

The correlation of perception in biology lessons with the learning outcomes of students cross-interests on ecosystem concepts

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Article information	ABSTRAK
Article history:	Persepsi peserta didik terhadap suatu mata pelajaran atau konsep akan berdampak pada cara pandang peserta didik dalam menghadapi proses pembelajarannya. Persepsi yang dibangun oleh peserta didik terhadap suatu pelajaran atau konsep harus senantiasa positif agar hasil belajar yang dicapai dapat menjadi maksimal. Penelitian ini bertujuan untuk mengetahui hubungan antara persepsi peserta didik pada mata pelajaran Biologi dengan hasil belajar peserta didik lintas minat Biologi di SMA Negeri 6 Kota Tasikmalaya. Penelitian ini merupakan penelitian korelasional yang menghubungkan antara persepsi dengan hasil belajar peserta didik pada konsep ekosistem. Populasi seluruh kelas X IPS sebanyak 5 kelas dan sampel sebanyak 1 kelas berjumlah 34 peserta didik yaitu di kelas X IPS 5 sebagai partisipan dengan teknik pengambilan sampel secara <i>purposive sampling</i> . Kelas tersebut dijadikan sampel atas dasar pertimbangan nilai rata-rata terendah dibanding kelas lainnya. Instrumen penelitian yang digunakan meliputi angket dari penelitian lain yang diadaptasi dan disesuaikan dengan konsep ekosistem, dan tes pilihan ganda untuk mengukur hasil belajar peserta didik. Angket persepsi peserta didik terdiri dari 28 pernyataan. Setiap item memiliki alternatif jawaban yang terdiri dari 4 pilihan, yaitu sangat setuju (SS), setuju (S), tidak setuju (TS), sangat tidak setuju (STS). Sementara tes hasil belajar diukur menggunakan soal pilihan ganda materi ekosistem terdiri dari 46 soal. Teknik analisis data yang digunakan adalah uji regresi korelasi bivariat. Sebelum analisis data dilakukan terlebih dahulu uji normalitas dan uji linearitas sebagai uji prasyarat analisis. Hasil penelitian menunjukkan ada hubungan antara persepsi dengan hasil belajar peserta didik pada konsep ekosistem sebesar 38,9% dengan kategori kuat.
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Persepsi	
Hasil Belajar	
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Ekosistem	
Keywords:	Students' perceptions of a subject or concept will have an impact on the perspective of students in facing the learning process. Perceptions built by students towards a lesson or concept must always be positive so that the learning outcomes achieved can be maximized. This study aims to determine the relationship between students' perceptions in the Biology subject with the learning outcomes of students across Biology interests at SMA Negeri 6 Kota Tasikmalaya. This research is a correlational study that
Perception	
Learning outcomes	
Cross Interest in Biology	
Ecosystem	

links perceptions with student learning outcomes on the concept of ecosystems. The population of all class X IPS was five classes, and a sample of 1 class amounted to 34 students, namely in class X IPS 5 as participants with the sampling technique using purposive sampling. The class is sampled based on the consideration of the lowest average score compared to other classes. The research instruments used included questionnaires from other studies that were adapted and adapted to the ecosystem concept and multiple-choice tests to measure student learning outcomes. The student perception questionnaire consists of 28 statements. Each item has an alternative answer consisting of 4 choices, namely strongly agree (SS), agree (S), disagree (TS), strongly disagree (STS). While the learning outcome test was measured using multiple-choice questions, the ecosystem material consisted of 46 questions. The data analysis technique used was the bivariate correlation regression test. Prior to data analysis, the normality test and linearity test were performed first as a prerequisite test for analysis. The results showed that there was a relationship between perceptions and student learning outcomes on the ecosystem concept of 38.9% with a strong category.

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INTRODUCTION

The implementation of the Kurikulum 2013 in learning complements the previous curriculum, namely the Education Unit Level Curriculum (KTSP) (Herawati et al., 2018), which was carried out with the aim of preparing Indonesian people to have the ability to live as individuals and citizens who are faithful, productive, creative, innovative, and affective, and able to contribute to the life of society, nation, state and world civilization (Pratama, 2018). Thus, students can better prepare themselves to become fully Indonesian people.

