The Influence of MURDER (Mood Understand Recall Digest Expand Review) and STAD (Student Teams Achievement Divisions) Learning Models on Physics Learning Outcomes Of Class XI High School Students in Terms of Self Regulated Learning

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ABSTRACT

This study aims to determine the effect of the MURDER (Mood Understand Recall Digest Expand Review) learning model and STAD (Student Teams Achievement Divisions) on the physics learning outcomes of XI high school students in terms of Self Regulated Learning. The method used in this research is the True Experimental Design method. After the data are normally distributed and homogeneous based on tests of normality and homogeneity, then proceed with hypothesis testing using two-way Analysis of Variance (ANAVA) and the t-Dunnet test. The results showed that: (1) there was an interaction between the MURDER and STAD learning models at low-level Self Regulated Learning ($t_h = 19{,}27 > t_t = 1{,}692$) which states an increase in student learning outcomes through group learning activities; (2) there is no interaction between the MURDER and STAD learning models at high-level Self Regulated Learning ($t_h = 0{,}2237 < t_t = 1{,}692$); and (3) there is a difference between the learning outcomes given by the MURDER learning model and STAD in terms of Self Regulated Learning ($t_h = 4{,}1782 > t_t = 1{,}692$).

Keywords: Learning Outcomes, MURDER , Self Regulated Learning, STAD

INTRODUCTION

National education functions to shape the dignified character and civilization of the nation in the context of the intellectual life of the nation. National education also aims to develop the potential of students to become human beings who are devoted to God Almighty, noble, knowledgeable, capable, creative, independent, and become citizens of a democratic and responsible. The educational objectives will be realized if the learning process goes well. Good learning is influenced by several factors therein, namely from the factors of educators, students, the environment, the learning tools used, infrastructure facilities, and so forth. In this case, educators have a very important role in the continuity of the learning process, where educators provide opportunities for students to find a rule including concepts, theories, ideas, definitions and so on through examples that illustrate or represent the rules that are the source [1] .

Thus, the application of the learning process in accordance with the 2013 Curriculum at the Senior High School level which is centered on students (student centers) becomes more improved. This is in line with the objectives of the 2013 Curriculum, which in addition to providing answers to some of the problems inherent in the previous curriculum, also aims to encourage students to be better able to make observations, ask questions, reason, and communicate (present) what is obtained or known after students receive learning material [2].

The implementation of the 2013 Curriculum objectives especially at the Senior High School level, one of which is found in physics. The process of learning physics is not only emphasized in mathematical abilities, but also in understanding the physical phenomena that occur in the surrounding environment so that it would be better if the learning is based on learning experiences.

But in practice, there are still students who are less enthusiastic and feel difficulties in physics. The difficulty is caused by the existence of students who do not have an initial understanding of the material being studied, have not made use of independent learning well, there is still an attitude of dependence on group friends when completing assignments, students are less trained to interpret knowledge according to their understanding and other things. These factors cause students to lack the courage to express ideas about the topic of the material being studied [3].

Based on the factors of learning difficulties experienced by these students, educators have an important role to improve the quality of learning by choosing the use of models, strategies, and learning methods. This is done based on the characteristics of the learning model that is a logical theoretical rationale, the rationale for how learners learn, the behavior of educators to apply effective and efficient learning models, as well as how to create a conducive learning environment or conditions so that learning objectives can be achieved [4].

One learning model that can actively involve students is the MURDER type of cooperative learning model, which is a cooperative learning model that has been developed by educational experts based on the perspective of cognitive psychology [5]. MURDER learning model is defined as a process of learning in groups wherein each group there is another small group called dyad. This learning model is adapted from Bob Nelson's work "The Complete Problem Solver" which is a learning process that includes: Mood, Understand, Recall, Digest, Expand, Expand, Review, Review back) [6].

MURDER is based on cognitive psychology theory which has a dominant perspective in today's education that focuses on how humans acquire, store, and process what they learn and how the thinking and learning process takes place [7].

MURDER learning can direct students to a cognitive activity that can develop intellectual intelligence, so students can express their understanding using their language by existing theories and facts. Meanwhile, the weaknesses of the MURDER learning model include students who are weak and not concentrated in catching up on learning, and can only be used for certain subjects [8].

In addition to applying the MURDER learning model, this study also applies the STAD learning model where the learning model is done in groups and is relevant to be applied to science subjects such as physics.

The STAD learning model was developed by Slavin which is a cooperative type where students are formed into heterogeneous small groups [9]. This learning model emphasizes the existence of activities and interactions between students to motivate each other and help each other in mastering subject matter to achieve maximum achievement [10]. The STAD learning process goes through five stages, namely: (1) delivery of material, (2) group work, (3) individual tests, (4) calculation of individual scores, (5) awarding.

Learning independence and skills in expressing understanding which are the objectives of the application of the MURDER learning model can be reviewed by applying Self Regulated Learning (SRL). With Self Regulated Learning (SRL) students become proficient in regulating their learning and can improve their learning outcomes [11].

