Guiding Development Based Approach Practicum
Vertebrates Taxonomy Scientific Study Program for Students
of Biology Education

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Abstract. Students having difficulty in identifying and describing the vertebrate animals as well as less skilled in science process as practical. Increased expertise in scientific skills, one of which is through practical activities using practical guidance based on scientific approach. This study aims to produce practical guidance vertebrate taxonomy for biology education students PGRI STKIP West Sumatra valid. This study uses a model of Plomp development consisting of three phases: the initial investigation, floating or prototype stage, and the stage of assessment. Data collection instruments used in this study is a validation sheet guiding practicum. Data were analyzed descriptively based on data obtained from the field. The result of the development of practical guidance vertebrate taxonomic validity value of 3.22 is obtained with very valid category. Research and development has produced a practical guide based vertebrate taxonomic scientific approach very valid.

1. Introduction
The law on the national education system number 20 of 2003 states that education is a conscious and deliberate effort to create an atmosphere of learning and the learning process so that learners are actively developing the potential for him to have the spiritual power of religion, self-control, personality, intelligence, morality noble, as well as the skills needed him, society, nation and state. Many efforts were made to improve the quality of education continues to be done, one of which is the improvement of teaching and learning processes in all levels of education, including college. College study various fields of science, one of which is biology. Biology is the branch of science that can be studied in the laboratory than in the classroom, by doing practical work. Hovstein and Vincent (2012: 15) states that through laboratory activities will guide students to learn through understanding and construct their own knowledge.

In order to realize professional graduates, the development of the establishment of the graduate profile, the formulation of learning outcomes, competency elements, the weight of credits, learning activities, assessment and teaching materials. One of the materials used in the learning process is a guiding biology lab. Guidance practicum is a student activity sheet with instructions and questions that should be completed by the student to find a concept and presented in the form of activity in laboratory experiments (Wayan, 2010: 782). One practical guidance in learning biology is a practical guide Taxonomy of vertebrates. Morris, (2001) states that Vertebrates Taxonomy learn about animals
with a backbone in a system of classification and discuss the kinship or phylogeny of vertebrate animals. The material contained in Vertebrates Taxonomy lab is as follows: 1) super class Pisces (classes Chondrichthyes and Osteichthyes 2) amphibian class 3) class Reptilia, 4) the class Aves, and 5) the class Mammalia.

Based on observations through the questionnaire responses of students STKIP PGRI West Sumatra on December 19, 2016 there are some problems in the lab Taxonomy of vertebrates ie, guiding lab using is not yet using the steps of scientific work that is clear, students difficulty in finding and formulating a problem, and student hardship formulate hypotheses. Researchers also conducted interviews with faculty on December 22, 2016, which found problems in the practical implementation difficulties identifying which students first vertebrate animals, students also have difficulty proving practical results in accordance with the theory learned during lectures and practical difficulties concludes in accordance with the purpose of the lab. This is due to the lack of supporting theories and images in a practical guide to help students identify vertebrate animals. Both students have difficulty understanding the methods and measures making it less terasahnya practicum science process skills of students in the lab. The third number is inactive when praktikan practical activities take place. Based on these problems shows that the students are still difficulties in understanding the steps in scientific learning, where students difficulty in finding and formulating a problem, students are still difficulties in formulating hypotheses and less terasahnya science process skills of students in practical activities. So it is necessary to guide the lab that is designed to help overcome the difficulties of students in the lab.

The results of the analysis of the needs of students to guidance practicum students expect that, of the students stated that they agreed that if the pilot lab Taxonomy of vertebrates to be developed have measures that exist in the approach to scientific, where students agreed that if the pilot lab to be developed to steer students on the problem will be solved when the lab work, facilitate determine hypotheses, make it easier to conduct experiments, facilitate the collection of data, making it easier to process the information that has been collected from the results of the experiments that have been carried out, allowing submit observations and make their conclusions, as well as practicum consists of several components that contain scientific approach.

Based on the expected needs of students to practical guidance Vertebrate Taxonomy, the approach to be used is a scientific approach. Wizard-based practicum scientific approach is practical guide to hone the ability of students in accordance with the level of thinking ability. In the scientific approach are the steps in the form of observations and formulate problems, formulate hypotheses, testing hypotheses, analyzing data and drawing conclusions. Of these phases can develop a variety of skills such as critical thinking skills, communication skills, and character behavior (Machin, 2014: 31).

Selection of scientific approach as the approach used in the development of this practical guide also refers to research performed by Fauziah, (2016), which has conducted research on the development of practical guidance based General Biology scientific approach to students. This study revealed that the lab by using this practical guide to improve the competence of learning (cognitive, affective and psychomotor). Rahmi, (2016) Plant Physiology develop practical guidance with scientific approach in college. The results showed this practical guide to improve the competence of learning (cognitive, affective and psychomotor). Sophia, (2017) to develop practical guidance Taxonomy of Invertebrates by scientific approach in college. The results showed this practical guide to improve the competence of learning (cognitive, affective and psychomotor). Based on the needs and problems have developed practical guidance Vertebrate Taxonomy-based scientific approaches for students of biology education.

