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STUDENT CONCEPT UNDERSTANDING PROFILE ON ECOLOGY AND INDONESIA BIODIVERSITY MATERIAL BASED ON THE SELF-CONCEPT

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Abstract

This study aims to determine students' conceptual understanding of ecology and Indonesia's biodiversity materials from the perspective of students' self-concepts. The type of research used was quantitative descriptive. The study was carried out at SMPN 4 Bangkalan in the even semester of the 2023/2024 school year involving 50 research subjects of grade VII students. Data were collected through questionnaires and tests. The research findings indicate that: 1) The students' self-concept regarding science material shows that 10% of students were included in the high category, 28% in the moderate category, and 62% in the low category; 2) In the high self-concept group, the average concept understanding score was 69.64% with a good criterion, in the moderate self-concept group, the average concept understanding score was 49.23% with a sufficient criterion, and in the low self-concept group, the average concept understanding score was 23.92% with a poor criterion. Students with a high self-concept tend to have a good understanding of concepts related to ecology and biodiversity in Indonesia.

Keywords: ecology and biodiversity, self-concept, conceptual understanding

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INTRODUCTION

Natural Sciences subject is one of the sections that must be studied at the junior high school level (Astalini & Kurniawan, 2019). Natural science is a branch of science that systematically explores nature to gain understanding. In addition to acquiring knowledge of concepts, facts, and principles, science also involves a process of discovery that is connected to nature (Savira & Gunawan, 2022). The importance of natural science learning lies in improving students' understanding, thinking skills, and attitudes. Through natural science learning, students can understand, appreciate, and develop science and technology. In natural science learning, it is expected that students will produce inductive thinking skills in various science concepts and principles. Thus, it is hoped that students can use the acquired abilities to provide explanations about natural phenomena observed in daily life (Susilawati, 2022).

Understanding concepts in natural science learning plays an important role in learning and is a key foundation for achieving learning outcomes (Susilawati, 2022). Understanding the concept is individual skills in interpreting, distinguishing, and giving examples, as well as associating a concept with newer knowledge and being able to re-explain both in writing and orally according to the knowledge possessed without changing the true meaning (Amanda et al., 2022). Ecology and biodiversity material requires an understanding of concepts. Students' understanding of concepts in ecology and biodiversity material is less than optimal due to the lack of active involvement of students in the learning process which can cause misconceptions about the material (Nufus et al. 2023; Sari et al. 2023).

The lack of understanding of student concepts can be caused by two factors, internal factors related to student attitudes, and external factors depending on educators, such as using learning approaches or techniques (Diana et al., 2020). To improve conceptual understanding students are expected to emphasize a focus on the learning process. This is a moral aspect, which requires the contribution of students' internal factors, including psychological factors, to make it happen. Internal factors in students include self-concept (Susilawati, 2022). Self-concept can be explained as an individual's understanding of himself or herself (Septiyani & Alyani, 2021).

Based on the findings from interviews with teachers at Bangkalan Junior High School, students' self-concept is still not considered as a whole. According to research Umamy et al. (2023) emphasize that the level of students' self-concept is still at a low level, this can be found in some students who feel unsure of themselves and feel inadequate. According to Isnaningrum (2020), there is a link which is closely between self-concept and understanding of science concepts. If a student has a strong self-concept, the student likely has a good understanding of the concept of science. Students with a positive self-concept will be ready to face challenges

with high confidence and fighting spirit, while students with less self-concept are likely to feel afraid and pessimistic when faced with challenges.

According to Fitts (1991), various factors affect the formation of self-concept. Some of these include age, gender, physical condition, respect for the situation, treatment, and attitudes of others around them. Self-concept consists of positive and negative self-concepts. Positive self-concept is the view and belief that a person, even when facing failure, remains optimistic and always looks at things positively (Riko et al., 2019). A positive self-concept about oneself can be obtained through introduction, appreciation, self-understanding, and optimistic and rational thinking about oneself (Tus, 2020). The importance of positive self-concept in education in general has a relationship with improving academic performance and student perseverance in learning at school (Douma et al., 2022). Research conducted by Nursanti & Sugiarti (2022) about the influence of self-concept on the learning motivation of Al-Islam Taman students shows that the higher the self-concept that students have, the more positive the student's learning motivation. This is an input for teachers and schools to pay more attention to aspects of students' self-concept through guidance and counseling so that student motivation and achievement become better.

Self-concept is an important aspect that reflects an individual's view of himself. Therefore, every student must have a good self-concept. Self-concept has a very strong influence on a person's behavior. Thus, research was carried out on students' conceptual understanding to explore and seek an investigation of the relationship between self-concept and understanding of the concept of ecology and biodiversity in Indonesia. By combining aspects of understanding concepts and self-concept, it is hoped that it will be an important foundation to understand the extent to which students understand the material and create a learning environment that supports student development.

