



Students' interest and cognitive learning outcomes: Biology education in high schools during COVID-19

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ABSTRACT

The aim of this study to determine the interest in studying biology and the effect of interest in studying biology on the learning outcomes of cognitive biology during the Covid-19 pandemic. Based on several previous studies, it is known that online learning during the Covid-19 pandemic greatly influenced students' interest in learning biology. However, it is not yet known the level of interest in learning itself due to the effect of online learning, and it is not yet known the magnitude of the influence of interest in learning biology during online learning during the Covid-19 pandemic. This research was conducted in 2nd-grade science in Senior High School No. 13 Semarang using a survey method with correlational analysis. The data collection techniques in this study were questionnaires and documentation which were analyzed by testing the hypothesis using the correlation test and regression test. The results showed that the percentage of students' interest in learning biology online during the Covid-19 pandemic was 68.16%. The results of the correlation test show that there is a relationship between interest in learning biology with the cognitive biology learning outcomes of students. The results of the regression test and the value of R squared indicated that students' interest in learning biology affects learning outcomes of cognitive biology. The percentage of the influence of students' interest in learning biology on the cognitive biology learning outcomes is 34%. The interest in learning biology of students when learning biology online during the Covid-19 pandemic is still low. The interest in learning biology when learning biology online during the Covid-19 pandemic effect the cognitive biology learning outcomes of students.

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INTRODUCTION

Human Resources (HR) are individuals who are productive in working as a driving force for an organization that has a function as an asset so that its quality must be improved and developed. Muhardi (2004) states that improving the quality of HR can be achieved through an emphasis on quality education. The Minister of Education and Culture (Mendikbud) also stated that the quality of HR is determined by the quality of education. Some of these statements concluded that the best way to pay special attention to improving the quality of HR in Indonesia is to improve the quality of Indonesian education.

Education in the National Education System Law Number 20 of 2003 article 1 paragraph 1 explains that education is a process in which a learning activity occurs by individuals to find out, develop abilities, attitudes and other forms of behavior to adapt to the environment in which they are life. Whereas quality education is education which in the teaching and learning process can take place effectively and students experience a meaningful learning process. Education is also called quality if students show a level of mastery over what is being taught in accordance with the goals and objectives of education (Sudjana, 2010).

However, in fact, the quality of education in Indonesia is still in the low category. The quality of Indonesia's education is only ranked 64th out of 120 countries (UNESCO Education For All Global Monitoring Report, 2012). As for the Education for All Development Index (2015), Indonesia is only ranked 57th out of 115 countries. The low quality of education in Indonesia is also evidenced by its scientific achievements. The results of the Program for International Student Assessment (2015) state that Indonesia received a score of 396 in the science category so that Indonesia only ranks 80 out of 88 countries. While the results of the biological domain in Trends in International Mathematics and Science Study (TIMSS, 2015), students only have a 46% percentage of truth so that Indonesia only ranks 46th out of 51 countries. In addition, the low quality of education in Indonesia can also be seen from the learning outcomes of students which are shown by the average results of the Computer-Based National Examination (UNBK) which are still below standard. The average UNBK 2019 result in the Biology subject is one of the lowest with an average score of 50.61 (Puspendik, 2019).

The low average UNBK biology result which is a form of cognitive biology learning outcomes is influenced by several factors. These factors are internal factors which are all factors originating from the students themselves and external factors which are factors originating from outside the students. Internal factors include: (1) physiological factors, such as experiencing illness, disability or incomplete development. Then (2) psychological factors, such as intelligence, achievement motivation, interest in learning, perceptions, attitudes, talents, study habits. While external factors such as environment, curriculum, teaching materials, management administration, educators, facilities and facilities (Slameto, 2018).

Syarifuddin (2011) states that interest in learning biology is one of the internal factors that most influences the cognitive biology learning outcomes of students. This interest in learning biology is an inner impulse that grows from a student to study biology. Interest in studying biology is the desire that arises from students to study biology so that when studying biology, students will pay attention, be active and always try to understand the biology material they have been studying (Febriyanti, 2014). Interest in studying biology is very important in the learning process of biology because without interest in learning biology, biology learning cannot be well received by students. (Usman, 2003) adds that interest in learning biology is very important because it is the main factor that determines the degree of activity of students in learning biology.

