

Preliminary Analysis for Development of Plant Ecology Practical Guide Based on Guided Inquiry

Hikmah Pertiwi SA¹, Azwir Anhar²

¹Student of Master Degree Program of Biology Education,
Faculty of Mathematics and Sciences, Universitas Negeri Padang

²Department of Biology, Faculty of Mathematics and Sciences, Universitas Negeri Padang
Jl. Prof. Dr. Hamka Air Tawar Barat Padang - 25131, Indonesia



Abstract - Plant ecology is a part of biological science that involves interactions between plants and their environment. In the process of learning it requires correlation with observation activities in the practicum process. In the implementation of the Practicum, a practical guide is needed. The purpose of this study was to reveal, analyze, and explain the fact that it was important to develop a plant ecology practical guide based on guided inquiry approach. This research was conducted at STKIP PGRI West Sumatra in August 2018. The first step in Plomp's design development was a preliminary analysis. This preliminary analysis consists of curriculum analysis, practical guidance analysis, lecturer response analysis, problem analysis and need analysis. From the curriculum analysis it is found that there are eight practicum meetings that can be elaborated in the Semester Learning Plan. Furthermore, the analysis of practical guides shows that practicum guides did not yet have a scientific approach so that they did not facilitate students in finding concepts scientifically. Lecturer response analysis states that it was necessary to develop a guide to plant ecology practicum. Analysis of the problem shows that many students were not too well-versed on how to practice scientific methods such as observation, formulating problems, making hypotheses, testing hypotheses and making conclusions. While in the needs analysis students want a practical guide with cleared images, cleared scientific steps and a better practicum guide display.

Keywords - Analysis, Descriptive, Plant ecology, Practical Guide, Preliminary.

I. INTRODUCTION

The success of a nation's education was inseparable from the guide of the teacher. The teacher was a professional educator with the main task of educating, teaching, guiding, directing, training, measuring, and evaluating students in early childhood education, formal education, basic education and secondary education [1]. The creation of professional teachers was needed by educational providers for prospective teachers, known as the Educational Personnel Education Institutions (LPTK) [2].

The Teacher Training and Education College (STKIP) PGRI of West Sumatra was one of the teacher-producing institutions, including biology teachers. The biology education studied program equips students with compulsory

subject and elective subject. Plant ecology was a compulsory subject for biology students with the code BIO10021 and had 3 credits. This credit was divided into 2 credits of theoretical learning activities and 1 credit of practicum activities[3].

Based on the Semester Learning Plan (RPS) of the Biology Education Studied Program, one of the Learning Outcomes from the Plant Ecology subject was that students were expected to master the concepts, principles, and procedures of plant ecology through scientific work so that they could be applied in accordance with plant ecology current education. To realize the learning outcomes, it was necessary to choose the right strategies, teaching materials

and media so that the achievement of student competence could be maximized.

Plant ecology was the studied of specifically about the interaction of plants with the environment and related to the processes and symptoms that occur in it. In understanding the concepts that exist in plant ecology, practical activities were urgently needed. Practical activities aimed to provide opportunities for students to test hypotheses or observe real objects and related to the theories and concepts learned. Revealed that the most important part in practical activities was the habituation of scientific behavior like scientists in finding concepts carried out through experiments and scientific researched. To support the implementation of plant ecology practicum activities, the most needed was a practical guide.

II. METHODOLOGY

This research was a descriptive studied to determine the need to develop a plant ecology practical guide based on a guided inquiry approach for students. This research conducted at STKIP PGRI of West Sumatra in the biology education studied program. There were several steps taken in the studied. They were as following:

2.1 Curriculum Analysis

Curriculum analysis aims to saw the learning outcomes and subject matter of the course on plant ecology. This analysis was used as a basis for determining the material and practical objectives of the developed plant ecology practical guides.

2.2 Practical Guide Analysis

The guiding analysis of the practicum was carried out to find out the contents of the plant ecology practical guide commonly used by students. Practical guiding analysis aims to find out whether the practical guide used had an approach or not, and knows the components contained in the

practical guide. The analysis was carried out on the guide of plant ecology practicum in STKIP PGRI west sumatra.

2.3 Analysis of Plant Ecology Lecturer Response

Analysis of the response of lecturers of plant ecology aims to find out the problems found in the practical guide used in practical activities. Information on plant ecology lecturer responses was obtained by using an opened questionnaire.

2.4 Analysis of Student Problems and Needs

Problem analysis was carried out to find out the problems faced by students in plant ecology practicum activities. While the needs analysis was done to determine the characteristics of practical guides that were liked by students. The activities carried out at this stage were by giving questionnaires to students. The results of the needs analysis were used as a benchmark in designing and developing plant ecology practical guides based on guided inquiry approach.