METHOD

The type of research used is quantitative descriptive. The descriptive method is carried out to collect useful data to provide an overview of the actual situation. This research was carried out in the even semester of the 2023/2024 academic year at SMPN 4 Bangkalan in April 2024 with the subject of 50 grade VII students.

Students' self-concept was measured by a self-concept questionnaire containing 24 questions using the first indicator, namely self-fulfillment one example of the statement is "I feel satisfied when I get a high score in science learning", the second indicator is honesty with an example of the statement "I always do the science exam honestly without cheating in any form", the third indicator of autonomy and one example of the statements is "I have difficulty doing science problems when I don't understand the material explained", and the fourth indicator of emotional self-concept with the statement "I find it easier to understand the science lesson that I am learning when I am in a happy state" (Goni, 2011). Conceptual understanding of ecology and biodiversity materials was measured through concept understanding test questions. The concept understanding test was in the form of 14 essay questions with 7 indicators namely interpreting, exemplifying, classifying, comparing, explaining, summarizing, and inferring (Dewi & Ibrahim, 2019). The self-concept questionnaire and concept understanding test questions have been validated by experts and declared valid and reliable.

The results of the concept questionnaire were calculated by formula 1.

$$SC = \frac{R}{SM} \times 100\% \quad \text{.....(1) (Adaptation of Rahmah et al., 2023)}$$

Information:
SC: Self-Concept Value
R: Questionnaire score obtained
SM: Maximum score of self-concept questionnaire
The values obtained were interpreted into the self-concept category in Table 1.

Table 1. Categories Self-Concept

Self-Concept Value (%)	Category
80 < SC ≤ 100	Very High
60 < SC ≤ 80	High
40 < SC ≤ 60	Moderate
20 < SC ≤ 40	Low
0 < SC ≤ 20	Very Low

Source: (Adaptation of Rahmah et al., 2023)

Concept understanding data analysis used an assessment rubric of 0-4 points with a total of 14 questions. The indicators and sample of questions are presented in Table 2.

Table 2. Table of Indicators and Sample Questions

Indicator	Question number	Sample questions
Interpreting	1	Take a look at the following picture!  Based on the picture above, mention the biotic and abiotic factors found in the pond ecosystem!
Exemplifying	2	In the concept of ecology, there are levels of life organization starting from individuals, populations, communities, ecosystems, biomes, and biospheres. Give examples from communities in the neighborhood!
Classifying	3	Symbiosis is a reciprocal relationship between two different living beings. Classify symbiosis based on the relationship between the two organisms involved!
Comparing	4	Pay attention to the picture below!  (Tropical rainforest)  (Savannah grassland) Based on the image above, tropical rainforest and savannah grassland ecosystems have several characteristics that can distinguish between the two. Mention at least 2 distinguishing features of the two images!
Explaining	5	Conservation is the management of biological natural resources that is carried out wisely to maintain the sustainability of biological supplies by improving the quality of their diversity of values. Explain the benefits of conservation in terms of ecological and economic aspects!
Summarizing	6	Indonesia is famous for having the highest biodiversity in the world. Indonesia has many biomes such as tropical rainforests, savannas, beaches, and grasslands. This is supported by its geographical location located on the equator line which receives sunlight throughout the year and high rainfall. Tropical rainforests in Indonesia are famous for having many endemic plants typical of Indonesia. Endemic plants are plant plants that are only found and live in a specific region or geographic location and are not found naturally anywhere else in the world. The presence of endemic plants is often related to the specific climate, soil, or environmental conditions of the region. Examples of endemic plants typical of Indonesia are *Rafflesia Arnoldi*, meranti, sandalwood, sugarcane orchids, paying leaves, resin, and others. Make a conclusion that can be drawn from the discourse!

Furthermore, students' understanding of concepts is analyzed using formula 2.

$$CU = \frac{S}{M} \times 100 \text{ ……. (2) (Aningsih \& Zahrani, 2019)}$$

Information:
CU: Conceptual Understanding Value
S: Total Score
M: Maximum score
The values obtained were interpreted into the concept understanding criteria in Table 3.

Table 3. Criteria for Understanding Concepts

Conceptual Understanding	Criterion
80 < CU ≤ 100	Excellent
60 < CU≤ 80	Good
40 < CU ≤ 60	Sufficient
20 < CU ≤ 40	Poor
0 ≤ CU ≤ 20	Very Poor

RESULTS AND DISCUSSION

The results of the self-concept questionnaire analysis showed that students had self-concept in the high, moderate, and low categories. The percentage of students in each category of self-concept is presented in Table 4.

