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Student's Critical Thinking Ability In Ethnoscience-Based Biology Learning In The Era Of Digitalization

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Abstract

This research aims to analyze the critical thinking abilities of MAN 1 Bone students in ethnoscience-based biology learning in the era of digitalization. This type of research is descriptive qualitative. The data processed are the results of student's critical thinking ability tests, observations and interviews with biology subject teachers and students with the highest test scores, three representatives from each class X.1, X.2 and X.5. The research results showed that student's critical thinking abilities based on the results of critical thinking ability tests in ethnoscience-based biology learning with ecosystem subjects for the even semester of the 2022-2023 academic year were in a very low category. Meanwhile, from learning activities, student's abilities are at varying levels based on critical thinking indicators. The indicator of providing further statements or explanations is at a fairly good level for the results of critical thinking ability tests and student learning activities. The indicators of providing basic statements or explanations, providing reasons for a decision, drawing conclusions or inferences, and providing feedback & reinforcement are at a level that is not good for critical thinking ability tests, while student learning activities are at a fairly good level. The results of this study indicate that it is important to increase student's mastery and understanding by integrating ethnoscience in learning so that they have critical thinking skills amidst the trend in the use of information technology.

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INTRODUCTION

Education is a conscious effort designed to realize a meaningful learning process so that students are active in developing their potential to have religious spiritual strength, self-control, personality, intelligence, noble morals and skills needed by themselves, society, nation and state (Undang-Undang No. 20 Tahun 2003). Education is an important basis for making the nation's life intelligent and improving the quality of human resources (Idmal & Wahyuni, 2019). Therefore, education must be managed systematically and consistently to realize national development (Asma, 2021).

Education in the current digital era encourages a learning process that must prepare students to have the ability to innovate both in using technology, information media, and work as a preparation for living life in the future. Therefore, it is necessary to implement learning activities that are integrated into thinking, reasoning and material development skills, not just memorizing (Putri et al., 2018). With these skills, students have the competence to survive in the era of the onslaught of information technology.

The skills that must be mastered are high order thinking skills (Amin & Adiansyah, 2018). This skill requires students to be able to have critical, creative, communicative and collaborative thinking skills which are part of the high-level thinking skills that must be possessed in the era of digitalization (Mahanal, 2019; Hidayati et al., 2021). The aim of this thinking is to improve student's thinking abilities at a higher level, one of which is the ability to think critically in sorting out reliable information, solving problems and making decisions in various complex situations (Indriana & Hidayati, 2022).

Critical thinking skills are very important to apply and become the basic capital for students to think. Through critical thinking, students can solve problems because the increasingly rapid development of knowledge and technology produces various problems that must be faced. Therefore, critical thinking is part of student's maturity in fundamental thinking and needs to be taught to students through various disciplines in order to prepare them for life.

It is important to develop this critical thinking ability in students, so that it is easier for them to understand, know well the problems that occur so they can solve them and apply them to various concepts. Apart from that, critical thinking skills can equip students to respond to the influx of information received to test its truth or the knowledge gained with relevant evidence so that they can then draw the right conclusions. Through the critical thinking process, it encourages students to train and develop their training abilities (Mutia & Alberida, 2022) by integrating it into the learning process, including ethnoscience-based biology learning.

Ethnoscience-based biology learning focuses on local knowledge and local culture as learning resources. This approach makes it easier for students to combine biology learning with student's daily habits. This is because biology learning has more potential to develop student's experience and competence in understanding the natural surroundings (Yulianis et al., 2019) while also relying on the uniqueness and advantages of a region, including culture and technology based on local wisdom (Mardianti et al., 2020).

Ethnoscience is an activity to transform society's original science into scientific science (Wardani, 2021). Thus, learning that combines ethnoscience concepts provides students with a deep and integrated understanding by connecting the material obtained in class with the context of their lives. Learning that is aligned between science, technology and society provides an illustration that learning with an ethnoscience concept is not only informative but also practical and can be applied in social life.

Critical thinking skills need to be developed in ethnoscience-based biology learning. This is because basically biology learning leads to scientific activities (Muliana et al., 2021) which involve knowledge, application, investigation and assessment which require critical thinking. Like wise with ethnoscience, it contains local wisdom cultural values that are related to biological concepts so that it requires critical thinking skills to be able to harmonize the two. Ethnoscience-based biology learning is a means for students to think and investigate natural events or phenomena and objects of observation related to the context of local wisdom (Alimah, 2019).

Based on the results of initial observations carried out at MAN 1 Bone, the results obtained show that the current biology learning process is supported by the use of digital technology as an additional learning resource. Although students are generally able to use technology, they do not use it appropriately. Students

look for information related to learning without analyzing it first, so they tend to ignore the truth of the information. Apart from that, the learning activities have also been integrated with ethnoscience, although only limited to general descriptions related to the subject matter.

Based on this description, research was conducted to analyze student's critical thinking abilities amidst the tendency to use digital technology in ethnoscience-based biology learning. As well as categorizing student's levels in constructing critical thinking abilities. This aims to provide evaluation material for learning activities and input in preparing a learning process that can improve student's critical thinking abilities.

RESEARCH METHOD

This research uses a qualitative descriptive method to analyze student's critical thinking abilities in ethnoscience-based biology learning in the era of digitalization. This research was carried out from April to May 2023 located at MAN 1 Bone which is located on Jalan Letjend. Sukawati, Manurunge Village, Tanete Riattang District, Bone Regency in the Biology subject with Ecosystem material, even semester of the 2022/2023 academic year.

