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Profile of Student Ability in Solving Critical Problems in the Concept of Human Physiology

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Abstract

Learning human physiology is a study that we often encounter in everyday life related to the condition of the body, at any time it can experience problems or abnormalities that result in a decrease in the condition of human health itself. In addition, along with the development of science and technology, more and more problems are encountered in learning human physiology, so that the ability to think is needed in solving existing problems. This study aims to describe the profile of students' abilities in solving critical problems on the concept of human physiology. The study used a descriptive method with a qualitative approach. The data collection instruments in this study included the main instrument, namely the researcher himself and the supporting instrument in the form of a written assignment to describe the profile of students who had programmed human physiology courses. Students are categorized based on a hypothetical theory which contains five levels of critical thinking skills, namely very critical, critical, moderately critical, less critical, and not critical. The results showed that the ability profile of several students of the Biology Education Study Program, Faculty of Teacher Training and Education, Lambung Mangkurat University in solving critical problems on the concept of human physiology. Consists of four levels of critical thinking skills, namely very critical, critical, moderately critical, and less critical.

Abstrak

Pembelajaran fisiologi manusia merupakan kajian yang sering kita jumpai dalam kehidupan sehari-hari yang berhubungan dengan kondisi tubuh, sewaktu-waktu dapat mengalami permasalahan atau kelainan yang berakibat pada menurunnya kondisi kesehatan manusia itu sendiri. Selain itu, seiring dengan perkembangan IPTEK maka semakin banyak pula permasalahan yang dijumpai dalam pembelajaran fisiologi manusia, sehingga diperlukan kemampuan berpikir dalam penyelesaian masalah yang ada. Penelitian ini bertujuan untuk mendeskripsikan profil kemampuan mahasiswa dalam penyelesaian masalah secara kritis pada konsep fisiologi manusia. Penelitian menggunakan metode deskriptif dengan pendekatan kualitatif. Instrumen pengumpulan data pada penelitian ini meliputi instrumen utama yaitu peneliti sendiri dan instrumen pendukung berupa tugas tertulis untuk mendeskripsikan profil mahasiswa yang telah memprogramkan mata kulah fisiologi manusia. Mahasiswa dikategorikan berdasarkan teori hipotetik yangberisi lima tingkatan kemampuan berpikir kritis, yaitu sangat kritis, kritis, cukup kritis, kurang kritis, dan tidak kritis. Hasil penelitian menunjukkan bahwa profil kemampuan beberapa mahasiswa Program Studi Pendidikan Biologi, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Lambung Mangkuratdalam penyelesaian masalah secara kritis pada konsep fisiologi manusia. Terdiri dari empat tingkatan kemampuan berpikir kritis yaitu sangat kritis, kritis, cukup kritis, dan kurang kritis.

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A. Introduction

Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 49 of 2014 concerning National Standards for Higher Education Article 6 which states that graduates of the Bachelor Program are required to have general skills, namely being able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology who pay attention to and apply humanities values in accordance with their field of expertise (Santi et al, 2018). A person's ability to succeed in life is determined, among other things, by his thinking skills, especially in an effort to solve the life problems he faces. Critical thinking is an ability that is essential for life and functions effectively in all aspects of life (Zubaidah, 2006).

In the current era of globalization, it is important for individuals to have critical thinking skills in overcoming increasingly complex problems, so that critical thinking will guide individuals in making decisions and solving the most appropriate problems. In line with that, Fithriyah et al,. (2016) stated that the ability to think critically is one thing that needs to be considered in order to give birth to individuals who can meet global demands.

The critical thinking ability of each individual is different, depending on the frequency of frequent practice to develop these abilities. The exercises in question are such as frequently asking questions, making assumptions, identifying information, making inferences, identifying impacts, and so on. One of them with the problems contained in a learning one of which is the study of human physiology.

Learning human physiology is a study related to the condition of the body that functions as it should or with the condition of the body that has abnormalities and we often encounter in everyday life. Various problems that occur must be known well so that it can be understood how to solve the problem by criticizing the problem so that it triggers someone to think about getting a solution.

Based on the results of several studies, it shows that students' critical thinking skills are at a moderate level and some are also low. Santoso's research, (2014), students' critical thinking skills in solving math problems based on problems have a moderate category. Kirana (2019), the critical thinking ability of science education study program students in the case of one-dimensional kinematics charts has a low category.

As it is well known that human physiology is closely related to everyday life, of course there can be problems related to daily body conditions. For this reason, problem solving is a process of activity to sharpen logic, argue and solve problems as well as the ability to find out causes, develop alternatives and analyze and choose good solutions, so that efforts are needed to find a way out of a difficulty to achieve a goal that can immediately be achieved. achieved (Polya in Hudojo, 2003). In addition, the National Research Council (Education for Life and Work, 2012) suggests that critical thinking skills are very important for students, so that they are able to become critical consumers of science so that they can respond to and follow various developments that occur (Pradana et al, 2017). Based on that, there is also a need for research to describe the ability of students to solve problems critically on the concept of human physiology.

