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The Influence of Self-Efficacy and Achievement Motivation on Physics Learning Outcomes of Class X Students at SMA Negeri in Bulukumba

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Abstract: This research is a survey study that aims to analyze the direct and indirect effects of several variables. Sampling is done using a cluster sampling technique, assuming that all schools are relatively homogeneous, resulting in a sample size of 320 students from SMA Negeri in Bulukumba. The data is obtained through self-efficacy questionnaires 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 self-efficacy, achievement motivation, and physics learning outcomes are all in the high category. Additionally, the inferential analysis concludes that: self-efficacy have a direct and significant positive effect on physics learning outcomes of students, self-efficacy 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 self-efficacy have an indirect and significant positive effect on physics learning outcomes through achievement motivation of students.

Keywords: Achievement motivation; Physics learning outcomes; Self-Efficacy

Introduction

Learning is a process of interaction between students and educators and other learning resources in a learning environment, in this interaction process there is a transfer of knowledge and values from teachers to students including from the environment to students. Learning outcomes are the results that have been achieved by someone after experiencing a learning process by first conducting an evaluation of the learning process carried out. According to several definitions, learning outcomes can be seen from changes in behavior, the realization of potential abilities and mastery of the material given.

Jihad et al. (2010) define learning outcomes as real changes in student behavior after the teaching and learning process is carried out in accordance with the teaching objectives. Sudjana (2016) defines learning outcomes or achievement as the realization or development of potential skills or capacities possessed by a person. The learning outcomes possessed by a person can be viewed from their behavior. Arifin (2010) also expressed his opinion that optimal learning outcomes can be seen from the completion of their learning, being skilled in doing assignments, and having a good appreciation of the lesson.

The results of the observation found that the physics learning outcome score was still low and had not reached the Learning Objective Achievement Criteria (KKTP) that had been set. This proves that physics learning outcomes are in the low category and need to be improved. Not only in learning outcomes, there are

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also other things that are shortcomings and problems that are encountered, namely there are still students who cheat during exams, students are less confident when appointed to work on questions in front of the class and feel embarrassed to express their opinions during discussions.

The thing that causes the low physics learning outcomes of students is the lack of attention, motivation and self-readiness of students. According to Slameto (2010), factors that influence learning outcomes can be classified into two groups, namely internal factors and external factors. External factors are factors that come from the environment or outside the individual, for example the family environment, school environment and community environment. Internal factors are factors that exist within the individual who is learning, such as intelligence, attention, interest, talent, motivation, maturity and readiness (self-efficacy). In this scientific work, the focus is on readiness (self-efficacy).

Self-efficacy is very much needed because it can influence several aspects of a person's cognition and behavior such as in terms of choosing behaviors to try or avoid (level), strength or expectations of their abilities (strength), and confidence in their abilities (generality). Self-efficacy will lead to different behaviors among individuals with the same abilities because self-efficacy influences choices, goals, problem solving, and persistence in trying, in addition Tsang et al. (2006) stated in the scientific world journal that people who have self-efficacy can influence the thinking process, motivate themselves, and behave well. Carberry et al. (2010) in the Journal of Engineering Education that a person's self-efficacy functions as a complement to cognitive development. Self-efficacy greatly influences the learning process of students, and this self-efficacy can improve learning.

Kaharuddin et al. (2020) someone with high self-efficacy is able to do something to change the events around them, while someone with low self-efficacy considers themselves basically incapable of doing everything around them. In difficult situations, people with low efficacy tend to give up easily. Meanwhile, people with high self-efficacy will try harder to overcome existing challenges.

In addition to self-efficacy factors, other factors that can influence student learning outcomes are thought to come from other internal factors from the students themselves, namely their achievement motivation. Motivation is generally defined as the drive or movement of the soul to carry out actions or behaviors. If this definition is brought into the learning process, then learning motivation is a drive or driver that comes from both within and outside the student, which is able to generate enthusiasm and provide direction to learning activities so that the desired goals can be achieved.

