Effectiveness Of Domino Physics Learning Media With Teams Games Tournament (TGT) Strategy To Improve Students' Learning Outcomes Temperature and Heat Material Class XI MIPA 2 In State High School 9 Gowa

Suarti[1], **Muhammad Yusuf Hidayat**[2], **Jumardi**[3*]

Author Correspondence Email: jumardisaja48@gmail.com

ABSTRACT

The aim of this research is to determine the ability of students' learning outcomes before and after being taught using the Domino Physics learning media. To determine the difference in the ability of students' learning outcomes before and after being taught using the Domino Physics learning media. learning outcomes of class XI MIPA 2 students at SMA Negeri 9 Gowa. This type of research is classified as experimental research with a One Group Pre-test Post-test Design research design. The population used in this research was students in class XI MIPA 2 at SMA Negeri 9 Gowa, which consisted of three classes and a total of 108 students. The research instrument used is the Learning Outcomes Test and the learning tool used is the Learning Implementation Plan (RPP). Furthermore, the data analysis technique uses descriptive analysis and also N-Gain test analysis to see the effectiveness of this research. The results of descriptive research show that the average score for student learning outcomes in the pre-test is 35.28, which is in the low category, while for the post-test score, the average score is 59.86, which is in the medium category. Based on the results of non-parametric analysis using the Mann-Whitney test which shows a significant level value, namely the Asymp value. Sig (2-tailed) shows the number 0.001. Asymp value. Sig (2-tailed) is smaller than the 0.05 significance level so that H0 is rejected and H1 is accepted. This shows that there is a difference between student learning outcomes before and after using Domino Physics learning media on temperature and heat material for Class XI MIPA 2 at SMA Negeri 9 Gowa. The implication of this research is that the learning outcomes instrument produced in this research has gone through a validation process, so that it can be used to assess student learning outcomes. For future researchers, the results of this research can be used as reference material in conducting similar research.

Keywords: Learning Media, Physics Domino, Learning Outcomes, Temperature And Heat

1). INTRODUCTION

Education is a fundamental phenomenon in human life; wherever there is life, there is education. Education is both a phenomenon and an effort to humanize humanity itself. With the growing demand for better and more structured education to develop human potential, theoretical thoughts about education have emerged (Hidayat, 2019).

In the process of learning physics, the main goal is for students to master every material taught. However, often the achievement of students' learning outcomes is not optimal because they do not pay enough attention when the teacher explains. During the learning process, students do not always fully understand the content of the lesson, especially in physics, which contains many scientific concepts. Learning physics involves understanding concepts and finding relationships between these concepts. Additionally, physics learning is closely related to mathematics because many physics theories are expressed through mathematical notation, making much of the material in physics education mathematical in nature. Physics can be divided into two types: easy and difficult. Generally, for the easy type, no special learning model is required. However, for the difficult type, it is very important to use a special learning model to help students' understanding (Rafiqah, Suhardiman, 2021).

The use of media in the learning process generates new interest and motivation, provides stimulation for learning activities, and even has a psychological impact on students. Thus, students can achieve and meet the set minimum mastery criteria (Bulan & Idhar, 2021).

Based on an interview conducted on December 6, 2022, with a physics teacher at SMA Negeri 9 Gowa, it was found that students' learning outcomes were still unsatisfactory. Most students received low grades, while only a few achieved satisfactory or high grades. The factors contributing to the low learning outcomes include the unsatisfactory quality of teaching and the suboptimal use of media in learning, leading some students to be less focused during lessons and even play during the learning process. As a result, students' active involvement in learning is still low.

To address the problems described above, it is important to use learning media that can develop logical thinking skills and engage less active students in learning. Therefore, the researcher chose Domino Physics as an effective teaching aid. Domino Physics was selected because it can stimulate students' enthusiasm and interest in learning, prevent boredom, and create a comfortable learning atmosphere through the game. One of the advantages of using this learning media is its ability to foster students' interest in learning. With an engaging approach that involves games, this learning media can make the learning process more interesting and enjoyable. The teaching method also becomes easier to implement, while students are less likely to feel bored during lessons, especially in the subject of temperature and heat.

