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The correlation between self-regulated learning and student learning outcomes in the ecosystem sub-concept

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ABSTRACT

The purpose of this study was to determine the relationship between self-regulated learning and student learning outcomes in the ecosystem sub-concept in class XI MIPA in the 2020/2021 school year. This research was conducted from August 2020 to September 2020 at one of the SMAN in Tasikmalaya City. The research method used is correlational with a population of all students in class XI MIPA with a total of 261 people. samples taken using simple random sampling technique, so this study took a sample of 7 people from each XI MIPA class with a total of 8 classes. The instruments used in this study consisted of 2 instruments, namely the Motivated Strategies for Learning Questionnaire (MSLQ) questionnaire instrument in the self-regulated learning section adopted from previous research and test instruments in the form of multiple choice questions on ecosystem sub-concept material totaling 36 items. The data analysis technique used is bivariate person correlation test with significance level (α) = 5%. Based on the results of the study, it can be concluded that there is a relationship between self-regulated learning and student learning outcomes on ecosystem sub-concept material ($R = 0.502$). The contribution of self-regulated learning to learning outcomes is 25.2%.

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Introduction

Education is a program established by the government to educate and advance the nation. Through education, it is expected to produce qualified human beings who are able to face global competition. This is very important considering that students are part of the younger generation who will one day face global challenges. One of the educational processes is learning carried out at school. Where school is a form of interaction between students, educators and learning resources in a learning environment, including in learning in biology subjects. Biology subjects have their own characteristics from other subjects. Biology is known as the subject that learns

the most material and concepts and little calculation compared to other science subjects at the secondary school level. So that students assume that biology does more memorization.

The purpose of the learning process is the expected result of learning itself. In addition, the development of students can basically be seen from the learning outcomes obtained. The learning outcomes obtained by students can be known by evaluating teaching and learning activities, one of which is through the assessment of learning outcomes. Learning outcomes are the various abilities that students have after going through the learning process where the assessment of student learning outcomes is something that is very important in teaching and learning activities ¹. With learning outcomes, it can be seen how much success students have in understanding the material that has been taught by educators. There are several factors that can affect the achievement of student learning outcomes. One of them is internal factors in the form of psychological, health, and fatigue. Psychological factors greatly affect the learning process. One of the psychological factors needed in learning is the ability to regulate oneself when learning, known as self-regulated learning.

Self-regulated learning skills are needed by students to organize and give direction to themselves, adjust and control themselves in dealing with learning tasks, divide time between learning and playing, prepare themselves for test ². Self regulated learning consists of two aspects, namely cognitive strategy use and self regulation. In general, these two aspects discuss a person's ability to regulate himself in dealing with learning activities. Self-regulated learning is influenced by things that come from within the individual (knowledge, motivation, willingness, and behavior) and from outside the individual such as the environment. Both factors are interrelated with each other. Someone who has self-regulated learning feels that they are competent or capable, have self-confidence, and have self-reliance.

Self regulated learning is very important for someone, especially for students. Learners with high self regulated learning will have more opportunities to achieve the expected learning outcomes. self regulated learning can contribute to learning achievement ³ and increase students' achievement motivation ⁴. In addition, self-regulated learning also affects one's independence in dealing with the learning process ⁵. In learning, students who have self-regulated learning can be seen from the learning process that takes place, from the behavior shown in contrast to students who do not have self-regulated learning. Learners who have self-regulated learning in learning activities are more prepared in advance to contribute to learning material before it is given by educators. So, when the educator delivers the material, learners who have self-regulated learning are ready to receive the lesson material. While learning is the main task of a learner, not all learners have good self-regulated learning management skills and high self-confidence in carrying out learning activities.

Method

This research method is correlational research using a quantitative approach. Correlational research is research that intends to detect the extent to which variations in another fact are based on efficient correlation ⁶. This form of research is included in non-experimental research (correlational design) which uses statistical correlation to describe and measure the degree or relationship (relationship) between two or more variables or series of scores ⁷.

Correlational research is a study to determine the relationship or level of relationship between two or more variables without any attempt to influence these variables so that there is no manipulation of variables ⁸. Thus it can be said that correlation research is a type of research to determine the relationship and level of relationship between two or more variables. In this study, researchers wanted to determine the relationship between self-regulated learning and student learning outcomes in the ecosystem sub-concept of a correlation study in class XI MIPA in one of the State Senior High Schools in Tasikmalaya City in the 2020/2021 school year. Sampling was selected using simple random sampling from 8 classes XI of one of the State

Senior High Schools in Tasikmalaya City in the 2020/2021 school year with each class totaling 7 students. There are 2 types of data collection techniques used in this study, namely tests and nontests. Non-test data collection techniques in the form of a Motivated Strategies For Learning Questionnaire (MSLQ) questionnaire totaling 36 questions with a Likert scale of 1 to 4. While the data collection technique to measure learning outcomes in the form of a multiple choice test on ecosystem material totaling 36 questions.