B. Materials and Method

The research used is descriptive research using a qualitative approach (Sugiyono, 2014). The selection of a qualitative approach is based on the research objective, namely to describe the profile of students' abilities in solving critical problems on the concept of human physiology, starting from planning, subject selection, data collection, data analysis and conclusion drawing.

This research instrument includes the main instrument, namely the researcher himself and supporting instruments, namely written assignments and interview guidelines. In accordance with Ruhena's (2019) statement, researchers in qualtative research act as instruments (human instruments) as well as data collectors. The profile of students' abilities in solving critical problems on the concept of human physiology obtained from written assignment data. The data was then analyzed using qualitative data analysis techniques that refer to data reduction, data presentation, and drawing conclusions.

C. Result and Discussions

The research data regarding the profile of students' abilities in critical problem solving were obtained from the results of working on written assignments (WA) 1, 2, and 3 by students. So that there are four levels of critical thinking, namely, very critical, critical, moderately critical, and less critical. These results indicate that there is a diversity of levels of critical thinking among students who are research subjects. Suparni (2016) states the ability to think critically of each person it is different and the difference it can be seen as a continuity that started from the level of the lowest to the highest.

The data for each category of critical thinking level is represented from the answer data from a student. The student's answer will be seen

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whether it fulfills all aspects of critical thinking and the stages of problem solving. The following data for each level of critical thinking can be seen in Tables 1 to 4.

Table 1 Results of Written Assignments (Student Worksheets) Very Critical Category

Problem Solving Steps	Critical Thinking Aspects	Written Assignments			Reason
		I	II	III	
Understanding the Problem	Interpretation	Fulfilled	Fulfilled	Fulfilled	College student-1 is able to determine the problems that exist in the discourse then makes the formulation of a problem with the precise and clear.
Preparea Problem Solving Plan	Assumption	Fulfilled	Fulfilled	Fulfilled	College student-1 is able to draw up a plan settlement of the problem by giving the assumption of appropriate problems that exist in the discourse with precise and clear.
Carry out a Problem Solving Plan	Deduction	Fulfilled	Fulfilled	Fulfilled	College student-1 is able to determine the solution of the settlement of problems that exist in the discourse with precise and clear.
Checking Back Results Completion	Inference	Fulfilled	Fulfilled	Fulfilled	College student-1 able to check back in the results of the settlement of the problem with determining the impact of positive and negative of solutions then give the conclusion of the problems that exist in the discourse with precise and clear.

Table 2 Results of Written Assignments (Student Worksheets) Critical Category

Problem Solving Steps	Critical Thinking Aspects	Written Assignments			Reason
		I	II	III	
Understanding the Problem	Interpretation	Fulfilled	Fulfilled	Fulfilled	College student-2 is able to determine the problems that exist in the discourse then makes the formulation of a problem with the precise and clear
Preparea Problem Solving Plan	Assumption	Not Fulfilled	Not Fulfilled	Not Fulfilled	College student-2 has not been able to draw up a plan settlement of the problem by giving the assumption of appropriate problems that exist in the discourse with precise and clear.
Carry out a Problem Solving Plan	Deduction	Fulfilled	Fulfilled	Fulfilled	College student-2 is able to determine the solution of the settlement of problems that exist in the discourse with precise and clear.
Checking Back Results Completion	Inference	Fulfilled	Fulfilled	Fulfilled	College student-2 is able to check back in the results of the settlement of the problem with determining the impact of positive and negative of solutions then give the conclusion of the problems that exist in the discourse with precise and clear.

Based on the data in Table 1 shows that student-1 can fulfill all aspects of critical thinking. In the aspect of student interpretation-1 is able to determine the existing problems and formulate the appropriate problem. Furthermore, on the aspect of student assumptions-1 is able to convey steps in overcoming problems to maintain body condition from physiological problems. Likewise, in the aspect of deduction and inference, students-1 are able to determine solutions to solving existing problems as a teacher later well and are able to convey the positive and negative impacts of the solutions put forward, and then provide conclusions that are in accordance with the existing problems clearly. The fulfillment of these four aspects of critical thinking is what is expected to be the level of students' ability to solve critical problems, which is included in the very critical category.

Based on the data in Table 2 shows that student-2 can only fulfill three aspects of critical thinking. In the aspect of interpretation, students-2 is able to express problems and formulate problems related to the problems that exist in the discourse on diseases related to human physiology. Furthermore, on the assumption aspect, student-2 has not been able to express the steps for solving the problem clearly because it only conveys in general terms. The deduction aspect of student-2 is able to convey the solution as a teacher by providing recommendations for maintaining a healthy

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lifestyle. For the last aspect, student inference-2 is very good at conveying how the positive and negative impacts of the solutions that have been made and being able to conclude the existing problems. The data obtained is an assumption that students-2 are included in the ability to solve problems with critical categories.