The implementation of the Kurikulum 2013 also has an impact on changing the education implementation system in schools, especially at the high school level (SMA). One of the changes to the education implementation system is in the aspect of majors for students that are no longer carried out in class XI, but starting from class X (Mughniy et al., 2018; Yendrita et al., 2019). The study interests are divided into Mathematics and Natural Sciences (IPA), Social Sciences (IPS), and Culture and Language (Mughniy et al., 2018). Thus, because students have to choose a specialization since grade X, the readiness and decision of students in choosing a specialization are one of the considerations because it will determine their future career direction.

In addition to specialization, in the implementation of the 2013 Curriculum, compulsory subjects for cross-interests are imposed. Among the objectives, namely to facilitate students in learning various fields outside their field of specialization, they can obtain various knowledge and information that are considered important and relevant for everyday life and the future (Amizera & Destiansari, 2020). Biology is one of the subjects that are part of the cross-interest course.

Based on an interview with a Biology subject teacher, it was found that the determination of the majors of interest in student learning in one of the State Senior High Schools in Tasikmalaya City had been carried out in class X. The determination of the majors of student interest in learning was based on the results of the psychological test. In line with Permendikbud No. 69 of 2013 that in the selection of groups of interest-based on SMP / MTs report cards, SMP / MTs National Examination (UN) scores, recommendations for guidance and counseling teachers in SMP, placement test results when registering in SMA, and aptitude test results, interest by psychologists (Yendrita et al., 2019). However, there are several facts that students are

sometimes confused about determining their specialization, so the homeroom teacher determines their specialization.

Student's specialization in majors is essentially influenced by student's perceptions of their learning outcomes (Milarika et al., 2018). Students who choose majors other than Science are thought to have the perception that learning in a specialization in Science is more difficult so that it will have an impact on the learning outcomes obtained later. However, even though students did not choose Science as their major, there were several subjects of specialization in Science that were given to students with the aim of enriching their insights. One of the subjects given to cross-interest classes is Biology.

Based on observations and preliminary research the fact that the enthusiasm and attention of students in learning Biology is still relatively lacking. Even though some students are able to follow Biology lessons well, some students still have difficulty receiving and studying Biology subject matter, and there are even some students who are less interested or don't like Biology lessons. There are students who do not pay attention and tend to divert attention to other activities.

Based on these observations, there are positive perceptions and negative perceptions of students about different biology subjects. This raises the question of whether students who have positive perceptions of biology subjects will find good and satisfying learning outcomes and students who have negative perceptions of biology subjects find unsatisfactory learning outcomes. Thus, it was needed to conduct research on the perceptions of class X students who take Biology specializations. This research is expected to be used as a consideration and input for teachers to improve the learning process so that students' perceptions are positive, education observers and parents in helping students to consider the selection of subject interests and their perceptions of biology subjects.

METHODS

This type of research is correlational quantitative. The research design used is a simple correlation. Students' perception variables are independent variables that are thought to have a relationship with learning outcomes.

This research was conducted from June to August 2020 at one of the State Senior High Schools (SMA) in Tasikmalaya City. The population in this study were all five classes of X IPS for the 2019/2020 academic year, in which there are cross-interest subjects, one of which is Biology. The sampling technique used was purposive sampling. The reason for its sampling technique because the population in this study obtained an average value of the previous semester's end-of-term assessment (), which was not homogeneous. Therefore, to determine which class was sampled, the class with the smallest average score was taken in the cross-interest biology subject.

Data collection techniques in this study were using google Forms via a link that is distributed to research subjects. Data were collected using non-test instruments (in the form of questionnaires) and test instruments.

In the non-test instrument, a questionnaire regarding students' perceptions was made with four alternative answer choices using a Likert scale. The student perception questionnaire adopted from Pratama et al. (2018), which consisted of 38 question items by modifying several statements and additional statements according to the student perception indicators made by Pratama et al. (2018). The questionnaire was adjusted to the topic of learning outcomes, namely ecosystem so that the students' perception questionnaire in Biology was 43 statement items.

