

The Effect of Critical Thinking Skills and Achievement Motivation on Student Physics Learning Outcomes

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Abstract: This research is a survey study that aims to understand the overview of students' critical thinking skills, achievement motivation, and physics learning outcomes, and then to analyze the direct and indirect effects of several variables. Sampling is done using a multiple-stage random sampling technique, assuming that all classes are relatively homogeneous, resulting in a sample size of 80 students from SMA Negeri 2 Gowa. The data is obtained through critical thinking skill test instruments, achievement motivation questionnaires, and physics learning outcome tests. The collected data will be processed using two types of analysis techniques, namely descriptive analysis, and inferential analysis, using path analysis. The descriptive analysis concludes that students' critical thinking skills, achievement motivation, and physics learning outcomes are all in the high category. Additionally, the inferential analysis concludes that: critical thinking skills have a direct and significant positive effect on physics learning outcomes of students, critical thinking skills have a direct and significant positive effect on achievement motivation of students, achievement motivation has a direct and significant positive effect on physics learning outcomes of students, and critical thinking skills have an indirect and significant positive effect on physics learning outcomes through achievement motivation of students.

Keywords: Achievement motivation; Critical thinking skills; Physics learning outcomes

Introduction

The learning process is the interaction between students and educators and other learning resources in the learning environment, where there is a transfer of knowledge and values from teachers to students and also from the environment to students. Learning outcomes are the results achieved by someone after experiencing the learning process by evaluating it first. According to several definitions, learning outcomes can be seen from changes in behavior, a realization of potential abilities, and mastery of the material provided. Learning outcomes can also be grouped into three domains, namely cognitive, affective, and psychomotor. However, to express the success of a learning process, each teacher has different views and learning is declared successful if the learning objectives have been achieved and formative tests are carried out to determine the extent to which students have mastered.

Based on the results of observations and interviews conducted at State Senior High School 2 Gowa on 2 February 2022, information was obtained that there was inequality in the achievement of student learning outcomes. This can be seen from the report on learning outcomes which shows differences in the average test results in each class. For example, in one class there are only 7 students whose grades do not reach the passing standard, while in another class there are 16 out of 32 students whose grades do not reach the passing standard. This shows that students' learning outcomes, especially in physics subjects, still need to be improved.

Students' physics learning outcomes still need to be improved, presumably due to low analytical skills. The 2013 curriculum demands scientific physics learning to develop the ability to think, work, act scientifically and communicate as one of the important aspects of life skills. In the 2013 curriculum, based on Anderson's Taxonomy, educational goals are divided into three

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domains: cognitive, affective, and psychomotor. In the cognitive domain, including the aim to improve analytical skills as a mental process from the level of knowledge to the level of evaluation. Improving students' skills in analyzing subject matter including physics is a goal in certain fields of study.

Good analytical ability is an important indicator of critical thinking skills. This skill enables one to draw proper conclusions from an issue and evaluate them to ascertain its correctness. Good analytical skills also enable students to construct the concepts used in solving problems. Therefore, critical thinking skills are very important in determining student learning outcomes.

Effective learning to improve critical thinking skills is still a debate among researchers and educators. Critical thinking skills are considered one of the main skills needed by graduates of higher education to deal with global changes in the 21st century. However, effective methods for building critical thinking skills have not been determined with certainty. Several studies show different results in using the same method, so an evaluation cycle is needed to analyze the constructs or aspects of thinking skills that can make learning more effective.

Learning physics requires students to have good critical thinking skills, but apparently, not all students have them. This can be seen from the difficulties of students in carrying out basic classifications and drawing correct conclusions, as well as difficulties in understanding new terms that appear in learning. Reports on learning outcomes can also be used to measure the level of students' critical thinking skills.

Good student physics learning outcomes are influenced by high critical thinking skills. Research shows that there is a significant relationship between critical thinking skills and mathematics achievement. With good critical thinking skills, students can understand the material better and make the right decisions to solve the problems they face.

Researchers consider that critical thinking skills are an important factor in determining students' physics learning outcomes. High critical thinking skills will enable students to better analyze and understand the subject matter, so that their learning outcomes will be better. Conversely, if critical thinking skills are low, students will have difficulty analyzing and understanding the subject matter, so their learning outcomes will be low.