A. Prerequisite Test

The prerequisite tests of the analysis used include:

1) Normality Test using Kolmogorov-smirnov Test

The normality test is a test carried out as a prerequisite for conducting data analysis. The data normality test aims to determine whether the data from each research variable has a linear relationship or not significantly. The linearity test is carried out as the basis of correlation analysis in the form of a linear pattern or model. Data is said to be normal, if the significant value is greater than 0.05 at ($P > 0.05$). Conversely, if the significant value is less than 0.05 at ($P < 0.05$) then the data is said to be abnormal. The analysis was carried out using the linear test assisted through the SPSS version 23 for windows software application with a significance level of 5%.

2) Linearity Test

The linearity test aims to test whether there is a relationship between two variables that are linear. The linearity test is used to determine whether the independent variable (X) and the dependent variable (Y) have a linear relationship or not significantly. The linearity test is carried out as the basis of correlation analysis in the form of a linear pattern or model. Two or more variables are said to have a linear relationship if the significance (linearity) is greater than 0.05. The analysis was carried out using a linear test assisted by using the SPSS version 23 for windows software application with a significance level of 5%.

B. Hypothesis Test

If the results of the statistical analysis prerequisite test state that the data is normally distributed, then proceed with hypothesis testing. In this study using associative hypothesis (correlation). associative hypothesis is a statement that shows conjecture about the relationship between two or more variables ⁶. The analysis used uses simple correlation analysis (Bivariate Correlation) with Product Moment. This Product Moment correlation test is to see whether there is a relationship between variable "X", namely self-regulated learning and variable "Y", namely student learning outcomes on ecosystem sub-concept material. To determine the correlation of the two variables, the authors used the SPSS version 23 for windows program.

The product moment correlation is denoted by (r) provided that the value of r is more than ($-1 < r < 1$). If $r = -1$ means the correlation is perfectly negative, $r = 0$ means there is no correlation and $r = 1$ means the correlation is very strong ¹⁰. As for the interpretation of the correlation coefficient, it can be seen in Table 1 ¹¹.

Table 1. Correlation Coefficient Interpretation Guidelines

Coefficient Interval	Relationship Level
0,00 – 0,199	Very low
0,20 – 0,399	Low
0,40 – 0,599	Medium
0,60 – 0,799	Strong
0,80 – 1,000	Very strong

Results and Discussion

This study aims to determine the relationship between self-regulated learning and student learning outcomes on ecosystem sub-concept material. The prerequisite test of analysis is carried out to determine whether the data on the score of self-regulated learning and learning outcomes are normally distributed or not and the data obtained is linear or not. Then the Kolmogorov-Smirnov test is used with the SPSS 23 for windows application.

A. Prerequisite Test

The following is an explanation of the two prerequisite tests obtained.

1) Normality Test

To determine the normality of the data in this study, the Kolmogorov-Smirnov test was used in the SPSS 23 for windows application, with a significance level of 5% or 0.05. The hypothesis in this study is:

H₀: the sample has been drawn from a normally distributed population.

H_a: the sample has been drawn from an abnormally distributed population.

The hypothesis testing rules used are: Reject H₀ if the p value ≤ 0.05 . The results of the Kolmogorov-Smirnov normality test analysis using SPSS 23 for windows can be seen in table 2 below.

Table 2. SLR Normality Test Results		
One-Sample Kolmogorov-Smirnov Test		
		Self Regulated Learning
N		56
Normal Parameters ^{a,b}	Mean	105,5357
	Std. Deviation	7,08639
Most Extreme Differences	Absolute	,098
	Positive	,098
	Negative	-,077
Test Statistic		,098
Asymp. Sig. (2-tailed)		,200 ^{c,d}

Based on the analysis of the normality test of Self Regulated Learning table 2, that the probability value (p value) on Asymptotic Significance 2 tailed is 0.200 for Self Regulated Learning. The hypothesis test obtained is the p value > 0.05. The conclusion of the analysis is to accept H₀, meaning that the students' Self Regulated Learning data has been taken from a normally distributed population. Meanwhile, the results of the normality test for learning outcomes can be seen in table 3 below.

