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Results of Analysis of the Influence of Motivation and Interest in Learning on Physics Learning Achievement in Electromagnetic Wave Material among Students of the Physics Education Study Program

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ABSTRACT

Physics is a science that discusses natural phenomena and their interactions. This research aims to find out how the analytical results influence motivation and interest in learning on Physics Students' Learning Achievement in Physics on Electromagnetic Wave Material. This research uses quantitative data by distributing questionnaires to students of the Physics Education Study Program, Faculty of Teacher Training and Education, Jember University. The analysis technique that the researchers used was multiple linear regression analysis technique, the distribution of questionnaires was carried out from 30 May to 1 June 2023. In this research, a sample of 49 students was used. The results of the experiment using hypothesis testing are (1) It is proven that there is an influence on learning interest and motivation (initial ability) on physics learning achievement (2) It is proven that there is an influence of learning motivation on physics learning achievement (3) It is proven that there is an influence of interest study of physics learning achievement.

Key words: electromagnetic waves, interest, motivation, regression

INTRODUCTION

Technology and science (educational science) issomethingpart Which probably won't be able to inseparable in human life in the field of education. Technologydeveloped and created according to the industry to support human life activities. The rapid development of technology cannot be avoided and has an impact on the education sector. In the field of education today we always follow the development or path of technology to increase the quality of education, the most important thing now is adapting to the use of information technology. In this modern era, what has a very big influence on human life is information technology, because technology in education is very useful in the implementation of teaching and learning and it is very easy to get any information. Technology can now be created and can also be developed as a supporting tool in teaching and learning in schools. Learning science in physics, most of which are physics subjects, is learning that comes from abstract concepts which may be difficult for some students to understand these materials. Physics is a subject that may require a lot of understanding because physics uses a lot of symbols, equations and illustrative images [4].

Education is a process to educate human life in the field of education and produce a quality workforce in the future. With education, a person can gain knowledge and broaden his horizons. One of them is the science subject (Natural Education Science). Natural

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Science Education (IPA) is a process of discovering and managing natural knowledge in the form of concepts, facts and principles. Science is a science that discusses facts and/or natural phenomena and is empirical. Many problems are often encountered in science learning, including waves, sounds and vibrations which are abstract materials. Therefore, the lack of students' interest in this material causes a decrease in students' interest in learning, which is mainly caused by boredom and lack of active participation in learning [3].

Physics is a science that discusses natural phenomena and their interactions. The interaction of physics and its phenomena can be studied using a method by finding out a concept and also the information obtained is the result of findings and knowledge. The essence of physics is that physics becomes a product, physics is a process, and/also physics becomes an attitude. The products produced by physics are in the form of discoveries that include facts, laws, rules and physical principles. Physics products will later be obtained during a process called a scientific process. Skills in a scientific method known in physics include observation, definition, measurement, asking or raising questions, designing hypotheses, planning research, and interpreting data. Physics can be explained as an attitude in which thoughts and ideas are organized to explain natural phenomena. This attitude will form the basis for developing scientific process skills [13].

Many students have difficulty understanding physics subject matter, one of which is waves. Wave material is physics subject matter which may be very important to understand and master in Class XI high school. However, in reality, up to 28.89% of students think that wave material, especially stationary or moving wave material, is very difficult to learn. Waves are abstract matter. Therefore, we need a way to make it easier for educators to convey wave material in a simple and clear way that is directly related to everyday life. So that students will easily understand the concept of wave material. Therefore, the character of educators is much needed to express this wave material. In the teaching and learning process, educators function as providers whose role is to guide and inspire or motivate students so that students can actively work in a direct way so that they can build and determine their own understanding to solve the problem being studied [11].

