Students' Critical Thinking Skills Through the Reports of Practicum-Based Guided Inquiry Learning

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Abstract. Practicum guided inquiry learning is very important to improve students' critical thinking skills related to student activities in collecting data, analyzing, and making conclusions. In addition, the ability to think critically can be seen through the descriptions of phenomena that students write in the practicum report. Therefore, this study aims to describe the level of students' critical thinking skills through reports on the results of animal ecology practicums through guided inquiry-based learning. This descriptive research aims to describe students' critical thinking skills through practicum activity reports. The research began with implementing practicum activities for animal ecology courses using the guided inquiry learning model. Furthermore, the collected research data through reports on student practicum activities. The research was conducted from February to April 2022. The subjects of this research were 72 students of biology education at the Faculty of Teacher Training and Education, Sriwijaya University who took the Animal Ecology course. Data collection techniques by analyzing reports on animal ecology practicum activities by indicators of critical thinking ability. It analyzed data regarding students' critical thinking abilities through practicum activity reports based on the percentage of achievement indicators of critical thinking skills. The data obtained is then interpreted into several categories. Based on the research results, it can be concluded that categorizing students' critical thinking skills through reports on the results of practicum activities in guided inquiry learning as very good. Several indicators such as Providing simple explanations, building basic skills, providing advanced explanations and Concluding are categorized as very good. As well as the indicators of Managing Strategy and Tactics are in the good category. It can illustrate that students can relate phenomena found in the field during practicum activities with the studied concepts. Thus guided inquiry learning can be an alternative learning strategy that can support students' critical thinking skills in practicum activities.

Keywords: Critical Thinking · Ecology · Practicum · Guided inquiry-based learning

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1 Introduction

Animal Ecology is a course that discusses ecological concepts related to animal environmental systems, environmental factors, primary animal responses to various changes in conditions and resources, and the tolerance range of animals. In this lecture, students are also required to be able to analyze problems related to the basic concepts of ecology, which are related to environmental issues, through practicum activities. Through practicum activities, students are expected to develop thinking skills that can help solve problems in the surrounding environment [1]. Therefore, students must have the ability to think critically in analyzing the phenomena they find in their surroundings.

Critical thinking skills require students to be able to think reflectively so that they can determine solutions to problems faced based on what they believe [2]. Critical thinking skills can be applied in procedural knowledge learning, such as practicum learning so that the facts contained in conceptual knowledge are more widely understood [3]. Practicum learning requires students to be able to connect facts found in the field with concepts that have been studied. Therefore, this learning requires a higher quality of thinking to relate these facts so that the concept can be appropriately understood [4].

Each individual has the potential to have the ability to think critically, but not everyone can use it to solve a problem. Someone who can think critically can analyze and make decisions on a problem [5]. Practicum learning that can support critical thinking skills is by applying guided inquiry learning. The study [6] results show that critical thinking skills can be improved through the Guided Inquiry Learning Model and effectively increase learning outcomes. In addition, this model of learning activities can involve skills in observing and exploring systematically, critically, logically, and analytically so that students can formulate their findings [7]. Guided inquiry-based learning can assist in the development of disciplinary behavior and intellectual skills in finding solutions to problem-solving based on observed phenomena [8].

In animal ecology practicum learning, students' critical thinking skills in discovering ecological concepts based on findings in the field can be seen through reports on student practicum results. According to [9] students who can think critically have different perspectives in looking at a phenomenon found and can describe the problems encountered in practicum activities. Differences in student perspectives in addressing the issues found can be seen in the paragraphs they represent in the practicum results report. Therefore, students critical thinking skills can be seen through the practicum results report.

In this regard, students' critical thinking skills are related to student activities in collecting data, analyzing, and making conclusions in practicum activities that can help through guided lesson practicum learning [10]. In addition, the ability to think critically can be seen through the descriptions of phenomena that students write in the practicum report. Therefore, it is essential to analyze the level of students' critical thinking skills through guided inquiry learning. Thus, this study aims to describe the level of students' critical thinking skills through reports on the results of animal ecology practicums through guided inquiry-based learning.

