Islamic Journal of Integrated Science Education (IJISE), Vol. 2 No. 2, July 2023, pp. 91-98
DOI: https://doi.org/10.30762/ijise.v2i2.1271

Islamic Journal of Integrated Science Education (IJISE)

Program Studi Tadris IPA
Institut Agama Islam Negeri Kediri
e-ISSN : 2986-0865
https://jurnalfaktarbiyah.iainkediri.ac.id/index.php/ijise

Profile of Critical Thinking Skills of Grade XI Students related Inheritance

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Abstract: The ability to think critically about student learning outcomes is one of the abilities that students need to have. This study aims to analyze and see the ability of students to understand material that has been taught in schools through inheritance. This type of research is a type of quantitative research. The data collection technique used is the test instrument technique, using questions made by linking to the material that has been taught. The research subjects were students who had taken biology subjects in the inheritance sub-chapter, with a sample number of students in grade XI in one of the Aliyah Madrasahs in Palangka Raya City for the 2022–2023 academic year. The ability to analyze the results of critical thinking skills is seen in the final scores obtained by students. The results of the analysis of students' critical thinking skills show that less than 50% of students do not yet have the ability to think critically when understanding inheritance material. The ability to think critically about inheritance in students in grade XI Aliyah Madrasah is still low; this is due to a lack of ability to analyze, conclude, and decide actions related to inheritance. So an innovative model or medium is needed to encourage material inheritance.

Keywords: Analysis, Learning Outcomes, Critical Thinking Skills

Article History:
Received: 01 June 2023; Revised: 20 July 2023; Accepted: 24 July 2023; Published: 30 July 2023

Citation (APA Style):
Jumrodah, Wahyuni, S., & Sasmita. (2023). Profile of Critical Thinking Skills of Grade XI Students related Inheritance. *Islamic Journal of Integrated Science Education (IJISE)*, *2*(2), 91–98. https://doi.org/10.30762/ijise.v2i2.1271

INTRODUCTION

The world at this time has a very rapid development of science and technology, so it is said to be the era of globalization. Globalization has all aspects of society so that it raises new challenges and problems that must be answered and solved (Indriana & Maryati, 2021; Nurhaidah & Musa, 2019). Problems can be solved if we have quality human resources and high enough competitiveness.

There are many ways that can be used to develop and improve human resources. Where it is the same as in the school learning process, teachers and students play an important role in the teaching and learning process. The teaching and learning process always occurs in interaction activities between those who teach and students as the main subject. Collaborative roles between students and teachers are needed in order to create interactive and innovative learning (Muhali, 2019; Yuliani et al., 2021). In the world of education, one of the duties of a teacher is to provide an assessment of learning outcomes for their students. Assessment is an effort or action to find out the extent to which the goals that have been set have been achieved or not (Suardipa & Primayana, 2020). Therefore, an assessment functions as a tool to determine the success of the process and student learning outcomes both from the cognitive, affective, and psychomotor domains (Jumrodah et al., 2021b; Lesi & Nuraeni, 2021). There are several ways that can be used to assess the cognitive domain including through daily tests, midterm exams, final semester exams and national final exams. The national final exam held by the central government is in the form of a multiple-choice test. Therefore, in several ways a teacher's assessment is required to be able to make multiple-choice test questions properly and correctly while as well as being able to evaluate whether the test questions are used or not for the next test (Jumrodah et al., 2019).

Multiple choice questions are questions that must be answered from several possible answers provided. Multiple choice is a form of objective test that is currently often used in educational evaluation. When viewed from its structure, multiple choice questions consist of two parts, including the subject matter (*stem*) contains problems that contain a number of choices or possible answers (*option*). In a number of answer choices that have been prepared there is only one correct answer, which is usually called the answer key, while the other possible answers are called distractors (Arif, 2015; Jumrodah et al., 2021a). As for one of the goals of learning Biology in schools in the 2013 curriculum, namely emphasizing reasoning to understand the nature or analyze the components that exist in solving problems related to the

biological context regarding inheritance material within the scope of understanding problems with models that have been designed based on the solutions obtained (Inovasi *et al.*, 2022).

