

## THE INFLUENCE OF A CONTEXTUAL APPROACH ON STUDENTS' UNDERSTANDING OF CONCEPTS IN THE CLASSIFICATION OF LIVING CREATURES MATERIAL

Samsul Bahri<sup>1</sup>, Yuli Budhiarti<sup>2</sup>

<sup>1,2</sup> Melawi Teacher Training and Education College

Email: [samsulbahri804@gmail.com](mailto:samsulbahri804@gmail.com), [yuli.budhiarti@gmail.com](mailto:yuli.budhiarti@gmail.com)

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### ABSTRACT

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Research problem is a lack of understanding of the concepts in Classification of Living Things and a lack of the right approach so that students quickly get bored and are lazy to pay attention in the science learning process. The aim of the research is to find out whether the contextual approach influences students' conceptual understanding of Classification of Living Things. Pre-Experimental experimental method with a quantitative approach one group pretest posttest design. Research population consisted of 13 class X students at SMAN 1 Entikong. Data collection technique uses pretest and posttest test sheets by paying attention to four indicators of concept understanding. Data analysis using normality test and Wilcoxon test. Based on the normality test results,  $X_2$  count  $> X_2$  table with a pretest value of  $24.417 > 9.488$  and a posttest value of  $-74.983 < 9.488$ . The results of research using the percentage categories of the four indicators of students' conceptual understanding show that the first indicator is 69% moderate, the second 92% high, the third 84% high, and the fourth 92% high. Based on the Wilcoxon test, the  $W$  count is 91  $W$  table 17. So it can be concluded that  $H_a$  is accepted and  $H_0$  is rejected, meaning that there is an influence of the contextual approach on understanding concepts in Classification of Living Things.

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### ARTICLE HISTORY

Received 30 August 2024  
Revised 08 October 2024  
Accepted 24 October 2024

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### KEYWORDS

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Contextual Approach,  
Understanding Concepts  
Classification of Living Things

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### Introduction

The development of educational science in Indonesia is currently leading to high-level thinking skills or often referred to as High Order Thinking Skills (HOTS). Likewise, the standard of education in Indonesia will increase over time, this increase is influenced by the development of a global mindset. This research is based on an understanding of conventional learning which only focuses on theoretical teaching, which can cause students difficulty in understanding abstract concepts, such as the classification of living things. The concepts in the material on the classification of living things are often difficult for students to understand because they involve mathematical concepts related to the key dichotomy in the classification of living things and situations that are difficult to imagine in everyday life.

The material in Biology has many perceptions that must be understood, so concept skills are very useful for every student to have. Understanding Biology concepts plays a role in integrating science with technology in everyday life. Understanding the perception that students

\*CORRESPONDING AUTHOR. Email: [samsulbahri804@gmail.com](mailto:samsulbahri804@gmail.com)

have can be caused by the interpretation that students have of a concept of learning material. Students who come with the intention of studying in class bring their own conceptions and initial knowledge about a learning concept based on phenomena they have seen and felt themselves (Suhendi et al., 2014). In one class, students' level of understanding of concepts related to subject matter varies. There are students who are able to quickly accept the lesson material presented by the teacher, but there are students who take a long time to understand the lesson material.

By using a contextual approach, learning is expected to occur naturally in the form of student work and experiential activities, not a transfer of knowledge from teacher to student (Nurdin, 2009). Students learn what is useful and strive to achieve it. In this work, students need lecturers as coaches and mentors. In this approach, students are expected to learn by "experiencing" rather than "remembering." Previous research shows that implementing learning through a contextual approach can improve student learning outcomes in chemistry subjects (Chotimah, 2007; Siregar, 2011).

There are various organism systems in living things, so it is necessary to classify them so that students can easily learn them. Classification of living things can be done through various types in groupings. According to Campbell (2008), autotrophs are organisms that obtain organic food molecules without eating other organisms or substances originating from other organisms.

Arends (2012) explains that concepts become the foundation for a network of ideas that demands a person's thinking. An understanding of the concept of classification of living things is very much needed in the science problem solving process. Relevant context can also increase students' motivation in learning, because they can see the usefulness and application of science concepts in everyday life. The reason researchers took this title is because a contextual approach can involve situations and activities that encourage students to think, discuss, and try to apply science concepts in a given context.

