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Analysis of Critical Thinking Skills of Students Assisted with Nearpod Media on Ecosystem Materials

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ABSTRACT

The era of globalization is marked by changes and rapid developments that occur in various fields of life, one of which is in the field of education. This situation becomes a challenge for educators to always develop their abilities. This critical thinking skill becomes important to be appointed and trained in biology learning. Through this research, the aim is to analyze students' critical thinking skills using a blended learning model assisted by nearpod media on ecosystem materials. This study uses a quantitative approach which used method is a quasi-experimental method. The technique for collecting research data is through a description test of ten questions given during the pretest-posttest. Based on the data obtained during the study, it can be concluded that the results of critical thinking skills assisted by nearpod media got an average pretest of 55.53 which increased to 78.25 with an N-Gain value of 0.46 medium criteria. Students with critical thinking skills in the high category were 28 students, the medium category was 3 students, and the low category was 2 students.

Introduction

The era of globalization is marked by changes and rapid developments that occur in various fields of life, one of which is in the field of education. This situation becomes a challenge for educators to always develop their abilities. This demand was conveyed because the competency standards for elementary and secondary education unit graduates include students must be able to construct and apply information and knowledge logically, creatively, critically, and innovatively (Kemendikbudristek, 2022).

One of the skills that need to be mastered by students today is critical thinking skills. This critical thinking skill becomes important to be appointed and trained in biology learning, because it requires mastery of many concepts. These concepts have a fairly high abstraction, so that studying biology is often considered to have its own challenges and difficulties (Salirawati, 2013). Therefore, the purpose of learning by building students' critical thinking skills is to solve problems that exist in everyday life.

Problems that arise in various aspects of life can be introduced to students to get to know and also analyze further how to think critically well to be able to solve the problems at hand. The same thing was explained by Sutiani et al. (2021) that the development of critical thinking skills can be influenced by several factors in Persky et al. (2019) including learning experiences, guidance and support for learning resources, learning environment, and setting targets for achieving the desired learning. It is hoped that with the habituation of fact-based problems in the surrounding environment, students' critical thinking skills can improve findings-based learning activities (Davies, 2013).

Preliminary studies found that teachers still dominate during the learning process so that students' critical thinking power is still low. Then found a relationship between ecosystem material where the material concept discusses a lot about ecosystem problems. Therefore, students are required to be able to solve problems, explain, and conclude (Kartika et al., 2020). In research La Iku (2020) stated that in the concept of ecosystems, especially in the discussion of energy flows that require abstraction so that it has its own complexity for students. It is reviewed that students' critical thinking skills are very diverse, including thinking skills can be reflected into skills in interpreting, analyzing, evaluating, inferring, explaining, and self-regulating (Rositawati, 2019). Based on these abilities, the way to develop students' critical thinking skills in science learning, precisely in biology lessons, is not understood only by rote. In the process, of course, it is necessary to reconstruct the knowledge of students to become active learners (Anggareni et al., 2013).

This skill is important because it can be developed and improve the quality of students' thinking in solving problems related to the material presented by the teacher. Through these skills, students can be skilled in analyzing, assessing, and reconstructing their knowledge based on the thinking process to solve problems (Wulandari et al., 2021). Based on these findings, a learning model is needed in which it can change the way students think from observing, analyzing, to evaluating by discussing with their peers. In line with the basic learning theory such as constructivism theory.

The learning model that is considered appropriate in this study is the blended learning model because it has a syntax that can construct students' knowledge in forming critical thinking skills. Therefore, blended learning has characteristics as stated by Maulida et al. (2021) that blended learning is more efficient and effective in time and place, which can be done through monitoring web-based applications, such as LMS or google classroom assistance. The media used in this research is assisted by nearpod which can provide variations in learning media for materials, test instruments, and other activities. Through this research, the aim is to analyze students' critical thinking skills using a blended learning model assisted by nearpod media on ecosystem materials.

