Development of Student Critical Thinking Skills Through Inquiry Learning in Cell Metabolism Material (Study of Literature Study Analysis)

Tomi Hidayat[1](✉), Pariyanto Pariyanto[2], Santoso Santoso[2], Onsardi Onsardi[3], and Hesty Oktafiany[1]

[1] Program Pascasarjana Pendidikan Biologi, Universitas Muhammadiyah Bengkulu, Jl. Adam Malik, Kota Bengkulu 38226, Indonesia
tomihidayat@umb.ac.id

[2] Program Studi Pendidikan Biologi, FKIP, Universitas Muhammadiyah Bengkulu, Jl. Bali, Kota Bengkulu 38119, Indonesia

[3] Program Studi Ekonomi Manajemen, Fakultas Ekonomi dan Bisnis, Universitas Muhammadiyah Bengkulu, Jl. Adam Malik, Kota Bengkulu 38226, Indonesia

Abstract. The ability to think critically is very important because students critical thinking skills are one of the skills that must be possessed by students in addition to other skills that must be mastered by students. This study aims to look at the ability of students to solve the problems they face in their daily lives. Through inquiry learning models the development of critical thinking skills can be achieved. This research plan will be carried out in SMA 1 Bengkulu City. The method used is descriptive qualitative. Research data were collected through observation activities, interviews, and relevant documents, and using written tests and oral tests. The test uses essay form questions that are developed based on indicators of students critical thinking skills. The results of this study provide information on students low critical thinking skills so that teachers are expected to be able to design the process of learning activities that can empower students critical thinking skills. Based on the results of the test analysis, the data obtained that the average critical thinking skills of students are still relatively low. The low critical thinking ability of students is obtained from the results of student work on the test questions used.

Keywords: Critical Thingking Skills · Inquiry · Learning · Student · Cell Metabolism

1 Introduction

The main problem faced by the world of education in the current learning process is the low and weak learning and learning process by students and teachers, resulting in low student absorption [1]. One effort in the field of education that can be done to get quality human resources is to get in the habit of forming a culture of critical thinking in students in the process learning [2]. Te purpose of practicing critical thinking skills to students is to

M. L. Firdaus and A. Defianti (Eds.): MASEIS 2021, ASSEHR 718, pp. 332–336, 2023.
https://doi.org/10.2991/978-2-38476-012-1_42

prepare students to be critical thinkers, able to solve problems, and become independent thinkers, so they can face life, avoid indoctrination, fraud, brainwashing, overcoming every problem faced, and making decisions in an appropriate and responsible manner [2]. In learning science, students are taught to gain knowledge through data collection by experimentation, observation, and communication to produce a reliable explanation [2]. According to Saputro, critical thinking skills should be possessed by every student. if students already have the ability to think critically, he will be easier to solve a problem that is in front of them.

With the habit of solving or solving a problem, he will be accustomed to facing any difficult problems by being given critical thinking skills students can understand and apply learning concepts of cell metabolism. Inquiry comes from the word to inquire which means to participate, or be involved, in asking questions, looking for information and conduct an investigation. This learning model pioneered by Donald Oliver and James P. Shaver is based on an understanding of the community in which everyone has different views and priorities from one another and their social values confront each other. Inquiry comes from English inquiry which can be interpreted as the process of asking and finding out answers to scientific questions asked [3]. Inquiry learning is a learning activity that maximally involves all students' abilities to search for and investigate something (objects, people or events) systematically, critically, logically, analytically so that they can formulate their own findings with confidence [4].

The learning approach that focuses on finding one's own concepts is the inquiry approach [5]. In inquiry learning there is a series of learning activities that emphasize the process of thinking critically and analytical to find and find their own answers to a problem in question [6]. Inquiry learning model is one of the models that can encourage students to be active in learning, inquiry learning is a learning activity where students are encouraged to learn through their own active involvement with concepts and principles, and the teacher encourages students to have experience and conduct experiments that allow students to find principles for themselves [7]. Inquiry method is a learning method where students are required to be more active in the discovery process, placing students more on their own learning and developing activities and solving problems [8].

So, the inquiry method is a method of learning on its own initiative, which can be carried out individually or in small groups. Differences in scientific (scientific approach) with the method of inquiry in learning a scientific approach does not only focus on how to develop student competencies in conducting observations or experiments, but how to develop knowledge and thinking skills so that it can support creative activities in innovating or creating [9]. Factors that cause problems in the world of education are not only caused by teachers but facilities and students because the three components are very closely related to support progress in the world of education. Overcoming problems in class every teacher is different so that various strategies developed by others cannot be used by all teachers [10]. The teacher has the responsibility to make the maximum effort, so that the class can be managed well. Excellent classroom management is based on the teacher's ability to quickly find out the factors that create favorable conditions in the learning process, recognize the problems that can interfere with the learning process in progress [10]. This study aims to produce students 'critical thinking skills by using inquiry learning so that students' critical thinking skills can be improved.

2 Method

This research uses descriptive qualitative research, the research method used to make systematically, factual, and accurate regarding the facts and characteristics of certain populations or regions [10]. Descriptive research is research that describes what it is about a variable, symptom or about a situation [11]. The research procedure of this research is in the form of preliminary stages, making tests of critical thinking questions, collecting data, analyzing data, and drawing conclusions [12]. This study uses a simple descriptive design, which explains the achievement of certain subject groups without manipulating treatment and is aimed at taking direct information in the field, namely students' critical thinking skills [13].

