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The Influence of Snakes and Ladders Game Media, Concrete Media and Initial Skills on Mathematics Learning Outcomes

Siti Sangiddah*, Ibut Priono Leksono, Retno Danu Rusmawati
Universitas PGRI Adi Buana Surabaya
*e-mail corresponding: mbakiddah@gmail.com

Abstract : This study aims to determine the use of snakes and ladders game media, concrete media, and initial skills can improve student learning outcomes. This methode f research is experimental research using a positivism-quantitative approach. The subjects of this study were students at SDN Jumputrejo class VB and class VC and SDN Sukodono I in-class VA and VB, amount 80 students. The data collection technique in this study is a questionnaire and the test technique is a questionnaire. Technical data analysis using SPSS. Based on the results of the study it was concluded that there were differences in the average score of mathematics learning outcomes in classes taught using snakes and ladders learning media and concrete media with the initial skills of students in the experimental group, students who were taught with the snakes and ladders game media obtained higher learning outcomes compared to the control group or the group taught with concrete media and there was an interaction effect between the snakes and ladders game media and concrete media and initial abilities in mathematics learning outcomes.

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Introduction

Mathematics is a means of thinking in determining and developing science and technology, has an important role in various disciplines, and can advance human thinking (Indriani & Imanuel, 2018). To create and master technology in the future, a strong mastery of mathematics is needed as early as possible (Oktavianingrum, Ambarwati, & Tarjiah, 2020). Mathematical understanding requires quality mathematics learning activities. Mathematics learning activities are very necessary because they are related to the cultivation of concepts in students, who will contribute to the further mathematics development and apply mathematics in everyday life (Simbolon & Wahyuni, 2022). In fact, mathematics learning activities at school students are only taught theories/ definitions/ theorems, examples of which are then given practice questions. As a result, students' understanding of concepts is very weak and often has difficulties in learning mathematics activities in class. In addition, many students are not interested in learning mathematics activities because students consider it less meaningful just to hear, write material, and do problems without being understood so students feel that mathematics is difficult and boring (Indriani, Aisyah, & Elok, 2021).

Learning media while playing is one of the right media for elementary school students. Learning activities while playing are activities that are carried out with a feeling of pleasure, without coercion, but have a method that is expected to create good results for students' self-

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development (Ishak, Afifah, & Kamelia, 2021). The advantage of game-based learning activities is that it opens opportunities for students to be fully involved in activities by directing their attention to games, meaning they also pay attention to learning (Ariessanti, Purwaningtyas, Soeparno, & Napitupulu, 2020). Based on the results of Anjelina Wati's research in (Wati, 2021) entitled 'Pengembangan Media Permainan Ular Tangga untuk Meningkatkan Hasil Belajar Siswa Sekolah Dasar' that the application of Snakes and Ladders game learning media shows that student learning outcomes have increased by 45%. According to Hani et al in (Ariessanti, Purwaningtyas, Soeparno, & Napitupulu, 2020) that the simplicity of the game makes it easy for researchers to modify in achieving certain goals, such as the effort to introduce snakes and ladders as a medium for learning mathematics.

The object of mathematics learning activities is abstract, so the teacher must be able to create a learning atmosphere so that students can form their own concepts of mathematics learning activities (Prananda, Friska, & Susilawati, 2021). Concrete media make learning activities more real and create an atmosphere of active and interesting learning activities (Cahyono, Ulya, & Ristiyani, 2020). Based on the results of research by Defti et al in (Frawiyandani, Margiati, & Sabri, 2019) entitled 'Pengaruh Media Konkret terhadap Hasil Belajar Matematia Kelas III Sekolah Dasar' shows that the use of concrete media in learning activities makes students more active in the learning process, so that students' mathematics learning outcomes increase. With the help of concrete media, students are more active and better understand the topic of learning activities.

It is not uncommon for students who are good at mathematics in school today, influenced by the initial abilities they have at the school level before the current level. Initial skills in mathematics learning activities are skills that every student must have before starting a lesson (Nurrahman & Agustina, 2021). Initial skills are related to learning outcomes in increasing student potential in mathematics learning activities. To create conducive learning activities, of course, students maximize learning outcomes in students' initial skills so that the learning outcomes achieved are better (Pioke, Rivai, Pakaya, & Abdullatif, 2022).

Research Methods

This research is an experimental study, which is research to find out whether there is a result of "something" imposed on the subject. The approach used is a quantitative positivism approach, where positivism is data in this study using quantitative data to test the hypothesis of the relationship between variables that will be studied. The variables in this study include independent variables, namely learning media with snakes and ladders games and concrete media, moderator variables, namely students' initial abilities, and dependent variables, namely mathematics learning outcomes. The following research design uses a 2 x 2 factorial analysis design with technical analysis of variance (Anava).