Learning objectives are essential and specific, can be viewed from the learning objectives themselves in general, and can be viewed from the students themselves. Therefore, student learning motivation will also depend on the student's learning objectives, which are more personal in nature. One of them is the student's goal to achieve achievements. Motivation of this nature is known as achievement motivation. McClelland et al. (1989) defines achievement motivation as an individual's effort and belief to pursue achievement or realize learning goals with certain standards of success and be able to overcome all obstacles that hinder the achievement of these goals. High need for achievement will encourage someone to achieve the expected goal, namely good achievement. Achievement motivation is very important in learning because someone who has strong achievement motivation tends to make various efforts to be able to master the field they are studying so that they can achieve higher achievements. Achievement motivation is an internal factor in learning that makes a large contribution, namely 64% in determining a person's learning achievement.

Achievement motivation is something that students should have, with the existence of achievement motivation students will use their best abilities to achieve standards of perfection. One of the behaviors that reflects this effort, for example, is asking good questions, discussing lesson materials outside of school hours, and thinking deeply about the lesson materials being studied. These things are factors in increasing student learning outcomes and are also expected to increase students' self-confidence in the learning process. This is in line with research conducted by Pristiwaluyo et al. (2016) with a population of 39 people, a positive and significant relationship was obtained between achievement motivation and learning outcomes supported by a determination coefficient of $r2y2 = 0.491$. This determination coefficient shows that the influence of achievement motivation on learning outcomes is 49% while the rest is influenced by other factors. Further research by Syamsinar et al. (2023) who looked at the influence of achievement motivation on student learning achievement, with a sample size of 80 people and a significance level of $\alpha = 0.05$, the t-value was obtained = 4.9030> t-table = 1.9905, so it can be concluded that achievement motivation has a positive and significant effect on student learning achievement.

Based on several supporting studies, the researcher suspects that achievement motivation does have an effect on student learning outcomes, in this case the learning outcomes in question are physics learning outcomes. Where, students with high achievement motivation will show high learning outcomes.

Meanwhile, students with low achievement motivation will show low learning outcomes as well.

Based on the previous descriptions, regarding the definition of learning outcomes themselves, then the definition of self-efficacy and achievement motivation and their influence on learning outcomes, the researcher is interested in conducting a study entitled "The Influence of Self-Efficacy and Achievement Motivation on Physics Learning Outcomes of Class X Students of SMA Negeri in Bulukumba".

Method

The type of research used is survey research with an explanatory research design, where researchers reveal the characteristics of cause and effect between variables without any intervention from researchers. The results of the study were further analyzed using path analysis to test the strength of the direct and indirect relationship of the independent variables, namely variables X1 and X2, to the dependent or dependent variable, namely variable Y. This study was conducted in 6 State Senior High Schools in Bulukumba, South Sulawesi, which were divided based on coastal, urban and mountainous areas in the even semester of the 2024/2025 academic year. The relationship between the research variables can be described as follows:

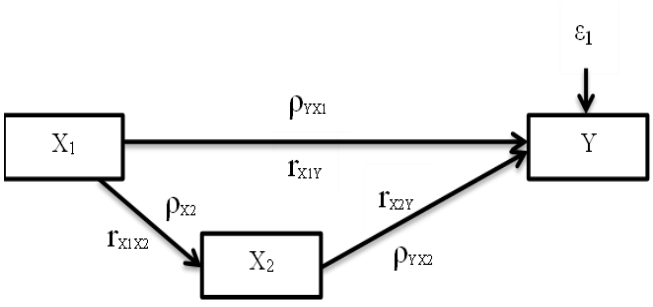

Figure 1. Path diagram

Information:
X1 : Self-efficacy
X2 : Achievement motivation
Y : Physics learning outcomes
ρ : Path coefficient of each variable
ρYX1 : Path coefficient of self-efficacy towards learning outcomes
ρYX2 : Path coefficient of achievement motivation towards learning outcomes
rX1X2 : Correlation coefficient between independent variables