3 Result and Discussion

The results of this study were obtained from test analysis, the research data showed that the average critical thinking ability of students was categorized as low. Based on the results of the analysis of the tests that have been carried out, the students' critical thinking ability is obtained on average the results are categorized as low. The results of the low critical thinking ability in this low category can be seen from the results of students' answers in administering test questions for critical thinking skills. Results The average score on students' critical thinking skills obtained a percentage of 52.28% categorized as less. The interpretation aspect shows that 48.80% is categorized as very poor, in the analysis of students 45.98% is categorized as very poor, in terms of evaluation, 53.39% is categorized as very poor, in terms of concluding 55.09% is in the poor category; In the explanation aspect, the number of 46.48% is categorized as very poor, and in terms of self-knowledge, 63.94% is categorized as sufficient.

Based on the results of students' critical thinking skills as many as 80% of students included in the very high category, 14% in the high category, and respectively 3% in the low and very low categories. Students in the very high category already understand the questions and are able to write facts or information in the problem and are able to write sentence questions correctly.

An indicator of critical thinking skills is the ability to plan problem solving strategies Indicators of planning problem solving strategies in critical thinking skills mean planning solutions to problems through the application of concepts that have been held by students, some of which are high level or low.

Only 17% of students are in the very high category, 8% are in the high category, 32% are in the low category, and 43% of students are still in the very category low. Students in the very high category are able to solve problems, that is, calculate correctly and make conclusions from solving the problem completely [13]. Based on the analysis of the 3rd critical thinking indicator that is evaluating the decision includes the process of finding answers and the ability to count. This process is in accordance with predetermined problem solving strategies. That is, between indicators asking questions planning strategies, and evaluating interconnected decisions in problem solving and demanding students' critical thinking skills. Critical thinking is thinking that includes checking, connecting, and evaluating all aspects of a situation or problem, including collecting, organizing, remembering, and analyzing information [13].

4 Conclusion

Students' critical thinking skills from the results of the analysis that has been carried out on cell metabolism learning obtained an increase in students' critical thinking through inquiry learning that has been applied so as to make students able to solve problems. The students' critical abilities were found to be categorized as high, in the medium category and some in the low category. Indicators of formulating problems on students' critical abilities obtained 94% of students were able, while the indicators of planning problem solving strategies obtained students' critical thinking skills of 90% of students were able. Furthermore, students' critical thinking skills on the third indicator, most of the students are still not able to evaluate decisions, which is 75%.

Acknowledgments. I want to say thank you for my team in Biology Education Muhammadiyah University of Bengkulu and Director Post Graduate Biology Education for guidance and advice so that I can finish this research and article. The authors also thanked to the Post Graduate Biology Education who has funded this preliminary research and Muhammadiyah University of Bengkulu.

References

1. Lahadisi, Inquiry A Strategy Towards Meaningful Learning Tarbiyah *Journal STAIN Sultan Qaimuddin Kendari* 7 2 (2014).
2. Prayoga, Z. N., Students Critical Thinking Ability in Learning Environmental Management Materials Using the Science Process Skills Approach. *Essay* Faculty of Math and Science. Biology Study Program Semarang State University Semarang pp 25–38 (2013).
3. Amri, S and Ahmadi, K. I., Proses Pembelajaran Kreatif dan Inovatif di Dalam Kelas *Jakarta: Prestasi Pustaka Raya* 2 (2010).
4. Julianto, Teori dan Implementasi Model-model Pembelajaran Inovatif *Surabaya: Unesa Press* 1 pp 26–32 (2011).
5. Sari, I.J., Ratnasari, D and Zaky, R.A., Analysis of Oral Communication of Prospective Biology Teachers Through Inquiry Approaches to the Concept of Cell Metabolism *Journal of Proceedings of the National Seminar on Education* FKIP 2 (1) (2019).
6. Sanjaya, W., *Strategi Pembelajaran* Jakarta; Kencana pp 46–50 (2009).
7. Suhada, H., Inquiry Learning Model and Critical Thinking Ability to the Science Process Skills of Class V Students in Science Subjects *Journal of Basic Education* 8 pp 2 (2017).
8. Yulianto, T., Penerapan Metode Pembelajaran *Jakarta: Raja Grafindo p 34* (2000).
9. Suid, A.B., Yusuf, M.N., and Nurhayati, The Effect of Inquiry Learning Method on Motion Substema and Style on Student Learning Outcomes of Class IV Sdn 16 Banda Aceh *Journal of Basic Charms* 3 p 4(2016).
10. Nurhayani, S. T., Syamsudduha and Ahmad, A., Teacher Difficulties in Developing Higher Level Thinking Skills of Students in Biology Learning in Xii Classes at SMA Negeri 2 Gowa *Journal of Biotech* 6 p 1 (2018).
11. Arikunto, S., Prosedur Penelitian Suatu Pendekatan Praktek *Jakarta: Rineka Cipta* pp 52–59 (2000).

12. Susilowati, Sajidan, and Ramli, M., Analysis of Critical Thinking Skills of State Madrasah Aliyah Students in Magetan Regency *Journal of Science Learning and Research Development Strategy for Sharpening 21st Century Skills* pp 20–22 (2017).
13. Azizah, M., Sulianto, J and Cintang, N., Analysis of Critical Thinking Skills of Primary School Students in Mathematics Learning Curriculum 2013 *Journal of Educational Research* 35 pp 5–7 (2018).