Table 4. Percentage of students in each category of student self-concept

No	Category	Number of Students	Percentage of Self-Concept (%)
1	Very High	0	0
2	High	5	10
3	Moderate	14	28
4	Low	31	62
5	Very Low	0	0
	Total	50	100

Based on Table 4, it can be seen that the dominant category of student self-concept is in the low category with a total of 31 students or 62%, while the minimum level of student self-concept is in the high category with a total of 5 students or 10%, but no students are in the very high or very low category. Students with low self-concepts have a higher percentage compared to students with moderate and high self-concepts. Students with high self-concepts have a lower percentage than students with moderate self-concepts.

The results of the data analysis of the students' concept understanding test on ecology and biodiversity material reviewed from self-concept can be seen in Table 5.

Table 5. Students' Concept Understanding Reviewed from Students' Self-Concept

Categories Self-Concept	Student Code	Concept Understanding Value	Criterion	Average Concept Understanding Score (%)	Percentage of Students
High 60 < KD ≤ 80	D1	71	Good	69.64(Good)	10%
	D17	79	Good		
	E12	70	Good		
	E19	63	Good		
	E27	66	Good		
Moderate 40 < KD ≤ 60	D3	52	Sufficient	49.23(Sufficient)	28%
	D4	43	Sufficient		
	D5	46	Sufficient		
	D6	48	Sufficient		
	D12	50	Sufficient		
	D15	52	Sufficient		
	D25	52	Sufficient		
	D26	55	Sufficient		
	D27	54	Sufficient		

Categories Self-Concept	Student Code	Concept Understanding Value	Criterion	Average Concept Understanding Score (%)	Percentage of Students
	D28	48	Sufficient		
	E6	45	Sufficient		
	E7	52	Sufficient		
	E9	43	Sufficient		
	E13	50	Sufficient		
Low 20 < KD ≤ 40	D8	34	Poor	23.92 (Poor)	48%
	D10	34	Poor		
	D13	32	Poor		
	D14	32	Poor		
	D16	32	Poor		
	D18	32	Poor		
	D20	25	Poor		
	D21	38	Poor		
	D24	32	Poor		
	E1	38	Poor		
	E2	34	Poor		
	E4	21	Poor		
	E8	36	Poor		
	E10	34	Poor		
	E11	32	Poor		
	E14	29	Poor		
	E16	23	Poor		
	E18	25	Poor		
	E21	38	Poor		
	E22	39	Poor		
	E24	34	Poor		
	E25	30	Poor		
	E26	34	Poor		
	E28	25	Poor		
	D2	14	Very poor		14%
	D9	18	Very poor		
	D19	11	Very poor		
	D23	20	Very poor		
	E5	20	Very poor		
	E15	20	Very poor		
	E17	11	Very poor		

Based on Table 5, it is stated that no student with a high self-concept category has sufficient or low concept understanding. For students with a low self-concept category, there are 7 students who have a very poor understanding of concepts. Furthermore, students who have high self-concept also get a higher score of concept understanding than students who have moderate and low self-concept. However, moderate self-concept students showed higher average results in concept understanding than students who had low self-concept.

The results of the analysis of self-concept questionnaire data showed that the majority of research subjects had low self-concept. This finding is reinforced by the results of an interview with a science teacher at a school in Bangkalan which stated that students' self-concept at the time of learning has not been fully considered. The results of this study are comparable to the results of research conducted by Umamy et al. (2023) that students' self-concept is still low. This can be found in some students who have low self-confidence and feel that they are not enough. Self-concept can shape attitudes such as self-confidence, self-esteem, and the ability to recognize oneself thoroughly so that students believe that they are able to follow the learning process (Kartilah, 2022). A high self-concept will enable a person to solve problems in the surrounding environment. According to Gestalt learning theory, learning is an understanding process *(insight*). A student

who possesses conceptual understanding will be able to comprehend and resolve the issue at hand (Wisman, 2020).

According to the exam findings, one of the students with a high self-concept category gained a good conceptual understanding (subject D1). The results of the concept understanding test for D1 students were able to answer questions accurately and completely on the interpreting indicators, namely questions 1 and 9, on the indicator of classifying question number 11, on the indicator of summarizing question number 12, on the indicator of summarizing on question number 6 and 13 and on the indicator of attracting the reference of question number 12. The student can also answer questions on the indicator giving an example of question number 2, the indicator classifies question number 3 and explains question number 8 precisely but incompletely. Based on the results of the questionnaire answer to question number 19, it shows that the student remains calm in solving the science questions, even though there are very difficult questions. Based on the answers to the concept understanding questions, it can be said that students with high self-concepts will not give up on completing the tasks given. This statement is in accordance with the characteristics of a positive self-concept, namely believing in one's abilities (Anwaroti & Humaisi, 2020). Therefore, students with the D1 code have the compatibility of the results of the test for understanding the concept of ecology and biodiversity with the results of the self-concept questionnaire on science material.