The population in this study were all students of class X of SMA Negeri in Bulukumba Regency consisting of 19 schools with a total number of students of 3,558 divided into several classes. The sampling technique used was cluster sampling using the Slovin formula, the precision level set at 10% as follows:

$$n = \frac{3.558}{1+3.558(0,1^2)} = 97 \quad (1)$$

The sample size obtained based on the Slovin formula is 97 people, but the researcher took a sample size of 320 people which means it is above the minimum sample size limit desired by the Slovin formula.

Physics learning outcomes are measured using test questions that have been validated by experts and then analyzed using the point biserial coefficient formula and tested for reliability using the KR-20 equation. While the variables of self-efficacy and achievement motivation are measured by providing a questionnaire sheet, with answer choices using a Likert model scale that has been validated by experts and analyzed using the product moment test, and tested for reliability using the Cronbach alpha equation. The data obtained are then analyzed using the normality test, homogeneity test, significance test and regression test before the path analysis test is carried out.

Result and Discussion

The results of this study are in the form of a description of student learning outcomes, achievement motivation and student self-efficacy. Then the model will be tested using path analysis to test the hypothesis.

Description of Physics Learning Outcomes of Class X Students of SMA Negeri in Bulukumba

The score of student physics learning outcomes was obtained from a test instrument with a total of 25 question items. The scoring used in the questions is 1 point for the correct answer and 0 points for the wrong answer. The form of data tabulation obtained using Microsoft Excel program software, obtained the average score, variance, standard deviation, and median of the physics learning outcomes presented in Table 1.

Table 1. Statistics Descriptive Physics Learning Outcome Score

Statistics	Score
Sample size	320
Max theoretical score	25
Min theoretical score	0
Max empirical score	24
Min empirical score	6
Average	15.20
Standard deviation	3.85
Variance	14.84
Median	15

From table 1, it is known that the average score of students' physics learning outcomes is 15.20 and the variance value is 14.84. For further research, the scores are presented in a frequency distribution list with 5 (five) categories presented in table 2

Table 2. Frequency Distribution of Physics Learning Outcome Scores

Interval Class	Categorization	Frequency	Percentage (%)
0-4	Very low	0	0
5-9	Low	20	6
10-14	Medium	115	36
15-19	High	140	44
20-24	Very high	45	14

The calculation results obtained can be displayed visually in the distribution of physics learning outcome scores of class X students of SMA Negeri in Bulukumba which is displayed in the form of a histogram in Figure 1.

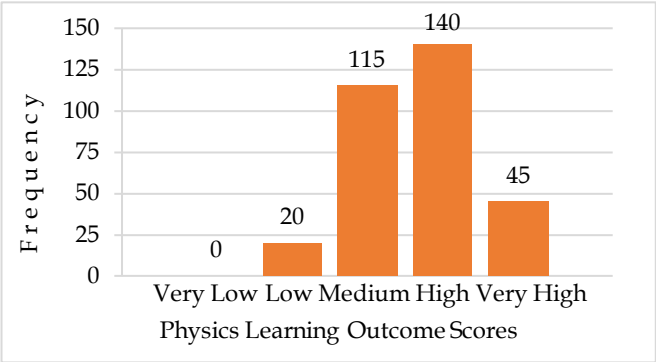

Figure 2. Histogram of physics learning outcomes

Table 1 and Table 2 show that the physics learning outcomes of students in the score range of 15-19 have a frequency of 140 students. This shows that the physics learning outcomes of class X students of SMA Negeri in Bulukumba are in the high category.

Description of Self-Efficacy of Class X Students of SMA Negeri in Bulukumba

The student self-efficacy score was obtained from a questionnaire with a total of 40 statement items. The scores used in the questionnaire were 1 to 5 for each statement item. The form of data tabulation obtained using Microsoft Excel software, obtained the average score, standard deviation, variance, and median of self-efficacy which are presented in table 3.