2. Methods
This study is design and development (design and development research) with the aim to produce a valid practical guidance. The products developed are practical guides Vertebrate Taxonomy-based scientific approaches to students of Biology Education STKIP PGRI. This study uses a model of Plomp development, research stages consist of, the initial investigation phase (preliminary research
phase), stage of development or manufacture of prototypes (development or prototyping phase) and a stage of assessment (assessment phase) (Plomp, 2013: 15).

3. Results
3.1. Data Description Development Results
3.1.1. Data Preliminary Investigation
3.1.1. Curriculum Analysis
Of Vertebrate Taxonomy Wizard-based lab designed a scientific approach based on analysis of high diperguruan curriculum. Curriculum components that are directly related to the products produced are learning achievements, material and indicators. The translation of the indicator obtained five themes: Pisces (Chondrichthyes and Osteichthyes), Amphibia, Reptilia, Aves, and Mammalia.
3.1.2. Interview with Lecturer Course Vertebrate Taxonomy
The interview was conducted by a lecturer in Taxonomy of vertebrates in STKIP PGRI West Sumatra. Problems obtained is difficulty in identifying students vertebrate animals. This is due to lack of support and discrepancy theory diagrams in the practical guide to the observed object. Students difficulty in understanding the methods and measures that are less terasahnya lab science process skills of students in the lab.
3.1.3. Problem Analysis Students in the Practical Activity
Based on observations through questionnaire responses STKIP students PGRI West Sumatra on December 19, 2016 there are some practical problems in Vertebrates Taxonomy. A total of 40% of the students answered that the guiding lab used Vertebrate Taxonomy using the steps yet clear scientific work, where students stated that their difficulties in understanding the sequence of work contained in the practical guide. Students are also difficulties in finding and formulating the problem to be solved in practical activities, where only 53% of the students who responded were able to discover and formulate the problem to be solved when the lab. Students difficulty formulating a hypothesis in practical activities, where only 40% of students who answered able to formulate hypotheses. The number of inactive time praktikan practical activities take place, where only 40% of students who take an active role when the practicum takes place.
3.1.4. Needs Analysis Students Against Guidance Practical
Results of the analysis of the needs of students to guide practical to expect that, as much as 100% of the students stated that they agreed that if the pilot lab Taxonomy of vertebrates to be developed have measures that exist in the approach to scientific, where students agreed that if the guiding practicum will be developed to steer students on the problem will be solved when the lab, allows the practitioner to determine a hypothesis, enabling the practitioner to experiment, facilitate students in data collection, allows the practitioner to process the information that has been collected from the results of the experiments that have been done, and facilitate students in making In conclusion, as well as practicum consists of several components that contain scientific approach.
3.2. Development stage or Prototyping
3.2.1. Prototype I
After the design and manufacture practical guidance Vertebrate Taxonomy-based scientific approaches do, do a self-evaluation(self-evaluation). The results of self evaluation showed that these steps are complete scientific, but the sequence number in the sequence and picture captions yet there are some errors that occur are in writing and no pictures that do not have the source. After the evaluation, the revision to repair all the errors found.
3.2.2. Prototype 2
3.2.2.1. Results Validation Instrument
Instrument overall research beforehand validated by Dr. Darmansyah, ST, M Ed, briefly whole instrument validation results can be seen in the following table.
Table 1 Results Validation Guidance Practice-Based Research Instruments Scientific Approach

| No. | Aspect Assessed                                                                 | Value | Category    |
|-----|----------------------------------------------------------------------------------|-------|-------------|
| 1.  | The linkage indicators are in accordance with item questionnaire on the questionnaire statement. | 4.00  | Very Valid  |
| 2.  | Expressions used already includes aspects of a guide containing practical validity based scientific approach. | 4.00  | Very Valid  |
| 3.  | The phrase used by the correct Indonesian rule.                                  | 4.00  | Very Valid  |

Amount Overall: 12.0 average

Based on the table, the general assessment validator (lecturers) to the overall research instruments obtain an average value of 4.00 with very valid criteria so that the whole instrument can be used for research.

3.2.2.2 Results Validation Guidance Practicum

Guidance Practicum that has been designed, followed by validation activities by 3 experts. At this stage, the guiding validation lab by experts (professors) in order to produce a practical guide valid. The tests can be seen in the Table 2.