2.) METHODS

The type of research used in this study is quantitative research with an experimental method, utilizing a one-group pretest-posttest design. The population in this study consists of all students of class XI MIPA 2 at SMA Negeri 9 Gowa, with the sample comprising 36 students from this class. The sampling technique used is simple random sampling, conducted by randomly drawing lots among three classes: XI MIPA 1, XI MIPA 2, and XI MIPA 3. Based on the random drawing, the researcher selected class XI MIPA 2 as the sample. The research instruments used include a learning achievement test and the learning materials, such as the Lesson Plan (RPP). Data analysis techniques employed in this study include descriptive statistical analysis, inferential statistical analysis, and the N-Gain test to determine the effectiveness of the learning media used in this research.

1. Descriptive statistical analysis

a. Average score

The average score of students is determined by the following formula:

$$(\underline{X}) = \frac{\sum fixi}{\sum f}$$

Explanation :

$\underline{X}$ = Average score

$\sum fixi$ = Total score of the students

$\sum f$ = Total number of respondents

b. Standard deviation (S)

$$S = \sqrt{\frac{\sum fixi^2 - \frac{(\sum fixi)^2}{n}}{n-1}}$$

Explanation :

S = Standard deviation

$\sum$fixi = Total score of the students

$\sum$fixi^2 = Sum of the squared average scores

N = Number of research subjects

(Citrawati & Khuzaini, 2021).

c. Variance (S^2)

$$S^2 = \frac{\Sigma fi - (xi - X)2}{(n-1)}$$

Explanation:

S = Standard deviation

X = Arithmetic mean

Xi = Data from the i-th to the n-th value

N = number of data/data size

d. Coefficient of Variance (KV)

$$KV = \frac{standard\ deviation}{mean} \times 100\%$$

e. Categorization

The following is the categorization of Physics learning outcomes for students:

Table 3.8 Categories of students' cognitive learning outcomes

Interval	**Categorization**
0-34	Very Low
35-54	Low
55-64	Currently
65-84	Tall
85-100	Very high

2. Inferential Statistical Analysis

a. Normality Test

The normality test in this study used Shapiro-Wilk. With the formula, namely:

$$Lmaximum = [F(Z)-s]$$

Explanation:

L = Calculated L value

F(Z) = Theoretical cumulative frequency distribution

s = Observed cumulative frequency distribution

Data is considered normally distributed if the calculated L value (Lhitung) is less than the critical L value (Ltabel) at a significance level of α=0.05. Additionally, normality testing is also conducted using the SPSS IBM v.26 software with Shapiro-Wilk analysis at a significance level of α=0.05.

b. Hypothesis Testing

Hypothesis testing in this research uses the Mann-Whitney test with the following formula:

$$U_1 = n_1 n_2 + \frac{n_1 (n_1+1)}{2} \text{R}_1$$

$$U_1 = n_1 n_2 + \frac{n_2 (n_2-1)}{2} - R_2$$

Explanation:

n1 = Observations in the first sample

n2 = Observations in the second sample

R1 = Sum of ranks in the first sample

R2 = Sum of ranks in the second sample

If the significance value (sig) is less than 0.05, H_0 is rejected, and if the significance value is greater than 0.05, H_0 is accepted.

c. Effectiveness Test

$$N - Gain\ Test = \frac{posttest\ score - \ pretest\ score}{ideal\ score - \ pretest\ score} \times 100\%$$

Table 3.9 N-Gain effectiveness criteria

Categorization	Interval
High	g > 0,70
Medium	0,7 > g ≥ 0,3
Low	g < 0,29

Based on the table above, the improvement in learning outcomes between the pre-test and post-test is calculated using the N-Gain score. The learning media is considered effective if the Gain score obtained is greater than 0.3 or at least falls within the medium category (Supriadi, 2021).

3.) RESULTS AND DISCUSSION

A. Research Results

1. Student Learning Results Test

a. Pre-Test

Table 4.1 Frequency Distribution of Pret-test Learning Results for Class XI MIPA 2 Students.