From table 3, it is known that the average score of self-efficacy of students is 158.16 and the variance value is 540.63. The research scores are then presented in a frequency distribution list with 5 (five) categories presented in Table 4.

Table 3. Statistics Descriptive Self-Efficacy Score

Statistics	Score
Sample size	320
Theoretical score max	200
Min theoretical score	40
Max empirical score	200
Min empirical score	59
Average	158.16
Standard deviation	23.25
Variance	540.63
Median	162

Table 4. Frequency Distribution of Self-Efficacy Scores

Interval Class	Categorization	Frequency	Percentage (%)
40-72	Very low	1	0
73-105	Low	13	4
106-138	Medium	30	9
139-171	High	195	61
172-204	Very high	81	25

The calculation results obtained can be displayed visually in the distribution of physics learning outcome scores of class X students of SMA Negeri in Bulukumba which is displayed in the form of a histogram in Figure 3.

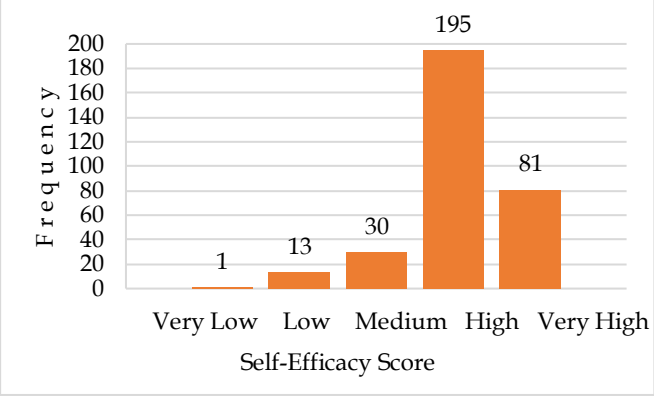

Figure 3. Self-efficacy histogram

Table 3 and Table 4 show that the self-efficacy of students in the score range of 139-171 has a frequency of 195 students. This shows that the self-efficacy of students in class X of SMA Negeri in Bulukumba is in the high category.

Description of Achievement Motivation of Students in Class X of SMA Negeri in Bulukumba

The achievement motivation score of students was obtained from a questionnaire with a total of 33 statement items. The scores used in the questionnaire were 1 to 5 for each statement item. The form of data tabulation obtained using Microsoft Excel software, obtained the average score, standard deviation, variance, and median of self-efficacy which are presented in table 5.

Table 5. Descriptive Statistics of Achievement Motivation Score

Statistics	Score
Sample size	320
Theoretical score max	165
Min theoretical score	33
Max empirical score	165
Min empirical score	100
Average	130.53
Standard deviation	12.51
Variance	156.53
Median	130

Table 5 shows that the average score of students' achievement motivation is 150.53 and the variance value is 156.53. The next research score is presented in a frequency distribution list with 5 (five) categories presented in Table 6.

Table 6. Frequency Distribution of Achievement Motivation Scores

Interval Class	Categorization	Frequency	Percentage (%)
33-59	Very low	0	0
60-86	Low	0	0
87-113	Medium	25	8
114-140	High	230	72
141-167	Very high	65	20

The calculation results obtained can be displayed visually in the form of a distribution of physics learning outcome scores for class X students of SMA Negeri in Bulukumba, which is displayed in the form of a histogram in Figure 4.

