ADDIE model in its flexibility in its application to various forms of educational products, including learning media, is a strong basis in the justification for its selection in this study, especially to support the development of educational game media for snakes and ladders that can improve the understanding of numeracy concepts for elementary school students.

### **3 Results and Discussion**

#### **3.1 Research result**

The final product produced from this research is a learning medium for snakes and ladders in mathematics subjects. Based on the research conducted by the author, namely "Development of Numeracy of Snake and Ladder Games with Canva Media for Mathematics Learning in Grade IV at SDN SUKOWONO 4" teaching and learning activities in mathematics subjects using numeracy learning media of snake and ladder games can make students interested and not feel bored with mathematics subjects.

This learning medium was developed to provide a fun and immersive learning experience, by integrating game elements into the math learning process. The use of Canva-based snake and ladder media provides convenience in design and content that can be tailored to the needs of grade IV students. In addition, this media is also able to increase student involvement in the learning process, so that they are more active in understanding mathematical concepts such as calculation operations, fractions, and measurements. The results show that this approach not only increases students' interest in learning, but also has a positive impact on their learning outcomes. Thus, ladder learning media can be one of the innovative alternatives in increasing learning effectiveness.

The innovative integration between the snake and ladder game and Canva's design platform in grade IV math learning offers a uniqueness that sets it apart from conventional game-based learning tools. Unlike game-based media that is generally physical or uses digital applications that are limited to a specific format, Canva allows for the development of media that is highly flexible, visually appealing, and accessible to teachers without the need for advanced design skills. Game designs can be quickly modified to suit specific math topics, as well as can be displayed through a projector in the classroom for collaborative play. By combining elements of traditional games familiar to students and modern digital platforms, these media bridge the gap between conventional learning and 21st-century learning needs.

This medium offers a new approach to understanding numeracy by utilizing visual and kinesthetic interactions to strengthen the understanding of mathematical procedures. In this context, Canva-based snake and ladder media not only presents practice questions in a fun format, but also facilitates experiential learning. When students have to solve math problems on certain squares during the game, they are encouraged to think quickly, discuss, and apply concepts directly, which is in line with a constructivist approach to learning. Thus, this medium helps students not only memorize formulas, but understand numeracy concepts more deeply through the context of fun games.

The main users of this media are grade IV elementary school students, with a research sample of 24 students from SDN Sukowono 04 consisting of male and female groups. The selection of samples was carried out purposively based on the needs and suitability of the level of students' cognitive development and the curriculum used (independent curriculum). In its implementation, teachers are also important users

because they act as learning facilitators who direct and guide the course of the game and ensure that the material presented is relevant and in accordance with learning outcomes.

The evaluation of the effectiveness of the media is carried out through qualitative and quantitative approaches. Quantitatively, the researcher used test instruments to measure the improvement in student learning outcomes before and after the use of media. Meanwhile, qualitatively, observation and documentation are used to see the level of student involvement during the learning process. Through direct observation, it can be seen that there is an increase in motivation, active participation, and enthusiasm of students for mathematics lessons that were previously considered difficult and boring.

The success indicators in this study are clearly defined, which include an increase in mastery of basic mathematical concepts (such as calculation, fraction, and measurement operations), an increase in the level of students' active participation in learning, and students' satisfaction and interest in the learning process. This success is demonstrated through improved post-learning test results, high student engagement during the game, and positive feedback from students and teachers on the use of media. With these indicators, it can be concluded that Canva-based snake and ladder media has strong potential as an innovative learning tool that is effective and fun.

### **3.2 Discussion**

This study uses a type of research and development method or Research and Development (R&D) with the ADDIE model, namely analysis, design, development, implementation and evaluation.

#### **Analysis.**

The analysis stage is the initial stage in the development of the ADDIE model. The first stage begins with conducting an analysis, namely field studies and literature studies. The field study was conducted by interviewing the school directly, namely Mr. Wawan Kurniawan S.Pdi. Based on the results of observations carried out on February 19, 2024 at SDN Sukowono 04, it showed that teachers and staff still experienced obstacles in implementing mathematics learning.

The obstacles faced by SDN Sukowono 04 in implementing mathematics learning include 1) student competence in using mathematical concepts in everyday life, 2) low levels of student motivation in participating in mathematics learning activities, this is because the majority of students consider learning to be a boring and difficult activity to understand, 3) innovation of mathematics learning media to make it more interesting for students to learn. In the curriculum analysis, it was found that the curriculum used at SDN SUKOWONO 04 is the independent curriculum. At the analysis stage, it was discovered that teachers and students needed innovative learning media to assist in the process of providing and receiving learning materials, as well as increasing motivation and enthusiasm for learning, especially when learning mathematics.

### Design.

Based on the results of the analysis of facts found during observations and interviews with teachers, an idea emerged to develop mathematics learning media that are more interesting to elementary school students so that students can play a more active role in learning. The learning media is in the form of a snakes and ladders game developed in mathematics learning. Where the snakes and ladders learning media refers to media that imitates the snakes and ladders game. However, in some squares there are questions that must be passed by the player, and answer the question if the player is right on the square containing the question. At the design stage, the author created snakes and ladders media using the Canva application.



Fig. 1. Design numerical games snake ladder.

### Development.

The ADDIE model includes all the actions expected to achieve the goals according to the product design. Conceptual framework for the implementation of new learning media that has been formed during the design phase [15]. Selanjutnya, kerangka konseptual ini direalisasikan sebagai produk yang siap dipakai dalam tahap pengembangan. Sebagai contoh, saat penggunaan media pembelajaran numerasi games ular tangga dalam tahap pengembangan ini adalah penggabungan antara media dan materi.