Research shows that critical thinking skills and achievement motivation have a significant influence on students' physics learning outcomes. Critical thinking skills can help students analyze the subject matter and draw the right conclusions, while achievement motivation can provide encouragement and enthusiasm for students in learning. Several studies also show that

independent learning also has a positive relationship with achievement motivation, and is considered a goal of higher education in several countries.

Achievement motivation is a person's drive or desire to achieve higher achievements in a particular activity or field. In this case, students can show high motivation in learning physics if their learning goal is to get good performance in that subject. The link between achievement motivation and student learning outcomes is very close, where students who have high achievement motivation tend to show good learning outcomes as well.

McClelland (1987) achievement motivation is an important factor that must be considered in the learning process, so that it can help students to achieve good performance and improve their learning outcomes.

Achievement motivation is considered an important factor in learning because, with this motivation, students will try to achieve standards of perfection in learning. This can be seen from the behavior of students who show good effort in learning, such as asking quality questions, discussing subject matter outside of school hours, and thinking deeply about the material being studied.

The researcher argues that at State Senior High School 2 Gowa, student achievement motivation needs to be improved. This can be seen from the attitude of students who prefer tasks that are easy and not challenging, and tend to give answers without sufficient analysis. This causes learning outcomes that are less than optimal. Based on these characteristics, researchers believe there is a relationship between student achievement motivation and learning outcomes.

The results showed that there was a positive and significant relationship between students' achievement motivation and their learning outcomes. Several studies have shown that achievement motivation plays an important role in determining the level of student achievement. This is confirmed by the results of the research by Pristiwaluyo et al. (2018) and Patulak (2019), which shows that achievement motivation has a positive and significant effect on student achievement.

Researchers consider that achievement motivation has a positive and significant influence on students' physics learning outcomes. That is, students who have high achievement motivation will tend to achieve high learning outcomes in physics subjects, while students with low achievement motivation will achieve low learning outcomes. Based on the results of research conducted by Pristiwaluyo, et al and Patulak, it can be seen that achievement motivation has a positive and significant effect on student learning outcomes.

Based on previous descriptions about the definition of learning outcomes, critical thinking skills, and achievement motivation and their influence on learning

outcomes, researchers are interested in evaluating the relationship between critical thinking skills and achievement motivation with physics learning outcomes of students at Gowa 2 State Senior High School by conducting research entitled "The Influence of Critical Thinking Skills and Achievement Motivation on Student Physics Learning Outcomes at State Senior High School 2 Gowa". This study will evaluate how much influence these two variables have on the physics learning outcomes of students at the school.

Method

The type of research used is survey research, in which the researcher reveals causal characteristics between variables without any intervention from the researcher. The results of the study were then analyzed using path analysis to test the strength of the direct and indirect relationship of the independent variables, namely variables X_1 and X_2 , to the dependent or dependent variable, namely variable Y . This research was conducted at Gowa 2 State Senior High School, Education Street, Limbung, Gowa South Sulawesi and will be held in the Even Semester of the 2021/2022 Academic Year. The relationship between the research variables can be described as follows:

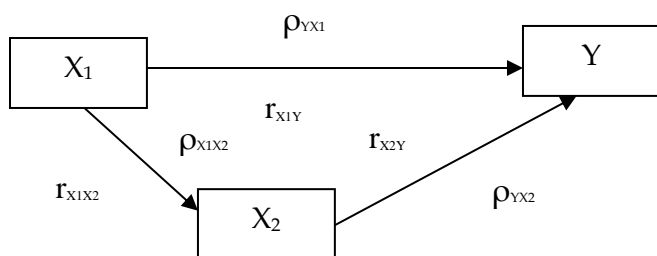


Figure 1. Path Diagram

Information:

- X_1 : Critical thinking skills
- X_2 : Achievement motivation
- Y : Physics Learning Outcomes
- ρ : The path coefficient of each variable
- ρ_{YX1} : Path coefficient of critical thinking skills on learning outcomes
- ρ_{YX2} : The path coefficient of achievement motivation on learning outcomes
- r_{X1X2} Correlation coefficient between independent variables

The population in this study were all students of class XI Natural Sciences at State Senior High School 2 Gowa consisting of 9 classes. The total number of students is 295 people. The sampling technique used is multiple-stage random sampling, using the Slovin formula, the precision level is set at 10% as follows:

$$n = \frac{295}{1+295(0,1^2)} = 75 \tag{1}$$

The sample size obtained based on the Slovin formula is 75 people, but the researchers took a sample size of 80 people, which means that it is above the minimum sample size limit required by the Slovin formula. Physics learning outcomes and critical thinking skills are measured using test questions that have been validated by experts and then analyzed using the biserial point coefficient formula and tested for reliability using the KR-20 equation. Meanwhile, achievement motivation variable is measured by giving achievement motivation questionnaire sheets, with answer options using a Likert model scale that has been validated by experts and analyzed using the Product Moment test, and tested for reliability using the Alpha Crocbach equation. The data obtained were then analyzed using the normality test, homogeneity test, significance test and regression coefficient test before the path analysis test was carried out.