Method

This study uses a quantitative approach that is testing by processing data numerically. According to Sukmadinata (2017), it is explained that research that is testing, then each variable must have a measuring instrument with instruments that have gone through validation. The research method used is a quasi-experimental method with a non-equivalent control group design involving the experimental and control classes.This method has a control group, but cannot function fully to control external variables that affect the experiment (Sugiyono, 2015). Sources of data were obtained through primary data consisting of the results of the pretest-posttest of the two classes.

The research population is all class X IPA with a total of nine classes. The research sample was taken using a purposive sampling technique with X IPA 2 as the control class and X IPA 5 as the experimental class. The technique for collecting research data is through a description test of ten questions given during the pretest-posttest. The question has gone through a test-test phase with an analysis of validity, reliability, discriminatory power, and level of difficulty using Anates. As for analyzing the results of students' critical thinking skills, it can be seen from the pretest-posttest which was processed using the N-Gain value to find out how the results improved from before and after treatment during the study.

Results and Discussion

The results of the pretest-posttest were analyzed to determine the results of students' critical thinking skills in ecosystem material.

Table 1. Results Second Class Pretest-Posttest

Data	Pretest	Posttest	N-Gain	Criteria
Experiment	55.5	78.25	0.46	Currently
Control	63.3	74.92	0.20	Low

Based on Table 1, it is known that the average pretest value of the experimental class using the blended learning model assisted by nearpod media is 55.5, increasing to 78.25 during the posttest. Calculation of N-Gain pretest-posttest experimental class got 0.46 results in the medium category. The details of the results of students' critical thinking skills in general from the two research classes, both from the experimental class and the control class based on each indicator are presented.

Table 2. Details of Achievement of Critical Thinking Indicators for Both Classes

KBK Indicator	Experiment				Control			
	Pretest	Posttest	N-Gain	Category	Pretest	Posttest	N-Gain	Category
Give a simple explanation	87.9	62.1	-2.06	low	62.1	54.5	-0.20	low
Building Basic Skills	81.06	84.09	0.16	low	78.03	81.06	0.13	Low
Conclude	55.05	77	0.48	middle	66.6	82.8	0.48	middle
Provide further explanation	34.84	76.13	0.63	middle	53.7	68.5	0.31	middle
Setting Strategy and Tactics	33.33	83.7	0.75	high	53.7	73.4	0.42	middle

It is presented in Table 2 that there are differences in the values of the pretest-posttest results. In Table 2, it can be seen that the experimental class has N-Gain values from low, medium to high levels. Based on the value of each student, the data is then interpreted into three categories of students with high, medium, and low critical thinking skills. The data can be seen in Table 3.

Table 3. Criteria of Student's

No.	Value Interval	Total students	Percentage	Category
1.	72.5 – 95	28	84.8%	High
2.	63.5 – 71.5	3	9.1%	Middle
3.	37.5 – 62.5	2	6.1%	Low
	Amount	33	100%	

Based on Table 3, it can be concluded that students with high category critical thinking skills have a more dominant number. Critical thinking skills in the high category as many as 28 people, the medium category as many as 3 people, and the low category as many as 2 people. Based on the grouping of the three categories of students, an indicator graph is presented based on the acquisition of the three categories of students which can be seen in Figure 1.

