

Comparison of Tenth-Grade Students' Understanding Concept of Motion Between Domino and Snake and Ladders Media

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Abstract – Physics learning should be student center. Students used as learning centers impact their understanding of the material or concepts being taught. However, students do not get to learn like that. It impacts students' low level of understanding of physics concepts, especially the concept of motion. An alternative solution to this is using dominoes and ladders in physics learning. This study examines the effect of using two learning media (dominos and ladder snakes) on the understanding of physics concepts of class X students at MAN 1 Sumbawa. This type of research is quasi-experimental with a posttest-only design. The research sample was obtained using a purposive sampling technique. The number of research respondents was 138 students, who were divided into two experimental groups. Experimental Group 1 used domino media, and Experimental Group 2 used snakes and ladders media. The data collection instrument used was a concept understanding test in the form of filling in and multiple choice given after the treatment was given. The results showed that the domino group better understood the concept than the snakes and ladders group. The parametric prerequisite test shows that the students' conceptual comprehension data is homogeneous and not normally distributed. The hypothesis test results show that the data's significance value is less than 0.05. It can be concluded that there are significant differences in understanding the concept of motion between the domino group and the snakes and ladders group. Applying the domino game in physics learning is better than the snakes and ladders game in maximizing the students' understanding of the concept of motion in MAN 1 Sumbawa.

Keywords: Understanding Concept; The Concept of Motion; Domino; Snake and Ladders

INTRODUCTION

Physics is a science that discusses and studies the basic principles of the universe and can be said to be a science that discusses the world's most basic (Solikhin, 2017). Physics is a science that helps humans manage their daily lives (Karunia & Kholiq, 2021). One of the basic physics materials to learn is work and energy, as well as kinematics/motion material (Yusro & Sasono, 2016).

Even though kinematics is so important in everyday life, physics is one of the subjects that students dislike the most (Sari et al., 2018). In addition, physics material that is difficult to understand and

causes boredom is kinematics material (Rais et al, 2019)

Based on observations made in Class X IPA MAN 1 Sumbawa, several things related to the teaching and learning process of physics in class are to be conveyed. How teachers teach, learning media is used, and how students find themselves in the learning process. The learning process does not address the abstract characteristics of physics subjects, learning motivation, and poor academic achievement. Teachers often adopt conventional learning, where students learn independently and are not actively involved in learning, causing boredom and a lack of motivation.

Sutrisno's research (2019) found that the percentage of students who misunderstood linear kinematics material was 34.17%, and this percentage was greater than students who understood the concept, namely 21.35%. A lack of course training influences it (Wiyono et al., 2020). Students find that learning physics is monotonous and uninteresting, and the methods and media used by the teacher are responsible for students' lack of interest in learning physics.

The learning process does exist in education (Afriansyah & Turmudi, 2022). The learning process reaches a climax because the success of the learning process leads to educational goals (Indriani & Sritresna, 2022). Learning objectives are the desired direction from a series of activities. Therefore, before starting the learning process, preparing a series of activities is very important to ensure that the direction follows the expected goals (Afriansyah & Turmudi, 2022).

The rapid digitalization trend and the rapid development of information and communication technology indicate that we are now in the 21st century (Hadisaputra et al., 2018). Human life in the 21st century has undergone radical changes, unlike its lifestyle in the early centuries (Abdillah, 2015), penetrating the world of education. Furthermore, changes in learning in the 21st century are also marked by changes in learning media that allow abstract learning to be interpreted in ways that can be understood (Jusuf, 2016).

Abstract concepts in physics learning require visualization (Hermansyah et al., 2019; Hapsari et al., 2020; Hermansyah, Gunawan, & Herayanti, 2015). Unsurprisingly, instructional media are used to help students learn in context and better understand the concepts being explained. One of the learning media that can be used to foster student learning motivation and

creativity is educational games (Vitianingsih, 2017; Putra et al., 2018).

Using educational games can make it easier for students to understand the concept of kinematics. The writer assumes that most students like games very much. Both at school and at home, we spend most of our time playing games. Physics educational games can be an alternative source of learning to train students to become active learners and increase student motivation, understanding, and achievement (Yakin, Suwindra, & Mardana, 2018).

Educational games that can be used in physics learning to improve students' understanding are Snakes and Ladders and Domino games. Snakes and Ladders digital media aims to improve learning outcomes and discover new material-related concepts, especially in physics learning (Wulandari, Dewi, & Munawar, 2018). Mulyani in (Munawaroh et al., 2018), domino card games help students improve their ability to use logic, solve problems, and increase their understanding. Hendratmoko in (Novita, 2020) provides information that using games in learning increases student motivation, responsiveness, and interaction.

RESEARCH METHODS

This type of research is quasi-experimental with a posttest-only design. This study compares the use of two learning media (Domino, Snakes, and Ladders) on students' understanding of concepts.

The research was conducted at MAN 1 Sumbawa with 138 respondents in class X IPA. The respondents were divided into two groups, the group that applied Domino media and the group that used Snakes and Ladders media. The research sample was determined by purposive sampling because only two classes could be used as a sample. The two experimental groups were treated with different media. After being given

treatment, a test of understanding the concept of motion was given using instruments like filling in and multiple choice. This instrument has been tested for the validity and reliability of the data so that the number of item items used is five entries and 20 multiple-choice questions. The conceptual understanding data obtained is then processed to facilitate analysis to determine the effect of the given educational game. Then test the data's normality and the variance's homogeneity as a prerequisite test to determine the hypothesis test used. The Mann-Whitney test was used in this study because the data were not normally distributed. If the significant value obtained through this test is less than 0.05, then there is a significant difference between the two sample groups and vice versa.