However, Indonesia's conditions during the Corona Virus Disease (Covid-19) pandemic caused changes in learning activities. Through the Circular of the Minister of Education and Culture of the Republic of Indonesia No. 3 of 2020 concerning the prevention of Covid-19 requires students to carry out learning activities online. This online learning affects learning interest, including students' interest in learning biology. Several studies such as Yunitasari & Umi (2020) and Rini (2020) also revealed that online learning during the Covid-19 pandemic greatly influenced students' interest in learning biology. The effect of online learning on students' interest in learning biology is experienced by students in all regions of Indonesia, including in the city of Semarang. Suluh Media Online (SMOL) Semarang in October 2020 revealed that many students in Semarang complained about the application of an online learning system during the Covid-19 pandemic so that it greatly affected students' interest in learning, including

students' interest in learning biology. It is known that online learning during the Covid-19 pandemic affected students' interest in learning biology. However, the level of interest in learning itself is not yet known due to the effect of online learning during the Covid-19 pandemic.

Based on the description above, the researchers are interested in conducting further analysis related to interest in learning biology and its effect on cognitive learning outcomes of 2nd grade science in Senior High School No. 13 Semarang students during the Covid-19 pandemic. This study aims to determine the interest in studying biology during the Covid-19 pandemic. In addition, this study also aims to determine the effect of interest in studying biology on cognitive biology learning outcomes during the Covid-19 pandemic. In theory, interest in studying biology certainly affects the cognitive learning outcomes of biology, but the authors want to know how much the percentage of interest in learning biology affects the cognitive learning outcomes of students..

METHODS

Research Design

The research method used in this research is survey method with quantitative descriptive analysis approach, correlation and regression test. This quantitative descriptive analysis describes the state of the research subject based on existing facts (Rakhmat, 2017). Correlation test is used to examine the relationship between students' interest in learning (X) and the variable learning outcomes of students' cognitive (Y). While regression test is to examine the effect of the students' interest in learning (X) to the dependent variable, namely the cognitive learning outcomes of students (Y).

Population and Samples

The population of this study was all students 2nd grade science in Senior High School No. 13 Semarang, Indonesia in 2020-2021 academic year that consisted of 134 students. While the samples in this study were 72 students who were obtained using simple random sampling technique.

Instrument

The instruments used in this study were questionnaire sheets and documentation. The questionnaire in this study was used to obtain data related to students' interest in learning biology. The questionnaire used is in the form of an online questionnaire in the form of a google form. The questionnaire contains 31 statements addressed to 72 students. The questionnaire in this study has 4 indicators, namely formulating feelings of pleasure, interest, attention and involvement. The weighting of the Likert scale values used is Strongly Agree (SS) = 4, Agree (S) = 3, Disagree (KS) = 2, and Disagree (TS) = 1. Data on the level of student learning interest are obtained using the Likert scale. The data is in quantitative form with a score range of 1-4. The questionnaire was validated by an expert lecturer before being distributed to the students.

Furthermore, namely documentation, Sugiyono (2017) states that documentation is a method used to obtain data and information by viewing or analyzing documents that can support research. Documentation is used to collect data on students' cognitive biology learning outcomes, then the data is analyzed.

Procedure

This research begins by identifying the problem, then determining the population and sample. After that, it was followed by making a research instrument in the form of an online questionnaire. Online questionnaires in the form of google form were given to 72 students. After obtaining data on students' biological learning interest through questionnaires, documentation techniques were carried out to obtain data on students' cognitive biology learning outcomes. Biology learning interest data and the cognitive biology learning outcomes of students were then analyzed.

Data Analysis Techniques

The data analysis technique in this research is using the likert scale, normality test and linearity test as a prerequisite test, correlation test and regression test as a hypothesis test. Data on the level of students' interest in learning were obtained using a Likert scale. The data is in quantitative form with a score range of 1-4. The score for each indicator is then calculated using the following percentage formula

$$\text{Percentage} = \frac{\text{Sum of data collection results}}{\text{Maximum Score}} \times 100\%$$

Then the percentage results from each of these indicators will be averaged and adjusted to the assessment criteria (Table 1).

Table 1.