The instrument in the form of a test in this study was a question with a multiple choice of 5 options. The choice of aspects measured in this study includes factual knowledge (K1), conceptual knowledge (K2), procedural knowledge (K3), and metacognitive knowledge (K4) and is limited to the level of remembering (C1), understanding (C2), applying (C3), analyze (C4), and evaluate (C5). The instrument for measuring learning outcomes is 50 items.

Measurement of the validity and reliability of the instrument is carried out in several stages, including 1) validation by experts; 2) testing is limited to class XI or those who have

received ecosystem material in the previous school year; and 3) processing data from the test instruments using Anates ver. 4.0.5 for windows. Based on the results of the students' perception questionnaire instrument test, there were 28 statement items that were declared valid and suitable for use as a research instrument. Furthermore, the results of the test instrument test results of learning and the calculation of validity using ANATES, there were 46 item questions that were declared valid and fit for use as a research instrument. The calculation of instrument reliability shows that something can be trusted enough to be used as a data collection tool because the instrument is good (Arikunto, 2013: 221). The reliability test for the student perception questionnaire instrument used the Alpha Cronbach formula (Hairun, 2020) and the criteria as shown in Table 1.

$$\alpha_{Cronbach} = \left(\frac{n}{n-1} \right) \left(1 - \frac{\sum S_i^2}{S_t^2} \right)$$

Information:

n = Number of items

S_i^2 = Variant of item scores

S_t^2 = Variant of total scores

Table 1. Reliability Criteria

Interval	Criteria
$0,91 \leq r < 1,00$	Very High
$0,71 \leq r < 0,90$	High
$0,41 \leq r < 0,70$	Moderate
$0,21 \leq r < 0,40$	Low
$R < 0,20$	Very Low

Based on the results of calculations using the Alpha Cronbach formula, the reliability value of the students' perception questionnaire instrument was 0.913 with a very high degree of consistency of reliability.

For the learning outcome instrument, the calculation of the reliability test uses the KR-20 formula according to Arikunto (2013), the K-R 20 formula, namely:

$$K-R_{20} = \left(\frac{k}{k-1} \right) \left(\frac{Vt - \sum pq}{Vt} \right)$$

Information :

r_{11} : instrument reliability

k: number of questions

Vt: total variance

p: the proportion of subjects who answered correctly on an item

q : the proportion of students who score 0 ($q = 1 - p$)

$\sum pq$: the sum of the product between p and q

Based on the calculation of reliability, the learning outcome test instrument has a reliability value of 0.92 with very high criteria.

Techniques for processing and analyzing data in the form of normality tests and linearity tests as prerequisites for analysis are assisted by using the software. Hypothesis testing uses the Pearson bivariate correlation test, then followed by calculating the coefficient of determination to see the percentage of contribution that students' perceptions give to learning outcomes.

RESULTS AND DISCUSSION

The data obtained from this study were in the form of students' perceptions and student learning outcomes on the concept of ecosystems. According to Busmayaril & Heldayani (2016), individual perceptions are essentially shaped by culture because they receive knowledge from previous generations and used to give meaning to the facts, events, and symptoms he faces. The following is a histogram and a student's perception polygon, as shown in Figure 1.