According to Zimmerman, self-management (Self Regulation) is related to self-awakening both thoughts, feelings, and actions planned, and the reciprocity that is adjusted to the achievement of personal goals. In other words, self-management is related to metacognitive, motivational, and behaviors that actively participate in achieving personal goals [12].

Metacognitively, individuals who regulate themselves plan, organize, instruct themselves, monitor, and evaluate themselves in the learning process. Motivatively, individuals who learn to feel that they are competent, have self-efficacy, and have independence. While behaviorally, individuals who learn to select, arrange, and organize the environment to be more optimal in learning [13]. Students who have Self Regulated Learning have alternative ways or strategies to achieve goals such as correcting, evaluating their mistakes, and redirecting themselves when the plans they make do not work. In other words, they know their strengths and weaknesses and know how to use them productively [14].

RESEARCH METHODS

This research was conducted at the 12th High School of Bekasi City in the 2019/2020 school year. The method used in this study is an experimental method with a true experimental design research type. The main characteristic of true experimental designs is that the samples used for the experiment as well as the control group are taken randomly from certain populations [15]. The design of this study uses 2 x 2 Factorial ANAVA, where there is one independent variable, namely the learning model which is divided into MURDER and STAD. One attribute variable is Self Regulated Learning, which is also divided into high-level Self Regulated Learning and low-level Self Regulated Learning as in **Table 1** below :

Table 1. 2 x 2 Factorial ANAVA

Kemandirian Belajar \\ Model Pembelajaran	MURDER (A_1)	STAD (A_2)
Self Regulated Learning Tingkat Rendah (B_1)	A_1B_1	A_2B_1
Self Regulated Learning Tingkat Tinggi (B_2)	A_1B_2	A_2B_2

Information :

A_1 : MURDER learning model
A_2 : STAD learning model
B_1 : Self Regulated Learning level low
B_2 : Self Regulated Learning level high
A_1B_1 : Student group using learning models MURDER with low-level SRL
A_2B_1 : Student group using learning models STAD with low-level SRL
A_1B_2 : Student groups using learning models MURDER with high-level SRL
A_2B_2 : Student groups using learning models STAD with high-level SRL

The sampling technique in this study is purposive sampling, which is a sampling technique with certain considerations [16]. The sample in this study amounted to 33 students in class XII IPA 2 for the trial of the instrument, XI IPA 4 as the experimental class I gave MURDER learning model treatment, and XI IPA 1 as the experimental class II given the STAD learning model treatment where each class there are 38 students. The experimental class I and the experimental class II were given the same learning material, namely the material dynamics of rotation and equilibrium of rigid bodies in the same time allocation.

Data collection techniques used in this study were by giving a description test and a questionnaire Self Regulated Learning (SRL). The description test instrument consists of 20 items arranged based on cognitive aspects at the level of C3, C4, and C5. While the questionnaire instrument is arranged based on three aspects in the learning process namely metacognitive, motivational, and behavioral results will be measured using a Likert scale. The implementation process is divided into four stages, namely the pretest, treatment, posttest, and questionnaire.

The instrument validity testing uses the product-moment correlation technique, while the instrument reliability testing uses alpha Cronbach [17]. Whereas for data analysis techniques including the normality test using liliefors (frequency) test, homogeneity test using fisher test, hypothesis testing using ANAVA test, and t-netnet test.

RESULT AND DISCUSSION

Based on the data of student learning outcomes in terms of Self Regulated Learning seen an increase in the posttest scores obtained by students compared with the value of the previous pretest. The biggest posttest value is in the class that is given treatment with STAD learning model with the lowest value of 29 and the highest value is 90. Whereas the class given treatment with the MURDER learning model gets the lowest value of 38 and the highest value is 88.

Then, for the analysis prerequisite test in the form of a normality test using the liliefors test (frequency). The normality results of the MURDER learning model (A_1) earned value $L_{count} = 0,1942 < L_{table} = 0,200$ which means that the data are normally distributed, the normality of the MURDER learning model at a low-level SRL (A_1B_1) earned value $L_{count} = 0,1586 < L_{table} = 0,300$ which means the data is normally distributed, and the results of the normality of the MURDER learning model at a high-level SRL (A_1B_2) earned value $L_{count} = 0,2483 < L_{table} = 0,258$ which means the data is normally distributed. As for the results of normality in the STAD learning model (A_2) earned value $L_{count} = 0,1999 < L_{table} = 0,200$ which means that the data are normally distributed, the results of the normality of the STAD learning model at low-level SRL (A_2B_1) earned value $L_{count} = 0,2342 < L_{table} = 0,300$ which means the data are normally distributed, and the results of the normality of the STAD learning model at high level SRL (A_2B_2) earned value $L_{count} = 0,2293 < L_{table} = 0,258$ which means the data is normally distributed.