Table 1. Critical Thinking Indicator (Modified from Ennis)

No.	**Indicator**	Sub-Indicator
1.	Making Basic clarification	• Provide explanation
		• Identify or formulate answer
		• The structure of an argument
2.	Building basic support	• Consider source suitability
		• Consider using appropriate procedures
		• Ability to give reasons
		• Involves a bit of guesswork
		• Reporting observations
3.	Making advanced clarification	• Giving advanced explanation
		• Giving an explanation not a statement
		• Constructing arguments
4.	Strategies and tactics	• Revealing the problem
		• Have criteria for considering possible solutions
		• Using logical strategy
		• Shows position, speech or writing
5.	Interference	• Making and determining the results of considerations based on the background facts
		• Making and determining the results of considerations based on consequences
		• Making and determining the results of considerations based on problems

2 Method

This descriptive research aims to describe students' critical thinking skills through practicum activity reports. The implementation of practicum activities is assisted by guided inquiry learning. Furthermore, research data was collected through reports on student practicum activities.

The research was conducted from February to April 2022. The subjects of this research were biology education students at the Faculty of Teacher Training and Education, Sriwijaya University. The research subjects were 72 students who took the Animal Ecology course. Data collection techniques by analyzing reports on animal ecology practicum activities following the indicators of critical thinking skills are presented in Table1.

Data on students' critical thinking skills through practicum activity reports were analyzed based on the percentage of achievement indicators of critical thinking skills. The data obtained is then interpreted into several categories, which are presented in Table 2.

Table 2. Category of critical thinking skills [10]

No.	**Score**	Criteria
1.	81–100	Very Good
2.	70–85	Good
3.	55–69	Enough
4.	40–54	Less
5.	<39	Very Less

3 Result and Discussion

Based on the study results, it can be seen that the level of students' critical thinking skills through reports on practicum activities through the guided inquiry learning model. The level of student ability can be seen in Table 3.

Based on Table 3. It can be seen that the critical thinking ability of is 83.8 so that it is categorized as very good. Students' critical thinking skills are related to the practicum activities carried out. According to [11] through practicum learning, students are required to observe the results and emphasize the thinking process when practicum activities are conducted. The description of students' critical thinking processes can be seen in the report on the results of practicum activities. In addition, critical thinking skills can also be supported through inquiry learning which is applied during practicum activities. In this regard, guided inquiry learning can arouse students' curiosity by directing students to solve the problems given and leading students to participate in practicum activities [12]. In addition, the steps in guided inquiry practicum activities can assist in carrying out a series of scientific processes in finding learning concepts so that learning is more meaningful [13].

Based on Table 3, it can be seen that the average student score for Making Basic clarification is 86. This value indicates that students are very good at explaining phenomena found during practicum activities. It is also reflected in the criteria for student explanations and student arguments against the observations made in the environment during the animal ecology practicum. It is supported by the statement [14] that the indicator provides a simple explanation that can be measured through the ability to provide a description and analysis of information. Through practical learning, students learn through the phenomena they encounter in the field. Based on the phenomena that arise, students will be motivated to describe the phenomena encountered in arguments. Therefore, students critical thinking will develop to solve problems [15]. Based on the analysis of the results of the practicum report, there are variations in providing an explanation of the phenomena found that are related to the concept of animal ecology. It can indicate student understanding in explaining the basic concepts of the material being studied.

Based on Table 3, it can be seen that the average student for building basic support is 82. This value indicates that students are in a very good category in building basic skills during practical activities. It is also reflected in considering the suitability of the source, considering the use of appropriate procedures, the ability to give reasons, involving a little guesswork, and reporting the results of observations. According to [16] Critical thinking

Table 3. Score Average of critical thinking indicators

No.	**Indicator**	Score Average
1.	Making Basic clarification	86
2.	Building basic support	82
3.	Making advanced clarification	84
4.	Strategies and tactics	80
5.	Interference	87
	Average	83,8 (Very Good)

skills lead to looking at phenomena from various angles and then evaluating them through practical activities—practicum activities in the form of observation and measurement of the phenomena that occur. Based on the results of the analysis of the practicum report, critical thinking skills appear when students understand the concept of the material to be discussed. However, in reality, many students are still not precise in giving reasons and only involve a few guesses in the phenomena found during practicum activities. However, in the practicum report, it was seen that there was a scientific attitude of students who took part in this practicum activity. It is possible because of the application of the guided inquiry model. It is supported by the statement [17] that using the guided inquiry learning model positively impacts students' scientific attitudes, which will later have implications for critical thinking skills.