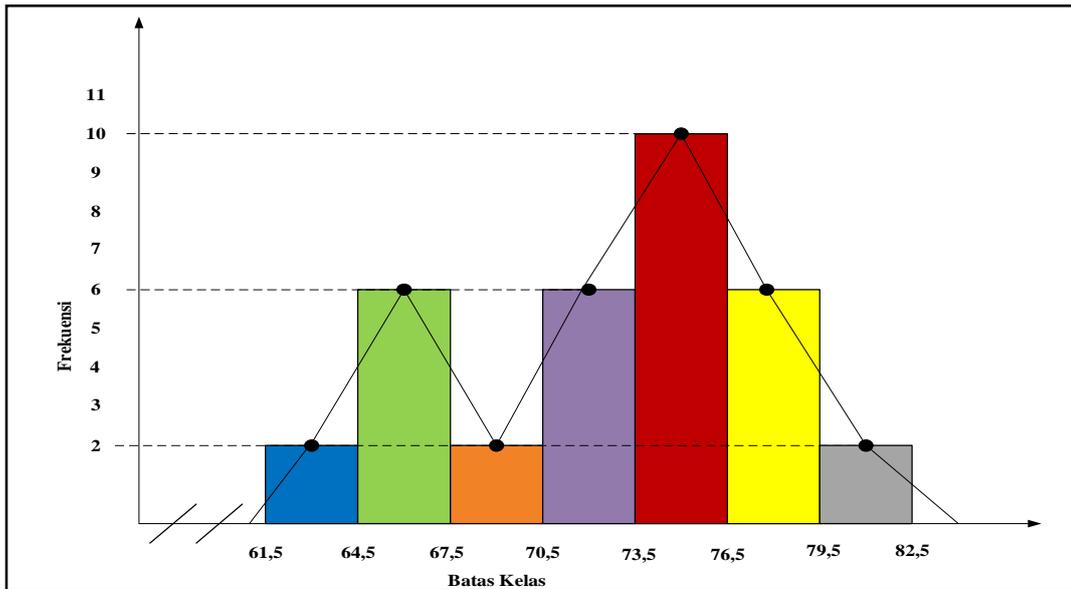


Figure 1. Student Perception

Based on Figure 1, it shows that the lowest score is between the class limit of 61.5-64.5, namely 2 people, while the highest score is between the class limit of 79.5-82.5, namely 2 people, and the frequency of students' perception scores is at most among the class limit of 73.5-76.5, namely 10 people. From the diagram, it can be seen that the histogram and polygon formed are normal.

Then, the following shows the histogram and polygons of the learning outcomes of students on the concept of ecosystems, as shown in Figure 2.

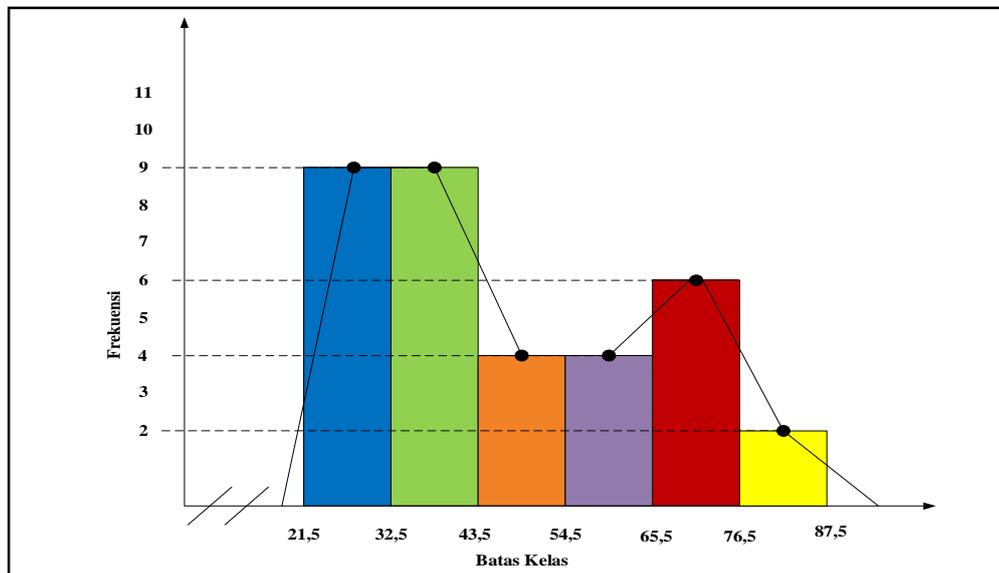


Figure 2. Student Learning Outcomes

Based on the data shown in Figure 2, it can be seen that the lowest score is between the class limit of 21.5-32.5, namely 9 people, and the highest score is between the class limit of 76.5-87.5, namely 2 people, and the frequency of learning outcomes scores. Most students are between the class limit of 21.5-32.5 and 32.5-43.5, which is as many as 9 people. From the diagram, it can be seen that the histogram and polygons that are formed tend to be normal, although the data tends to be more leftward.