The contextual learning model is a learning concept that helps teachers link the material they teach with real world situations and encourages learning to make connections between the knowledge they have through application in students' lives. So the teacher's job is to help students achieve their goals. According to Sudirman (2014) teachers deal more with strategies than information so that classroom management becomes conducive.

Based on the descriptions above, it can be understood that contextual learning prioritizes elements of knowledge and experience or realities that occur in everyday life, high-level thinking, student-centered, where students must be active, critical and creative, students are able to solve problems, students learning is fun, exciting, not boring, and uses various learning resources.

The results of initial observations on March 20 2024 carried out at SMAN 1 Entikong found several obstacles and problems related to learning, including: Lack of understanding of students' concepts in understanding science learning and its application in everyday life, both inside and outside the classroom environment. There is a lack of the right approach in the learning process so that students quickly get bored and are lazy to pay attention when learning science to material on the classification of living things. It is necessary to apply concepts broadly through a contextual approach, students can see how the concepts of classification of living things relate to other science concepts.

Based on the problems that have been described, researchers are interested in conducting a scientific study regarding the influence of a contextual approach on students' conceptual understanding by paying attention to several indicators in the material on the classification of living things in class X SMAN 1 Entikong. So it can be a reference for further scientific research on students' understanding of concepts. This is because class X not yet able to understand the

concept of classification of living things in the context of everyday life and how this concept can be applied in students' daily lives. In line with the opinion of Tural, G, (2013) Applying learning with a contextual approach influences students' perceptions about science, who consider science difficult and after learning with a contextual approach, students think science is fun. The aim of the research is to find out whether the contextual approach influences students' understanding of concepts in science material.

## Methods

The research method used is the Pre-Experimental Experimental Method with a quantitative approach. This research uses a one group pretest posttest design as in Figure 1 (Sugiyono, 2017).

<i>Pretest</i>	<i>Treatment</i>	<i>Posttest</i>
O1	X	O2

**Figure 1. Research Design**

Information:

O1 = *Pretest* (initial test before being given the application of the contextual approach)

X = Treatment given

O2 = *Posttest* (final test after being given the application of the contextual approach)

## Research Subjects and Objects

The subjects in this research were all 13 class X students consisting of 5 women and 8 men. The object of research in this research is a contextual approach to understanding the concepts of class X SMAN 1 Entikong on the material of the classification of living things.

## Data collection technique

### Observation

Research observation can be used as a tool to observe and obtain information about phenomena or objects that are directly observed. The observation technique used in this research is participant observation technique. Participant observation techniques were used to obtain data about students' conceptual understanding in the learning process using a contextual approach based on indicators of class X SMPN 1 Entikong on the material on the classification of living things. With this participant observation technique, the data obtained will be more complete, sharper, and will allow you to know at what level the meaning of each visible behavior (Sugiyono, 2017).

## Research instrument

The research instrument uses test items by paying attention to a contextual approach based on indicators of students' conceptual understanding in class. The indicators of students' conceptual understanding abilities are in table 1.

**Table 1. Indicators of Students' Conceptual Understanding Ability for Classification of Living Creatures Material**

No	Indicator	No Question Items	Student Gain Score			
			Pretest		Posttest	
			True	False	True	False
1	Restate a concept	1				
2	Classifying objects according to certain properties (according to the concept)	2				

3	Give examples and non-examples of the concept	3
4	Presents concepts from various forms of mathematical representation	4

These indicators can be used to measure the extent to which students understand the concepts being studied. It is important to combine several indicators and choose the ones that are most relevant to the learning material and learning objectives to be achieved. In evaluation, it should be noted that understanding of concepts is not absolute and can develop over time and continuous learning experiences. This can be seen in table 2 to find out the criteria for the percentage of student understanding of concepts according to (Istikomah & Jana 2016) which are as follows:

**Table 2. Criteria for Student Concept Understanding Percentage**

Test Score Percentage	Category
81% - 100%	High
61% - 80%	Medium
41% - 60%	Less
21% - 40%	Very less

The data processing technique in this research is to use the normality test and the Wilcoxon test with the aim of finding out whether there is an influence or not. Test the hypothesis to determine the effect of the contextual approach in increasing students' understanding of concepts the classification of living things. So the hypothesis test carried out is as follows:  $H_a$  = there is an influence of the contextual approach on increasing understanding of concepts in the material for the classification of living things.  $H_0$  = There is no influence of the contextual approach on increasing understanding of concepts in the material on the classification of living things.