Study a learners influenced by a number of factor like motivation, interest, And intelligence. Motivation And interest Study is factor Whichhaveinfluence positive to process learning And results Study student. Motivation is process push student For reach What Which want to achieved. If student motivated For learn something, they will enthusiastic For learn lesson That Also. Even If they No understand it, they can develop behavior Which Good like not quite enough answer, Spirit, And abstinence give up. Motivation Study is a change Whichexperiencedon self student Which reflectedbyhow much big attention And Power responsive student to learning[10]. Students are said to have an interest in something if the student feels enthusiastic or attentive, interested and happy about that something. There are several indicators of interest in learning, namely feeling enthusiastic and happy or liking it, being aware of learning without being asked by anyone, having a sense of self-interest, paying attention and playing an important role in learning activities [1].

StudyWhat you do has a purposeFor know How motivation And interest Study physics influence success learning physics student on materialwaveelectromagnetic. We survey student Program Education Physics Faculty Teachers University Jember with share link Questionnaire. Results study This intended For inform reader design we.

RESEARCH METHODS

The type of data used in this research is

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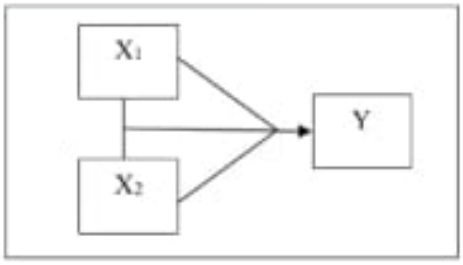
quantitative data. Quantitative data is qualitative data that is quantified, or also quantitative data is data in the form of numbers. data obtained from the results of a questionnaire given to students of the Physics Education Study Program, Faculty of Teacher Training and Education, Jember University. The respondents used in the research were students from the Physics Education study program. The questionnaire in this research serves to determine the results of the analysis of the influence of motivation and interest in learning on physics learning achievement in electromagnetic wave material among physics education study program students.

A questionnaire is a technique used in collecting data in which respondents are given several questions to answer. There are two types of questions in the questionnaire, namely open type and closed type. The open type is a questionnaire whose contents are questions in the form of descriptions, so respondents need to write their answers on the questionnaire. Meanwhile, the closed type is the opposite of the open type, where in this closed type the respondent is instructed to choose one answer from the available questions, so there are several answer choices and the respondent only chooses the answer he thinks is correct. In this study, the questionnaire used was a closed questionnaire, respondents were given a choice of answers to several questions. The questionnaire contains how interested physics education students are in learning wave material and there are also several questions regarding initial knowledge of wave material.

In this research, the analysis technique that the researcher used was multiple linear regression analysis technique, the distribution of questionnaires was carried out from 30 May to 1 June 2023. In this research, a sample of 49 students was used. There is a relationship between the three variables, the following is an illustration of the relationship graph:



Information:

X_1 = Learning Motivation

X_2 = Interest in Learning

Y= Physics Learning Achievement

Based on the graph above, it can be seen that there are three types of data in the research carried out. These three data are based on research variables. In this study there are three research variables.X_1(Learning Motivation) andX_2(Interest in Learning) is the independent variable, while Y (Physics Learning Achievement) is the dependent variable. Before the questionnaire became a data collection tool. So first the researcher carries out an analysis of the instrument, the instrument trial consists of a validation test and a reliability test in order to find out the reality of the instrument obtained being used as a research instrument.

RESULTS AND DISCUSSION

The Influence That Occurs on Learning Interest and Motivation on Physics Learning Achievement of Physics Education Study Program Students

Based on the results of data that has been analyzed using multiple linear regression, the correlation coefficient (R) is obtained. Testing this data uses the SPSS program, where the correlation coefficient (R) value is 0.931 and the determination coefficient (R Square) value is 0.866%, from the values of these two coefficients the results are significant. This can be interpreted as meaning that there is an influence between motivation to learn physics

