Student Needs to Practicum Guidance in Physiology of Animals Based on Guided Inquiry

R Widiana*, S Susanti and D Susanti
Program Studi Pendidikan Biologi, STKIP PGRI Sumatera Barat, Jl. Gunung Pangilun, Padang 25173, Indonesia

*rinaroesdi68@gmail.com

Abstract. The achievement of the subject of animal physiology requires that the students actively and creatively find their knowledge independently in understanding the concepts, theories, physiological processes, decompose, assemble, compare and modify physiological processes in relation to the fluctuation of environmental factors through practicum activities. The achievement of this lesson has not been fully realized because the learning resources used can’t guide, direct and make the independent students achieve their learning achievement and the practical handbook used has not been able to lead the students active and creative in finding their own knowledge. The practical handbook used so far consists only of the introduction of materials, work steps and questions. For that, we need to develop guided inquiry guide based on the needs of students. Objectives this study produces a practical handbook that fits the needs of the students. The research was done by using 4-D models and limited to define stage that is student requirement analysis. Data obtained from the questionnaire and analysed descriptively. The questionnaire obtained an average of 88.16%. So the needs of students will guide guided inquiry based inquiry both to be developed.

1. Introduction

Learning in university not only provides the materials or concepts but must provide a learning experience that allows creative development and student independence in learning. One of the student learning activities that demand creativity and independence students is a practical activity. One of the subjects that are practiced in Biology Education program is Animal Physiology.

Animal physiology is one of the compulsory subjects in the study program of Biology Education. This subject discusses the physiological processes in vertebrate animal bodies. The learning achievement of the subject requires the active and creative students to find their knowledge independently to understanding the concepts, theories, physiological processes, decompose, composing, comparing and modifying physiological processes in relation to the fluctuation of environmental factors through practical activities. One of the factors that can support the creativity and independence of students in the implementation of the practical activities is the availability of adequate laboratory guidance.

The practicum guidance is a form of teaching material. A practice guide is a guideline for the implementation of a practice that contains procedures for preparation, implementation, and data analysis. The practicum guidance is compiled and written by a person or group of teaching staff who handles the practical by following scientific writing rules [1]. The components of the practicum guidance according to Rohman and Sofan [2] are a) Introduction, b) Objectives, c) Basic theories, d) Tools and materials, e) procedures, f) Data/results of observations, g) Discussion and h) Questions and conclusions.

Based on observations of the students and lecturers of Biology Education Program found that Practicum guidance used have not been able to lead active and creative students in finding their own
knowledge so that the achievement of learning from the implementation of the lab can not be achieved. The guidance of the existing practicum is that the learning activities are still focused on the lecturers, causing several problems, including 1) the students are unable to relate the physiological concepts in theory to the laboratory activities; 2) the laboratory activities have not emphasized the scientific activities in problem-solving and have not used Approach, 3) practice topics are limited to the type of experiments that can be done only [3], 4) guide provides detailed instructions so that students lose the benefits of the experiment, 5) the instructions are very rigid and does not allow the flexibility of students in creative so that student creativity is hampered [4-7] and 6) the student is unable to communicate his idea effectively in making practice report. For example, students are unable to attribute variations of the rate of respiratory processes with nerve work and fluctuations in animal environmental factors.

What is the solution to this problem? Therefore, it is necessary to develop a practicum guidance that is able to lead students actively, creatively and independently in building their knowledge and forming active, productive and conducive educational interaction between students and lecturers. A student-centered and active approach that uses inquiry-based laboratory activity has been shown to produce more skills related to independent and critical thinking and enhances students' curiosity and motivation than any other traditional approach [8-11] Before doing the development of teaching materials, to get the teaching materials that match the characteristics and needs of students need to be done in advance of student analysis. Based on the above, the definition of this research has been done by the student's analysis with the aim to get the design model for the development of practical handbook according to the characteristics and the needs of the students.

2. Experimental Method

This research uses Four-D development model developed by Thiagarajan. This research has been done until define stage and the activity done at this stage is student analysis. This research is a development research using 4D model (define, design, develop and disseminate). But the stage that is carried out only to the define stage is to analyze the needs of students. Respondents consisted of 45 students of the 5th semester who have followed animal physiology practicum, responded taken from 5 classes with 3 lecturers, each sample class was taken 25%. The data in this study were obtained from the questionnaire instrument of modified student needs from Sophia [11] The data obtained were processed by descriptive analysis using modified formulas from Riduwan [12] as follows.

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\text{Value Requirement} = \left( \frac{\text{Score obtained}}{\text{Score maximum}} \right) \times 100\%
\]

The level of achievement of needs category using Purwanto classification [13] in the following table.

| Level of Achievement (%) | Category        |
|--------------------------|----------------|
| 90-100                   | Very Good      |
| 80-89                    | Good           |
| 65-79                    | Enough         |
| 55-64                    | Not Good       |
| 0-55                     | Very Bad       |