## Results

The test results are based on indicators of students' conceptual understanding abilities obtained from the *pretest* and *posttest* results so that the results are as follows:

**Table 3. Percentage Results of Students' Concept Understanding Ability Indicators**

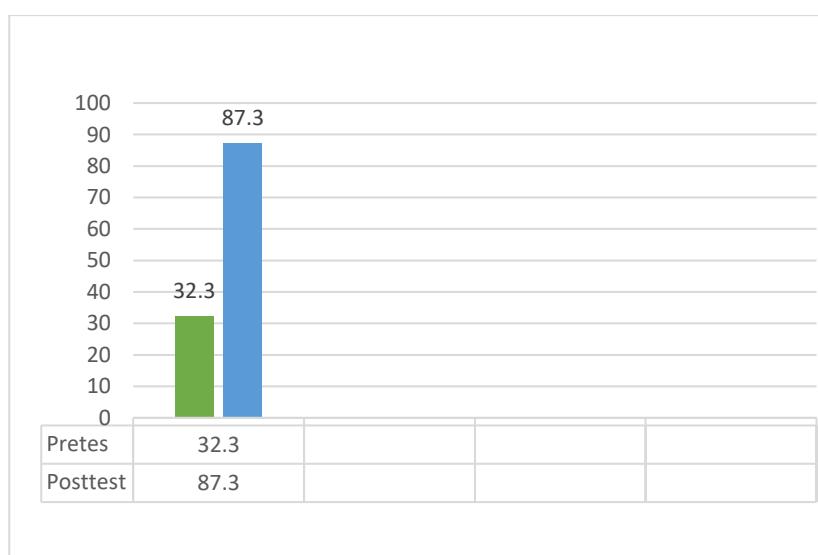
No	Indicator	No Question Items	Student Gain Score				Results Qualification (%)		Category	
			Pretest		Posttest		Pretest	Posttest	Pretest	Posttest
			True	False	True	False				
1	Restate a concept	1	9 Student	4 Student	9 Student	4 Student	69%	69%	Medium	Medium
2	Classifying objects according to certain properties (according to the concept)	2	1 Student	12 Student	12 Student	1 Student	8%	92%	Very less	High
3	Give examples and examples of the concept	3	4 Student	9 Student	11 Student	2 Student	31%	84%	Very less	High

4	Presents concepts from various forms of mathematical representation	4	0 Student	13 Student	12 Student	1 Student	0%	92%	Very less	High
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Table 4 data on the results of the *pretest* and *posttest* of students' ability to understand concepts in class X at SMAN 1 Entikong in learning material on the classification of living things. Based on this table, it can be seen that the lowest pretest scores were 0 and 10, while the posttest results with the highest score of 100 consisted of 6 students and the lowest score was 50. This shows differences based on *pretest* and *posttest* test scores.

**Table 4. Pretest Test Results Data and Posttest Data**

Code Student	Pretest	Posttest
AD	75	100
CF	45	85
DS	50	100
D	0	85
N	10	85
RK	25	100
S	25	50
SK	50	100
VS	25	100
VL	25	85
VA	40	60
WGS	10	85
YM	40	100
Total number	420	1.135
Average	32,30	87,30



**Diagram 1. Diagram of Pretest and Posttest Data Results**

Diagram 1 shows the *pretest* test results data for class X students at SMAN 1 Entikong where the average score is 32,3. With a total of 420 from 13 students. Meanwhile, the average *posttest* score showed 87,3 with a total of 1,135 from 13 students. So it shows different differences in the *pretest* and *posttest* test scores. This can also be seen in table 5 based on the results of the *pretest* and *posttest* Wilcoxon test analysis.

**Table 5. Pretest and Posttest Wilcoxon Test Results**

No Responden	X	Y	X-Y	(X-Y)	Rank	<b>Rank</b>	
						(+)	(-)
1	75	100	-25	25	2,5		2,5
2	45	85	-40	40	4		4
3	50	100	-50	50	5,5		5,5
4	0	85	-85	85	13		13
5	10	85	-75	75	10,5		10,5
6	25	100	-75	75	10,5		10,5
7	25	50	-25	25	2,5		2,5
8	50	100	-50	50	5,5		5,5
9	25	100	-75	75	10,5		10,5
10	25	85	-60	60	7,5		7,5
11	40	60	-20	20	1		1
12	10	85	-75	75	10,5		10,5
13	40	100	-60	60	7,5		7,5
Total							91

## Discussion

Based on the results of research at SMAN 1 Entikong, the sample in this study was 13 class X students. Before learning takes place, pretest questions are given to determine students' initial abilities, and after learning the material, students are given posttest questions which aim to determine students' understanding of concepts.

