

## The Increase of Students Science Cognitive using Snake Ladder Media

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### Abstract

The purpose of the study was to determine the increase in science cognitive of students using snake ladder media. This study is quantitative research design by applying Pre-test – Post-test Control Group Design. The initial stage in the experimental class treated using snake ladder media, whereas, the control class treated by simple experiment. The subjects of the study were 65 Elementary school students who were participated in the implementation of this study with the population of Gugus Pattimura in Mejobo, Kudus. The data collection technique was using the learning outcomes test techniques with multiple choice type questions. The data analysis technique applied was quantitative descriptive analysis techniques. The results of this study indicated that there is an increase in the acquisition of science cognitive of students using snakes ladders media. The average pre-test scores were 60, meanwhile, the average post-test scores 72. The gain score of the pre-test and post-test data is 0.3 in moderate criteria. Therefore, it can be concluded that the use of snakes ladders media can income students science cognitive.

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## INTRODUCTION

Learning is a behavior change that is relatively permanent and results from experience or intended or planned to learn (Sumantri, 2016). Experience is obtained by someone in interaction with the environment, both unplanned and planned to produce changes that are relatively settled. This is by the concept of constructivism that learning should provide continuous knowledge and build new concepts (Waseso, 2018).

In line with the notion of learning based on the objectives of national education, therefore, the education carried out aims to develop and shape the dignity and character of a dignified nation. Based on the results of observations of student grades in Gugus Patimura, Mejobo, Kudus, the cognitive domain of students was still low. This is indicated by the results of the average learning achievement of students who get a score below the minimum completeness criteria (KKM) that has been set at 70. At SD 3 Golantepus there are 15 students (60%) who have not reached KKM, and 10 students (40%) have reached KKM, in SD 3 Tenggeles there are 12 students (63%) who have not yet reached the KKM, and 7 students (37%) who have reached KKM.

The in-depth interview conducted with the teachers in both schools reinforced the indication that the results of student learning achievement were still low. The teacher assumes that the value of some students is low due to the unpreparedness of students in accepting learning and the characteristics of students who are more receptive to learning by conducting experiments or direct learning. Observation of the completeness of learning instruments shows the same results, namely the lack of materials, sources and learning media that fulfill to change abstract learning patterns into concrete ones. Though, the use of tools, sources and media learning plays an important role to maximize the potential of cognitive and affective psychomotor students (Mahnun, 2012).

In the learning process, students must actively carry out activities, actively think,

manipulate concepts and give meaning to things that are being studied (Kristiningtyas, 2017). The interaction between teacher and students will make the classroom atmosphere fresh and conducive, where students can maximize their abilities. Also, it will lead to the formation of knowledge and skills that will lead to improving student learning outcomes (Purbiyanti, Wasino, and Nuryatin, 2017).

Common problems faced by elementary school students in Patimura Group are the ability to carry out experiments and evidence, difficulty writing down the results of the experiment and the difficulty in delivering the results of the experiment. The function of this experiment skill is related to the activity of looking for concepts and proving them in everyday life. This capability will have an impact on achieving national education goals that can be helped through science learning.

Subjects that are often considered difficult based on performance document observations, behavioral observations and interviews indicate are science subjects. In line with the fact of the observation results of the TIMSS (Trends International in Mathematics and Science Study), a study which showed that the ability of Indonesian students in the field of science is relatively low compared to other Southeast Asian countries. This is evident from Indonesia, which was ranked 45<sup>th</sup> out of 48 participating countries in the field of science.

The low student learning outcomes in science subjects cognitive aspects are something interesting to study. The effort that can be done by the teacher in class is by using fun media. The use of media as an effort to improve the low learning outcomes of fifth-grade elementary school students on cognitive aspects is supported by the opinions of Dale and Finn in (Arsyad, 2011). Dale argues about the Cone of Experience which states that the direct experience results are better than experience through communication symbols, extending from the concrete to the abstract. The statement about the cone of Dale experience was supported by Trianto (2010) which revealed that most direct learning experiences (90%) would be remembered if

obtained through practical activities (doing) and expressed (stated) by others. In line with that, Afandi (2015) explained that learning media could provide an understanding of abstract concepts, with images expected that students do not think abstractly so that students can think by the expected concepts.

One alternative learning media to overcome the low student learning outcomes is the snake ladder game. The snake ladder game can be made into an effective learning medium because the exciting and straightforward nature of the game can make students enthusiastic about playing (Husna, 2009). According to Haryono (2013), snakes and ladders as a form of play that is popular and favored by children, adolescents and even adults.