A homogeneity test was performed using Fisher's Test. Homogeneity test results between columns namely between learning models (A_1A_2) earned value $F_{count} = 1,018 < F_{table (\alpha = 0,05)} = 2,33$ which means the data between learning models is homogeneous in distribution. It is said to be homogeneous because based on the results of the calculation of student learning outcomes data has a similarity level of competence after the test. Homogeneity test results between learning models at low level SRL are obtained $F_{count} = 1,734 < F_{table (\alpha = 0,05)} = 4,28$ which means the data between learning models at the low level SRL has homogeneous distribution. While the homogeneity test results between learning models at high-level SRL are obtained $F_{count} = 1,115 < F_{table (\alpha = 0,05)} = 3,18$ which means the data between learning models at the low-level SRL has homogeneous distribution. Hypothesis testing uses the two-way ANAVA hypothesis test as in Table 2 below :

Table 2. ANAVA Hypothesis Test Results

Sumber varian	Db	JK	RJK	Fh	Ft 0,05	Ft 0,01
Antar Kolom JK(AK)	1	148	148	6,73	4,17	7,56
Antar Baris JK (AB)	1	12669	12669	576,2	4,17	7,56
Interaksi JK(I)	1	222	222	10,1	4,17	7,56
Antar Kelompok JK(A)	3	13039	4346,3	593	2,92	4,51
Dalam kelompok JK(D)	30	659,6	21,988	1		
Total direduksi JK (TR)	33	13699				
Rerata (koreksi)	1	14145				
Total JK(T)	34	15515				

Based on the results of the hypothesis test in the table, testing the squares between columns obtained values $F_{count} = 6,73 > F_{table (\alpha = 0,05)} = 4,17$ dan $F_{count} = 6,73 < F_{table (\alpha = 0,01)} = 7,56$ which means that there are significant differences between the MURDER and STAD learning models of physics learning outcomes. That is because not all students who learn in groups have the responsibility to be active in discussion activities so that they are still dependent on their group members in solving problems.

Meanwhile, hypothesis testing for interaction variants gained value $F_{count} = 10,1 > F_{table\ (\alpha = 0,05)} = 4,17$; dan $F_{count} = 10,1 > F_{table\ (\alpha = 0,01)} = 7,56$ which means that there are very significant differences between the MURDER and STAD learning models for physics learning outcomes in terms of Self Regulated Learning. To prove the next hypothesis, a t-dunnet test is carried out as in Table 3 below :

Table 3. T-Dunnet Test Results

Desain Penelitian	t_o	t_{hitung}	t_{tabel}	A	Ket
$A_1B_1 - A_2B_1$	$(X_{mr} - X_{sr})$	19,27			Signifikan
$A_1B_2 - A_2B_2$	$(X_{mt} - X_{st})$	0,224	1,692	0,05	Tidak Signifikan
$A_1 - A_2$	$(X_m - X_s)$	4,178			Signifikan
$A_1B_1 - A_2B_1$	$(X_{mr} - X_{sr})$	19,27			Signifikan
$A_1B_2 - A_2B_2$	$(X_{mt} - X_{st})$	0,224	2,444	0,01	Tidak Signifikan
$A_1 - A_2$	$(X_m - X_s)$	4,178			Signifikan

Based on the t-dunnet test results table obtained values $t_{count} > t_{table}$ with a significance level of $\alpha = 0.05$ and $\alpha = 0.01$, which means there is an interaction between the MURDER learning model at low-level SRL and the STAD learning model at low-level SRL. This happens because students who have low-level Self Regulated Learning tend to like group learning activities because of a lack of confidence when completing assignments without the help of others. With the formation of group learning, these students get direction for learning because they can discuss and help each other to complete assignments.

Meanwhile, for the MURDER learning model on high-level Self Regulated Learning with the STAD learning model on high-level Self Regulated Learning $t_{count} < t_{table}$ with a significance level $\alpha = 0,05$ and $\alpha = 0.01$, which means there is no interaction between the learning models provided with SRL owned by students. This happens because students who have a high level of Self Regulated Learning tend to like individual learning activities and are less able to adapt to the learning environment in groups so that they do not focus during the learning process.

There is a difference in the results of the t-Dunnet Test calculation at the low-level SRL that is "Significant" and the high-level SRL that is "Not Significant" given the MURDER or STAD learning model due to the lack of heterogeneity in the formation of learning groups during the learning process. Some students get the highest score but the SRL results tend to be low, and vice versa.

CONCLUSION

Based on the results of hypothesis testing using the Two Path ANAVA and t-Dunnet Test obtained (1) there is an interaction between the MURDER and STAD learning models at low-level Self Regulated Learning ($t_h = 19,27 > t_t = 1,692$) which states an increase in student learning outcomes through group learning activities; (2) there is no interaction between the MURDER and STAD learning models at high-level Self Regulated Learning ($t_h = 0,2237 < t_t = 1,692$); and (3) there is a difference between the learning outcomes given by the MURDER learning model and STAD in terms of Self Regulated Learning ($t_h = 4,1782 > t_t = 1,692$).

Suggestions that researchers can give for further research are in the learning process that applies group learning such as MURDER and STAD students should be able to work well together, provide a mutual explanation (peer tutors), and appreciate the opinions expressed by each group member. But students must still maintain good Self Regulated Learning, so that there is no dependency on group members.

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