Criteria for the Level of Interest in Learning Biology of Students

Score Range	Category
$X > Mi + 1,8 \times Sdi$	Very High
$Mi + 0,6 \times SDi < X \leq Mi + 1,8 \times Sdi$	High
$Mi - 0,6 \times SDi < X \leq Mi + 0,6 \times Sdi$	Moderate
$Mi - 1,8 \times SDi < X \leq Mi - 0,6 \times Sdi$	Low
$X \leq Mi - 1,8 \times Sdi$	Very Low

RESULTS AND DISCUSSION

Interest in Studying Biology of Students During the Covid-19 Pandemic

The average percentage result of 68,16% (Table 2) states that the interest in learning biology of 2nd grade science in Senior High School No. 13 Semarang online during the Covid-19 pandemic was low.

Table 2.

Results of Students' Reading Interest Questionnaire Analysis

No.	Indicator	Percentage	Category
1.	Feeling happy	69,79%	Moderate
2.	Interest	64,32%	Low
3.	Attention	71,75%	Moderate
4.	Involvement	67,16%	Low
Average Percentage		68,16%	Low

In addition, the results of the analysis (Table 3) also stated that out of 72 respondents there were no students or 0% who stated that their interest in learning biology was categorized as very high and high. A total of 39 students or 54,17% expressed interest in studying biology which was classified as moderate. While the remaining 33 students or about 45,83% were categorized as having low interest in learning biology.

Table 3.

Results of the Analysis of Students' Biology Learning Interest

Category	Percentage
Very High	0,00%
High	0,00%
Moderate	54,17%
Low	45,83%
Very Low	0,00%
Total	100%

Based on the research that has been done, the results showed that the students of class XI MIPA at SMA Negeri 13 Semarang had a low interest in biology learning during the pandemic. This illustrates that during the pandemic, students were less interested in taking online biology lessons during the Covid-19 pandemic. The lack of interest in participating in online biology learning during the Covid-19 pandemic was seen from the number of students who stated that learning biology online during the Covid-19 pandemic was less fun. Then it could be seen from the number of students, namely 55,6% who

stated that they complained about taking online biology lessons during the Covid-19 pandemic. In addition, it could be seen from the number of students, namely 51,3%, who stated that they were less enthusiastic about taking online biology lessons during the Covid-19 pandemic. There were also many students, namely 61,2% who stated that they were not active in participating in online biology learning during the Covid-19 pandemic. This low interest in learning during the pandemic was in line with the previous researches of Sulistiawati (2020) which concluded that students' interest in learning has decreased during the pandemic. Wicaksana, et al. (2020) also concluded that students' interest in learning biology during the pandemic was low.

The low interest in studying biology was also suspected because the methods used by the teachers during the Covid-19 pandemic were less varied. One of the students stated that online biology learning during the Covid-19 pandemic almost always used the same method. The method used previously was providing video quipper, after which students were given assignments. This has led to increased student saturation, resulting in low interest in studying biology in online biology learning during the Covid-19 pandemic.

Based on this explanation, it could be seen that students' interest in learning biology was strongly influenced by the teaching skills of teachers in the online biology learning process during the Covid-19 pandemic. This was in line with the previous research of Syaputri & Usman (2019) which stated that teacher teaching skills had a very positive effect on students' interest in learning with a percentage of 85,5%.

Student Biology Cognitive Learning Outcomes during the Covid-19 Pandemic

The cognitive biology learning outcomes of students are known by means of documentation. The results of documentation regarding the cognitive biology learning outcomes of students can be seen in Table 4.

Table 4.
Student Biology Cognitive Learning Outcomes

No.	Class	Complete	Not Complete	Percentage	Average Score
1.	MIPA 1	19	0	100%	89,21
2.	MIPA 2	22	0	100%	89,09
3.	MIPA 3	20	0	100%	89,95
4.	MIPA 4	11	0	100%	88,00
Total Average Score					89,19

Based on the data on the cognitive learning outcomes of students, it is known that the cognitive learning outcomes of students are classified as high. All students get cognitive learning outcomes above the cut score (cut score = 75). The average result of students' cognitive learning outcomes was 89,19 which categorized as high. This result was in accordance with the research of Apriyanto & Herlina (2020) which stated that cognitive learning outcomes were in the high category with an average of 87%. Still classified as high student learning outcomes allegedly because students were active in learning independently.

The Influence of Learning Interests on Cognitive Learning Outcomes of Students in Biology during the Covid-19 Pandemic

Based on the prerequisite test, namely the normality test and linearity test, it is known that the significance values of learning interest and learning outcomes of biology obtained are 0,741 and 0,783. Both values are significance > 0,05. So it can be concluded that the data on interest in learning biology and cognitive biology learning outcomes of students are normally distributed and there is a significant linear relationship.