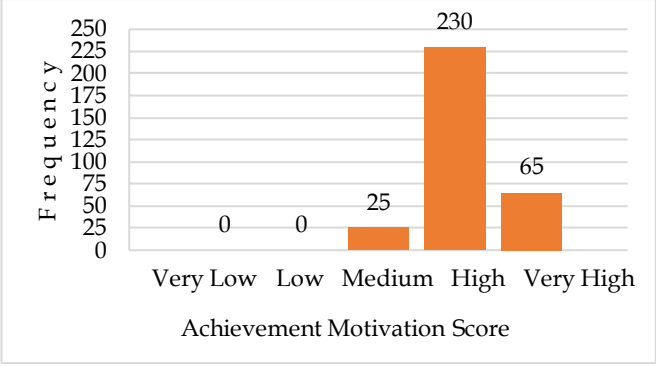

Figure 4. Histogram of achievement motivation scores

Table 5 and Table 6 show that the self-efficacy of students in the score range of 114-140 has a frequency of 230 students, this shows that the achievement motivation of class X students of SMA Negeri in Bulukumba is in the high category.

Description of Inter-Variable Influence

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

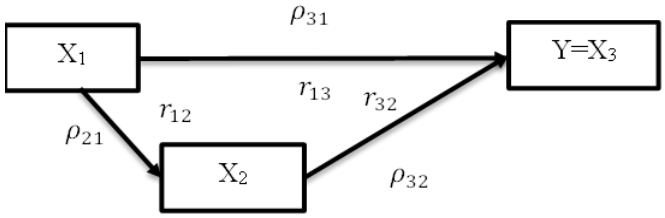

Figure 5. Relationship X1 and X2 to Y=X3

From the path diagram above, three correlation coefficients are obtained, namely r_{12}, r_{13} and r_{23} and also three path coefficients, namely ρ31, ρ32 and ρ21. The path coefficient shows the direct influence of the independent variable on the dependent variable while the correlation coefficient shows the relationship of the independent variable to the dependent variable. The results of the correlation coefficient calculation have been obtained using Microsoft Excel software which can be seen in the following table.

Table 7. Pearson Correlation Test Data

		(X_1)	(X_2)	(Y)
Efficacy (X_1)	R_{count}	1	0.115	0.219
	r_{table}	-	0.113	0.113
Motivation (X_2)	R_{count}	0.115	1	0.232
	r_{table}	0.113	-	0.113
Learning outcome (Y)	R_{count}	0.219	0.232	1
	r_{table}	0.113	0.113	-

The correlation coefficient value obtained for the relationship between self-efficacy and learning outcomes or r_{13} is 0.219 > 0.113, so it can be ascertained that there is a relationship or correlation between the self-efficacy variable and learning outcomes. While the correlation coefficient values obtained for the relationship between achievement motivation and physics learning outcomes or r_{23} are 0.232 > 0.113, it can also be ascertained that there is a relationship or correlation between the achievement motivation variable and physics learning outcomes. A positive correlation coefficient value indicates a unidirectional relationship. This means that if self-efficacy and/or

achievement motivation are high, then the physics learning outcomes are also high.

Direct Effect of Self-Efficacy on Physics Learning Outcomes

The analysis that has been done, by analyzing tcount then comparing it with ttable, then calculating the path coefficient between variables, the researcher obtained the conclusion that self-efficacy (X1) has a direct effect on physics learning outcomes (X3). This shows that students with high physics learning outcome scores have high self-efficacy scores. Likewise, students with low physics learning outcome scores have low self-efficacy scores.

Self-efficacy is the belief that a person has in their ability to control themselves in carrying out an activity so that the activity is as expected. The characteristics of people who have high self-efficacy are having a strong commitment and integrity, being able to rise from failure, being able to find solutions to problems, enjoying trying new things, seeing challenges as things that must be mastered.

The average score of students' self-efficacy in the range of 139-171 has a frequency of 195 students, this shows that the self-efficacy of class X students of SMA Negeri in Bulukumba is in the high category. For the average score of students' physics learning outcomes in the range of 15-19, the frequency is 140 people out of 320 research samples, this shows that the physics learning outcomes of class X students of SMA Negeri in Bulukumba are in the high category. However, the researcher found one student who had a self-efficacy score in the very low category but his learning outcome score was in the low category. However, this only applies to a small number of students, so in general it can be concluded that self-efficacy and physics learning outcomes have a positive and significant effect. The factors causing the high score of students' learning outcomes related to the self-efficacy variable are in the level dimension with indicators of the level of difficulty of tasks and behavior shown in facing tasks, where students continue to try to solve difficult problems and find ideas in completing tasks.