RESULTS AND DISCUSSION

Results

Data on understanding the concept of motion that has been obtained is then processed to determine the level of students' understanding of the concept. It was found that the conceptual understanding of the group using domino media was higher than the group using snakes and ladders. The average data for students' understanding of the concept of motion is shown in Figure 1.

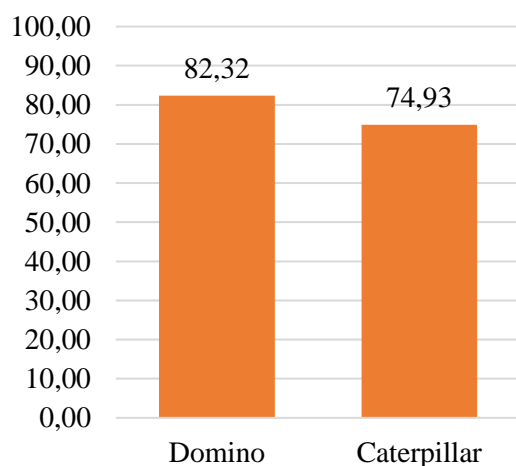


Figure 1. Comparison of Concept Understanding of Both Groups

A homogeneity and normality test of the data was carried out to determine the effect of using games/educational media on students' understanding of the concept of motion. This test is a prerequisite test of the hypothesis test.

The results of the homogeneity and normality test of the data showed that the data on students' understanding of the concept of motion in both groups were included in the homogeneous data but not normally distributed. Therefore, a nonparametric test (Mann-Whitney Test) is used. Based on the hypothesis test, a significance value is obtained that is smaller than 0.05, equal to 0.00. It shows significant differences in understanding the concept of motion between the domino group and the snakes and ladders group. The results of the prerequisite and hypothesis tests are presented in Table 1.

Table 1. Prerequisites and Hypotheses Test

Asymp. Sig.	
Homogeneity	Normality
0.07	0.00
Mann-Whitney Test	
0.00	

Discussion

Understanding the concept of the group of students using Domino media managed to achieve the Maximum Completeness Criteria score at the school, while the group using the Snakes and Ladders media could not achieve the Maximum Completeness Criteria score. The value of the Maximum Completeness Criteria is a benchmark that learning outcomes have been achieved or not. In learning, students who use domino media are very visible in interaction and are active in discussions with each other and the teacher. Meanwhile, students who use Snakes and Ladders media do not see much activity and

interaction because the space for discussion between peers and the teacher is limited. The data analysis results show that domino card modification media can have a greater effect than the Snakes and Ladders game.

Using domino card media in physics learning can make students more active. Domino games can provide meaningful learning that increases understanding for students. The results of Cynthia M. Odenweller, Christopher T. Hsu, & Stephen E. DiCarlo's research entitled Educational Card Game for Understanding Gastrointestinal Physiology (Suzana, 2017), where card media helps students learn about science in understanding basic concepts. Domino games can make students challenged in learning and interactive. Vun's research (2013) found that when a group of students plays cards, their intelligence improves the learning experience and increases students' active learning interest.

Domino media used in this study is real/real media, while snakes and ladders media is electronic/virtual media. Based on some of the results of previous research, it was found that using snakes and ladders media can improve student learning outcomes. Widowati (2014) found that using technology-based snakes and ladders media increased learning outcomes. Napitupulu et al., (2016) found that using Macromedia Flash-based snake and ladder media impacted student learning outcomes. Snakes and ladders media that is applied in learning is one of the media that can help students understand the lessons given by their teachers, thus making learning interactive, fun, and interesting (Nuryanti, 2017; Haryanto & Adiwiharja, 2015; Guterre et al., 2018).

Research data and related studies show that Snakes and Ladders media are good at increasing learning outcomes and motivating students to participate in active

learning. However, domino card media is better at increasing students' understanding of the concept of motion. It is due to the concrete conditions experienced by students with the opening of space to discuss each concept studied with the teacher to provide opportunities for students to construct each of their understandings. According to Arifin, Pujiastuti, & Suidiana (2020), learning through concrete objects can increase meaningful understanding and knowledge. The advantages of learning media are 1) attracting students' attention, 2) increasing student learning motivation, and 3) creating a common understanding and transcending space and time.

Learning media must continue to be developed, both technology-based and new products, to produce better quality learning (Novita, 2020). Media use in learning really helps students and teachers increase learning activity. In this study, using domino media as one of the real media increased learning motivation and student activity. It follows the opinion of Nuryanti (2017), which states that using real media is more effective in increasing learning engagement.

Learning in groups of students who use domino media is also better because of direct guidance by the teacher during learning so that students can participate actively. This active student participation allows students to digest information rather than memorize it to gain knowledge of the learning process and increase their intellectual potential. It is illustrated by how they answered the questions in the game that were asked by their colleagues well, in detail, and clearly. The activeness of students in participating in learning is one factor that can increase their understanding of the physics concepts being taught.

This study also found that students were not interested in studying physics for several reasons. In addition to the many

equations or calculations, the learning environment used to teach and teach physics material is less diverse, so it cannot be utilized optimally, and the learning outcomes are unsatisfactory. Applying the use of domino and ladder snake media in learning the concept of motion can produce a fun learning environment for students that is useful and meaningful.

CONCLUSION

The use of learning media, Snakes and Ladders and Dominoes, can create a learning atmosphere that is fun and not boring. It will trigger enthusiasm and motivation for student learning. However, in this study, using domino media to learn motion concepts improved student understanding better than snakes and ladders media. The use of domino media also has a significant effect on students' understanding of the concept of motion in MAN 1 Sumbawa. This research's weakness is that the learning model's application has not been maximized due to the limited research time. Media use in learning physics is very useful for teachers in conveying information and students in understanding every physics concept being studied.

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