There are advantages to the use of snake ladder games in learning, namely: (1) The concentration of students in the lesson will increase; (2) Affective content increases; (3) Psychomotor aspects can be shown from the activeness of students in asking, playing and discussing; and (4) Creating a pleasant learning atmosphere. According to Nachiappan, Rahman, Andi, and Zulkafaly (2014), learning using snake ladder media can improve students' cognitive abilities in facing difficulty in learning. Golchali, Nazari, Hassani, Nasiri, Ghasemnejad, and Jafari (2012) explain the same thing that the use of snake ladder media can foster students' knowledge in learning. Not only that, but snake ladder media can also create a transformation of experience in the learning process.

The game will be more fun when packaged in simple technology. One of the technologies that can be used is multimedia. According to Budiman, Triono, and Ariani (2014), multimedia systems are a technology that combines various media sources such as text, graphics, sound, animation, animation, video and so on that are delivered and controlled by a computer system interactively. Haryanto, and Adiwiharja (2015) explains that multimedia plays a role in supporting the progress of educational development and plays an important role in facilitating teaching and learning activities.

The use of snake ladder media in this study combines various types of media needed in the game, including media images, experimental video media, and media props that will be used directly by students. All media are processed in Microsoft PowerPoint software. Also, in the snakes and ladders game-based multimedia, there are also several important components that support the board game snake ladder and game dice.

This design on media is designed as an interesting and fun learning tool for students. The design includes the front page/home menu page, the game instructions page, the question page, the wrong answer sign page, correct answer page, and the program exit page. The following is an example of a snake ladder board game based multimedia which can be seen in Figure 1.

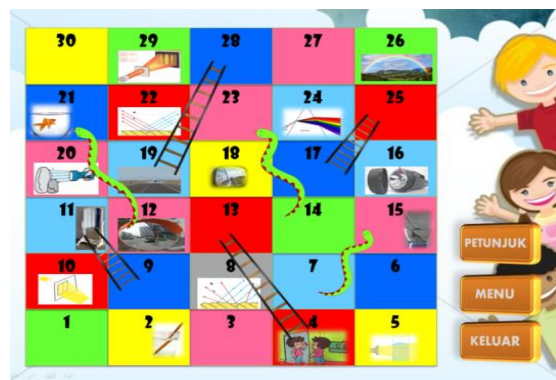


Figure 1. Snake and Ladder Board Game

The aim of the snake ladder game according to Ferryka (2017) is that students can always learn or repeat the material that has been studied before which will be tested through games so that it feels fun for students. Baiquni (2016) states that by using the snake ladder game students will be more active in finding and finding a learning concept by getting closer to the real surroundings, so the concept of science learning that brings the concept of the environment closer to learning resources will be fulfilled maximally.

Based on the background above, it can be concluded that the main problem refers to the lack of supporting media to help improve students' cognitive learning outcomes in the fifth grade. The researcher tried to overcome these problems by using snakes and ladders media

based multimedia to improve students' cognitive learning outcomes.

## METHODS

This study was a type of quantitative research. Procedurally, the implementation of this study uses the Pre-test – Post-test Control Group Design. The initial stage in the experimental class of treatment used snakes and ladders game-based multimedia, while in the control class, the treatment was simple. The subjects of the study were 65 elementary school students who were used in the implementation of this study with the population of Gugus Pattimura in Mejobo, Kudus. Data collection techniques used in this study was learning outcomes test technique with multiple choice type questions. The data analysis technique used in this study was a quantitative descriptive analysis technique.

The sampling technique used was cluster random sampling technique, namely the regional sampling technique used to determine the sample if the object to be studied or the data source is very large (Sugiyono, 2016). Since the research design requires that sample conditions should be equal when experimenting, randomization was carried out due to the following considerations: (1) Elementary school with almost the same number of students, (2) Elementary school which is still the same group/target area, (3) Elementary school have almost the same learning facilities and science materials in class V that are taught are relatively the same.

The cluster random sampling technique used was two-stage cluster random sampling or taking a two-stage cluster. The steps are as follows: The first step is taking clusters in the form of seven groups in Mejobo. Then, the seven groups drew randomly to determine one cluster. The second stage is the determination of SD in the group selected in the first stage. The selected clusters were drawn four elementary schools from two different village clusters, two elementary schools as the experimental group and two elementary schools as the control group.

## RESULTS AND DISCUSSION

This study used simple experiments in the control class and snakes and ladders game-based multimedia in the experimental class, the use of media as presented in Figure 2.