The first hypothesis testing, namely the correlation test, was conducted to determine the correlation between interest in learning biology and the cognitive biology learning outcomes of students. The results of the correlation test can be seen in Table 5.

Table 5.
Significance of Correlation Test Results

		Student Interest in Biology Learning (X)	Student Biology Cognitive Learning Outcomes (Y)
Student Interest in Biology Learning (X)	Pearson Correlation	1	,586**
	Sig. (2-tailed)		,000
	N	72	72
Student Biology Cognitive Learning Outcomes (Y)	Pearson Correlation	,586**	1
	Sig. (2-tailed)	,000	
	N	72	72

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

The significance value of the results of the correlation test between the interest in learning biology and the cognitive biology learning outcomes of students is 0,000. The significance value is $0,000 < 0,05$, then the alternative hypothesis (H1) which states that there is a relationship between interest in learning biology with the cognitive biology learning outcomes of students when learning biology online during the Covid-19 pandemic is accepted. This means that students' interest in learning biology is related to cognitive biology learning outcomes. These results are in accordance with the research of Rajab, et al. (2018) which concluded that there is a relationship between interest in learning and cognitive learning outcomes of students. As for Amin's research, et al (2018), which concluded that interest in learning biology has a positive and significant relationship with cognitive learning outcomes in biology. The relationship between interest in learning biology with the cognitive biology learning outcomes of students in this study is depicted in the scatter diagram (Figure 1)

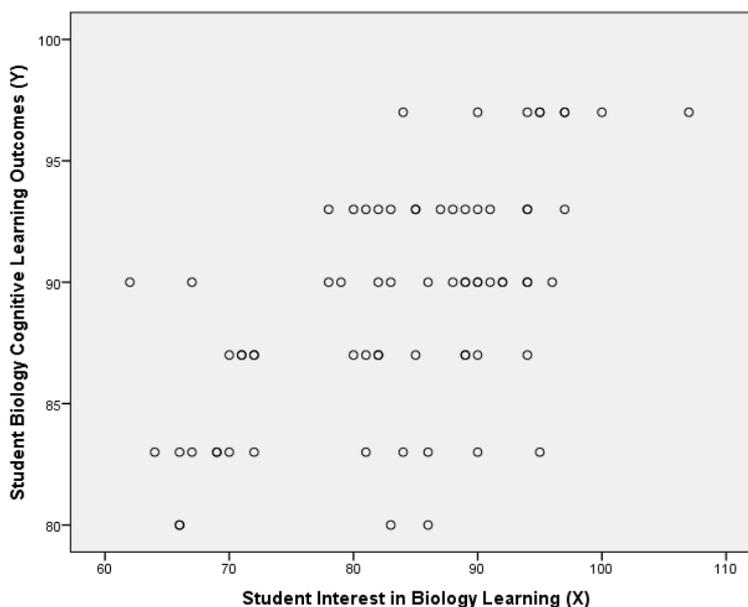


Figure 1. Scatter diagram of the relationship between interest in learning biology with cognitive biology learning outcomes of students.

Based on the scatter diagram image, it is known that the data plot points form a straight line pattern from bottom left to top right. This indicates that there is a linear and positive relationship between students' interest in learning biology with the cognitive biology learning outcomes of students. A positive relationship means that if students' interest in learning biology increases, the cognitive biology learning outcomes of students will also increase. This is supported by Erizal et al. (2019) which states that if students have an interest in studying biology, the maximum cognitive biology learning outcomes will be obtained. Berutu & Tambunan's research (2018) also states that if students' interest

in learning is high, it will tend to produce high learning outcomes as well. Conversely, if students' interest in learning is low, it will tend to produce low learning outcomes as well.

The next hypothesis testing is the regression test which is carried out to determine the influence and magnitude of the influence of interest in learning biology on the cognitive biology learning outcomes of students. The results of the regression test for the interest in learning biology on the cognitive biology learning outcomes of students that have been done can be seen in [Table 6](#).