In accordance with research by Sari et.al. (2023) that the learning outcomes of students who have high self-efficacy are superior to those who have low self-efficacy. These findings are in line with research conducted by Musa (2020), and Lisaholit et al. (2021) which shows a correlation or relationship between self-efficacy and learning outcomes. There is a linear relationship between self-efficacy and learning outcomes, the more a student has high self-efficacy, the more likely the student will get high grades or learning outcomes too. The results of this study are also supported by (Putri et al. (2019) and Greenberg et al. (2018) who stated that self-efficacy is a good predictor of future behavior. Students with high self-efficacy will try harder and be highly committed to taking any action to achieve goals. Conversely, students who have low self-efficacy tend to have low commitment so they decide not to try an action.

Direct Effect of Self-Efficacy on Achievement Motivation

The analysis that has been done, by analyzing the t-value then comparing it with the t-table value, then calculating the path coefficient value between variables, the researcher concluded that self-efficacy (X1) has a direct effect on students' achievement motivation (X2). This shows that students with high achievement motivation scores have high self-efficacy scores. Likewise, students with low motivation scores have low self-efficacy scores.

The average self-efficacy score of students in the score range of 139-171 has a frequency of 195 students, this shows that the self-efficacy of class X students of SMA Negeri in Bulukumba is in the high category. For the average achievement motivation score of students in the range of 114-140, the frequency is 230 students, this shows that the achievement motivation of class X students of SMA Negeri in Bulukumba is in the high category. However, the researcher found one student whose self-efficacy score was in the very low category but had a moderate achievement motivation score. However, this was only in a small number of students, so in general it can be concluded that self-efficacy and achievement motivation have a positive and significant effect. The factors that cause students to have high achievement motivation related to self-efficacy are that they believe that they are able to overcome various challenges, obstacles and achieve the goals they have set, one of which is being motivated to achieve.

The results of this study are in line with research conducted by Abdullah (2014) which showed the results of research on the influence of self-efficacy on achievement motivation of class VIII students in Malang stating that self-efficacy and achievement motivation have a direct positive and significant correlation. The higher the self-efficacy of students, the higher the achievement motivation possessed by students to achieve high learning outcomes. Li et al. (2023) who stated that self-efficacy acts as a mediator in the relationship between self-identity and achievement motivation, where the stronger a person's self-efficacy, the higher their achievement motivation.

Direct Achievement Motivation on Physics Learning Outcomes

The analysis that has been carried out, by analyzing the t-count value then comparing it with the t-table value, then calculating the path coefficient value between variables, the researcher concluded that

achievement motivation (X2) has a direct effect on students' physics learning outcomes (X3). This shows that students with high physics learning outcomes have high achievement motivation scores. Likewise, students with low physics learning outcomes have low achievement motivation scores.

The average score of students' achievement motivation in the range of 114-140 scores was 230 students out of a total of 320 research samples, this shows that the achievement motivation of class X students of SMA Negeri in Bulukumba is in the high category. For the physics learning outcomes of students in the range of 15-19 scores, the frequency was 140 students out of 320 research samples, this shows that the physics learning outcomes of class X students of SMA Negeri in Bulukumba are also in the high category. The factors that cause high physics learning outcomes of students when viewed from their achievement motivation are because students need achievement, students with high achievement motivation will use all their abilities to achieve this goal, namely getting achievement. Some of the ways that students will do, for example, doing assignments on time, students will also prefer to do assignments rather than playing, then in doing their assignments, students will of course be more careful in doing their assignments and do not want to be the same as others. These things are what trigger an increase in student learning outcomes.