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(X_1) with interest in studying physics (X2) simultaneously with physics learning achievement (Y). In this study, using the equation Y = a + b1X1 + b2X2, we get Y = 2.857 + 6.2339 X1 + 5.376 X2. The resulting values are constant = 2.857, which shows that motivation and interest in learning have low values. This low score is because it is difficult for physics education students to achieve good physics learning achievements. However, the reflection coefficient values of 6.239 and 5.376 indicate a positive influence from the independent variables X1 (motivation to learn physics) and X2 (interest in learning physics) simultaneously on the dependent variable Y (achievement in learning physics). This regression coefficient value shows that with every increase in the value of learning motivation there will also be an increase in physics learning achievement with a value of 6.239 and when there is an increase in the value of interest in learning physics to the value of learning achievement in physics there will also be an increase with a value of 5.376.

After carrying out a regression test using SPSS, it was found that the regression line was linear. Based on testing the regression coefficient, the coefficient obtained is significant. So it can be interpreted that there is a relationship between the independent variable X_1(motivation to learn physics) with X2 (interest in learning physics) to the dependent variable Y (physics learning achievement). Theoretically or conceptually, the meaning of motivation is the behavioral activity or ability possessed by a student to seek knowledge or activities that he does not yet know. Meanwhile, theoretically, interest in learning is an impulse in a student or a factor that creates interest or attention effectively which can give rise to the nature of happiness, satisfaction and pride in a student. And the meaning of physics learning achievement is the student's ability to organize themselves to be able to master physics material in understanding and explaining the theory and then using it as a simple application example to prove the theory in question. Next, you can solve problem cases using predetermined formulas. After studying and studying physics, notes will be made at the end of each semester in a report book which is usually called a report card. The physics education study program students' physics learning motivation score regarding electromagnetic wave material is higher than before, which will be followed by physics learning achievement scores directed by physics education students. If the value of interest in studying physics is high, you will get the maximum score and ultimately the physics education students will get better results in learning physics than before. Based on the explanation above, it can be interpreted that the higher or higher the motivation value for studying physics is balanced with the interest in studying physics, the higher the achievement value for studying physics will also be in terms of achievement in knowledge, skills and attitudes. According to the review above, after conducting the research, it was concluded that there was a relationship between motivation and interest in studying physics simultaneously and physics learning achievement by physics education students.

Comparison of the Impact of Learning Motivation on Physics Learning Achievement of Physics Education Study Program Students

Based on the hypothesis data testing experiment, the experimental results were obtained where the valuetcount = 10.168 and Sig = 0.000, seen from the Sig value < 0.05, it can be interpreted that H0 is rejected. So the perception from the statement above can be said that there is a significant influence on the independent variable, namely learning motivation (X1) with the dependent variable, namely physics learning achievement (Y). Theoretically or conceptually, the meaning of motivation is the behavioral activity or ability possessed by a student to seek knowledge or activities that he does not yet know. Meanwhile, the meaning of physics learning achievement is the student's ability to organize themselves to be

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able to master physics material in understanding and explaining the theory and then using it as a simple application example to prove the theory in question. Next, you can solve problem cases using predetermined formulas. In a learning process activity, a teacher records, gives grades and evaluates the daily activities of his students and then makes them into a report book called a report card. In the learning process activities, the role of learning motivation is a superior point. Learning motivation is the process of honing students' abilities to obtain higher learning outcomes in material that they have not yet received or studied. So, it can be said that a student who has the ability to understand good initial concepts will understand the material more quickly compared to students who do not have the ability to understand initial concepts in the learning process. So, the results obtained in the hypothesis data testing experiment based on quantitative data and theories that have been explored by researchers can be concluded that there is an impact of learning motivation (initial ability) on physics learning achievement.