Table 6.
Significance of Regression Test Results

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	65,739	3,901		16,853	,000
1 Student Interest in Biology Learning (X)	,279	,046	,586	6,056	,000

a. Dependent Variable: Student Biology Cognitive Learning Outcomes (Y)

The significance value of the regression test results is equal to 0,000. The significance value is $0,000 < 0,05$, then the alternative hypothesis (H1) which states that there is an effect of interest in learning biology on cognitive biology learning outcomes of students when learning biology online during the Covid-19 pandemic is accepted. This means that the interest in learning biology when learning biology online during the Covid-19 pandemic significantly affects the cognitive biology learning outcomes of students. This result is in line with the research of Wilda et al. (2018) which states that interest in learning significantly affects student learning outcomes. This result is also supported by the results of research by Silfitriah & Mailili (2020) which states that there is an effect of interest in learning on student learning outcomes.

This study found that the level of interest in learning biology of students when learning biology online during the Covid-19 pandemic determined the cognitive biology learning outcomes of students. The results of this study are in line with the results of research by Triarisanti & Pupung (2019) which states that students' learning interests have an effect so that it can determine the cognitive learning outcomes of students. The results of this study can be explained by several theories such as the theory which says that high interest in learning will greatly affect how students learn. For example, students who are very interested in learning biology will study seriously and focus on learning biology so that cognitive biology learning outcomes can be maximized (Darmawan, Zubaidah, Ristanto, Zamzami, & Wahono, 2020; Refirman Djamar, Rizhal Hendi Ristanto, & Ericka Darmawan, 2020; Ristanto, Djamar, Heryanti, & Ichsan, 2020). Thus the interest in learning biology when learning biology online during the Covid-19 pandemic is very necessary for students to get good cognitive learning outcomes (Wicaksana, Atmadja, Wikanso, Putri, & Muthia, 2020).

Based on the results of this study, it was obtained a constant number of unstandardized coefficients of 65,739. This means that if students do not have an interest in learning biology, the consistent value of the cognitive biology learning outcomes of students is 65,739. The results of this study also show a regression coefficient of 0,279. This means that every 1% increase in interest in learning biology, the cognitive biology learning outcomes will increase by 0,279 (Harlan, 2018). The regression coefficient value based on the research results is positive, it can be seen that students' interest in learning has a positive effect on the cognitive biology learning outcomes of students. Furthermore, the magnitude of the effect of the influence of interest in learning to learn biology on cognitive biology learning outcomes of students can be seen in [Table 7](#). Furthermore, the magnitude of the effect of the influence of interest in learning to learn biology on cognitive biology learning outcomes of students can be seen in [Table 7](#).

The R-squared value obtained from this study is 0,344 in the low category (Sugiyono, 2017). This value means that interest in learning biology affects cognitive biology learning outcomes by 34%. Thus there are 66% other factors that effect the cognitive biology learning outcomes of students. The results of this study indicate that students' interest in learning biology is only one of the internal factors that affect cognitive learning outcomes. These results are in line with the results of research by Sawawa, et

al. (2018) which concluded that the cognitive learning outcomes of students are influenced by several dominant factors consisting of internal and external factors. Internal factors consist of interest in learning (0.757), motivation to learn (0.858), attention to learning (14.9%), and physiological aspects (0.722). External factors consist of aspects of the state of the school (0.525), aspects of the social environment (0.037), and finally aspects of the condition of the family (0.037).

Table 7.

The Magnitude of the Influence of Learning Interest on Biological Cognitive Learning Outcomes

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,586 ^a	,344	,334	3,925

a. Predictors: (Constant), Student Interest in Biology Learning (X)

b. Dependent Variable: Student Biology Cognitive Learning Outcomes (Y)

CONCLUSION

Based on the results of the research that has been obtained, it can be concluded that the interest in learning biology online of 2nd grade science students in Senior High School No. 13 Semarang during the Covid-19 pandemic is still low with a percentage of 68.16%. The results of this study also concluded that the interest in learning biology online during the Covid-19 pandemic affected the cognitive biology learning outcomes of students. The percentage of this influence is 34%. Based on the results of the conclusions that have been explained, the implication of this research is that the low interest in studying biology needs to be increased because interest in studying biology is very important and greatly affects the learning outcomes of biology. The biology learning process will run smoothly if students have an interest in studying biology. Biological cognitive learning outcomes will also be good if students have an interest in studying biology. Therefore, teachers need to increase the interest in learning biology from the participants in the biology learning process to run well and the cognitive learning outcomes of biology are also good. High interest in studying biology will result in high cognitive biology learning outcomes, and conversely, low interest in learning biology will result in low cognitive learning outcomes.

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