Result and Discussion

The results of this study consist of a description of description of student learning outcomes, achievement motivation, and students' critical thinking skills. Then the model will be tested using path analysis to test the hypothesis.

Description of Physics Learning Outcomes of Class XI Natural Sciences Students of Senior High School 2 Gowa

Scores of students' physics learning outcomes were obtained from the test instrument questions with a total of 22 question items. The scoring used for this question is 1 point for a correct answer and 0 points for an incorrect answer. As for the form of data tabulation obtained using the Microsoft Excel program software, the average score, variance, standard deviation, and median of the physics learning outcomes are obtained which are presented in Table 1.

Table 1 Descriptive Statistics of Physics Learning Outcomes Scores

Statistik	Score
Sample Size	80.00
Max. theoretical score	22.00
Min. theoretical score	0.00
Max. empirical score	21.00
Min empirical score	4.00
Average	14.50
Standard Deviation	4.56
Variance	20.81
Median	15.00

From Table 1 it is known that the average score of students' physics learning outcomes is 14.50 and the variance value is 20.81, for further research scores are presented in a frequency distribution list with 5 (five) categories presented in Table 2.

Table 2. Frequency Distribution of Physics Learning Outcomes Scores

Interval Class	Categorization	Frequency	Percentage (%)
0-3	Very low	0	0
4-8	Low	12	15
9-13	Medium	18	22
14-18	High	30	38
19-23	Very high	20	25

The results of the calculations obtained can be displayed visually in the distribution of scores of physics learning outcomes for students of class XI Natural Sciences at State Senior High School 2 Gowa which is displayed in the form of a histogram in Figure 1.

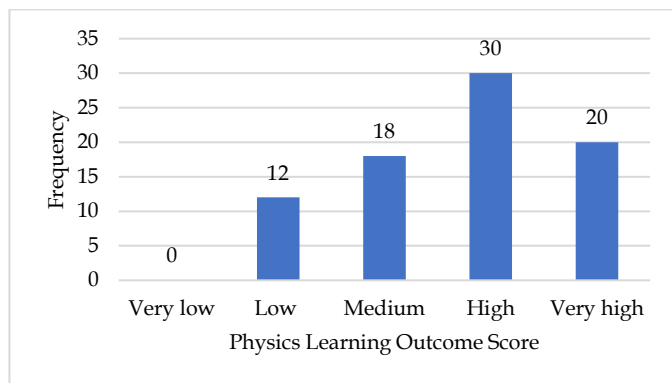


Figure 2. Histogram of Physics Learning Outcomes

Based on Table 1 and Table 2, it can be seen that the physics learning outcomes of students in the score range 14-18, the frequency of 30 students is in the high category.

Description of Critical Thinking Skills of Class XI Natural Sciences Students of State Senior High School 2 Gowa

The scores of students' critical thinking skills were obtained from the question test instrument with a total of 10 question items. The score used in the question is 1 point for a correct answer and 0 points for an incorrect answer. As for the form of data tabulation obtained using the Microsoft Excel program software, the average score, variance, standard deviation, and median of the physics learning outcomes are obtained which are presented in Table 3.

Table 3 Descriptive Statistics of Critical Thinking Skills Scores

Statistics	Score
Sample Size	80
Max. theoretical score	10
Min. theoretical score	0
Max. empirical score	10
Min empirical score	2
Average	6.51
Standard Deviation	1.95
Variance	3.80
Median	7.00

From Table 3 it is known that the average score of students' critical thinking skills is 6.51 and the variance value is 3.80. Further research scores are presented in a frequency distribution list with five categories presented in Table 4 below.