Table 3. SLR Normality Test Results		
One-Sample Kolmogorov-Smirnov Test		
		learning outcomes
N		56
Normal Parameters ^{a,b}	Mean	28,3571
	Std. Deviation	2,81185
Most Extreme Differences	Absolute	,094
	Positive	,094
	Negative	-,094
Test Statistic		,094
Asymp. Sig. (2-tailed)		,200 ^{c,d}

One-Sample Kolmogorov-Smirnov Test		
		learning outcomes
Most Extreme	Positive	,080
Differences	Negative	-,094
Test Statistic		,094
Asymp. Sig. (2-tailed)		,200 ^{c,d}

Based on the analysis in table 3, it can be seen that the probability value (p value) in the Asymptotic Significance 2 tailed column is 0.200 for learning outcomes. The hypothesis test obtained is the p value > 0.05. The conclusion of the analysis is to accept H₀, meaning that the data on student learning outcomes have been taken from a normally distributed population.

2) Linearity Test

To determine whether the data is linear or not, a linear test is used using the SPSS 23 for Windows application, with a significance level of 5% or 0.05. The hypothesis used is:

H₀: both data are linear

H_a: both data are not linear

Reject H₀ if sig. ≤ 0,05

The results of the linearity test analysis using SPSS 23 for windows can be seen in table 4 below.

Table 4. Linearity Test				
ANOVA Table				
	Sum of Squares	Df	Mean Square	Sig.
Combined	238,107	26	9,158	,216
Linearity	109,639	1	109,639	,000
Deviation from Linearity	128,468	25	5,139	,758
Within Groups	196,750	29	6,784	
Total	434,857	55		

Based on table 4, it can be seen that the significance value of linearity is 0.758. The hypothesis test obtained sig > 0.05. The conclusion of the analysis is to accept H₀, meaning that both data are linear. From the linearity test, a linear equation $\hat{Y} = a + bx$ is also obtained which is found in table 5 below:

Table 5. Linear Equation					
Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	7,330	4,939		1,484	,144
SLR	,199	,047	,502	4,267	,000

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		

^aDependent Variable: Learning Outcomes

Based on table 5, it can be seen that the linear equation in simple correlation, the regression equation used is $\hat{Y} = a + bx$. From the table, the Constant value (a) is 7.330 while the value of self-regulated learning (b/ regression coefficient) is 0.199. So that the simple linear regression equation obtained is $\hat{Y} = 7.330 + 0.199x$.

B. Hypothesis Test

Untuk mengetahui ada tidaknya hubungan antara *self regulated learning* dan hasil belajar peserta didik pada materi sub konsep ekosistem, maka harus dilakukan uji hipotesis yaitu dengan uji korelasi product moment menggunakan SPSS for windows, dengan taraf signifikansi yaitu 5% atau 0,05. Hipotesis yang digunakan adalah:

H₀ : There is no relationship between self-regulated learning and students' learning outcomes on ecosystem sub-concept material in class XI MIPA SMA Negeri 1 Tasikmalaya.

H_a : There is a relationship between self-regulated learning and students' learning outcomes in the ecosystem sub-concept material in class XI MIPA one of the State High Schools in Tasikmalaya City.

The hypothesis testing rules used are:

Reject H₀ if sig. $\leq$ 0,05. The results of the correlation test analysis using SPSS 23 for windows can be seen in table 6 below:

Table 6. Correlation Model Summary

Correlations			
		SLR	Learning Outcomes
SLR	Pearson Correlation	1	,502**
	Sig. (2-tailed)		,000
	N	56	56
Hasil Belajar	Pearson Correlation	,502**	1
	Sig. (2-tailed)	,000	
	N	56	56

** . Correlation is significant at the 0.01 level (2-tailed).

Based on table 6, the significance value obtained is 0.000. The hypothesis test obtained is the sig value. $\leq$ 0.05, which means rejecting H₀. The conclusion of the analysis is that there is a relationship between self-regulated learning and student learning outcomes on ecosystem sub-concept material in class XI MIPA one of the State High Schools in Tasikmalaya City. In addition, the table explains the magnitude of the correlation or relationship value (R) correlation coefficient of 0.502. Which means strong enough. The coefficient of determination can be seen in table 7 below:

Table 7. Regression Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,502 ^a	,252	,238	2,45409

^aPredictors: (Constant), SLR

From table 7, the coefficient of determination is 0.252 which means that the relative contribution of self-regulated learning to student learning outcomes is 25.20%. There are two ways of making decisions in the simple correlation test, namely based on the significance value and based on the t value. Decision making based on the significance value has been presented in table 6, while decision making based on the t value can be seen in table 8 below:

Table 8. Decision Making Based on t Value

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std. Error	Beta		
Constant	7,330	4,939		1,484	,144
SLR	,199	,047	,502	4,267	,000

Decision making based on the t value has a hypothesis testing rule, namely reject H₀ if $t_{count} > t_{table}$. Based on table 8, the t_{count} is 4.267. To find the t table, you can use the formula:

$$\begin{aligned}
 t_{table} &= t(\alpha, dk) \\
 &= (0,05; 56-2) \\
 &= (0,05; 54) \\
 &= 2,016
 \end{aligned}$$

Based on the results of these calculations, a t table of 2.016 was obtained. The t_{count} value of 3.698 > t_{table} of 2.016. The conclusion of the analysis obtained is to reject H₀, meaning that there is a relationship between self-regulated learning and student learning outcomes in the ecosystem sub-concept material of class XI MIPA one of the State High Schools in Tasikmalaya City.