The subjects of this research were the class X biology subject teachers along with the students of class X.1, class X.2 and class X.5 using purposive sampling technique. The instrument used was a 10-item critical thinking ability test in the form of descriptions, observations and interviews using critical thinking indicators by Ennis (2011). The data obtained was analyzed using reduction, display and conclusion drawing and verification techniques. The data was then tested for credibility by triangulating techniques and sources.

Table 1 Indicators of Critical Thinking Ability by Ennis (2011)

No.	Indicators	Sub-indicators
1.	Provide a basic statement or explanation	a. Identify the problem b. Analyze arguments
2.	Give reasons for a decision	a. Observe relevant sources b. Assess the credibility of the source
3.	Draw conclusions or inferences	a. Make main inferences b. Make & consider decisions
4.	Provide further statements or explanations	a. Defining terms b. Identify assumptions
5.	Provide feedback & reinforcement	a. Determine the action b. Defending decisions

RESULTS AND DISCUSSION

Biology learning at MAN 1 Bone in class X for ecosystem material for the even semester of the 2022-2023 academic year takes place by integrating ethnoscience. The results of observations and interviews obtained show that during the learning process, the teacher presents a phenomenon, behavior and local beliefs of the community related to the subject matter. This is in line with research by Sanova et al (2021) which explains that in the learning process teachers provide real examples in the surrounding environment by linking elements of cultural perspective and local wisdom.

Based on the results of critical thinking ability data analysis carried out in classes X.1, X.2 and X.5. This is in line with research by Yulianis et al (2019) that student's critical thinking abilities are in the low category. One of the factors in student's low critical thinking skills is student's lack of understanding and ability to analyze and identify problems found in critical thinking skills tests so that students are less able to describe answers well.

Mutia and Alberida's (2022) research also states that nowadays, students are less interested in the concept of problem solving in learning activities and students also do not like learning activities that require high levels of thinking. This is due to student's habits which tend to be practical and rely on technology. Apart from that, another factor is the environment, the habit of being in an inappropriate environment can affect student's critical thinking abilities. This is supported by interviews conducted with biology subject teachers who explained that student's habits of playing games and accessing social media greatly influence student's cognitive levels. This is also based on observation findings where there are several students who access games and social media during learning. Therefore, the environment also has a big impact on student's critical thinking abilities.

Referring to the results of critical thinking ability tests, observations and interviews that have been carried out regarding the critical thinking abilities of MAN 1 Bone students in ethnoscience-based biology learning, there are indicators formulated to measure student's critical thinking abilities on selected research subjects. These indicators are explained as follows:

First, student's critical thinking skills on the indicator of providing basic statements or explanations are on average in the low category even though student's learning activities in identifying and analyzing a problem are quite good. This is due to a lack of understanding and mastery of the subject matter so that student's ability to analyze and answer critical thinking ability test questions is still low, which is different from the case during learning where students are still supported by learning resources and teachers still help students in identifying problems. The low level of student's critical thinking abilities is in line with the results of research by Ridho et al (2020) which found that student's critical thinking abilities were in the low category.

Second, student's critical thinking skills on indicators provide reasons for an average decision being in the very low category. This is in line with research by Adinda et al (2021) that student's critical thinking abilities are in the low category. Meanwhile, student's learning activities in observing and assessing the credibility of sources are in good condition. This is due to student's low mastery of the material and student's lack of ability to provide appropriate reasons so that the answers they make do not meet good criteria in working on critical thinking ability test questions. The difference that occurs between the results of critical thinking ability tests and student learning activities is because students only memorize without mastering the material obtained so that understanding and mastery of concepts hinders student's critical thinking abilities.

Third, student's critical thinking skills on the indicator of drawing conclusions or inferences are on average in the low category. This is in line with research by Agustine et al (2020) which found that the average ability of students was in the low category. This is because only a few students are able to make and consider several appropriate decisions to form a conclusion on the results of their critical thinking ability test questions. In contrast to the learning process in class, the ability to make conclusions about the material is quite good because students refer to learning sources and the results of the summaries they make so they can convey them well. Apart from that, there are also some students who are less able to convey inferences and this is in line with research by Mutia and Alberida (2022), because students have not been able to get used to conveying their opinions and ideas due to low motivation to take part in learning activities.

Fourth, student's critical thinking abilities in the indicator of providing further statements or explanations are in the medium category. These results are in line with research by Sundari et al (2020), which showed that student's ability to make the right decisions was in the medium category. This is because students are able to do critical thinking ability test questions quite well. The same results from student learning activities, where students are able to provide definitions and explanations of terms and identify assumptions from the lesson material quite well.

Fifth, student's critical thinking abilities on the indicators of providing feedback & reinforcement are in the low category. This is in line with research by Azizah et al (2021) which found that student's critical thinking abilities were in the low category. If seen from learning activities, student's abilities are quite good in determining and providing solutions to problems in the subject matter because students get supporting information from the media and learning resources used. In contrast to the results of working on critical thinking ability test questions, student's ability to provide appropriate reasons and solutions to problems in the discourse presented is still lacking because students do not concentrate well so they cannot provide correct answers.

CONCLUSION

Student's critical thinking abilities based on critical thinking ability test results are on average in the very low category, while in terms of learning activities, student's abilities are at varying levels based on critical thinking indicators. The indicator of providing further statements or explanations is at a fairly good level for the results of critical thinking ability tests and student learning activities. The indicators of providing basic statements or explanations, providing reasons for a decision, drawing conclusions or inferences, and providing feedback & reinforcement are at a level that is not good for critical thinking ability tests, while student learning activities are at a fairly good level. The results of this study indicate that it is important to increase student's mastery and understanding by integrating ethnoscience in learning so that they have critical thinking skills amidst the trend in the use of information technology.

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