Based on the research that has been carried out, it can also be analyzed that there are several things that cause students' low understanding of concepts, especially regarding the classification of living things. Like the research results of Ngertini, et al. (2013) said that improving students' conceptual understanding and scientific literacy can be done by applying learning strategies that are appropriate to the concepts of the material to be taught and delivered. Therefore, perhaps teachers can analyze again, strategies, especially what other methods will be used during learning that are appropriate to the material on the classification of living things, apart from the methods that have been used previously. Apart from that, according to Shidik (2020), when the teacher is going to carry out learning, it is better for the teacher to provide motivation first to the students because when the students are motivated, the students will tend to be more enthusiastic and this will enable them to easily understand the concepts of the lesson so that they will get better learning results. better.

Adhani and Rupa (2020) also said that the factors causing low understanding of concepts are difficulty understanding questions, students' varying academic abilities, complexity of material, weak retention, and unsupportive learning processes. This low understanding of concepts could be due to misconceptions that occur among students. As stated by Yana, et al. (2019) that many students understand some concepts with misconceptions where there are conceptions that do not match the actual concept. These errors may occur during or as a result of newly acquired learning. Analysis of concept understanding is an important thing to

do to see the distribution of concept understanding by students. The results of the analysis of understanding this concept can be used as a basis for considering follow-up learning that will be used (Lestari, et al., 2017; Silung, et al., 2016).

Based on table 3 above, it can be seen that there are differences in the ability to understand concepts in class X SMAN 1 Entikong there are differences where the category is very lacking before the treatment of the treatment and after being given treatment undergoes a high enough change. These four indicators include the results of the indicator pretest 1). Restating a concept, 9 students answered correctly, 4 students answered incorrectly with a qualifying result of 69% in the medium category. Indicator 2). Classifying certain objects (according to the concept) only 1 student answered correctly and 12 students answered incorrectly out of 13 class X students with 8% qualifications in the very poor category. Indicator 3). Providing examples and non-examples of the concept, 4 students answered correctly and 9 students answered incorrectly with 31% qualifications in the very poor category. In indicator 4). Presenting concepts from various forms of mathematical representation, 12 students answered correctly and 1 student answered incorrectly with a qualification of 92% in the high category.

The results of the posttest after being treated with a contextual approach to the material for classifying living creatures based on these four indicators experienced quite a change. Where in indicator 1). Restating a concept is still the same as the pretest, with 9 students answering correctly, 4 students answering incorrectly with a qualifying result of 69% in the medium category. This is different from the results of the next indicator which experienced changes, namely in Indicator 2). Classifying certain objects (according to the concept), 12 students answered correctly and 1 student answered incorrectly out of 13 class X students with 92% qualifications in the high category. Indicator 3). Providing examples and non-examples of the concept, 11 students answered correctly and 2 students answered incorrectly with a qualification of 84% in the high category. In indicator 4). Presenting concepts from various forms of mathematical representation, 12 students answered correctly and 1 student answered incorrectly with a qualification of 92% in the high category.

This shows that their overall ability to answer questions correctly is different from the *pretest* and *posttest* results. However, these findings are in line with research conducted by Istikomah & Jana (2016), which states that "Students' ability to understand mathematical concepts is in the medium category because students are often confused when trying to solve a problem, even though they already understand the concepts that must be used. Apart from that, according to Fajar & Arapu (2018), "the ability to understand concepts is categorized as high if the indicators for understanding concepts are achieved well and correctly. So it can be seen based on diagram 1 that there are differences in students' understanding of concepts in the pretest and posttest. The average score for students' conceptual understanding on the pretest was 32.30. Meanwhile, the average score for students' conceptual understanding in the posttest was 87.30 for class X students' learning about the classification of living things.

Based on the research that has been carried out, it can also be analyzed that there are several things that cause students' low understanding of concepts, especially regarding the classification of living things. Like the research results of Ngertini, et al. (2013) said that students can improve their understanding of concepts and scientific literacy by applying learning strategies that are appropriate to the concepts of the material to be taught and delivered.

