Research Article

Need Analysis of Ecology Course Teaching Materials Based on Student Needs

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Abstract.
One of the important components of the lecture process is the existence of quality teaching materials. Teaching materials will assist students in understanding content delivered by lecturers theoretically or in practice. Results of preliminary study indicate that there are teaching materials unsuitable to student needs. Some students opine that it is difficult to obtain learning sources for the Ecology course. This research aims to find out the results of needs analysis of Ecology course teaching materials that will be used as a basis in preparing STEM (Science, Technology, Engineering, Mathematics)-based Ecology course module. The method employed in the research is survey method. Data collection were done using survey questionnaire in Google Form. The survey respondents were 104 students of Biology Education in three universities who had taken the Ecology course. The data analysis was done by describing the survey results of need analysis of ecology course teaching materials. The research results suggest that about 52.9% of respondents had difficulties in obtaining ecology learning sources. About 98% of respondents state that most lecturers only used PowerPoint in teaching and did not recommend teaching materials according to the content delivered. Therefore, in certain ecology contents, students encounter difficulties to work on their assignments and understanding the existing content.

Keywords: ecology course, teaching materials, student need

1. INTRODUCTION

Teaching and learning is a process of transfer of knowledge between teacher and learners. The process requires few things to run smoothly and achieve its learning objectives. Those things include teaching materials suitable for student needs. These teaching materials are expected to facilitate students in understanding the content taught [1]. Teaching materials are a systematically arranged set of content that are used

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by teachers and students to achieve learning objectives. They play important roles in the existing learning process [2].

Ecology is a compulsory course for students of Biology Education department. The course lecture process must be supported by adequate teaching materials. Teaching materials could assist students in understanding content delivered by lecturers and facilitate them in working on assignment from the lecturers. These teaching materials can be from supporting books according to content taught in the ecology course. They could also develop by the course lecturers in the form of enrichment books, textbooks, or module [3]. The advantage of teaching materials developed by the course lecturers is that it can be adjusted to their student needs and to the content delivered in the lecture process [4].

Based on observation results, the lecturers of Ecology course are mostly utilize PowerPoint in teaching process. The lecturers recommend books related to ecology but only one or two book sources and oftentimes student must pay for the book. Therefore, it is hard for the students to obtain learning sources, especially when they learn independently. This affects the students' activities in working on independent assignments. Students, therefore, tend to use few references. These make it difficult for students to achieve the specified graduate achievement. The most-often-stated difficulty face by the students is in understanding content delivered and in applying the content.

This issue can be overcome by developing teaching materials suitable to student needs. The teaching material can be a module thus it can be used as a learning source as well as for independent learning for students. Module is a teaching material in the form of books that are systematically arranged and written so that student could learn independently or at the direction of teachers [5]. The module is more practical and efficient to use in supporting student learning since it can be used anytime and anywhere. The research aims to identify the results of need analysis of ecology course teaching materials that will be used as a basis in preparing STEM (Science, Technology, Engineering, Mathematics)-based ecology course module. The development of ecology course module is expected to support the Ecology lecture process.

2. RESEARCH METHOD

The research used survey method. The survey was distributed to students who enrolled in Ecology course in three higher education institutions in East Java. The number of respondents who filled the questionnaire was 104 students. The questionnaires were distributed in February-March 2020. Data collection technique in the research was

through survey questionnaire using Google Form platform. Instrument used in the data collection was interview guide to the course lecturers and compiled survey question-naire guide to respondents, students of Biology Education. The research consisted of the following stages: 1) preparation stage, namely preparing the research instruments, 2) disseminate, which is distribution of survey questionnaire to students of Biology Education, 3) interview with lecturers of biology course, and 4) data processing, which is processing data of survey results. The data analysis technique carried out by elaborating the results of interview with the Ecology course lecturer.

3. RESULT AND DISCUSSION

The results of survey with respondents identified things related to the need for teaching materials in Ecology course. About 52.9% respondents stated that they have difficulty in searching for learning sources of books that match to the content learned (Figure 1). This suggests that more than half of the students experienced similar issue. The learning source of books recommended by the lecturers is in English. Understanding foreign language in books or journals is one of obstacles for students in understanding a course content [6]. This is supported by the Ecology course lecturers who stated that teaching materials used and considered as good are in English and students' literacy was low due to their difficulty in understanding foreign language. Therefore, students were less understand the content delivered in the books and in turn, students' grade was decreasing in the Ecology course [1].