Table 4. Frequency Distribution of Critical Thinking Skills Scores

Interval Class	Categorization	Frequency	Percentage (%)
0-3	Very low	0	0
4-8	Low	12	15
9-13	Medium	18	22
14-18	High	30	38
19-23	Very high	20	25

The calculation results obtained can be displayed visually the distribution of critical thinking skills scores of students in class XI Natural Sciences at State Senior High School 2 Gowa which is displayed in the form of a histogram in Figure 3.

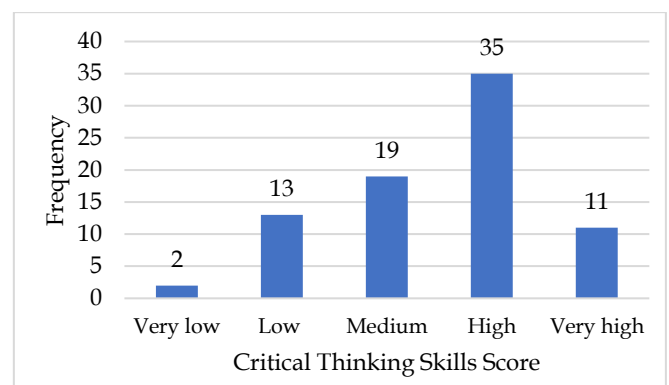


Figure 3. Histogram of Critical Thinking Skills

Based on Table 3 and Table 4 it can be seen that the critical thinking skills of students in the score range 7-8 have a frequency of 35 students. This indicates that the critical thinking skills of students in class XI Natural Sciences, State Senior High School 2 Gowa are in the high category.

Description of Achievement Motivation of Class XI Natural Sciences Students of State Senior High School 2 Gowa

Students' achievement motivation scores were obtained from a questionnaire with a total of 36 item statements. The scores used in the questionnaire are 1 to 5 for each statement item. As for the form of data tabulation obtained using the Microsoft Excel program software, the average score, variance, standard deviation, and median of the physics learning outcomes are obtained which are presented in Table 5.

Table 5. Descriptive Statistics of Achievement Motivation Scores

Statistics	Score
Sample Size	80.00
Max. theoretical score	180.00
Min. theoretical score	36.00
Max. empirical score	157.00
Min. empirical score	103.00
Average	127.03
Standard Deviation	13.33
Variance	177.77
Median	127.00

From Table 5 it is known that the average score of students' achievement motivation is 127.03 and the variance value is 177.77. Further research scores are presented in Table 6.

Table 6. Frequency Distribution of Achievement Motivation Scores

Interval Class	Categorization	Frequency	Percentage (%)
36-64	Very low	0	0
65-93	Low	0	0
94-122	Medium	17	21
123-151	High	59	74
152-180	Very high	4	5

The calculation results obtained can be displayed visually in Figure 4.

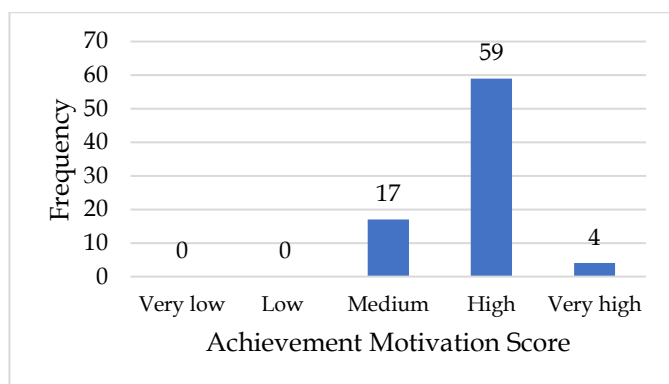


Figure 4. Histogram of Achievement Motivation

Based on the table it can be seen that the achievement motivation of students is in the score range of 123-151 with a frequency of 59 students. This indicates that the achievement motivation of students in class XI Natural Sciences, State Senior High School 2 Gowa is in the high category.

Description of Influence Between Variables

Before testing the model, it is necessary to have research data that has been tested and meets the requirements. Furthermore, the analysis used in processing the data is path analysis. Path analysis is used to describe and test the model of the relationship between causal variables. Through path analysis, it will be proven whether the path diagram made is proven or not. The initial stage before testing the model is the preparation of a model of the relationship between variables, which in this case is called a path diagram. The path diagram is arranged based on the framework developed from the theory used in this study. The shape of the path diagram in this study can be seen in Figure 5.

