Development of Invertebrates Diversity Practical Guide Oriented Contextual Approach for Student in Biology Department

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Abstract. Practicum is an integral part of science learning which aims to provide opportunities for students to test hypotheses or observe real objects related to concepts or theories. In order for the practicum to be carried out well, it must be facilitated with practical guide. In this study, a practical guide for invertebrates diversity oriented contextual approach was developed. The purpose of this study is to produce a practical guide for invertebrates diversity oriented with contextual approach. The results of this study are a valid practical guide. Based on the research and development that has been done, practical guides that have been developed are in accordance with the established quality standards.

1. Introduction
The essence of learning is not just remembering and understanding the concepts which discovered by scientists. However, the most important thing is the habituation of the behavior of scientists in finding concepts that are carried out through scientific experiments and research. The concept discovery process involves fundamental skills with scientific experiments that can be implemented and improved through laboratory activities [1].

The diversity of invertebrates is one of the practical courses in the Biology Department of FMIPA UNP. This course is one of the compulsory courses for students of the third semester Biology Education Study Program. The knowledge process is obtained through the provision of theory in lecture activities, while the process of skills is obtained through practicum activities to provide laboratory skills for prospective biology teachers. Practicum aims to train the ability of students to work according to scientific procedures, so that students are able to gain knowledge, improve skills and find scientific values [2]. Practical activities will directly expose students to real symptoms regarding the concept of knowledge they already have, both in natural conditions and in conditions of manipulation through experiments. Practicum requires students to work scientifically and systematically so that the objectives of practicum activities can be achieved properly.

Invertebrates diversity courses study about morphology, anatomy, behavior studies, classification, identification, nomenclature, distribution areas and their role in everyday life. Therefore, in order for the practicum of invertebrates diversity to be carried out properly, a laboratory is needed as a place for...
practicum activities and a practical guide to guide it.

Based on the results of the study of the practicum guide for the diversity of invertebrates, it is known that the practicum guide used does not train students’ thinking skills because even though the work method has been given, the practicum assistant still has to explain and remind again the procedures in carrying out the practicum. In addition, the practicum guide has not maximally linked the material with real life, because this is needed by prospective teacher students to explain the material to their students later.

One of the learning approaches that can be used in learning biology is a contextual approach. The contextual approach is a learning approach that emphasizes the process of students involvement to find the subject being studied and connecting with real life, so as to encourage students to apply it in their lives [3]. Thus, the practical guide of invertebrates diversity oriented to a contextual approach can be used as an initial capital for prospective teacher students to understand the concept of invertebrate animals in order to become professional teachers.

Based on the explanation above, the authors developed a practical guide for the diversity of invertebrates oriented to a contextual approach for students of the Biology Department, Faculty of Mathematics and Natural Sciences, State University of Padang.

2. Materials and Methods

This is a research development to produce a practical guide to the diversity of invertebrates animals oriented to a contextual approach. The development model is the 4- D Model which consists of four stages. According to Thiagajaran, Semmel, and Semmel in Trianto (2012: 93) the stages of the 4-D model are: define, design, develop and disseminate [4]. In this study, researchers only carried out the develop stage, especially until the product validation stage by experts. The research instrument was a validation sheet. Product validation data were analyzed using descriptive statistical analysis techniques. The validation data obtained were analyzed using a modified below [5].

\[
V_a = \frac{\sum_{i=1}^{n} A_i}{n} \times 100\% \\
P_a = \frac{\sum_{i=1}^{n} A_i}{n} \times 100\%
\]

\(V_a\) = the average results of the assessment of the validity of the experts

\(A_i\) = the average validity of the experts against the criteria \(i\) n

\(n\) = the number of criteria

The criteria for the level of validity (\(V_a\)) are

- a. 91% – 100% = very valid
- b. 81% – 90% = valid
- c. 66% - 80% = quite valid
- d. 51% – 65% = invalid
- e. 51% < = very invalid

3. Results and Discussion

The first stage is definition. At this stage, student analysis, concept analysis, and drafting of practicum objectives in the Invertebrate Animal Diversity practicum are carried out. Based on the results of the study of the diversity of invertebrates and the author's observations, it is known that the guides used do not train students' thinking skills because even though the work method has been given, the practicum supervisor still has to explain and remind again the procedures in carrying out the practicum. In addition, there are still main topic that have not been included in the guide and practicum activities that have not been linked to the real life, because this is needed by prospective teacher students to explain the topic to students later.
Practical learning outcomes that must be understood by prospective teacher students are compiled by lecturers with several considerations. Lecturers select phyla that are easy to find around the environment where humans live, based on the roles and relationships of these phylum members in everyday life. These phyla are Porifera, Cnidaria, Platyhelminthes, Rotifera, Annelida, Mollusca, Nematoda, Arthropoda, and Echinodermata.

The next stage is the design stage. At this stage, a practical guide for Invertebrate Animal Diversity is prepared. The practical guide consists of 9 chapters, each chapter representing one selected topic. One chapter of the practical guide consists of the practicum title, practicum objectives, basic theory, tools and materials, how to work, and practicum observation sheets. On the practicum observation sheet, students will draw the practicum object and its body parts, classification, role and relation to the surrounding environment.

The next stage is develop. At this stage, product validation was carried out by an expert on Invertebrate Animal Diversity and a learning media expert. The validation stage of the practical guide is carried out by assessing several aspects, namely: the feasibility of the content, language, presentation, and graphics. The results of the validation of the Invertebrate Animal Diversity practical guide with a contextual approach are presented in table 1.

| No  | Assessment Aspects | Mean Validation Value (%) | Criteria   |
|-----|--------------------|---------------------------|------------|
| 1   | Content feasibility| 85                        | Valid      |
| 2   | Language           | 91.67                     | Very Valid |
| 3   | Presentation       | 80                        | Valid      |
| 4   | Graphics           | 86                        | Valid      |

Based on the results of the validity analysis of the practical guide, it is known that the mean value of validation given by the validator is 89.13% with valid criteria. The practical guide for Invertebrate Animal Diversity is considered a validator to be used as a learning medium for students in the Invertebrate Animal Diversity practicum. As stated by Pratiwi et al. (2014) that a valid biology learning module can be used as a learning medium for students \[6\]. Learning media that have been developed can be used to help students achieve learning goals. Learning media is valid because it is considered to be able to help students make their learning more efficient and not only memorize topics.

This Invertebrate Animal Diversity practical guide is equipped with original images of invertebrate animal species. The addition of images aims to stimulate students to practice topics. This is in accordance with Komalasari’s (2011) statement that the use of images or photos can provide a real picture so that it provides a more lively and precise meaning of learning and stimulates thinking skills \[7\]. Invertebrate animal species are generally small in size, some even need tools such as loops and microscopes to observe their morphological structure. In addition, the use of images is also very helpful in classifying and identifying living things, one of which is by comparing the species found with existing images. Simatupang and Junita (2009: 76) that images serve to help students’ imaginations to connect the topic being studied with the natural conditions around them \[8\]. This is in accordance with the contextual approach used in this practical guide. In accordance with the statement of Sanjaya (2006) that the contextual approach emphasizes the process of involving students to find the material being studied and connects with real life, so that students are able to apply it in their lives \[4\].

4. Conclusion
Based on the results of the research that has been done, it can be concluded that a practical guide for invertebrate animal diversity with a contextual approach as a learning medium for students of the Department of Biology, Faculty of Mathematics and Natural Sciences, UNP has been produced.
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