III. RESULT AND DISCUSSION

The results obtained at the Preliminary Analysis were explained as follows:

3.1. Curriculum Analysis

Curriculum analysis was done by reading and understanding learning outcomes of plant ecology courses contained in the semester learning plan (RPS). Based on the results of an analysis of existing learning outcomes, indicators and objectives for each practicum were described. Analysis results this was used as a basis for formulating indicators and learning objectives and concepts that were necessary in practicum activities. Based on the analysis, researchers formulate the material to be put into practiced which could be seen in Table 1.

Table 1. The Title and Purpose of the Practicum in accordance with the Curriculum Analysis on Learning Outcomes

| Learning Outcomes | The Title | The Purpose |
|--|--|---|
| 1. Students are able to master the concept of environmental factors | Abiotic Environment | 1. Students are able to operate the tools used in the measurement of environmental factors 2. Students are able to distinguish environmental conditions in sheltered and open areas. |
| 2. Students are able to understand and be able to explain the relationship between Vegetation and Biotic Environ-mental Factors and Prove the interaction between Plants and the environment | Competition: Interspecific and Interspecific | 1. Students are able to distinguish between intraspecific competition and interspecific competition 2. Students can observe intraspecific competitions and interspecific competitions that occur in plants |
| 3. Students are able to understand the concept of succession, understand the process of succession | Secondary Succession | 1. Students can observe the secondary succession process in an area |

| | | |
|--|--|--|
| and the forms of succession | | 2. Students are able to observe and understand the process of population growth or reduction in stages on a land as part of the succession process |
| 4. Students are able to understand the individual distribution patterns | Distribution Patterns of Plant Species | 1. Students are able to observe the different patterns of distribution of several plant species by Poisson analysis Students are able to determine the factors causing the pattern of spread of a plant species |
| Students are able to understand and can do vegetation description and analysis with a variety of methods | Determining the Minimum Area | Students are able to determine the minimum plot size to be used in vegetation analysis sampling |
| 6. Students are able to do vegetation analysis data processing using plot and point center methods | Checked Line Method | 2. Students are able to calculate important types in a forest community stand using the line method |
| 7. Students are able to do vegetation analysis data processing using plot and point center methods | Quartered Point Centerer Method | Students are able to calculate the important value of the dominant type in a forest community stand using the Quartered Point Centerer method |
| 8. Students are able to analyze plant statistical data | Spectrum Life Form | Students are able to observe and determine the spectrum of life forms on different stand / stand types (shaded, transition and exposed areas) |

From table 1 it could be seen that the results of curriculum analysis in the plant ecology course found 8 practical activities that will be carried out by students. Thus, the theory obtained from classroom learning was strengthened by the existence of practical activities.

3.2. Practical Guide Analysis

The analysis of the plant ecology practical guides aims to find out the components that need to be improved in the practical guides. The components analyzed were the typed of approachd used, the accuracy and appropriateness of the material with the Semester Learning Plan the correctness of the concept, the completeness of the guiding components, and the language used. The practical guides analyzed were practical guides used in the laboratory of STKIP PGRI west sumatra, which was written by a team of plant ecology lecturers.

The analysis shows that the practical guide used has not yet had a learning approach. Practical guides were presented without going through stages of scientific work such as formulating problems, formulating hypotheses, testing hypotheses, analyzing data and making conclusions. Students were directly focused on following the steps in the guiding practicum, so it was feared that students will not be able to develop students' scientific attitudes and were less honed in solving problems in plant ecology. This was a consideration for researchers to develop a guide to the plant ecology practicum based on a guided inquiry approachd that could facilitate students to work scientifically in practicum activities.

The practical guide was a conventional typed of guide that contains the title, practical purpose, basic theory, tools and materials, ways of working and some data analysis tables. Practical guides used from year to year were always the same and almost did not experience updating or adding information. This situation causes some of the volunteers to copy and paste reports on the results of the implementation of practicum activities from seniors. In addition, the guide to plant ecology practicum used was still verification by using a cookery book typed guide. The prescription model requires students to work according to the steps written in the practical guide, without any exploration from the students themselves.

3.3 Analysis of Lecturer Response

The lecturer response analysis aims to saw the lecturer analysis of the plant ecology practicum guide that had been used by students. Based on the results of a written interview using the questionnaire responses of lecturers of plant ecology courses, plant ecology lecturers revealed that the guide to plant ecology practicum used did not yet had an approachd.

The guide still cannot make students work independently because the work steps were not yet detailed in guiding the practitioner. Therefore, to improved the scientific work of students it was necessary to had renewal. According to [5], in studying plant ecology it would be better if students were facilitated with an approachd that made it possible to connect many concepts to help students understand ecological concepts.