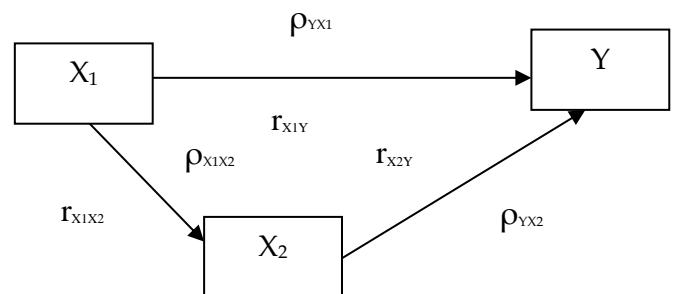


Figure 5. Relationship X1 and X2 to Y

The path diagram above shows three correlation coefficients namely: r12, r13, and r23, and also three path coefficients namely: ρ31, ρ32, and ρ21. The path coefficient shows the direct effect of the independent variable on the dependent variable, while the correlation coefficient shows the relationship between the independent variable to the dependent variable. The results can be seen in the following table.

Table 7. Pearson Correlation Test Data

		(X1)	(X2)	(Y)
Critical Thinking Skills (X1)	R _{count}	1	0.3951	0.4913
	r _{table}	-	0.2199	0.2199
Achievement Motivation (X2)	R _{count}	0.3951	1	0.5844
	r _{table}	0.2199	-	0.2199
Learning Outcomes (Y)	r _{count}	0.4913	0.5844	1
	r _{table}	0.2199	0.2199	-

Based on the value of the correlation coefficient obtained for the relationship between critical thinking

skills and physics learning outcomes or r_{13} is $0.4913 > 0.2199$, it can be ascertained that there is a relationship or correlation between the variables of critical thinking skills and physics learning outcomes. While the value of the correlation coefficient obtained for the relationship between achievement motivation and physics learning outcomes or r_{23} is $0.5844 > 0.2199$, it can also be ascertained that there is a relationship or correlation between the variables of achievement motivation and physics learning outcomes. The positive correlation coefficient value indicates a unidirectional relationship. That is, if critical thinking skills and/or achievement motivation are high, then the learning outcomes obtained will also be high.

The Direct Effect of Critical Thinking Skills on Physics Learning Outcomes

Based on the analysis that has been carried out, by analyzing the t_{count} value and then comparing it to the t_{table} , then calculating the path coefficient values between variables, the researcher concludes that critical thinking skills (X1) have a direct effect on physics learning outcomes (X3). This shows that students with high physics learning outcomes scores also have high critical thinking skills scores. Vice versa, students with low scores in physics learning outcomes have low scores in critical thinking skills.

Critical thinking is the ability to think rationally, analyze problems objectively, and evaluate information properly. So, by thinking critically, we can get the right results according to the facts and make sense. The characteristics of people who think critically are having high curiosity, having a strong desire to seek the truth, being skeptical of unclear information, being open-minded, and being able to make connections between one idea and another.

Based on the average score of students' thinking skills in the score range 7-8, the frequency is 35 students, this shows that the critical thinking skills of students in class XI Natural Sciences, State Senior High School 2 Gowa are in the high category. For the average score of students' physics learning outcomes in the score range 14-19 the frequency is 30 people out of 80 research samples, this shows that the physics learning outcomes of class XI Natural Sciences students of State Senior High School 2 Gowa are in the high category. However, the researcher found two students who had critical thinking skill scores which were in the very low category, but their learning outcomes scores were in the low and medium categories. Even so, this only affects a small proportion of students, so in general it can be concluded that critical thinking skills and physics learning outcomes have a positive and significant effect.

The factors causing the high score of student learning outcomes related to the variable critical

thinking skills are at the level dimension with indicators of analytical ability (analysis), where students can rewrite the relationship between concepts used in solving a problem, and also able to write down what to do in solving the problem. In addition, students critical thinking skills can be in a high category, one of the reasons is related to the use of a learning model, namely the problem-based learning model (PBL). The teacher first explains the learning objectives, then provides several problems in physics that are relevant to everyday life to spark students' curiosity. After that, the teacher divides students into several groups, each of which is given a different problem. Then students are asked to discuss the problem, having to find out the cause of the problem, as well as what solutions must be given to solve the problem.