Table 3 Results of Written Assignments (Student Worksheets) Quite Critical Category

Problem Solving Steps	Critical Thinking Aspects	Written Assignments			Reason
		I	II	III	
Understanding the Problem	Interpretation	Fulfilled	Fulfilled	Fulfilled	College student-3 is able to determine the problems that exist in the discourse then makes the formulation of a problem with the precise and clear.
Preparea Problem Solving Plan	Assumption	Not Fulfilled	Not Fulfilled	Not Fulfilled	College student-3 has not been able to draw up a plan settlement of the problem by giving the assumption of appropriate problems that exist in the discourse with precise and clear.
Carry out a Problem Solving Plan	Deduction	Not Fulfilled	Not Fulfilled	Not Fulfilled	College student-3 has not been able to determine the solution of the settlement of problems that exist in the discourse with precise and clear.
Checking Back Results Completion	Inference	Fulfilled	Fulfilled	Fulfilled	College student-3 able to check back in the results of the settlement of the problem with determining the impact of positive and negative of solutions then give the conclusion of the problems that exist in the discourse with precise and clear.

Table 4 Results of Written Assignments (Student Worksheets) Less Critical Category

Problem Solving Steps	Critical Thinking Aspects	Written Assignments			Reason
		I	II	III	
Understanding the Problem	Interpretation	Fulfilled	Fulfilled	Fulfilled	College student-4 is able to determine the problems that exist in the discourse then makes the formulation of a problem with the precise and clear.
Preparea Problem Solving Plan	Assumption	Not Fulfilled	Not Fulfilled	Not Fulfilled	College student-4 has not been able to draw up a plan settlement of the problem by giving the assumption of appropriate problems that exist in the discourse with precise and clear.
Carry out a Problem Solving Plan	Deduction	Not Fulfilled	Not Fulfilled	Not Fulfilled	College student-4 has not been able to determine the solution of the settlement of problems that exist in the discourse with precise and clear.
Checking Back Results Completion	Inference	Fulfilled	Fulfilled	Fulfilled	College student-4 able to check back in the results of the settlement of the problem with determining the impact of positive and negative of solutions then give the conclusion of the problems that exist in the discourse with precise and clear.

Based on the data in Table 3 shows that student-3 has a category in solving quite critical problems; only able to fulfill two aspects of critical thinking. Aspects of student interpretation-3 are able to convey problems and formulate problems according to the existing discourse. Furthermore, for the aspects of assumptions and deductions, students -3 have not been able to convey a problem-solving plan precisely and clearly, and have not been able to convey a clear solution as well. The inference aspect of student-3 is able to convey positive and negative impacts as well as conclusions from the problem clearly, so that the data obtained becomes an assumption that student-3 is able to solve problems in the fairly critical category.

As stated by Suparni (2016), this level can be equated with preliminary thinking because students begin to modify their thinking abilities. Like

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recognizing the relationships in solving problems, but the insight is still limited.

Based on the data in Table 4, shows that student-4 is only able to fulfill one aspect of critical thinking, namely in the interpretation aspect by being able to convey problems and formulate problems in the discourse, while for aspects of assumption, deduction, and inference, student-4 has not been able to deliver appropriate answers. and clearly related to the problems that exist in the discourse, so that from the data obtained it is assumed that students-4 are only able to solve problems in the discourse in the less critical category.

Based on the results of research on the profile of students' ability in critical problem solving on the concept of human physiology, the results of various levels of critical thinking show that many factors affect this critical thinking ability, both environmental factors and habits, according to the statement of Dharmono, et al (2019). It is important to train critical thinking skills because this ability does not occur outwardly, but must be trained continuously so that it becomes a good habit to prepare students to become individual critical thinkers. Therefore, continuous training by utilizing the surrounding environmental conditions. This is in line with the statement of Irwandi, et al (2019) which explains that using the environment as a learning resource will be able to improve students' thinking skills. Students become more active in asking, assuming, reasoning, providing conclusions, and arguing.

D. Conclution

Based on the research that has been done on the profile of students' ability to solve critical problems on the concept of human physiology, it is found that there are four levels of critical thinking skills, namely very critical, critical, moderately critical, and less critical, each level represented by one student. For students who are able to solve problems very critically, namely being able to fulfill all four aspects of critical thinking, for a critical level students are able to solve problems by fulfilling only three aspects. Furthermore, at a moderately critical level, students are only able to fulfill two aspects of critical thinking in solving problems. Finally, the less critical category of students is only able to fulfill one aspect of the four aspects of critical thinking in solving problems regarding human physiology.

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