International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Analysis of Needs for Textbook Development Case-Based Curriculum Study of The Problem-Solving Ability and Character of Biology Education Students

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Abstract

Textbooks are needed in lectures for students to make it easier to achieve learning targets regarding subject matter content. This research aims to analyze the needs of biology education students regarding the need to develop case-based curriculum study textbooks on problem-solving abilities and character formation of students. This preliminary research is the beginning of development research with research subjects totaling 80 biology education students who have studied curriculum review lectures determined using random sampling techniques. Data was obtained using a questionnaire and analyzed using percentage techniques. The research results found that students need textbooks for case-based Curriculum Study courses. This is intended to obtain problem-solving abilities and objectively measure student character.

Keywords: textbooks, cases, problem solving ability, character, curriculum study

INTRODUCTION

Biology students' understanding of the biology curriculum is not only limited to the scope of learning outcomes. However, more broadly and deeply requires the ability to analyze and solve problems so that students hone their high-level thinking skills. In addition, during the learning process it is hoped that a positive character will be formed as a future biology teacher candidate who is able to find solutions to increasingly complex problems. Thus, students need to make it easier to access various learning resources, including representative textbooks. According to Suparman (2021), students need to have high-level thinking skills or character through textbooks.

In studying the Curriculum Review course so far, biology education students as prospective biology teachers often experience difficulties in obtaining the right learning resources to achieve learning outcomes. Indeed, so far students have obtained information from the internet or libraries. However, the availability of information packaged to develop students' problem-solving abilities and character building is still felt to be minimal and is deemed necessary for students to be prepared. According to Jatmiko, et al (2020) stated that textbooks can improve students' critical thinking skills, including the ability to solve problems. Likewise, the opinion of Gunawan and Hidayatullah (2020) states that textbooks are needed in forming student character.

Textbooks that contain discussions related to cases can develop students' thinking abilities, especially problem-solving abilities. Berg (2004) states that through the cases studied, students will form a richer

and deeper understanding. Students can think logically and interpret findings. Likewise, Amaliah et al (2003) added that by discussing cases students can train their thinking skills and find solutions from discussing the problems presented.

The Curriculum Review course is a mandatory course for biology education students at Medan State University which has 2 theoretical credits. For students, the availability of textbooks will make it easier to study the material independently and for lecturers it will be more effective in delivering the material, because the lecturer acts as a facilitator. In this Curriculum Review course, students are provided with high school biology curriculum material, changes, developments, and comparisons with various neighboring countries and developed countries. Information related to the theory underlying the biology curriculum is presented in this course.

So far, in Curriculum Review lectures, students have not had the same textbook to use as a guide for students, so they have varying perceptions and abilities regarding the biology curriculum itself. This understanding, which is still in partial form, needs to be managed well considering the potential that exists in presenting a representative and systematic textbook in accordance with the demands of the syllabus and student needs. In this way, students' dependence on lecturers will be overcome if there are textbooks that are able to create student independence in learning.

The aim of this research is to find out which textbooks need to be developed for the Curriculum Review course in the Biology Education Study Program, FMIPA Unimed according to student needs. It is hoped that the results of the research will provide initial information regarding the textbooks that need to be developed and what materials need to be included in the textbooks. It will then be used as a reference in subsequent development research.

METHODS

Based on the type, this research uses research and development research methods. In this development research, products are produced and the product's effectiveness is tested (Sugiyono, 2012). In carrying out this development research, five steps were used in the ADDIE model development research (Branch, 2009). However, Sukmadinata (2012) modified research and development into three steps. First, a preliminary study, reviewing theories and observing existing products or activities. Second, develop new products or activity programs. Third, test or validate new products or activity programs. Development activities were carried out through several trials, with limited samples and wider samples.

This research is at the Analysis stage, which is a preliminary study (pre eliminary study) part of development research which begins with a survey method for developing Curriculum Review textbooks. At this research stage, data was collected in the form of a questionnaire from 80 Biology Education students who had attended lectures in the second semester. The research subjects were determined purposively on the grounds that students had already attended lectures in the second semester.

Data collection in the form of interviews using an interview guide was carried out with 4 lecturers teaching the Curriculum Review course, and in-depth interviews were carried out with the Head of the Biology Education Study Program. This research was carried out from February to June 2024 at the FMIPA Unimed Biology Education Study Program.

Data analysis process with peer-debriefing activities. Peer-debriefing is a technique for testing the credibility of previously obtained research data findings, by asking more careful questions to sources/research subjects who have never been researched (Cohen et al., 2007). The data analysis technique uses descriptive analysis to describe the trends that occur in each question item and percentages

are presented in the form of a frequency table.

RESULTS

The results of this research are presented in three parts relating to document analysis, analysis of student needs and analysis of lecturer needs obtained through observation, interviews and interviews with research subjects.