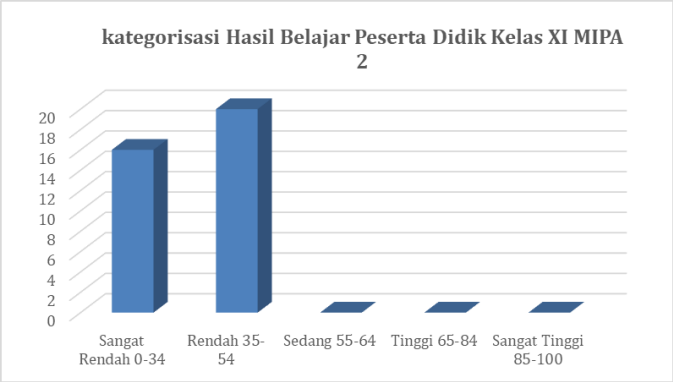
x_1	f_i
15	1
20	3
30	12
35	2
40	10
45	7
50	1

Based on the frequency distribution table of students' pret-test learning outcomes above, they are categorized into the following learning outcomes categorization table:

Table 4.3 categorization of learning outcomes (pret-test) of class XI MIPA 2 students

Categorization	Interval	Frequency	Percentage
Very Low	0-34	16	44%
Low	35-54	20	56%
Currently	55-64	0	0%
High	65-84	0	0%
Very high	85-100	0	0%
Amount		**36**	**100%**

Table 4.3 above shows that of the 36 students who took part in this research, 44% were very low and 56% were categorized as low. The data is then depicted in the following histogram or bar chart.



The diagram above shows that the frequency of high pre-test scores for student learning outcomes is in the range 35-54, which means it is in the low category, namely 20 students.

b. Post-Test

Table 4.4 Frequency Distribution of Post-Test Learning Results for Class XI MIPA 2 Students.

xi	fi
30	2
45	3
50	4
55	7
60	2
65	7
70	5
75	6

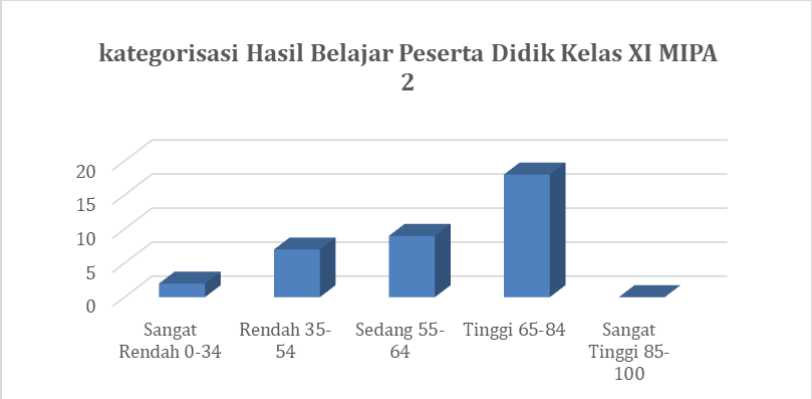
Based on the frequency distribution table of students' post-test learning outcomes above, they are categorized into the following learning outcomes categorization table:

Table 4.6 categorization of learning outcomes (post-test) of class XI MIPA 2 students

Categorization	Interval	Frequency	Percentage
Very Low	0-34	2	6%
Low	35-54	7	19%
Currently	55-64	9	25%
High	65-84	18	50%
Very high	85-100	0	0

Amount	**36**	**100%**

Table 4.6 above shows that of the 36 students who took part in this research, 6% were in the very low category, 19% were in the low category, 25% were in the medium category and 50% were in the high category. The data is then depicted in the following histogram or bar chart.



The diagram shows that the frequency of post-test scores for high student learning outcomes is in the range 65-84, which means it is in the high category, namely 18 students. The diagram shows that the frequency of post-test scores for high student learning outcomes is in range 65-84 which means it is in the high category, namely 18 students.

B. Discussion

1. Description of student learning outcomes before (pre-test) being taught using Domino Physics learning media for class XI MIPA 2 SMA Negeri 9 Gowa students

Based on the results of research and analysis that has been carried out to improve learning outcomes, a total of 36 students who took part in this research obtained an average learning outcome score before being given treatment which was in the low category. The average was then divided into several categories according to the analysis results obtained, namely in the very low and low categories.

This condition is caused by students only being taught the lecture method or using conventional learning models and the lack of creativity of educators in the learning process even though the curriculum used in class XI does not yet use an independent curriculum like in class learning.