3. Result and Discussion

Based on the results of interviews that have been conducted by researchers with lecturers of Animal Physiology lecturers obtained information that during this practical handbook has been using practical guides and practical activities have been able to run well but the guides available not yet able to lead students to be creative, active and independent in finding Concepts and build knowledge and form an active, productive and conducive educational interaction between students and lecturers. The result of student requirement analysis based on practical handbook through questioner distribution to students is shown in Table 2.
Table 2. Results of Student Needs Analysis Based On Animal Physiology Practical Handbook

| No | Question                                                                 | Student Answers | Percentage (%) |
|----|--------------------------------------------------------------------------|-----------------|----------------|
| 1  | Do you already have an animal physiology guide                           | Yes             | 100            |
| 2  | Do you like the activities of Animal physiology practical?               | Yes             | 100            |
| 3  | Is the work done in accordance with the theories learned in the classroom? | Yes             | 100            |
| 4  | Does the animal physiology guide you use to contain the basic theories about the material to be practiced? | Yes             | 83,33          |
| 5  | Does the lab workbook you use have images that support the theoretical basis of the material being practiced? | Yes             | 58,33          |
| 6  | Are your practical handbook used in order to do practical work?          | Yes             | 100            |
| 7  | Is the language used in practical handbook easy to understand?           | Yes             | 91,66          |
| 8  | Does the practical handbook you use have column sheets for observation results? | Yes             | 100            |
| 9  | Does the practical handbook you use have a column for assessment?        | Yes             | 100            |
| 10 | Is the work order in your practical handbook easy to understand?         | Yes             | 91,66          |
| 11 | Is the practical handbook you use to help explain abstract learning concepts? | Yes             | 83,33          |
| 12 | Does your practical have applied the following scientific ways: formulating problems, formulating hypotheses, collecting data, testing hypothesis formulating hypotheses and drawing conclusions? | Yes             | 58,33          |
| 13 | Do you have prior knowledge/read lines before practicing?                | Yes             | 91,66          |
| 14 | Can you conclude the results of the lab?                                | Yes             | 100            |
| 15 | Can you understand the practice of formulating hypotheses according to the Guided Inquiry steps of identifying mapping the scope of the problem, planning and predicting outcomes, investigating data collection, interpreting data and developing conclusions and reflecting? | Yes             | 75             |
| 16 | Is there a conducive atmosphere at the time (fun)?                       | Yes             | 83,33          |
| 17 | Does the laboratory on your campus have a laboratory/technician?         | Yes             | 100            |
| 18 | Is at the time of practical all students participate / active role in practical? | Yes             | 58,33          |
| 19 | Is it possible to increase your knowledge after practical?              | Yes             | 100            |
Based on Table 1 it can be seen that 100% of students answered already have a practical handbook, 100% like practical animal physiology, 100% practical has been carried out according to theory, 83.33% guidance guide already contains the required theory, 58.33% Which is required, 100% guides contain discipline of practice, 91.66% of the language used is easy to understand, 100% guides have observation columns, 100% has assessment columns, 91.66% of working order is easy to understand, 83.33 % Guidance is able to help explain the concept of abstract learning, 58.33% practical activities have applied for scientific work, 91.66% of students have preliminary knowledge before the lab, 100% of students can conclude the lab results, 75% of students are able to understand the practical according to Step guided inquiry, 83.33% the atmosphere is conducive laboratory, 100% laboratory already has a labour /technician, only 58.33% of students who have active participation in the lab and 100% practical can increase knowledge.

The result of the analysis from the student's answer shown that the students of Biology Education that program need practicum guidance that can help the students to understand the abstract concept and stimulate the active participation of the students in the practical implementation, is the practical handbook which has the following characteristics: 1) In accordance with the achievement of learning 2) systematic, 3) contains the required theories, 4) can help explain the concepts of learning that are abstract, 5) can guide and train students in applying scientific work, Implementation of the inquiry approach in the lab can increase involvement in scientific work. Students complete a physiological research project from developing individual hypotheses to preparing journal-formatted reports. Skills associated with formulas and hypothesis testing, experimental design, and data analysis, interpretation, and presentation are required when students complete their reports [14]. 6) can understand the material lab According to guided inquiry step and 7) can motivate students to actively participate in practical activities, Application of inquiry approach in the implementation of animal physiology practice can improve LO achievement of students' material understanding from 57% to 92%, LO hi design [1], and to increased student motivation and commitment to the course [16]. Regular course commitment also encourages cooperation among students and increases the likelihood of peer guidance.

Based on this result, it is necessary to develop guidance of Animal Physiology based on guided inquiry approach. The inquiry approach is the right approach because the inquiry approach has several steps which are suitable for the practical activity. The steps are 1) orientation, 2) formulate the problem, 3) formulate the hypothesis, 4) collect data, 5) test the hypothesis and 6) formulate the conclusion. In addition, the inquiry approach can train learners in developing thinking skills through questions [17].

The inquiry consists of two levels: open inquiry and guided inquiry. Departing from the analysis that active participation and student independence in the implementation of the lab is still low, the inquiry approach chosen in this guidance development is guided inquiry approach. In a guided inquiry approach, learners seek and find with the help of teachers as facilitators [18]. Guided inquiry model can provide learners with the opportunity to learn how to find facts, concepts, and principles through thinking and scientific skills [19], as well as improve positive attitude and high-level thinking [20]. In addition, guided inquiry model can also attract the attention of learners to do the practice independently and mentored.

The result of student's analysis also showed that 91.66% of students have knowledge and readiness before doing practically. This indicates that the students already have experience with the material that practical before. This condition supports the use of guided inquiry approaches in the development of this Physiology Animal practical handbook. Guided inquiry based lab activities are laboratory activities that encourage learners to build their cognitive knowledge. In addition, through practical activities learners will gain experience directly, the results of the experience can be either new knowledge or verification of prior knowledge. Knowledge is the result of two stages of learning that is assimilation and accommodation that occurs in practical activities. Assimilation occurs when new information (the result of practicum activities) matches the prior knowledge. If learners get new information that is not in accordance with previous knowledge, then learners experience the stage of accommodation. At this stage, there is an imbalance of knowledge so that learners will accommodate
(find out and find solutions to the problem) of that knowledge to fit the knowledge possessed previously [21].

4. Conclusion
From the student's analysis, it can be concluded that the students need guidance of Physiology of Animals based on guided inquiry in Biology Education Program. Based on these results, the research can be continued at the design and development stage of Practicum guides based on guided inquiry approach.

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