Comparison of the Impact of Learning Interest and Physics Learning Achievement of Physics Education Study Program Students

Based on the hypothesis data testing experiment, the experimental results were obtained where the valuetcount = 8.546 and Sig = 0.000, seen from the Sig value < 0.05, it can be interpreted that H0 is rejected. So the perception from the statement above can be said that there is a significant influence on the independent variable, namely interest in learning (X2) with the dependent variable, namely physics learning achievement (Y). Theoretically or conceptually, the meaning of interest in learning is an impulse in a student or a factor that creates interest or attention effectively which can give rise to the nature of happiness, satisfaction and pride in a student. Meanwhile, the meaning of physics learning achievement is the student's ability to organize themselves to be able to master physics material in understanding and explaining the theory and then using it as a simple application example to prove the theory in question. Next, you can solve problem cases using predetermined formulas. In a learning process activity, a teacher records, gives grades and evaluates the daily activities of his students and then makes them into a report book called a report card. Interest in learning is a series of activities of a student to obtain a change in behavior, attitude and understanding with the desire to learn seriously in order to achieve the exploration of new learning concepts according to what is desired. So interest in learning can be categorized as an attitude that can influence student learning outcomes. If a student does not have an interest in learning something, it cannot be expected that the student will be successful in studying the material explained in a learning activity. In learning and learning activities, a student at school studies various kinds of knowledge and has obligations where students are expected to get good and satisfactory grades of course by paying attention to the achievement of their learning outcomes, the main thing being to examine the learning interests that they have experienced from previous semester to semester. next. So, the results obtained in the hypothesis data testing experiment based on quantitative data and theories that have been explored by researchers can be concluded that there is an impact of interest in learning on physics learning achievement.

Equations

$$\mathbf{Y = a + b1X1 + b2X2} \qquad (1)$$

Where Y is the dependent variable (predicted value), a is a constant (predicted value when the independent variable has no influence), b1=b2 is the regression coefficient (value of increase/decrease), X1=X2 is the independent variable

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Image Presentation

Table Presentation

Table 1. Coefficient of Determination Results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,931[a]	,866	,860	7,80352

a. Predictors: (Constant), Minat Belajar, Motivasi Belajar
b. Dependen Variable: Prestasi Belajar Fisika

Table 2. Results of the Significance of the Relationship between Learning Motivation and Interest in Learning on Physical Learning Achievementa

Figure 1. Graph of interest in learning physics about Electromagnetic Waves

Figure 2. Motivational graph for learning physics about Electromagnetic Waves

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ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18104,955	2	9052,478	148,657	,000[b]
	Residual	2801,167	46	60,895		
	Total	20906,122	48			

a. Dependent Variable: Prestasi Belajar Fisika
b. Predictors: (Constant), Minat Belajar, Motivasi Belajar

Table 3. ResultsSignificance Test for Multiple Linear Regression Coefficients

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2,857	5,039		,567	,573
	Motivasi Belajar	6,239	,614	,601	10,168	,000
	Minat Belajar	5,376	,629	,505	8,546	,000

a. Dependent Variable: Prestasi Belajar Fisika

CONCLUSION

According to the results of the discussion above, research has been carried out using the SPSS program, this research has succeeded in answering all the hypotheses desired by the researcher. What can be concluded is that first there is a relationship between motivation and interest in learning simultaneously on physics learning achievement. This can be seen from the value of the multiple linear regression coefficient with a value of 0.931 and a contribution with a value of 0.866% to the physics learning achievement of electromagnetic waves in physics education students. This relationship can be said to be significant because the sign value obtained is 0.000. Where this value is smaller than 0.05, which means there is a significant influence between the three variables, secondly there is a relationship between learning motivation and physics learning achievement. This relationship can be said to be significant because the sign value obtained is 0.000. Where this value is smaller than 0.05, which means there is a significant influence between the two variables, so it can be interpreted that if the location of students' learning motivation is more precise, good and superior, it can make students' learning achievements better too. Then thirdly, there is a relationship between interest in learning and physics learning achievement. This relationship can be said to be significant because the sign value obtained is 0.000. Where this value is smaller than 0.05, which means that there is a significant influence between the two variables, so it can be interpreted that if the location of students' learning interests is more precise, good and superior, it can make students' physics learning achievements better and more developed.

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