Document Analysis

Document analysis through observations made on the Semester Learning Plan (SLP) shows that the RPS is prepared by the Coordinator of the Lecturer Group of Studies (CLGS). The CLGS team conducted a Focus Group Discussion (FGD) to equalize perceptions in compiling and implementing RPS in the learning and assessment implementation process. The documents reviewed relate to the drafted SLP. The SLP is prepared referring to the curriculum used in the current year, namely the Independent Learning Campus (ILC) curriculum

Analysis of learning outcomes in the Curriculum Review course has shown various students' thinking abilities. There are 2 learning outcomes included in the low level thinking category and there are 11 learning outcomes included in the high level thinking category. The learning outcomes of the Curriculum Review course are as shown in Table 1 below.

Table 1: Learning Achievements Curriculum Review

No	Learning Outcomes	Category
1.	1.1. Able to analyze the essence of the curriculum and the essence of curriculum development.	C4
2.	1.1. Able to explain the basis for curriculum development.	C2
3.	1.1. Explain the function of the curriculum	C2
4.	1.1. Summarizing the types of curriculum.	C5
5.	2.1. Summarizing changes to the biology curriculum.	C5
6.	2.2. Concluding improvements to the biology curriculum.	C5
7.	2.3. Analyzing the development of the junior high school biology curriculum in Indonesia.	C4
8.	2.4. Analyzing the development of the high school biology curriculum in Indonesia.	C4
9.	3.1. Analyzing the structure of the junior high school biology curriculum in Indonesia.	C4
10.	3.2. Analyzing the structure of the high school biology curriculum in Indonesia	C4
11.	3.3. Analyzing concepts and learning approaches in the biology curriculum.	C4
12.	3.4. Examining the biology curriculum at high school level in neighboring countries, Malaysia or Singapore.	C4
13.	3.5. Examining the independent learning curriculum.	C4

Analysis of the competency achievements that will be achieved by students in Curriculum Review lectures based on documents shows that 100% of the cognitive aspects have been achieved, but the affective and motoric aspects have not yet been written down explicitly. For the affective aspect, there is still minimal assessment of student character, because it prioritizes the cognitive aspect. In fact, the required curriculum and the forms of assessment that apply at Unimed allow for assessment in the affective domain

Analysis of the learning resources used by students in Curriculum Review lectures is lacking. Generally, the reference sources used are still in Indonesian and National Journals, there is still not a lot of searching for information with learning sources from English language textbooks and articles from English language journals. Even though the assignment pattern given is that students are supposed to carry out critical analysis of textbooks and review relevant journal articles.

Learning process Curriculum analysis based on documentation contained in the SLP shows that what is carried out is Self Directed Learning (SDL) and Cooperative Learning (CL), as well as a contextual approach, integrating Case Methods, and based on Routine Assignments, Critical Book Reports, Critical Journal Reviews, Mini Research, Idea Engineering and Projects. This activity is planned to be spread across each meeting from the 2nd week to the 15th week. Project assignments are collected in the 15th week.

Analysis of the source books contained in the SLP can be presented in Table 2 below.

Table 2: Analysis of Source Books in SLP

No	Book Type	Amount in %	Latest %
1.	Speak Indonesian	50	85
2.	English text book	50	75
3.	National Journal	10	90
4.	International Journal	10	90

Analysis of the form of assessment based on the SLP, that in Curriculum Review lectures, the assessment system is implemented in accordance with the provisions applicable in the Unimed Biology Education Study Program in accordance with the Reference Book used in the lecture process from the Unimed guidebook, namely the Mid-Semester Examination (MSE) and the Final Semester Examination (FSE). The exam system is carried out simultaneously for parallel classes with the same questions. There are 5 parallel classes currently taking courses in the Curriculum Review course.

Based on documentation analysis of the questions tested during the Mid-Semester Examination (MSE) and Final Semester Examination (FSE) as shown in Table 3 below.

Table 3: Analysis of Question Items based on Question Documentation

No	Implementation	Higher Level Thinking (%)	Case Analysis Form (%)
1.	Mid-Semester Examination (MSE)	50	10
2.	Final Semester Examination (FSE)	50	10

Analysis of Student Characteristics

Analysis of student characteristics in taking Curriculum Review lectures is seen from student responses to the questionnaire items given. Students' opinions regarding whether or not it is necessary in lectures to

discuss cases are as shown in Table 4 below.

Table 4: Students' views on whether or not to discuss cases

Alternative Answers	Frequency	Percentage
Strongly agree	21	26.25
agree	57	71.25
Neutral	2	2.50
Don't agree	0	0
Strongly disagree	0	0
Amount	80	100.00

Analysis of biology education students' responses in terms of whether or not it is necessary to discuss character development that needs to be assessed in Curriculum Review lectures as shown in Table 5 below.

Table 5: Student Responses regarding Student Character Assessment

Alternative Answers	Frequency	Percentage
Strongly agree	20	25.00
Agree	58	72.50
Neutral	2	2.50
Don't agree	0	0
Strongly disagree	0	0
Amount	80	100.00

Data regarding the analysis of learning resources used by students is as shown in Table 6 below.