Therefore, perhaps teachers can analyze again, strategies, especially what other methods will be used during learning that are appropriate to the material on the classification of living things, apart from the methods that have been used previously. Apart from that, according to Shidik (2020), when a teacher is going to carry out learning, it is better for the teacher to provide

motivation first to students because when students are motivated, students will tend to be more enthusiastic and this will enable them to easily understand lesson concepts so that they will obtain good learning outcomes. better.

Adhani and Rupa (2020) also said that the factors causing low understanding of concepts are difficulty understanding questions, students' varying academic abilities, complexity of material, weak retention, and unsupportive learning processes. Students seem to be doubtful about the concepts of identification and classification because there are still many students who find it difficult to differentiate between the two. Students consider identification by classification to be an activity of grouping living things. According to Ramlawati (2017), classification is a way of grouping living things based on similar characteristics they have. Meanwhile, identification is observing one living creature with another living creature based on behavior, morphology, anatomy and physiology (Ramlawati, 2017).

The key to termination in understanding concepts needs to be applied to student learning, especially in the material on the classification of living things. According to Ramlawati (2017), the key to determination is a description of the characteristics of living things which are arranged sequentially from general to specific characteristics to find a type of living creature.

Classification of living things is a system used to group various types of organisms into broader categories based on similarities in morphological, genetic, behavioral and evolutionary characteristics. The main aim of this classification is to understand the diversity of life on Earth and facilitate identification and further study of these organisms (Pangsuma & Hidayat, 2023).

Since ancient times, humans have understood the importance of classification to organize and understand the biodiversity around them (Widianto et al., 2003). Modern classification originates from the works of scientists such as Carl Linnaeus who created the binomial classification system to give scientific names to each species based on genus and specific epithet. As science and technology develop, classification no longer only relies on visible morphological characteristics, but also uses genetic and molecular data to build more accurate kinship relationships between various organisms (Silalahi, 2015).

The current classification of living things covers various levels, starting from very broad domains (such as Archaea, Bacteria, and Eukarya), to individual species which are the basic units of biological classification (Azhar, 2016). A good classification system must be reflective of the enormous diversity in life and able to accommodate changes and new discoveries in science.

The understanding of the concept of class X at SMAN 1 Entikong is based on 4 indicators with the results of the normality test of pretest data and posttest data of the chi square test, it is known that the pretest data is not normally distributed and the posttest data is normally distributed. This was proven by calculating the normality test of the pretest data which was carried out using the chi square test  $X^2_{\text{count}} > X^2_{\text{table}}$  that is,  $24,417 > 9,488$  which means the pretest data is not normally distributed. Then the calculation of the posttest data normality test was carried out  $-74,983 < 9,488$  which means the posttest data is normally distributed. This can be seen in table 5 of the Wilcoxon pretest and posttest results.

Based on table 5, the results of the Wilcoxon test are used to see the effect of the treatment given. Where the results of hypothesis testing using Wilcoxon test calculations for pretest and posttest data obtained a t count of 91 and a t table of 17. So it can be concluded that there is an influence of the contextual approach on students' conceptual understanding of the material on the classification of living things in class X at SMAN 1 Entikong.

## Conclusion

The conclusions from the results of the research that have been carried out are as follows: First The influence of the contextual approach on class X students' understanding of concepts at SMAN 1 Entikong in the material on the classification of living things. This can be seen from the average score between the pretest of 32.30 and the average posttest score of 87.30. Second The results of the normality test of the pretest and posttest data using the chi square test showed that the pretest data was not normally distributed using the chi square test  $X^2_{\text{count}} > X^2_{\text{table}}$  this is  $24,417 > 9,488$ . Then, in calculating the normality test, the posttest data was obtained  $X^2_{\text{count}} < X^2_{\text{table}}$  this is  $-74,983 < 9,488$  which means the posttest data is normally distributed. Third hypothesis test results using the Wilcoxon test for pretest data and posttest data were obtained  $W_{\text{count}}$  is 91 and  $W_{\text{table}}$  is 17. From these data it can be seen that  $W_{\text{count}} > W_{\text{table}}$ . So it can be concluded that learning using a contextual approach towards students' conceptual understanding of the material on the classicization of living things in class X SMAN 1 Entikong has an influence.

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