Based on the test results, one of the students with a medium self-concept category with a concept understanding is sufficient to have a D3 code. The results of the concept understanding test for D3 student can answer questions accurately and completely on the indicator classifying question number 11, the indicator explaining question number 5, and the indicator summarizing question number 6. The student can also answer questions on the indicator interpreting question number 1, the indicator explaining question number 8, but the answer given is still not precise and complete. Based on the results of questionnaire question number 19, show that the student remains calm in solving the science questions, even though there are very difficult questions. Based on the answers to the concept understanding questions, it can be said that students with sufficient self-concept will try to complete the tasks given even though they experience difficulties. Asri & Sunarto (2020) state that if a person has a positive self-concept, then they will believe in their competence.

Students with low self-concept category not all students gain less concept understanding, but there are still students with low self-concept categories who gain very poor concept understanding. Based on the test results, one of the students who got the low self-concept category with poor concept understanding had a D8 code. The results of the concept understanding test for D8 students answered the questions correctly and completely on one of the indicators of concept understanding, namely interpreting question number 1, the indicator classifying question number 3, the indicator explaining question number 5, and the indicator summarizing question number 6. However, in the indicator of giving an example of question number 2, the indicator comparing question number 4, and the indicator of interesting reference to question number 7 the student could not answer the question according to the existing concept and on one number with the same indicator the student did not give an answer, so he did not get a score. Based on the results of the questionnaire on question number 19, show that the student gave an answer that did not agree if he remained calm in solving the science questions, even though there were very difficult questions. Based on the answers to the concept understanding questions, it can be said that students with low self-concept easily give up when solving the concept understanding questions before trying them. This statement is in accordance with the characteristics of a negative self-concept, which is easily influenced by failure (Anwaroti & Humaisi, 2020). Based on research conducted by Rizkiyah (2019) students' attitudes in biology lessons have a significant direct influence on the understanding of ecosystem concepts, the high and low understanding of ecosystem concepts is one of them influenced by students' attitudes towards biology materials.

Based on the test results, one of the students with a low self-concept category who obtained a very poor understanding of the concept had the E17 code. The results of the concept understanding test for E17 students can answer questions, but they are not by the concepts in the indicator of interpreting question number 1, the indicator of giving examples of question number 2, the indicator of classifying question number 3, the indicator of comparing question number 4, and the indicator of explaining question number 5. However, in the indicator of summarizing and attracting inference, the student could not answer both numbers with the same indicator. Based on the results of the questionnaire in question number 19, shows that the student gave an answer that he often felt emotional when he found a very difficult question while doing an assignment. Based on the answers to the concept understanding questions, it can be said that students with very low self-concepts give up on solving concept-understanding problems before trying them. The way that can be used to improve students' self-concept is to create a learning environment that encourages student motivation to learn (Hasanah & Suyadi, 2020). This statement is supported by findings in the study Isnaningrum (2020) stated that students with low self-concept generally feel afraid and pessimistic when facing challenges.

The factor that can increase students' understanding of concepts is in good criteria, namely science learning needs to take advantage of the environment found in the environment around the school as a source of learning. Based on David Ausubel's learning theory, students will understand better because the material taught is interrelated and more meaningful (Tarmidzi, 2018). This is also by the theory of learning Piaget's constructivism on ecology and biodiversity materials. The constructivist approach refers to learning that involves students directly in observing, exploring, and understanding their natural environment (Sugrah, 2019), so in learning ecology and biodiversity, students not only develop theoretical concepts but develop a deep understanding of ecology and biodiversity. In addition to learning through direct observation of the surrounding environment, it can also be done by improving students' self-concept. Self-concept can be improved through educators building a learning atmosphere that increases learning motivation, educators must be able to understand the situation of students who are at the stage of optimizing their abilities and educators can build a challenging learning atmosphere (Hasanah & Suyadi, 2020)

CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

Based on the study's results, it can be concluded that as many as 5 students have a high self-concept, 14 students have a moderate self-concept category, and 31 students have a low self-concept. Thus, it can be stated that the majority of research subjects have a low self-concept towards the material ecology and biodiversity of Indonesia. In high self-concept, the average concept understanding score was 69.64% with good criteria, in moderate self-concept, the average concept understanding score was 49.23% with sufficient criteria, and in low self-concept, the average concept understanding score was 23.92% with poor criteria. Students who have a high self-concept tend to have a good understanding of the concept of ecological materials and Indonesia's biodiversity.

B. RECOMMENDATION

In the next research, it is hoped to use a research method that delves deeper into how self-concept affects the understanding of concepts in the material being studied. Students' self-concept needs to be considered and developed in science learning by designing an interesting learning model so that students can understand the learning material effectively. In science learning, it is necessary to take advantage of the environment available in the school environment as a source of learning.

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