The prerequisite analysis consisted of a normality test and a linearity test. The results of the calculation of the normality test can be seen in Table 2, showing that the sample of student perceptions and student learning outcomes is taken from a normally distributed population, this is evidenced by the results obtained using SPSS version 25 for windows. Obtained a significance value of $0.121 > 0.05$ and a significance value of student learning outcomes in the ecosystem concept of $0.070 > 0.05$. In addition, the results of the linearity test can be seen in Table 3, showing that between student's perceptions and student learning outcomes get a significance value of $0.517 > 0.05$, which means that there is a linear relationship between student's perceptions and student's learning outcomes.

Table 2. Summary of the normality test using the Kolmogorov-Smirnov test

One-Sample Kolmogorov-Smirnov Test			Preception	Learning outcomes
N			34	34
Normal Parameters ^{a,b}	Mean		72.6176	47.3529
	Std. Deviation		5.16993	18.30198
Most Extreme Differences	Absolute		.135	.144
	Positive		.097	.144
	Negative		-.135	-.083
Test Statistic			.135	.144
Asymp. Sig. (2-tailed)			.121 ^c	.070 ^c
a. Test distribution is Normal.				
b. Calculated from data.				
c. Lilliefors Significance Correction.				

Table 3. Summary of linearity tests

			ANOVA Table				
			Sum of Squares	df	Mean Square	F	Sig.
hasilbelajar * persepsi	Between Groups	(Combined)	7201.765	15	480.118	2.244	.052
		Linearity	4300.423	1	4300.423	20.09	.000
		Deviation from Linearity	2901.341	14	207.239	.968	.517
Within Groups			3852.000	18	214.000		
Total			11053.765	33			

The results of the hypothesis using the bivariate correlation test listed in table 4, obtained a significance value of 0.000 with a significance level of 0.05. The significance value < 0.05 , so it can be concluded that the hypothesis is Reject H_0 , which means that there is a relationship between students' perceptions and student learning outcomes on the concept of ecosystem. The relationship between perceptions and student learning outcomes in the ecosystem concept has a correlation coefficient (R) of 0.624 which means that the relationship between perception variables and student learning outcomes variables is strong. The coefficient of determination (R^2) is 0.389 or 38.9%. This shows that the perception variable contributes 38.9% to the learning outcomes of students. While the remaining 61.1% is the influence of other variables not examined in this study.

Table 4. Hypothesis test results using the bivariate correlation test

Model	R	R Square	Adjusted R Square	Model Summary					
				Std. Error of the Estimate	R Square Change	Change Statistics	F	df1	df2
1	.624 ^a	.389	.370	14.52728	.389	20.377	1	32	.000
a. Predictors: (Constant), perception									

The influence of other variables contained in this study is inseparable from a variety of other factors that affect student learning outcomes. Slameto (2015); Mulyana, et al. (2013) states that the factors that affect learning outcomes are classified into two groups, namely internal factors and external factors. Internal factors are factors that come from within the learning individual. Apart from perception, there are other internal factors including ability, talent, interest, creativity, motivation, and study habits. External factors are factors that come from outside the individual who is learning, namely in the form of discipline, learning environment, infrastructure, socio-culture and politics, and student-teacher interactions.

In this study, to determine whether the perceptions of students across high interest in Biology subjects, the researchers categorized the perception questionnaire data obtained. It is known that the minimum value of perception is 25 and the maximum value is 100. Furthermore, looking for the ideal average value (M_i) with the formula $M_i = \frac{1}{2} (X_{\max} + X_{\min})$ obtained $M_i = 62.5$, looking for the ideal standard deviation (SD_i) with the formula $SD_i = \frac{1}{6} (X_{\max} - X_{\min})$ obtained $SD_i = 12.5$. From these calculations, it can be categorized into 3 classes according to the categorization formula according to Azwar (2010) which can be seen in Table 5.