Learners can collect information through books or by browsing the internet. They try to collect and understand as much information as possible. The information that has been understood is then discussed and shared with other group members so that all group members have the same understanding of the material being discussed. In the process of formulating causes and finding solutions, students will engage in arguments with their group members, this activity can train students' critical thinking skills to find and analyze the most appropriate possible solutions to a given problem. Even though students are given space to formulate and search for themselves, the teacher still supervises and evaluates. Students still have to present the results of their discussions in front of other groups. To present the results of the discussion, of the course students must have good communication skills, namely expressing ideas or ideas rationally and systematically so that they can be easily understood by others. Indirectly this communication ability will also have an impact on students' critical thinking skills. So that the use of problem-based learning models (PBL) by teachers also has an impact on improving students' critical thinking skills.

Based on Yuzhi's research (2003) the problem-based learning model (PBL) has been shown to be effective in improving student learning outcomes and critical thinking skills in the field of chemistry studies, both chemistry and science subjects in high schools and chemistry subject courses in tertiary institutions. Assuming that the problem-based learning model (PBL) is capable of developing students' critical thinking skills and problem-solving in all fields, this learning model should also be effective in increasing critical thinking skills and problem-solving for high school students in the field of Physics. The PBL learning model is indicated to improve cognitive learning outcomes. This can be seen based on the increase in the percentage of KBK. The

percentage of CBC in cycle I (Rerung, 2017) was 64.00%, and in cycle II increased to 84.00%.

Learning that focuses on thinking skills, especially critical thinking, is one way to improve student learning outcomes. One of the efforts that can be made to improve physics learning outcomes is by training students' critical thinking skills. The ways to train critical thinking skills include increasing interaction between students, utilizing open-ended questions so that students can think more complexly, providing sufficient time for students to reflect on the questions or problems given, and teaching for transfer. . Activities that can develop students' critical thinking skills are by answering innovative questions, for example, is there another way to get this? Or what if? Or even asking what to do next. Recognizing the importance of critical thinking skills, teachers are also required to be creative and innovative in arranging fun learning so that students are interested and motivated to take part in learning.

The Direct Effect of Critical Thinking Skills on Achievement Motivation

Based on the analysis that has been carried out, by analyzing the t_{count} value and then comparing it with the t_{table} , then calculating the path coefficient values between variables, the researcher concludes that critical thinking skills (X_1) have a direct effect on student achievement motivation (X_2). This shows that students with high achievement motivation scores also have high scores in critical thinking skills. Vice versa, students with low achievement motivation scores have low critical thinking skills scores.

Based on the average score of students' thinking skills in the score range 7-8, the frequency is 35 students, this shows that the critical thinking skills of students in class XI Natural Sciences, State Senior High School 2 Gowa are in the high category. For the average score of students' achievement motivation in the score range 123-151, the frequency is 59 students, this indicates that the achievement motivation of students in class XI Natural Sciences, State Senior High School 2 Gowa is in the high category. However, the researcher found two students who had critical thinking skill scores which were in the very low category, but their achievement motivation scores were in the high category. Even so, this only affects a small proportion of students, so in general, it can be concluded that critical thinking skills and achievement motivation have a positive and significant effect. One of the causes of students having high achievement motivation related to critical thinking skills is of them the learning method applied by the teacher at the school where the teacher applies a problem-based learning model, and the teacher also always gives open-ended questions, this question requires students to be able to analyze and see problems from various

perspectives, this makes students always see new opportunities and creative ideas.

This is in line with research conducted by Kaharu (2013) where it was found that the average learning motivation of students who were taught using open-ended questions was higher than the learning motivation of students who were taught using closed-ended questions. Critical thinking skills are also able to increase the level of self-confidence of students, with high self-confidence, of course, students' achievement motivation will also increase as well.

The Direct Effect of Achievement Motivation on Physics Learning Outcomes

Based on the analysis that has been carried out, by analyzing the t_{count} value and then comparing it with the t_{table} , then calculating the path coefficient values between variables, the researcher concludes that achievement motivation (X_2) has a direct effect on physics learning outcomes (X_3). This shows that students with high physics learning outcomes have high achievement motivation scores. Vice versa, students with low physics learning outcomes scores have low achievement motivation scores.