In continuing education institutions students must be equipped and able to develop to make decisions with due regard to economic, social, cultural and environmental impacts so that they can link skills and knowledge wisely to a sustainable environment (Conklin & Boulamatsi, 2020). Students who have the ability to think critically demonstrate the ability to analyze arguments, raise problems, and find cohesive and logical reasoning (Wahyudi, 2020).

Critical thinking skills are an ability to think academically and assess skills so that students can assess the right type of information and can take action in solving problems (Kong, 2015; Ramadhani et al., 2019; Yunita et al., 2022) . Therefore learning science cannot ignore critical thinking skills. Therefore, critical thinking skills are one of the important factors for achieving success in the 21st century learning process (Binkley et al., 2012; Stevens, 2012; Tiruneh et al., 2014). Based on the background above, it is necessary to conduct research that aims to determine the ability of students' learning outcomes in grade XI related inheritance.

METHOD

This research is one of the descriptive quantitative research approaches. The research subject was one of the Aliyah Madrasah schools in the city of Palangka Raya, grade XI students for the 2022/2023 academic year, which consisted of 60 students. The data collection technique in this study was using a test instrument made using *google drive*, as for the instrument test, namely in the form of multiple choice questions totaling 25 questions which were made by focusing on inheritance material that had been taught and taken by students in grade XI (eleven). The questions that were distributed or tested were analyzed based on validity, reliability, and index of difficulty using the Anates application. Anates is a software specifically used to analyze questions on multiple choice or essay test items.

The validation results of the item items using anates showed that when the item items were very significant. Meanwhile, the results of the reliability test showed a correlation of 0.376 which was included in the medium category. Furthermore, the level of analysis is carried out to see the level of difficulty of the questions. The results of the analysis of the difficulty level are seen using Anates in the **Table 1**.

DOI: https://doi.org/10.30762/ijise.v2i2.1271

Table 1. The results of calculating the difficulty level of the items using Anates

Difficulty Level	Information
16.67%	Difficult
50.00%	Currently
83.33%	Easy
100%	Very easy

The results of calculating the difficulty level of the items using Anates showed that there were 4 items that had a level of difficulty, namely at a percentage of 16.67% based on the description of the questions including questions in the difficult category, while for percentages 50.00% - 66.67% were included in the medium category, for presentations 83.33% then fall into the easy category, then if the percentage is 100% then the questions made are included in the group or category of questions that are very easy.

FINDING AND DISCUSSION

The results of the data obtained from the learning outcomes of critical thinking skills in the subject of inheritance the average value of the test instrument from 25 questions that contained multiple choice, while using 6 grade XI students as samples, which can be seen in **Figure 1**.

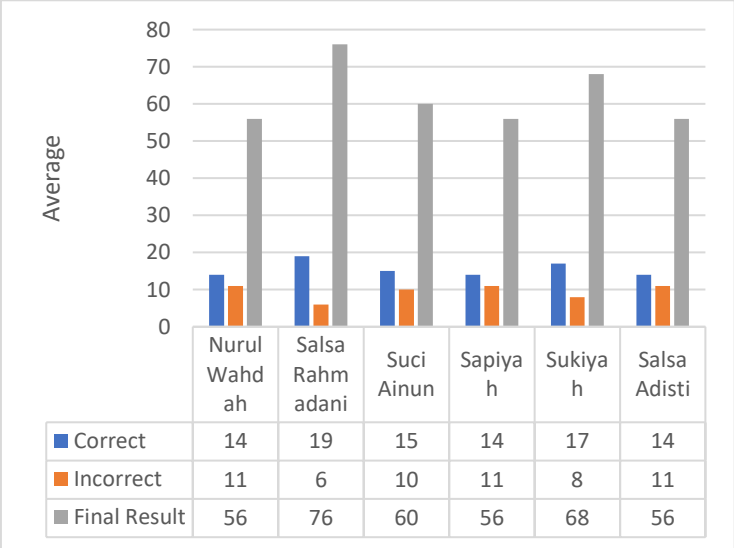

Figure 1. Data on the average score or value for each student at learning outcomes of critical thinking skills.