Table 5. Categorization formulas

Rumus	Category
$X > (M + 1 \times SD)$	High
$(M - 1 \times SD) \leq X < (M + 1 \times SD)$	Moderate
$X < (M - 1 \times SD)$	Low

Based on the results of the categorization of students' perceptions in Figure 3, there were 14 students who had high student perceptions (41%). Then there were 20 students who entered the medium category (59%), in this study, there were no students who fell into the low category. So it can be concluded that the tendency of the perception variable of students in class X IPS 5 is in the medium category, namely as many as 20 students (59%) of the total sample of 34 students.

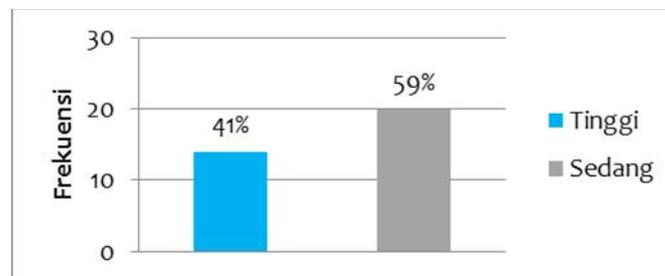


Figure 3. Categorization Diagram of Students' Perceptions

Determining the tendency of student learning outcomes variables, after it is known that the minimum value of learning outcomes is 0 and the maximum value is 100. Next, looking for the ideal average value (M_i) with the formula $M_i = \frac{1}{2} (X_{\max} + X_{\min})$ obtained $M_i = 50$, looking for standard deviation ideal (SD_i) with the formula $SD_i = \frac{1}{6} (X_{\max} - X_{\min})$ obtained $SD_i = 17$. These calculations can be categorized into 3 classes according to the categorization formula can be seen in table 11. The table above can be described in the categorization diagram which can be seen in Figure 4.

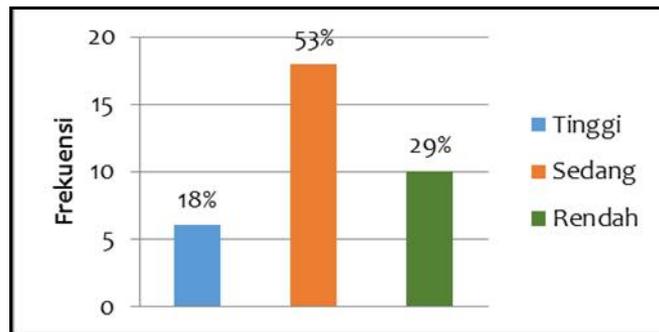


Figure 4. Categorization Diagram of Student Learning Outcomes

Based on the results of the categorization of student learning outcomes in Figure 4, there were 6 students who had high student learning outcomes (18%). Then there were 18 students who entered the medium category (53%), and 10 students entered the low category (29%). So it can be concluded that the tendency of the variable learning outcomes of students in class X IPS 4 is in the medium category, namely as many as 18 students (53%) of the total sample of 34 students.

Furthermore, the two data obtained in the form of perceptions and learning outcomes will be combined in one categorization diagram of research results which can be seen in Figure 5. Students' perceptions of Biology subjects and student learning outcomes are two things that are related to the learning process. Perception is one of the psychological factors that can determine the intensity of a student's learning until he gets the learning result (Triyono & Febriani, 2018). In line with the opinion of Najichun and Winarso, (2016) explains that perception is one of the important aspects of psychology for humans in responding to the presence of various aspects and attitudes around them. Perceptions and learning outcomes are signs of the emergence of changes in student behavior after gaining experience from the learning process. The same thing was also stated by Hussaini, Foong, and Kamar, (2015) which emphasized that the attitudes of students towards lessons can affect the learning outcomes obtained. If the attitude of students is positive, their learning outcomes are better and tend to be positive. And according to the previous research by Hussaini, Foong, and Kamar, (2015), there is a significant relationship between student interest in learning outcomes. Therefore it is very important to know how the attitudes of students towards Biology subjects.