Based on the average score of students' achievement motivation in the score range 123-151, the frequency was 59 students out of a total of 80 research samples, this shows that the achievement motivation of students in class XI Natural Sciences, State Senior High School 2 Gowa is in the high category. For the physics learning outcomes of students in the 14-19 score range, the frequency is 30 out of 80 research samples. This indicates that the physics learning outcomes of students in class XI Natural Sciences, State Senior High School 2 Gowa are also in the high category. The factor that causes high student physics learning outcomes in terms of achievement motivation is that students need achievement, students with high achievement motivation will exert all their abilities to achieve this goal, namely getting achievement. There are several ways that students will do this, for example doing assignments on time, students will also prefer doing assignments rather than playing, and in carrying out their assignments students will certainly be more thorough in doing their assignments and don't want to be the same as other people. These things trigger an increase in student learning outcomes.

Mariska, et al (2013) argues that motivation is an impulse that exists within a person to try to make changes in behavior that are better at meeting needs. According to Lukita (2021), motivation is closely related to the reasons why students carry out these activities. According to Fitriani (2020) with high achievement motivation, it will be easier for students to be encouraged to study on their own initiative without the

help of others. The urge to learn independently arises from the initiative to learn through the strategies he implements. From the several opinions above, it can be concluded that motivating students can foster students' learning interests, and with the growth of students' learning interests, learning objectives can be achieved easily. Giving motivation can also make it easier for teachers to deliver teaching materials because students' interest in learning has grown.

Indirect Effect of Critical Thinking Skills on Physics Learning Outcomes Through Achievement Motivation

Based on the results of the analysis, it is interpreted that there is an indirect effect of critical thinking skills (X1) on physics learning outcomes (Y=X3) through achievement motivation (X2). The large percentage of indirect influence of critical thinking skills (X1) on physics learning outcomes (Y = X3) through achievement motivation (X2) is 5.63%. This finding proves that in addition to indicators of critical thinking skills which have a direct effect on physics learning outcomes, there is also an indirect effect of critical thinking skills on physics learning outcomes through the path of achievement motivation of 5.63%.

The analysis that has been carried out so that the percentage of influence of critical thinking skills on learning outcomes is 15.14%, the effect of achievement motivation on learning outcomes is 21.38%, the effect of critical thinking skills on achievement motivation is 15.61%, and the indirect effect of motivation achievement on learning outcomes of 5.63%. From these data, it can be concluded that the achievement motivation variable has the greatest influence on the learning outcome variable. Achievement motivation is an intervening variable (bridge), this is evident from the analysis that has been carried out with the result that there is a direct or indirect effect between the achievement motivation variable and the learning outcome variable and has the greatest influence either directly or indirectly.

Motivation or encouragement to pursue achievement is an important factor for students to achieve learning goals. Because the existence of achievement motivation will make students feel comfortable in learning, feel happy about what is learned, and have a high enthusiasm for learning. Motivation itself can come from within students internally and can also be influenced by other people.

Conclusion

Based on the results and discussion of research with the title influence of critical thinking skills and achievement motivation on physics learning outcomes of students in class XI Natural Sciences at State Senior

High School 2 Gowa, the researchers found that critical thinking skills, achievement motivation, and physics learning outcomes of class students XI Natural Sciences State Senior High School 2 Gowa each in the high category. Critical thinking skills also have a direct positive and significant effect on the physics learning outcomes of students in class XI Natural Sciences, State Senior High School 2 Gowa. In addition, critical thinking skills also have a positive and significant direct effect on the achievement motivation of students in class XI Natural Sciences, State Senior High School 2 Gowa. Achievement motivation has a direct positive and significant effect on the physics learning outcomes of class XI students of Senior High School 2 Gowa State Senior High School. Critical thinking skills have a positive and significant indirect effect on physics learning outcomes through the achievement motivation of students in class XI Natural Sciences, State Senior High School 2 Gowa. After obtaining an overview of physics learning outcomes, critical thinking skills, and students' achievement motivation, it is hoped that the school can make the best use of the results of this research. where it was found that critical thinking skills and achievement motivation had a positive and significant effect on students' physics learning outcomes. Where when critical thinking skills and achievement motivation increase, the physics learning outcomes of students also increase. This can be utilized by providing stimulation to students so that their critical thinking skills and achievement motivation can be increased. For example, for critical thinking skills, students can be trained by providing open-ended questions that can train students' analytical skills. Then for achievement motivation, for example, students can be given reinforcement or reinforcement and more appreciation so that students' motivation can increase, in line with the increase in students' physics learning outcomes.

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