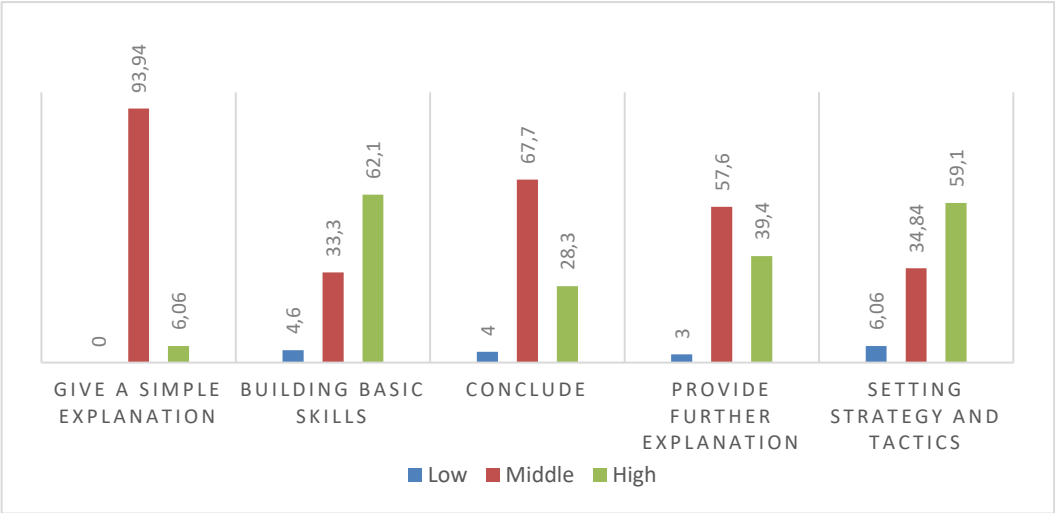

Figure 1. Chart of score in every indicator from student category

The first indicator, which is providing a simple explanation, has decreased the average score of students from pretest to posttest. This is inversely proportional to the other four critical thinking indicators which experienced an increasing change in value from pretest to posttest. The indicator provides a simple explanation of the decline in the average value caused by several possible factors. This factor is because there is another agenda, namely the presentation of environmental projects from the school. This is likely to be the cause of the loss of focus on student learning. Another possible factor is that students fill in the questions carelessly without reading the discourse carefully.

This is in line with the statement of Reski, (2019) which states that one of the factors that influence learning is adjustment to a condition which will affect the response given. There are three aspects of conditions that can cause differences in responses, namely factors of physical condition, needs, and skills. Especially those who are faced with this experimental class in a state of exhaustion both in terms of circumstances and from their senses.

The indicator of building basic skills has an average value that increases slightly from 81.06 to 84.09 at the posttest. However, the N-gain value is in the low category with a value of 0.16. The problem of building basic skills is not so much an increase in value because the majority of students have been able to understand the questions well. This is visualized by the achievement of 62.1% of students who excel in this second indicator at the level of students in the high category. Indicators of building these basic skills include observing and considering the results of observations based on the information obtained. These skills are trained through the syntax of the blended learning model at the stage of determining and understanding ideas. At the time of learning this was trained when using nearpod media in ecosystem video.

An indicator that is quite crucial is that the indicator concludes that it has understood the questions well, even though it excels in students with a moderate level of critical

thinking category of 67.7%. The average value of the pretest got a value of 55.05 to 77 with an N-Gain value of 0.48 in the medium category. Likewise with the fourth indicator, which provides further explanation with the average pretest value of 34.84 increasing to 76.13 with an N-Gain value of 0.63 which is interpreted in the medium category. The last indicator is strategy and tactics with an average pretest value of 33.3 to 83.7 which increased significantly. This is evidenced by the N-Gain value of 0.75 which is interpreted as a high category.

Indicators of strategy and tactics are superior indicators in terms of N-Gain value. These results can boost students' learning motivation so that students can answer well. This happened because the experimental class was faced with a learning situation that spurred critical thinking skills with the help of nearpod media, so that students could practice their critical thinking skills. One way to train critical thinking skills is through the syntax of the blended learning model, namely the stage of constructing knowledge. At this stage students will be assisted in forming concepts that have been obtained through the process of communicating information. After communicating the information, the teacher will help strengthen the concept. Allows indicators of strategy and tactics to be easy to answer during the posttest. This is in line with Nugraha et al. (2017) statement that the purpose of science education is to help students develop higher-order thinking skills through a learning process that uses the principles of High Order Thinking Skills (HOTS) such as science process skills, reasoning, reflective thinking, and critical thinking skills. These critical thinking skills include being able to analyze, interpret, and provide alternative problem solving.

Conclusion

Based on the data obtained during the study, it can be concluded that the results of critical thinking skills assisted by nearpod media got an average pretest of 55.53 which increased to 78.25 with an N-Gain value of 0.46 medium criteria. Students with critical thinking skills in the high category were 28 students, the medium category was 3 students, and the low category was 2 students. Students with high critical thinking skills category are superior with indicators of building basic skills, middle category students are superior with indicators providing simple explanations, and low category students are superior in strategy and tactics indicators.

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