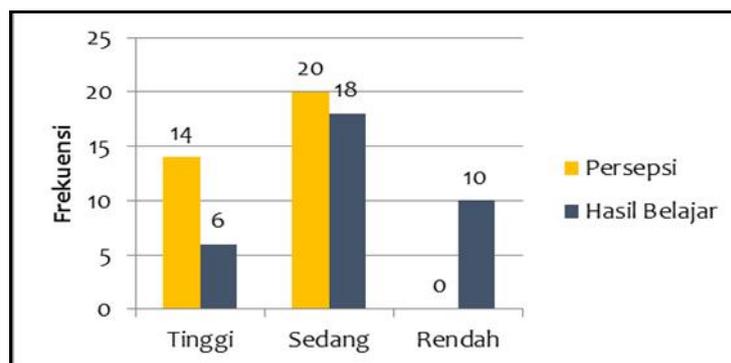


Figure 5. Students' Perceptions and Learning Outcomes

The research of Milarika et al., (2018) explained that each person has a different perspective on an object. If someone likes or is interested in an object, usually he will also be interested in knowing everything related to that object. Or vice versa, if someone is not interested and even has a negative view of an object, usually he will not be interested in knowing everything related to that object. Students who have positive perceptions tend to like Biology subjects and their learning outcomes are good (Cahaya, et al, 2014). This is in line with this study, namely when the perceived value of students increases by 1%, it will contribute to the

effect of learning outcomes by 39.9%. That is, if students have high perceptions, their learning outcomes will be high. This proves that students' perceptions of biology learning are related to student learning outcomes.

Evidence regarding the variable perceptions of students on subjects has a positive effect on student learning outcomes, also explained by Fitriana, et al., (2016) in their research results showing that students' perceptions of the geography learning process are positively related to student learning outcomes. Students' perceptions of geography learning include the entire learning process including the planning, implementation, and evaluation or assessment processes that contribute to the learning outcomes of learners' geography. Student's perceptions of the geography learning process are one of the factors that affect student's learning outcomes.

Students who have positive perceptions will follow the learning process well so that they will get good learning results too. Whereas for students who had negative perceptions, it turned out that when traced the learning outcomes obtained were classified as low scores among other students. According to Kabiato, et al. various factors that influence students' perceptions of mathematics and biology, found several findings, namely when a teacher presents the subject matter, as long as the lesson is understandable and in a meaningful form and the material can be applied to real-life situations it will encourage attitudes of students who are more positive towards biology and mathematics (Milarika et al., 2018). The results of research by Milarika et al. (2018) asserted that if students are convinced about the benefits of the subject for future careers, they will have a positive attitude towards the subject.

Biology as one of the subjects in a science specialization class is considered to be the easiest subject among science specialization subjects. According to Prokop, Prokop, & Tunnicliffe, (2007), science subjects are boring for many students, difficult, irrelevant to human life, and less attractive to students. However, this opinion cannot be generalized to all science subjects. According to Milarika et al. (2018), there are differences in the perspective of students between physics and biology subjects. The view of students towards physics is more negative than biology. Perception of biology subjects is a process of organizing and interpreting aspects related to biology, such as the nature of biological material, ways of thinking in biology, biology teachers, and biology books, by involving a person as a whole so as to give birth to a unique response to those aspects related to biology. So it can be concluded that students' perceptions in biology subjects are views, responses, or assessments of students based on statements and knowledge on biology which is marked by an understanding of biology, the benefits of studying biology, and attention to biology lessons. Information about biology is obtained by students through the five senses.

In this study, the relationship between perceptions and student learning outcomes in the ecosystem concept has a correlation coefficient (R) of 0.624 which means that the relationship between perceptual variables and student learning outcomes variables is strong. The coefficient of determination (R²) is 0.389 or 38.9%. This shows that the perception variable contributes 38.9% to the learning outcomes of students. While the remaining 61.1% is the influence of other variables not examined in this study.

The relationship between perceptions and student learning outcomes is in a strong category. The same thing was stated by Lestari, Amir, & Rohiat, (2017) which showed that students' perceptions had a significant relationship which was included in the strong relationship category. Students' perceptions affect student learning outcomes, but not only perceptual factors that can affect student learning outcomes, because there are many other factors such as motivation, students' learning interest, students' learning attitudes, learning environment and so on which can affect the results. learn learners. According to Purkana (2014), there are differences in learning methods between science and social studies class students that differentiate their cognitive abilities.