3.4. Analysis of Student Problems And Needs

3.4.1 Problem Analysis

Problem analysis aims to determine the difficulties and obstacles experienced by students during the plant ecology practicum. From the questionnaire analysis of the problem of plant ecology practicum results obtained that: first, in the implementation of practicum students tended to be passive and not fully involved.

The results of the questionnaire showed that only 30% of students were active in practicum activities. Second, practicum guides had not facilitated students in working scientifically. Seen from the results of the questionnaire which showed that 73% of students had not been able to master the steps of the scientific method such as formulating problems, formulating hypotheses, testing hypotheses, analyzing data and concluding. Third, students were less interested in the appearance of the guide to plant ecology practicum. The results of the questionnaire showed that 67% of the practicum guides did not had an interesting color combination.

3.4.2 Need analysis

The needs analysis was done to find out the characteristics of practicum guides that were developed to suit the needs of students. Based on the needs analysis questionnaire in practicum activities that had been carried out, it was obtained that 100% of students need a guide in plant ecology practicum which consists of covered, preface, instructions for using the guide, practicum discipline, table of contents, table of contents, list drawing, and introduction to laboratory equipment.

Furthermore, 100% of students need a plant ecology guide that directs to the problem to be solved, makes it easier to determine hypotheses, makes it easy to observe or conduct experiments, makes it easy to collected data, makes it easy to process information gathered from experiments that had been conducted, and easy to convey the results of observations and make conclusions.

The results of the needs analysis also obtained information that students needed the appearance of the plant ecology guide with a covered with the highest percentage of three choices: 80% chose green, 70% chose blue, and 33% chose black. Furthermore, for the contents of the practical guide 63% of students want dominant green, 60% light green, and 43% white.

For the type of font on the covered of the practicum guide, students choose 57% with the font Mt Light

Footlight, 53% with the typed of Times New Roman writing, and 43% with the Cambria font. As for the font on the contents of the practicum guide, students choose 80% with the Cambria font, 73% with the Times New Roman font, and 50% with the MT Light Footlight font. For the title of the guided inquiry approachd stepped, students choose 53% with the typed of Times New Roman, 43% with the typed of Lucida Calligraphy, and 40% with the Cambria typed.

IV. CONCLUSION

This preliminary analysis consists of curriculum analysis, practical guidance analysis, lecturer response analysis, problem analysis and need analysis. From the curriculum analysis it is found that there are eight practicum meetings that can be elaborated in the Semester Learning Plan. Furthermore, the analysis of practical guides shows that practicum guides did not yet had a scientific approached so that they did not facilitate students in finding concepts scientifically. Lecturer response analysis states that it was necessary to develop a guide to plant ecology practicum. Analysis of the problem shows that many students were not too well-versed on how to practiced scientific methods such as observation, formulating problems, making hypotheses, testing hypotheses and making conclusions. While in the needs analysis students want a practical guide with cleared images, cleared scientific steps and a better practicum guide display.

ACKNOWLEDGMENT

I would like thanks to Mr. Dr. Azwir Anhar, M.Si who has guided this research so that it can be carried out well. As well as Mr. Dr. Budhi Oktavia, Ph.D and Mrs. Dr. Mralita Chatri, M.Si who has contributed to making this research better.

REFERENCES

- [1] Depdiknas. 2005. "Undang-Undang Republik Indonesia : Nomor 14 Tahun 2005 Tentang Guru dan Dosen". *Publikasi Online*. Jakarta: Departemen Pendidikan Nasional RI.
- [2] Chotimah, U. 2009. "Peranan LPTK dalam mewujudkan guru yang profesional: suatu tantangan dan harapan. In *Seminar Nasional Pendidikan yang diselenggarakan oleh Universitas Sriwijaya, tanggal* (Vol. 14).
- [3] BAAK. 2016. *Buku Pedoman Akademik Penyelenggara Pendidikan Tahun Akademik 2016/2017*. Padang: STKIP PGRI Sumatera Barat Press.

- [4] Subagyo, Y., Wiyanto, Marwoto, P .2009. "Pembelajaran dengan Pendekatan Keterampilan Proses Sains untuk Meningkatkan Penguasaan Konsep Suhu dan Pemuaian". *Jurnal Pendidikan Fisika Indonesia*, 5(1): 42-46.
- [5] Amprasto, M. R., Supriatno, B., & Safaria, T. 2007. "Pembelajaran Ekologi Tumbuhan Menggunakan Metode Pemecahan Masalah Dengan Bantuan Tutor Sebaya". *Jurnal Pengajaran MIPA*, 9(2), 43-50.