Another issue found was that around 98% respondents stated that the Ecology course lecturers only utilized PowerPoint media in explaining the course content and provided book references that used foreign languages. This is in correspond with statement from the Ecology course lecturers that the use of PowerPoint in teaching is efficient and the rest students could have a question and answer session and independent learning using reference sources provided by the lecturers. Students sometimes did not understand some points in the description in the PowerPoint. They could ask and discuss it with the lecturers or their peers; the diverse student understanding, however, required them to learn independently through the recommended reference sources [7]. Power point is a practical tool to explain content in a teaching and learning process; it will be better, however, if it is supported by using teaching materials that are easy to understand by students [8]. This indicates that PowerPoint is not sufficient to bring concept understanding to students as it still requires deep explanation and comprehension [9].
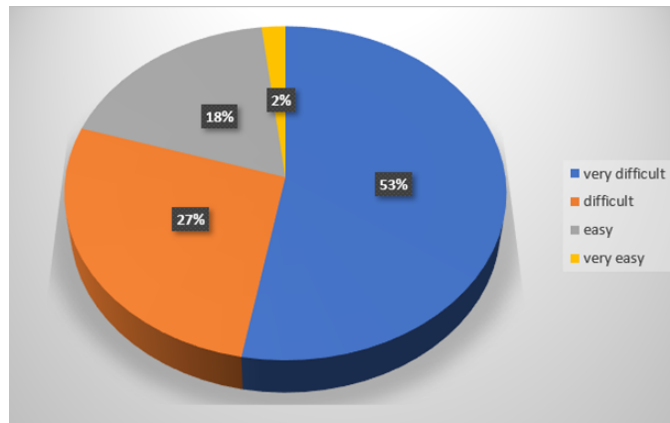
Figure 1: Percentage of difficulty finding teaching materials.

Referring to the need analysis results, alternative of solution offered is by developing teaching materials suitable to student needs. Appropriate teaching material selection affects the success in learning achievement. Based on the survey results, respondents were mostly responded to the need of teaching materials of module (Table 1). The course lecturer could develop the module according to lecture plan; thus, it can be adjusted to the needs of students who enroll in Ecology course. Module is one types of teaching materials that contains a set of content that is systematically arranged and can be used in lecture process as well as students' independent learning [10]. Module is deemed as more representative to teach Ecology for students who have limited access to search for primary sources and have trouble in understanding the content. It has several advantages that include effective and efficient use. Students could learn independently and asses or evaluate their achievement directly [3]. Most of the respondent students wanted a teaching material that could involve students actively and the chapters are not separated.

TABLE 1: Need analysis of ecology course teaching materials.

Points of Need	Score
Separated chapters presented in a sheet form	7.49%
All chapters are put together in a book	13.02%
All chapters are put together in a book	16.98%
Systematically list association, structure, and knowledge order	16.28%
Require students to learn actively	18.60%
Self-instructional, can be used independently	14.19%
Contain a section that can be used to assess (evaluate) self-achievement directly and independently	13.02%

The current need analysis will be used as a basis in developing STEM-based Ecology module. According to the survey results, respondents wanted teaching materials studied from various scientific fields. STEM is an approach that combines elements of Science,

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Technique, Engineering, and Mathematics in developing a teaching material. It is very likely to study Ecology course from the four fields of science. Scientifically, ecology is a branch of science. Technology approach is used to simplify learning objects. Students are more able to visualize what they learn by using the approach. Engineering is needed in ecology learning to compile and manipulate learning objects to make it simpler. Mathematics, on the other hand, is necessary to make the simplification of the various objects more real and closer to the truth. The STEM approach in teaching material development is known to be able in improving critical thinking skills, creative thinking skills, and learning outcome [11]. In the ecology module development, combination of the four elements in STEM is deemed appropriate, as it is suitable to current educational demands [12]. It is expected that the STEM approach could provide independent and innovative learning methods for students who enroll in Ecology course. Additionally, the ecology module development could improve students' learning outcome that has been decreasing for the last three years due to the aforementioned causes.

4. CONCLUSION

The research concludes that the results of student needs analysis of ecology course teaching materials indicate several findings. First, 52.9% respondents stated that they have difficulty in obtaining ecology learning sources. Second, 98% respondents stated that most lecturers used PowerPoint in teaching and do not recommend teaching materials suitable to content being taught; therefore, students have difficulty in working on assignment and in understanding certain ecology contents. The needs analysis become a basis in preparing STEM-based ecology module.

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