Table 6: Student Learning Resources

No	Type of Book Used	Frequency	Percentage
1.	Indonesian Language Books	32	0.40
2.	English/Foreign Language Books	12	0.15
3.	Photocopy of Book/Journal	36	0.45
4.	Amount	80	100.00

Based on the number of books read to enrich the Curriculum Review lecture material as shown in Table 7 below.

Table 7: Number of Books/Journals Read by Students

No	Number of Books/Journals Read	Frequency	Percentage
1.	Only 1 book/journal	21	26.25
2.	2 books/journals	27	33.75
3.	3 books/journals	19	23.75
4.	More than 4 books/journals	13	16.25
5.	Amount	80	100.00

Needs analysis regarding whether or not it is necessary for students to have a Curriculum Review textbook whose material is in accordance with the sequence in the syllabus as shown in Table 8 below.

Table 8: The need for textbooks for students

Alternative Answers	Frequency	Percentage
Strongly agree	18	22.50
Agree	62	77.50
Neutral	0	0
Don't agree	0	0
Strongly disagree	0	0
Amount	80	100.00

Analysis of Teaching Lecturer Needs

There are 6 lecturers who teach the Curriculum Review course at the Biology Education Study Program, Medan State University, which is a team for all available classes. The opinion of the lecturers is that in the SLP Curriculum Review it is necessary to improve learning outcomes that accommodate objectives that lead to the affective domain or attitude formation. Students' abilities need to be improved for questions based on HOTs and literacy measurements. Students' social attitudes related to student character still need to be considered in assessment items for both MSE and FSE questions.

DISCUSSION

The learning outcomes contained in the SLP Curriculum Review show that there is a balance between low-level and high-level thinking abilities. However, the analysis of the objectives presented still does not reflect the existence of high-level thinking abilities in category C6 (Creating). In fact, in the C6 (Creating) category, students can explore their productive thinking abilities and creative thinking. This is in line with the opinion of Rita et al, (2012), Roslan et al, (2021), and Nengsih et al, (2024) who state that high-level thinking abilities include the ability to think logically, think reflectively, metacognitively and think creatively.

In the SLP documentation for the Curriculum Review course, there is a learning pattern using six types of tasks, such as routine assignments, critical analysis of textbooks, analysis of journals, conducting simple research, engineering ideas, and working on projects, showing that students in lectures are directed to think at a higher level. . However, it still does not show that there is discussion of cases that can train students to have problem-solving skills. In Curriculum Review lectures, it is necessary for students to solve problems, especially now that education is faced with various problems. Problems can occur nationally or globally. The need for lecture explanations by exploring problem-solving abilities is in line with the opinion of Marada et al., (2021) that complex thinking, including the ability to solve problems and make decisions, is necessary for students to integrate students' thinking abilities.

When studying lecture material, a variety of textbooks are needed. In the findings of this research, even though it has presented foreign references and tried to use up-to-date reference books. However, case-based textbooks are still not found in the references used. That is why from needs analysis it is necessary to use case-based textbooks. The need for case-based textbooks will foster students' high-level thinking abilities, this is in line with the opinion of Ramdiah et al, (2018) which states that with cases, students can improve and stimulate their high-level thinking abilities, including the ability to solve problems.

In the findings of this research, students think that case-based textbooks are needed. This is necessary to develop the ability to discuss cases, especially regarding developments in the biology curriculum from time to time that have occurred in Indonesia. The importance of case-based textbooks is in line with the

opinion of Adnan et al (2021) who state that by discussing cases, students will actively and directly learn to find problems and solutions.

In the findings of this research, the form of student character assessment has not been revealed. In fact, at every learning opportunity, it is necessary to assess the student's character. Student character can be used as a barometer of whether students are ready to carry out their duties in the future after they finish studying and return to their activities in society with good character. This is in line with the opinion of Kurniawan (2013) that it is important to evaluate student character objectively to be able to measure religiousness, honesty, tolerance, discipline, hard work, creativity, independence, democracy, curiosity, national spirit, love of the country, friendship, communicative and caring.

The analysis of student needs is based on the lecturer's opinion that the need to assess student character is a big challenge for Curriculum Study course instructors. The key to success in measuring student character is that a grid of indicators is needed to measure student character in lectures. The importance of measuring student character is in line with Muslich's (2011) opinion that character education for students is the responsibility of educators as a whole in responding to the multidimensional crisis problems that have occurred recently in all areas of society.

In exploring science, it requires the presence of representative textbooks to make students successful in accordance with the planned learning outcomes. The case-based textbook design in this research findings achieved a very high level of agreement. This means the need for case-based curriculum review textbooks. Student involvement will be further honed by presenting case-based textbooks. This is in line with the opinion of Rahmat et al (2023) who state that the cases presented will provide students with the opportunity to analyze information in the form of cases and be able to create the best solutions to the analysis of the cases presented.

CONCLUSION

It is a necessity to have a Curriculum Review textbook for biology education students that has case-based characteristics. The importance of case-based curriculum study textbooks can be used as a reference in improving students' abilities in analyzing problems and finding solutions which ultimately can evaluate student character.

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