This is in line with research conducted by Miftahul Reski Putra Nasjum, which shows that the Teams Games Tournament (TGT) learning method can influence learning outcomes and increase students' learning motivation in science subjects in class VIII F. Previous research has also shown

similarities with The research that will be carried out is the use of Domino cards as a tool in the learning process(Miftahul Reski Putra Nasjum, 2020).

2. Description of student learning outcomes after (post-test) being taught using the Domino Physics learning media for class XI MIPA 2 students at SMA Negeri 9 Gowa

Based on the results of research and analysis that has been carried out to improve learning outcomes, a total of 36 students who took part in this research obtained an average learning outcome score after being given treatment which was in the medium category. The average is then divided into several categories according to the analysis results obtained, namely in the very low, low, medium and high categories. Students are still in the very low category because they are still not used to the media or learning models used by researchers and students are still carried away by the teaching habits of educators who talk a lot or explain. Students who are in the low category are some students who have experienced an increase from being in the very low category to the low category, as well as students who are in the medium category who have experienced improvement after being taught the Teams Games Tournament (TGT) media or learning model. Then it is different from students who are in the high category, most likely because according to him the use of Domino Physics learning media combined with the Teams Games Tournament (TGT) learning model has a positive impact on students' learning outcomes even though they are not yet fully able to adapt to the treatment given.

This is in line with research conducted by Al Fajri Adha, who concluded that if we look at the analysis of the implementation of procedures that are in accordance with the syntax of the Teams Games Tournament (TGT) learning model itself, it can be categorized as good. Therefore, overall the Teams Games Tournament (TGT) learning model assisted by Domino Physics media in the learning process has a positive influence on students' Physics learning outcomes. Based on the results obtained and reinforced by several journals, it can be concluded that the influence of the Teams Games Tournament (TGT) learning model using the Domino Physics game media on student learning outcomes is in the medium category but is also suitable for use in the learning process so that students do not feel bored in learning.

3. Description of student learning outcomes before (Pre-Test) and after (Post-test) being taught using the Domino Physics learning media for class XI MIPA 2 students at SMA Negeri 9 Gowa

Based on the results of the descriptive analysis, the average for the pre-test was 35.28 which was in the low category and for the post-test it was 59.86 which was in the medium category. This shows that the learning outcomes of students in class treatment.

This is in line with research conducted by Irawati, that there is an influence on the learning outcomes of students who are taught using Domino card media(Irawati, 2019).

This is also in line with research conducted by Adiani & Rini Kristiantari, that Domino cards have an influence on students' mathematics learning outcomes. So by implementing this model it can make it easier for students to understand mathematical formulas(Adiani & Rini Kristiantari, 2020).

4. Description of the Effective Use of Domino Physics Learning Media in Improving the Learning Outcomes of Class XI MIPA 2 Students at SMA Negeri 9 Gowa

Learning media is said to be effective if the Gain score obtained is ≥ 0.3 or at least in the medium category. Based on the results of the N-Gain test calculations that have been carried out, the Gain index value or average value before and after being given treatment is 0.37, which is in the medium category. So it can be concluded that the use of Domino Physics learning media with the Teams Games Tournament (TGT) strategy is effective in improving the learning outcomes of class XI MIPA 2 students at SMA Negeri 9 Gowa.

This is in line with research conducted by Mohammad Furqon, that the Domino Physics learning media can make it easier for students to understand the material on quantities and units and instill a strong desire to learn Physics(Hn et al., 2023).

This is also in line with research conducted by Wiyono1, showing that domika cards are valid and effective as a physics learning tool, and can improve student learning outcomes with indicators such as enthusiasm in working on questions, arguing with each other, and working together as a team(Wiyono1 et al., 2020).

4). CONCLUSIONS

Based on the research conducted, it can be concluded as follows:

1. The level of ability of students' learning outcomes before using the Domino Physics learning media obtained an average learning outcome value of 35.28 which is in the low category.

2. The level of ability of students' learning outcomes after using Domino Physics learning media obtained an average learning outcome value of 59.86 in the medium category.
3. There are differences in student learning outcomes before and after being given treatment in the form of using the Domino Physics learning media for class XI MIPA 2 at SMA Negeri 9 Gowa.
4. The use of Domino Physics learning media is effective in improving the learning outcomes of class XI MIPA 2 students at SMA Negeri 9 Gowa.

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