Based on the results of the correlation analysis, a significance value of 0.502 was obtained, which means that there is a relationship between self-regulated learning and biology learning outcomes on ecosystem sub-concept material. This R value is used to determine the strength of the relationship between self-regulated learning and biology learning outcomes on ecosystem sub-concept material which has a strength of relationship at a fairly strong level.

Based on the regression test results, the regression line equation is $\hat{Y} = 7.330 + 0.199x$. The constant of 7.330 means that the consistent value of the learning outcome variable is 7.330. While the regression coefficient x of 0.199 states that every 1% increase in the score of self-regulated learning, the score of learning outcomes increases by 0.199. The regression coefficient is positive, so there is a positive relationship between the X variable and the Y variable. If the regression coefficient price is positive, the Y variable will increase or increase, otherwise if the regression coefficient is negative, the Y variable will decrease¹².

In addition, the amount of relative contribution given by self-regulated learning to student learning outcomes is 25.2%. This shows that not all students' learning outcomes are influenced

by self-regulated learning, but there are other factors that influence the learning outcomes obtained by students. There are many types of factors that affect learning outcomes, but they can be classified into two, namely internal factors and external factors.¹³ Internal factors are factors that come from within the individual itself, while external factors are factors that come from outside. Internal factors include psychological factors such as intelligence, attitudes, interests, talents, motivation and physiological factors from within the individual itself¹⁴. In this study, self-regulated learning is one of the psychological factors that come from within learners. It can be seen from the attitude, interest, and motivation of students in participating in learning activities and how they regulate themselves to understand and receive learning well. So, self-regulated learning is one of the internal factors from within the individual itself that can support the success of students' learning.

The relationship between self-regulated learning and students' learning outcomes on ecosystem sub-concept material lies in the cognitive aspects of students in carrying out learning. Self-regulation strategy in learning (self regulated learning) is a cognitive learning approach strategy¹⁵. Where students have the willingness and desire to explore their abilities to achieve learning achievements from cognitive aspects. High or low self-regulated learning of students in this study, affects the learning outcomes obtained. So, it is possible that students who have high self-regulated learning will get good learning results, and vice versa, students who have little self-regulated learning get low learning results. Learners who have good self-regulated learning abilities are called self-regulated learners, self-regulated learners have good organizational strategies in receiving learning materials such as controlling their own learning behavior, managing their time and learning environment, and having good emotional management in dealing with failure¹⁶.

Educators have a major role in improving student learning outcomes, by improving self-regulated learning in students themselves. Self-regulated learning can be taught, learned and controlled.¹⁷ That way, to improve the learning outcomes of students, there needs to be a teacher's role in it. In line with that, the perspective of self-regulated learning in learning and student achievement is not only special, but also has implications for how educators should interact with students, and how educators should organize students in the classroom¹⁸. Thus, educators must provide efforts to improve self-regulated learning in students so that they can follow and carry out learning well which will later affect the learning outcomes obtained. Motivation in learning is one form of effort that can provide enthusiasm and confidence to learners to foster self-regulated learning. Establishing a good communication relationship between educators and students is one of the steps that can be taken to provide this motivation. There is a positive relationship between the interpersonal communication of educators and students towards self-regulated learning¹⁹. So, when the better communication carried out by educators to students can increase motivation to students, and when students have high motivation in learning, it means that they have fostered self-regulated learning in themselves. That way, students who have good self-regulated learning will achieve the desired learning outcomes.

Apart from an educator, there needs to be an effort by the students themselves to improve their learning outcomes, namely by increasing self-regulated learning. There are things that need to be applied by students, namely by planning the time and effort to be made, recording what you want to achieve in learning and what has not been achieved, monitoring the efforts that have been made with what has been achieved to see results, scheduling study time each day, organizing the material to be studied with the next day's study schedule, increasing effort in learning if you encounter difficulties and failures. That way, students can improve the learning outcomes they get and can recall past learning material to be applied in the future.

Conclusion

Based on the results of research and data processing, it is concluded that there is a relationship between self-regulated learning and student learning outcomes with a correlation coefficient of 0.502 which is classified as quite strong and with a large contribution given by self-regulated learning of 25.2% which means that not all student learning outcomes are influenced by self-regulated learning, but there are other factors that influence the learning outcomes obtained by students.

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