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DEVELOPMENT OF MODULE BASED ON CONSTRUCTIVISM IN LEARNING MODELS MATERIAL OF BIOLOGY LEARNING STRATEGY AND DESIGN SUBJECT

Evrialiani Rosba[i],
Zikra,
Mimin Mardhiah Zural
STKIP PGRI Sumatera Barat
Padang, West Sumatra, Indonesia

Abstract:
Models learning is one of the materials in biology learning strategies and design subject. Students must be able to choose learning models that are in accordance with the learning material. In fact, students are less able to choose and apply learning models in designing learning plans. This is caused the lecturer does not have teaching materials and students find it difficult to understand the textbooks on the market. Therefore, module based on constructivism has been developed on the material of biological learning models. The purpose of this study was to develop a practical and effective module on the material of learning models from biology learning strategy and design subject. The type of research is research and development using 4-D models. The results showed that the developed modules were categorized as practical with a practicality of 83.87%. Student activity and learning outcomes increased by using module based on constructivism in the material of learning models of the biology learning strategy and design subject.

Keywords: module development, constructivism, biology learning strategies and design subject

1. Introduction

Biology learning strategies and design subject is a subject that study teaching strategies and design biology learning devices. In this subject, there is one material, namely learning models. Learning models are very diverse; therefore, students must be able to choose learning models that are in accordance with the learning material. In fact, students are less able to choose and apply learning models in designing learning plans. This is because the lecturer does not have teaching materials and students find it

[i] Correspondence: email rosba.evrialiani@gmail.com

difficult to understand textbooks on the market because the material in textbooks generally does not correspond to the syllabus of the subject. Therefore, the lecturer must be able to develop a module based on constructivism the material of biological learning models. A module is a self-contained, formally structured learning experience with a coherent and explicit set of learning outcomes and assessment criteria (Rufiil, 2015). Some kind of evaluation strategies that exist in the module that tells the student whether they achieve complete mastery of the material and what they do if they cannot achieve the required mastery (Dick & Carey, 2001).

The aim of module based on constructivism to help students find and arrange their own knowledge. Making learning more meaningful and students more active in learning. According to Ramansyah (2013) that lecturers should use a constructivist approach and recognize the characteristics of their students and always motivate students to be able to learn themselves according to their characteristics. The purpose of this study was to develop a practical and effective module on the material of learning models from biology learning strategy and design subject.

2. Material and Methods

The type of research that has been carried out is research and development. This study uses a development research design of 4-D models (Trianto, 2010). This development model consists of 4 stages, namely defining, designing, developing (testing validity, practicality, and effectiveness), and dissemination. This developed module has been valid, so it continues with practicality and effectiveness tests.

1. Practicality test, this test is done by filling out the practicality questionnaire by lecturers and students. The practicality test steps by the lecturer:
   - explain how to fill out the questionnaire;
   - giving modules to the lecturer;
   - giving instructions on how to use the module to;
   - lecturer learn and understand the concepts in the module;
   - lecturer fill out the questionnaire.

   The practicality test steps by the students:
   - explains how to fill in a questionnaire;
   - giving the modules to the students;
   - give instructions on how to use the module;
   - students learn and understand the concepts contained in the module;
   - students fill out a questionnaire.

   The results of the questionnaire are calculated by finding the percentage using the formula raised by Riduwan (2008).

   P = score of items obtained maximum score x 100%

2. Effectiveness test, this test is done by observing student activities and assessing student learning outcomes.

- the activities of students observed by observers which consisted of four aspects, namely reading modules, doing exercises, discussing and actively asking questions.

P = frequency of each activity / number of activity frequencies x 100%

- Assessment of student learning outcomes is done by assessing assignments and examination of learning outcomes. The value obtained is processed using the formula proposed by Arikunto (2012).

Final score = 2T + 3H/5

3. Results and Discussion

Based on the results of the practicality test by two lecturers and 28 students showed that the developed modules were categorized as practical with a practicality of 83.87% (Tables 1 and 2). From the results of the practicality of the module by the lecturer shows that the module that is developed is very practical with a practical value of 84.41%. This shows that the module developed can facilitate and assist the lecturer in the learning process. The results of the module practicality by students, it was found that the module developed was very practical with an average value of 85.64%. This shows that the modules developed can facilitate students in the learning process.

Table 1: Average Primary Lecturer Value

No	Aspect assessment	Value		Average	Practicality Value %	Assessment criteria
		1	2			
1	Display aspect	3.75	3.5	3.63	90.6	Very Practical
2	Content aspects	4	3	3.5	87.5	Very Practical
3	Aspects of Practicality	3, 75	3	3.38	84.5	Very Practical
4	Aspects of Motivation	3	3	3	75	Quite Practical
	Total Value	3.63	3.12	3.37	84.41	Very Practical

Table 2: Average Student Practicality Value

No	Aspect Assessment	Average	Practicality Value %	Assessment Criteria
1	Aspect Display	3.57	85.71	Very Practical
2	Aspects Contents	3.5	87.05	Very Practical
3	Aspects practicality	3.53	87.95	Very Practical
4	Aspects of Motivation	3.45	81.85	Very Practical
	Total Value	3,51	85,64	Very Practical

The results of different studies on the practicality of student worksheets based on mastery learning in sex-linked gene subject is on practical criteria (Megahati and Yanti, 2018). The development of student worksheets based on mastery learning in the crossing-over material is valid criteria (Megahati et al., 2017). Prastowo (2011) states

that one of the functions of the module is as a substitute for educator functions. This means that the module is a teaching material that is able to explain the learning material well and is easily understood by students according to the level of knowledge of their age.

Based on the results of observations of student activities during lectures showed that a lot of positive activities appeared such as reading modules, doing exercises, discussing and actively asking questions. The results of the research presented by Putri (2013) stated that students' abilities can be seen from the discussion activities carried out when using modules and formative tests. When discussing in groups, students have indicated discussing the duties of each group member. In learning, students are given the opportunity to use prior knowledge to express their opinions.

The average student activity value is 87.78% with very effective categories. The aspect that has the lowest value is actively asking and reading modules with an average score of 60% in the effective category, while the aspect that has the highest value is the aspect of doing the exercise and discussing with an average score of 100% very effective category. Developing of student worksheet based on science process effective skills in improving student learning outcomes at the department of education, Giresun University, Turkey (Karsli and Sahin, 2009).

Student learning outcomes increased after using constructivism-based modules in the material of learning models. The criteria for student learning completeness were 89.66% and that which was not completed was 10.34% (Table 3).

Table 3: Student Learning

The value of learning outcomes	Total Number of Students	Total Percentage	Completeness Criteria
≥ 80	26	89,66%	Complete
< 80	3	10,34%	Not Complete

The average percentage of student success in classics is evidenced by students' ability to produce a work which is in accordance with the stipulated provisions into the level of excellent learning outcomes (Alfitriani and Hutabri, 2017). Learning outcomes are patterns of manufacture, values, understanding, attitudes, appreciation, abilities, and skills. Learning outcomes are patterns of deeds, values, understanding, attitudes, appreciation, abilities and skills (Lufri, 2017). Module based on constructivism in learnings material of biology learning strategy and design subject can be used for learning purposes and help students to learn individually.

4. Recommendations

This research will continue with the disseminate stage at other universities.

5. Conclusion

The results showed that the developed modules were categorized as practical with a practicality of 83.87%. Student activity and learning outcomes increased by using module based on constructivism in learnings material of biology learning strategy and design subject.

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