Based on Table 3, it can be seen that the average student for Making advanced clarification is 84. Its value indicates that students are in very good category in providing further explanations when reporting the results of practicum activities. It is also reflected in the ability of students to provide descriptions instead of statements when writing practicum reports and their ability to construct arguments in practicum reports. According to [18] the ability to provide further explanation is a skill that must be considered and thought about properly because asking for an explanation is not easy to do but needs to be thought about because it is related to students' thinking abilities. In this aspect of providing further explanations, students must be able to give explanations that have been tested for validity (valid), and students must also be able to provide explanations that are connected and considered with the description of the previous material. From the results of the analysis, it was found that some students needed to be more precise in explaining the concepts being studied because they required more connection and considered the results of the practicum obtained. They only explained in short words, were not directed and detailed, and needed clarification in writing and explaining the results of his observations. However, practicum activities through direct observation can train students to be more concerned about the phenomena that occur so that they can prepare students to think critically about making decisions on natural phenomena [19].

Based on Table 3, it can be seen that the average student score of Strategies and tactics is 80. This value indicates that students are in the good category of managing strategies and tactics when reporting the results of practicum activities. This is also illustrated when students reveal problems, consider possible solutions, use logical approaches, and show positions, speeches or writings in practicum results reports. According to [20] In practicum activities, students are allowed to experience themselves, follow a process, observe an object, analyze, and draw conclusions about a thing in a specific state or process. So that by learning this practicum method, students' critical thinking skills develop. Regarding managing strategies and tactics, the indicators of critical thinking skills analyzed include making interim reports and presenting work results. The hands assessed the ability of students to report all the results of their observations. This practicum activity can be seen in students' capacity to find concepts independently based on concrete facts found during practicum activities, making it easier for students to understand the concepts. In this regard, guided inquiry learning can provide opportunities for students to carry out practical activities with the help of instructions. Through practicum activities, students can find answers or solve problems in groups or with individuals with a scientific approach so that higher-order thinking skills will be formed, facilitating investigations and understanding scientific facts [21].

Based on Table 3, it can be seen that the average student score is 87. This value indicates that students are in the very good category in concluding concepts related to practical activities. It is also reflected in the ability to make and determine the results of considerations based on the background facts, the ability to determine the results of considerations based on consequences and the ability to make judgments based on problems. Concerning animal ecology practicum activities, the observed phenomena must be able to raise students' concern for environmental problems. According to [22] students' awareness and critical thinking skills are crucial to solving environmental problems. It can be seen when they relate the facts in the field to the cause and effect of the phenomenon. Based on the results of the analysis of the students' answers, it shows that most of the students wrote the answers correctly. In general, the conclusions written by students in practicum activity reports are almost the same but slightly different in wording and less straightforward in determining the considerations for concluding clear, regular and directed language. Although this category has been categorized as very good in concluding indicators, there are still students who are less precise in making conclusions because they have not been able to connect the facts found during practicum activities with the objectives of practicum activities.

4 Conclusion

Based on the research results, it can conclude that it can categorize students' critical thinking skills through reports of practicum activities in guided inquiry learning as very good. Several indicators such as Providing simple explanations, building basic skills, providing advanced explanations and Concluding are very good. As well as the indicators of Managing Strategy and Tactics are in the good category. It can illustrate that students can relate phenomena found in the field during practicum activities with the studied concepts. Thus guided inquiry learning can be an alternative learning strategy that can support students' critical thinking skills in practicum.

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