Table 2. Results Validation Wizard Lab expert

| No. | Assessment Criteria          | Number | average validity | Category    |
|-----|------------------------------|--------|------------------|-------------|
| 1.  | Terms Didactic               | 38     | 3.17             | Valid       |
| 2.  | Construction Conditions      | 60     | 3.33             | Very Valid  |
| 3.  | Technical Terms              | 80     | 3.33             | Very Valid  |
| 4.  | Terms Languages              | 38     | 3.17             | valid       |

Amount Overall: 216 average

Validation lab guiding judged by three people validator is very valid. This means practical guidance that has been developed already have a very good quality and can be used for a test run to the next stage, which can be used as a guide practicum Vertebrate Taxonomy.

4. Discussion

4.1. Guidance Development Process Practical Scientific Approach Based Vertebrate Taxonomy

Wizard lab Vertebrate Taxonomy developed using scientific approach, which is designed to be used by lecturers and tutors and student practicum. Development of practical guidance tailored to the stages of the scientific approach, namely: observation, formulate problems, formulate hypotheses, testing hypotheses, analyze data and draw conclusions.

The development of practical guidance starting from the curriculum analysis, interviews with the lecturer and student analysis. The results of the analysis that has been done obtained curriculum learning outcomes that students are able to understand the characteristics, examples of species and the spread of any class of vertebrate animals. Further analysis of indicators and get five themes: Pisces (Chondrichthytes and Osteichthytes), Amphibia, Reptilia, Aves and Mammalia. According Prastowo
(2011: 119) curriculum analysis done by looking at what is taught and the core competencies and learning outcomes that should be owned by learners.

Development of practical guidance is also based on interviews with the lecturer. The results of the interview obtained problem is still a lack of existing literature theory in guiding and diagrams in the guide does not match the object to be observed when the lab so students difficulty in identifying and describing the objects they observe. The next consideration in formulating practical guide is the analysis of student characteristics. Subjects in this study were students of biology education courses force of 2015 with an average age between 20-21 years old who are at the stage of formal operational period. According to Piaget's theory of learning (Budiningsih, 2008: 39) at the formal operational stage, a fundamental feature of child development have been able to think abstractly, logically, draw conclusions, interpret and develop hypotheses in using media including teaching materials self instruction, such as guiding practical

The use of scientific approach in the practicum is very appropriate, as it aims to develop the ability to think in a systematic, logical and critical student can hone his skills and science. According to McPherson (2001) approach to guide students to discover scientific knowledge on their own.

4.2. Practical Guidance validity of Vertebrate Based Taxonomy Scientific approach
Taxonomic validity vertebrates practical guidance based scientific approach validator validated by three experts / specialists. The validity of this practical guide in terms of the requirements didaktik, construction, technical, and language. Guidance practicum expressed very valid because it has met the four aspects: didactic, constructs, technical and language.

Based on the validity of the test results, the three validators declared Vertebrate Taxonomy practical guide scientific research based approach to design has been included in the category of very valid. This shows, guiding lab practicum guides developed in the course of Vertebrate Taxonomy has to be used in practical activities. According Trianto (2010: 55) valid means that the vote has been providing accurate information about the teaching materials developed. Vertebrates Taxonomy Wizard lab-based scientific approach has met with the didactic aspects valid criteria. The validation results show that the subject is presented in accordance with the applicable curriculum high diperguruan. Terms didactic closely associated with the process of finding the correct concepts and in accordance with the applicable curriculum. This is in accordance with the opinion Thoha (2001: 109-112) didactic requirements with regard to the process of determining the correct concepts in accordance with the applicable curriculum.

On the aspects of the construct also expressed very valid by the validator, because the products developed have met the terms of the preparation of practical guides. This is in accordance with the opinion of Wayan (2010: 782) there are several components of the practical guide are: introduction, objectives, tools and materials, procedures, observations, analysis and conclusions, a summary of the answer problems that have been analyzed. Penilalain on the technical aspects of Vertebrate Taxonomy practical guide based scientific approach is said to be valid. This means that all components of the technical requirements that include text, images and kegrafikaan been fulfilled properly. This is in accordance with the opinion Thoha (2001: 109-112) the technical aspects relating to the use of text, images and appearance.

Aspects of the guiding language lab Vertebrate Taxonomy-based scientific approach has a valid category in accordance with the assessment of the validator. The language requirement relating to the use of the word, spelling and punctuation, so easily understood by users. According to Hamdani (2011: 222) aspects of language is one of the aspects to be considered in the preparation of teaching materials, the language used should be simple language and easily understood. The fourth aspect of the validation votes practical guidance above is a unified whole and support each other to perfection developed practical guidance. Validation of a practical guide is very important. According to the Ministry of Education (2008: 15) validation a practical guide and other teaching materials is very important to gain recognition of conformity of teaching materials produced decent and suitable for use
in lectures). In line with that Nieveen in Plomp (2013: 28) states the criteria for getting a good quality product that is valid, practical and effective

4. Conclusion
Vertebrate Taxonomy Wizard lab-based scientific approaches that have been developed have validity with the very valid category.

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