Based on the data contained in the picture above, it shows that there is an increase in an achievement from the learning outcomes of inheritance material in cultivating critical thinking skills for students. The value of the learning outcomes obtained is tested with a test

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instrument containing multiple choice questions, namely with an average value of 60, while for the lowest score, it is found on the average with a value of 56 while for the highest score from observations based on the value obtained, it reaches 76. In the analysis of the questions on the instrument test for student learning outcomes, it was concluded that the abilities possessed by students in grade XI Madrasah Aliyah at one of the schools in the city of Palangka Raya, the subject of inheritance was included in the category of lacking critical thinking skills.

In indicators of critical thinking skills which include 1) formulating the main issues, 2) expressing existing facts, 3) choosing logical arguments, 4) concluding from different points of view, 5) being able to draw conclusions or being able to differentiate. Considering that a report on the results of Anates shows that in the inheritance material a student still has difficulty understanding both questions and answers, so that from the data obtained, there are 3 people who have the lowest score. This is because the inheritance material is one of the most difficult materials in the learning process, besides that students also say that biology lessons with the lowest level start from the chapter material on growth and development and the human reproductive system by 18.2%, cell division 18.2%, 43.6% material inheritance 52.7% and biotechnology 54.5% (Adi *et al.,* 2022).

In biology material, especially the inheritance sub-chapter, is one of the materials that requires deeper visualization and explanation because of the many foreign terms and misconceptions in the learning process between students and teachers. In addition, the method used by the teacher when learning is still relatively monotonous, causing a lack of motivation for students to learn and understand learning material. The method used in class XI is only limited to using lectures, questions and answers, and light discussion methods. The material contained in the basic molecular sub-chapter that underlies the inheritance of traits, genetic laws, and crosses that occur in living things is difficult to understand because most students stated that 41.8% of students had difficulty understanding foreign terms found in inheritance material. . This confirms that, the need for an interesting media that needs to be made to provide understanding to students. (Adi *et al.,* 2022).

Meanwhile, according to Fitriyah & Ramadani (2021) it is revealed that critical thinking skills can be grown and developed through project-based learning. Therefore, this learning is collaborative between the teacher and students and requires a long time so that it influences maturity in mastering concepts or principles of the material. The critical thinking skills can develop the ability to analyze a case, evaluate and conclude so that it can process facts in the field (Rachmawati et al., 2018). Critical thinking skills are a key strategy for

creating thinker and independent learners. In addition, project-based learning requires students to actively ask questions and express ideas and ideas (Susanti, 2013).

Given how important critical thinking skills students must have in the 5.0 industrial revolution era, in order to survive in facing life's challenges, so that critical thinking skills continue to be developed towards sustainable development. This is in line with Kong (2015) critical thinking skills are reflective thinking skills and abilities in assessment, so that students can decide what types and types of information actions are appropriate to take during reasoning and problem solving. Therefore learning science should be provide critical thinking skills, because critical thinking skills are one of them characteristics of 21st century learning objectives (Jumrodah et al., 2021b).

CONCLUSION

The results of this research data conclude that students' critical thinking skills are still low. So it is necessary to increase the ability to think critically in students. Based on the analysis of student or student answer errors, it can be concluded that the abilities possessed by students of class XI Aliyah Madrasah at one of the schools in Palangka Raya, the subject of inheritance is included in the category of lacking in critical thinking skills. The highest achievement was obtained by students with a final score of 76, and the lowest score was obtained by students with a final score of 56. This could be due to students' lack of accuracy in reading the questions, or it could also be due to the learning process carried out in school. Therefore, it is necessary to make further improvements in both the learning media and the teaching materials used.

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