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Table 1 Research Design

Initial Skill (Z)	Learning Model	
	Snakes and Ladders Media (X_1)	Concrete Media (X_2)
High Initial Skill (Z_1)	$Y_1(X_1Z_1)$	$Y_2(X_2Z_1)$
Low Initial Skill (Z_2)	$Y_3(X_1Z_2)$	$Y_4(X_1Z_2)$

Information:

$Y_1(X_1Z_1)$: The results of learning mathematics groups of students who have high initial skills are taught using snake and ladder game learning media.

$Y_2(X_2Z_1)$: The results of learning mathematics groups of students who have high initial skills are taught using concrete learning media.

$Y_3(X_1Z_2)$: The results of learning mathematics in the group of students who have low initial skills are taught using snake and ladder game learning media.

$Y_4(X_1Z_2)$: The mathematics learning outcomes of the group of students who have low initial skills are taught using concrete learning media.

The object of this research includes all VB and VC class students totaling 20 students each at SDN Jumputrejo and all VA and VB class students totaling 20 students each at SDN Sukodono 1 in the even semester of the 2021/2022 school year. The research instruments used are questionnaires and learning outcomes tests. Research data collection techniques are questionnaires given before learning activities are carried out and learning outcomes tests are given after learning activities. Then the data was analyzed using the two-track anava technique in SPSS Version 20 software.

Research Results and Discussion

The description of students' initial skills is obtained from questionnaire scores where the classification is based on the average value of each learning model treatment. Students who have grades higher or equal to (≥) grade point averages are classified into the group of students who have high initial skill, while students who have scores less than (<) average grades are classified into the group of students who have low initial skill. Based on the results of descriptive analysis between the experimental and control groups, a comparison of students' initial skill data was obtained as follows.

Table 2 Description of Students' Initial Skills

	Learning Media		
	Snakes and Ladders Game Media	**Concrete Media**	**Total**
High Initial Skill	28	21	49
Low Initial Skill	12	19	31
Total	40	40	80

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Based on Table 2, it was found that in the study group with Snakes and Ladders media, students who were included in the high initial skill category amounted to 28 students and as many as 12 students were included in the group of students with low initial skill. While in the study group with concrete media, students with high initial skill amounted to 21 students and as many as 19 students were included in the group of students with low initial skill.

Description of data on mathematics learning outcomes, subject matter, characteristics of building space obtained from post-test scores. Based on the post-test results between the experimental and control groups, a comparison of mathematics learning outcomes data was obtained as follows.

Table 3 Description of Learning Outcomes of the Experimental and Control Groups

Group	Categories Prior Knowledge	Average	Std. Deviation	N
Snakes and Ladders Game Media	Low	90.00	2.412	12
	High	90.82	4.312	28
	Total	90.57	3.829	40
Concrete Media	Low	79.32	3.591	19
	High	84.00	3.098	21
	Total	81.77	4.060	40
Total	Low	83.45	6.153	31
	High	87.90	5.108	49
	Total	86.17	5.915	80

Based on Table 3, shows the analysis of experimental group descriptions and control groups. The mean value of the experimental group was 90.57 with a standard deviation of 3,829, while the control group averaged 81.77 with a standard deviation of 4,060. The calculation results showed that the results of learning mathematics subject matter characteristics of building space in the experimental group or group taught using Snakes and Ladders game media were higher than the control group or group of students taught using concrete media.

Conclusion

Based on the results of the analysis and discussion, the following conclusions can be drawn: 1) There are differences in mathematics learning outcomes between the use of Snakes and Ladders game media with concrete media in grade V students of SDN Jumputrejo and SDN Sukodono 1 for the 2021/2022 school year. 2) There are differences in mathematics learning outcomes between students who have low initial skill and high initial skill in grade V students of SDN Jumputrejo and SDN Sukodono 1 for the 2021/2022 school year. 3) There is an influence of interaction between Snakes and Ladders game media with concrete media and initial skills on mathematics learning outcomes in grade V students of SDN Jumputrejo and SDN Sukodono 1 for the 2021/2022 school year.

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Suggestion

Based on the research above, the advice that can be given is as follows: 1) Consider the use of Snakes and Ladders game media in other subjects, because learning by using Snakes and Ladders game media gives a positive response. 2) The application of the learning model with the medium of Snakes and Ladders games needs to pay attention to time management and class management so that the learning process is in accordance with the learning plan and goals to be achieved.

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