In the research of Mariska et al. (2013) argued that motivation is a drive within a person to try to make better behavioral changes in meeting needs. According to Lukita et al. (2021) motivation is closely related to the reasons why students do these activities. According to Fitriani et al. (2020) with high achievement motivation, students will be more easily motivated to learn on their own initiative without encouragement from others. This is also supported by research by Dewi et al. (2024) that achievement motivation directly affects physics learning outcomes and students who have high achievement motivation show better learning outcomes. From several opinions above, it can be concluded that motivating students can foster students' interest in learning, with the growth of students' interest in learning, learning objectives can be achieved easily. By providing motivation, it can also make it easier for teachers to deliver teaching materials because students' interest in learning is growing.

Indirect Effect of Self-Efficacy on Physics Learning Outcomes Through Achievement Motivation

The results of the analysis are interpreted that there is an indirect effect of self-efficacy (X1) on physics learning outcomes (Y = X3) through achievement motivation (X2). The percentage of the indirect effect of self-efficacy (X1) on physics learning outcomes (Y = X3) through achievement motivation (X2) is 0.47%. This finding proves that in addition to self-efficacy indicators that have a direct effect on physics learning outcomes, there is also an indirect effect of self-efficacy on physics learning outcomes through the achievement motivation pathway of 0.47%. In line with the research of Wulandari et al. (2024) that the variables of self-efficacy and achievement motivation, both separately and together, have a significant positive relationship with physics learning achievement. This shows that the higher a person's self-efficacy and achievement motivation, the higher the physics learning achievement that can be achieved. Further research conducted by Arafah et al. (2020) that self-efficacy does not have a direct relationship with physics learning but has a positive relationship with physics learning through achievement motivation.

The analysis that has been done so that the percentage of the influence of self-efficacy on learning outcomes is 3.80%, the influence of achievement motivation on learning outcomes is 4.41%, the influence of self-efficacy on achievement motivation is 1.32%, and the indirect influence of self-efficacy on learning outcomes through achievement motivation is 0.47%. From these data it can be concluded that the achievement motivation variable has a greater influence on the learning outcome variable. Achievement motivation as an intervening variable (bridge), this is proven from the analysis that has been carried out with the results that there is a direct or indirect influence between the achievement motivation variable and the learning outcome variable and has the greatest influence both directly and indirectly. Motivation or encouragement to pursue achievement is an important factor for students to achieve learning goals. Because with the motivation to achieve, students will feel comfortable in learning, feel happy about what is being learned, and have a high enthusiasm for learning. Motivation itself can come from within the student and can also be influenced by others.

Conclusion

Based on the results and discussion of the study entitled the influence of self-efficacy and achievement motivation on physics learning outcomes of class X students of SMA Negeri in Bulukumba, the researcher found that self-efficacy has a direct positive and significant effect on physics learning outcomes of class X students of SMA Negeri in Bulukumba. Self-efficacy has a direct positive and significant effect on achievement motivation of class X students of SMA Negeri in Bulukumba. Achievement motivation has a direct positive and significant effect on physics learning

outcomes of class X students of SMA Negeri in Bulukumba. Self-efficacy has an indirect positive and significant effect on physics learning outcomes through achievement motivation of class X students of SMA Negeri in Bulukumba. After obtaining a picture of physics learning outcomes, self-efficacy skills, and student achievement motivation, it is hoped that the school can make the best use of the results of this study. where the results showed that self-efficacy and achievement motivation had a positive and significant effect on students' physics learning outcomes. Where when self-efficacy and achievement motivation increase, students' physics learning outcomes also increase. This can be utilized by providing stimulation to students so that their self-efficacy and achievement motivation can be increased. For example, for self-efficacy, namely the provision of recognition and awards, such as certificates for certain achievements, for example for the best students in discipline. Then for achievement motivation, for example, students can be given reinforcement or strengthening and more appreciation so that student motivation can increase, along with the increase in students' physics learning outcomes.

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All authors have real contributions in completing this manuscript.

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Conflicts of Interest
The authors declare no conflict of interest.

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