At this stage, the merging of media with material is done carefully to ensure that the two elements support each other and function optimally in support of learning objectives. The learning medium of the snake and ladder numeracy game, for example, not only serves as a visual aid, but also as an interactive means that allows students to be directly involved in the learning process. In this case, the math material presented through the snake and ladder game must be relevant to the topic being studied and designed in such a way that students can understand mathematical concepts in a more fun and applicable way.

The development of learning media includes the process of making things that are in accordance with the learning objectives, such as the content of preparing questions

related to basic mathematical operations, fractions, or other mathematical concepts that are in accordance with the curriculum [16]. In addition, game elements such as snake boards, dice, and game rules are also designed to enrich the learning experience of students, so they can learn as they play.

In addition, at this stage of development, product trials are also carried out to ensure the functionality of the media and suitability with learning objectives. The results of the experiment will provide insight into how students interact with this medium and the extent to which it can help them in understanding math material. Therefore, this stage of development is important to ensure that the resulting product is not only engaging and fun, but also effective in improving students' understanding of the subject matter.

### **Implementation.**

The implementation process involves the application of learning media that has been designed and developed. At this stage, everything that has been developed and arranged according to its function so that it can be used. At this stage, the design and media that have been developed are used in teaching and learning activities. The material is delivered with the help of learning media that has been developed. For example, learning mathematics uses this snake and ladder medium. Where this activity was carried out in class IV.

First, the author divides the class into 2 groups, namely the group of male students and the group of students. Then the group of male students and the group of students were given signs or pins with different colors so that when running the snake and ladder game were not exchanged. For example, the group of male students was given a blue pin and the group of students was given a pink pin. Furthermore, the numeracy of snake and ladder games that have been made using canva is displayed in front of the class using a school projector.



**Fig. 2.** Divide the class into 2 groups





**Fig. 3.** The game of snakes and ladders is displayed on the projector.

Then the game begins with a group of male students rolling the dice and running the pins. When the student's pin stops at number 5 or says a quiz, the student is required to complete the math problem in number 5. After all, the author has prepared a collection of math problems that students must solve when in the quiz position in the numeracy of snake and ladder games.



**Fig. 4.** A group of male students roll dice.



**Fig. 5.** Groups of male students complete quizzes.

The main objectives of implementation are First, to help students achieve learning objectives. The second is to ensure that a problem solving or solution to address the student gap occurs. The third is to produce student competencies, namely the knowledge, skills, and attitudes needed by students.

The main objectives of this implementation also include continuous monitoring and evaluation of the learning process to ensure that each student gets the maximum benefit from the learning media used. In this case, the role of the teacher is essential to facilitate the learning process, provide guidance to students, and maintain their progress individually. Teachers are also responsible for adjusting teaching methods according to the needs of students, as well as ensuring that the learning media used can be easily accessed by all students, without being constrained by technological limitations or students' understanding of the material.

In addition, the implementation also focuses on identifying and solving problems that may arise during the learning process, such as difficulties experienced by students in understanding certain concepts or the incompatibility of learning media with their learning style. By addressing these gaps, the implementation aims to create a more inclusive and effective learning experience for every student, ensuring that they have an equal opportunity to achieve their desired competencies.

### **Evaluation.**

The last stage in the development of this product is the evaluation stage. This stage is the last stage of the ADDIE motode. At the stage of evaluating the media that has been produced and the media that has been implemented, it is evaluated from several shortcomings. The initial evaluation is carried out after the application of learning media to provide feedback on the next application. The results of the development are applied in learning to determine its effect on the quality of learning, including efficiency, attractiveness, and effectiveness. The application is also carried out to get input to improve the media that has been developed.

## 4 Conclusion

The positive impact of the application of snake and ladder game media on mathematics learning in the classroom is very much visible, especially in students' mathematics learning outcomes. In addition to having an impact on students' mathematics learning outcomes, the snake and ladder game media also affects students' activeness in participating in mathematics learning in the classroom. When learning with this snake and ladder media, all students actively participate in playing while learning. There were no students who just listened quietly but all students were enthusiastic in carrying out this learning activity. Mathematics learning is no longer scary because students really enjoy learning with this snake and ladder media. In addition, the mathematical concepts inserted in the snake and ladder game help students understand the material in a more contextual and practical way. Thus, this game not only improves learning outcomes, but also increases students' activeness in participating in mathematics learning activities. The media of snake and ladder games also has an impact on students' motivation in learning mathematics. The media of snake and ladder games has a positive impact on students' motivation in learning mathematics. Based on the results of the research and product development conducted by the author on "Development of Snake and Ladder Numeracy Games with Canva Media for Mathematics Learning in Class IV at SDN SUKOWONO 4" which was carried out at SDN SUKOWONO 4, Jember Regency, East Java Province, it can be concluded that the purpose of this study is to develop snake and ladder media in mathematics and Inspire students to continue learning by inviting them to actively participate in learning and increase student learning motivation, activate student responses, and improve students' problem-solving skills. Based on the results of the research, the suggestions that can be conveyed in this study are as follows: The use of this learning media can overcome various problems faced in the mathematics learning process and is needed to follow up with the design of its development for the next learning process. This media is still limited from the design and editing media used, therefore, the next researcher can develop better numbers of snake and ladder games with Canva media and make new innovations again.

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