**Figure 2.** Students Were Doing Snake and Ladder Game

Snakes and stairs are played in groups; each group gets a turn to play alternately. Before running the pawn, the student must shake the dice first in the android application then students choose the numbers according to the dice that appear. Students choose the numbers on the snake ladder board found on the computer. After students select numbers, questions will come out that students must answer correctly so students can run the pieces according to the numbers obtained if students cannot answer, they cannot run the pawns.

The results of the study showed that cognitive learning outcomes were better in the experimental class. The increase in the average learning outcomes after using snakes and ladders game-based multimedia can be calculated using the gain test. The test results of the average increase in the pre-test and post-test data using the gain test can be seen in Table 1.

**Table 1.** The Average Improvement Test (Gain)

Category	Score	Criteria
Gain score	0.30	Moderate
Pre-test average score	60	
Post-test average score	72	
Average different score	12	

Based on the data in Table 1, it can be seen that the learning outcomes of experimental class students have increased indicated by the average pre-test and post-test by 0.30 with moderate criteria and an average difference of 12. Learning with snakes and ladders media based multimedia performed at SD 2 Golantepus and SD 3 Golantepus Mejobo, Kudus, can improve students' cognitive learning outcomes. In science learning material the properties of light, on average students in the experimental class can only answer 12 questions pre-test correctly and increase to 14 correct answers to the post-test questions.

This is supported by the research conducted by Surwantini (2015) on the use of visual media such as puzzle, snake ladder, and partner search cards more effectively than the use of conventional whiteboard and colored chalk media on the cognitive aspects of learning achievement. In line with this, research conducted by Puspitorini, Prodjosantoso, Subali, and Jumadi (2014) showed that the use of comic media in science learning was able to improve cognitive learning outcomes with a gain score of 0.42 in the moderate criteria.

**The Average Different Test of Experimental Class and Control Class**

The average different test of cognitive learning outcomes of the experimental class and the control class can be seen in Table 2. The significant difference in the average value between the scores of the learning outcomes in the experimental class and the control class is an explanation of the clear differences.

**Table 2.** The Average Different Test of The Experimental Class and Control Class

	N	Mean	df	Sig. (2 tailed)	t <sub>value</sub>
Exsperiment	37	72.03	76	0,026	2.266
Control	41	63.41			

Based on Table 2, it can be seen that the Sig. (2 tailed) = 0.026. The significance value is smaller than 0.05. The t<sub>value</sub> = 2.266 is greater than the t<sub>table</sub> = 1.66. Therefore, it can be stated that the

media of snakes and ladders based multimedia is effective for improving the learning outcomes.

This result is in line with Sumantoro, and Joko (2013) study which states that the use of snakes and ladders playing media influences the creation of a learning environment that is fun, fresh, alive, happy, and has a conducive learning atmosphere. This is evident from the average learning outcomes in the experimental class is higher than the control class. Furthermore, Nugrahani (2007) explained that the use of snake ladder media would make students repeat certain material that is considered difficult, thus achieving the ability to understand concepts and student cognitive learning outcomes will increase. Learning using the snake ladder game media in the experimental class shows that the average results of 72.03 were proven from the post-test results from the pre-test results of 60.4. While learning in the control class using the direct learning model showed a post-test value of 63.41 from the pre-test of 55.6. Based on these results prove that learning by using snake ladder media in students' cognitive abilities increases compared to simple experiment learning.

Learning using the media of snakes and ladders based multimedia to improve cognitive learning outcomes has advantages in its application, namely answering various kinds of questions and trial activities that function as activities to gain an understanding of concepts independently in hopes that the concepts obtained will provide meaning and can improve learning achievement students as an impact of one component of good cognitive learning outcomes.

The technical difference of snake and ladder learning games according to Guterres, Sudarti, and Putra (2018) compared to multimedia-based snakes and ladders games in elementary school is a game that is used to be an alternative solution in improving cognitive learning outcomes, with N-gain increase of 0.73 or high criteria while multimedia-based snake ladder game with N-gain results of 0.30 or in medium criteria. In technical learning for Android-based snakes and ladders game conducted by Guterres, Sudarti, and Putra (2018)

carried out at the high school level to improve cognitive learning outcomes but in practice learning games carried out only as evaluation tools means students only play by completing the questions made and there is no practical activity to find the concept of learning.

## CONCLUSION

Based on the description of the results of the study, it can be concluded that there is an increase in cognitive learning outcomes using the media of snakes and ladders based multimedia. The average pre-test value is 60, while the average post-test value is 72. The gain value of the pre-test and post-test data is 0.3 in the moderate gain criteria with an average difference of 12.

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