Based on the results of the study, there were differences in the ability of students to answer questions from each of the Bloom taxonomic indicators. The achievement of the average score for each cognitive dimension of learning outcomes can be seen in Figure 6. Figure 6 explains that the average score for each cognitive dimension of learning outcomes of students. The acquisition

of C1 cognitive dimension (remembering) is 0.56; C2 (understand) of 0.36; C3 (applying) of 0.56; C4 (analyze) of 0.42; and C5 (evaluating) of 0.27.

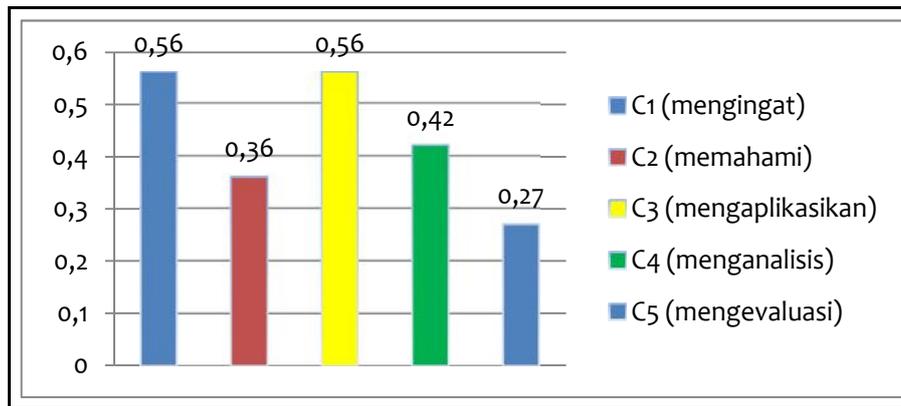


Figure 6. The Average Score of Students' Learning Outcomes in Each Dimension of the Cognitive Process

The highest score on each cognitive dimension is C1 (remembering) and C3 (applying). And the lowest score on each cognitive dimension is C5 (evaluating). The value obtained by students is very diverse. This is because answering questions is adjusted to the abilities of each student. In line with what was stated by Rahmatullah., Et.al. (2020: 42) that the results of achieving cognitive abilities are more determined by the academic ability of each student, then the diversity of student learning outcomes is caused by two factors, namely internal factors, and external factors. According to Dimiyati and Mujiono (2015: 236), internal learning factors include attitudes towards learning, learning motivation, learning concentration, processing learning materials, storing learning outcomes, exploring stored learning outcomes, achievement ability, or learning outcomes performance, learning habits, feeling self-confidence and intelligence of students. And external factors include teachers as coaches for learning students, learning infrastructure, social environment in schools.

According to Rahmatullah., Et.al. (2020: 42) the results of the cognitive domain of students can be improved in various ways, including improved learning models or learning media that can keep up with the times. This is because students tend to get bored when they carry out a learning process that tends to be monotonous. Furthermore, according to Rizaldi and Hanesman (2018: 32), there are many factors that affect learning outcomes, one of which is the teacher as teaching staff. In the learning process, the teacher does not only come and prepare the lesson material for completion, but the teacher must know the needs and potentials of students well. Therefore, a teacher must have competence. In line with the opinion of Susanti., Et.al (2015: 123) states that the knowledge and abilities of teachers are elements of teacher quality. Teacher quality is one of the factors that help students succeed in school. So as to create a good student perception makes students comfortable, enthusiastic, and easier to absorb the subject matter taught by the teacher.

CONCLUSION

Based on the results of data analysis and hypothesis testing, it can be concluded that there is a correlation between student's perceptions of biology subjects with student's learning outcomes across biology interests in the concept of ecosystems with a strong category. The perception variable contributed 38.9% to the learning outcomes of students, while the rest was the influence of other variables not examined in this study. Other variables in question are factors other than perceptions that can affect student learning outcomes.

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