Bioedukasi
Jurnal Biologi dan Pembelajarannya

Vol. 21 No 1, February 2023, page 45-51
e-ISSN: 2580-0094; p-ISSN:1693-3931
DOI: 10.19184/bioedu.v21i1. 36980
jurnal.unej.ac.id/index.php/BIOED

BANYUWANGI CUSTOM RITUAL ETHNOBOTANY-BASED MODULE DEVELOPMENT ON BIODIVERSITY MATERIALS TO TRAIN PLANT LITERACY AND PROBLEM-SOLVING ABILITY

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Article Info

Article history:
Received January 8, 2023
Revised February 28, 2023
Accepted February 28, 2023

Keywords:
Biodiversity
Traditional Rituals
Modules

ABSTRACT

The development of this teaching material aims to provide other alternatives in learning activities in the material chapter on biodiversity. The result of this teaching material is in the form of a biodiversity module based on the ethnobotany of Banyuwangi's traditional rituals with the aim of training plant literacy and students' problem-solving skills. The conventional rituals used in the module development are seblang Olehsari, seblang Bakungan, and petik laut Muncar. Module development uses the ADDIE method (Analyse, Design, Development, Implementation, and Evaluate) but module development only reaches the development stage. The modules made are tested for the feasibility of teaching materials and readability tests. The feasibility test of teaching materials consists of material coverage, material accuracy, material up-to-date, insight, appearance, and writing. The results of the eligibility validation of teaching materials showed a validity value of 88.70% with a very high category and showed that the module was very suitable for use in learning, while the results of the readability test using the cloze test contained 5 discourses consisting of 43 questions showing a readability level of 73% in the high category so that students easily understand the module developed in the readability aspect.

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1. INTRODUCTION

State Biodiversity is the diversity of ecosystems and various forms of the variability of animals, plants, and microorganisms that exist in nature. Biodiversity includes various types such as genetic diversity (genes), types (species), and also ecosystems (habitat). Indonesia is a country that has a high enough biodiversity that it is called a Mega Biodiversity Country. (LIPI, 2014).

Indonesia has the status of the third highest biological wealth in the world after Brazil and Colombia (Butler, 2016). Indonesia's wealth should be maximized by using it for the biology learning process. But these various kinds of biodiversity have not been utilized optimally in learning, even though plants have the advantage of producing discoveries in science, they are cheap to use, easy to care for, and can be experimental subjects, but knowledge about plants is currently less desirable due to basic things, such as a lack of explanation at school (Hemingway et al, 2015). This causes a lack of knowledge or literacy in students about plants.

Students can be said to have literacy when they can apply the concepts and facts obtained at school to natural phenomena that occur in everyday life (Nugraheni, 2017). Plant literacy is part of scientific literacy and can be used in biology learning. Students who are more familiar with complex environmental phenomena have high proficiency in environmental science literacy (NAAEE, 2011). However, students still have difficulties in studying plants (Cimer, 2012). In addition to literacy skills, in the 21st century according to Griffin et al (2012) in general, students need a way of thinking, it consists of solving problems, thinking creatively, and thinking critically (Kaleilogu & Gulbahar, 2014). The ability that must be developed by students is problem-solving abilities because problem-solving abilities in students are still at a low level (Rahmawati, 2014).

One of the solutions that can be done to overcome the low literacy of plants and students' problem-solving abilities on biodiversity is to develop teaching materials. The development of these teaching materials will be developed with learning based on local wisdom, namely the use of ethnobotany of traditional rituals to overcome students' difficulties in understanding plant material, especially in the chapter on biodiversity.

Local wisdom is all forms of knowledge, belief, understanding, or insight as well as customs or ethics that guide human behaviours in life in an ecological community (Sjahran, 2016). One of the local potentials that can overcome the problem of students' lack of interest in plant material can utilize ethnobotany in traditional rituals in Banyuwangi Regency. Traditional rituals in Banyuwangi make use of plants and biodiversity in the process. Some of the traditional rituals that still exist are the traditional *seblang Olehsari*, *seblang Bakungan* and *petik laut Muncar*. (Zackaria et al., 2019).

The traditional ritual of *seblang Bysari* utilizes various kinds of biodiversity in the form of plants on dancers' crowns and offerings of approximately 45 kinds of plants. The implementation of the ritual has the goal of a village clean event to avoid disaster. This ritual is carried out after the Eid al-Fitr holiday by presenting dances for 7 consecutive days. The dancers are girls who are still virgins and descendants of previous dancers. The dancers will dance according to the strains of the song and are possessed by ancestral spirits (Zackaria et al, 2019). Furthermore, *seblang Bakungan* has the same goal of cleaning the village, the difference is that this event is held after Eid al-Adha and the dancers are menopausal grandmothers who dance all night long. *seblang Bakungan* also utilizes a variety of biodiversity for dancer crown decorations and offerings for ritual processions of approximately 40 plants (Yashi, 2018).

The traditional ritual of *petik laut Muncar* must be carried out every 15th of Muharam (Javanese calendar; Suro), because on the 15th there is a full moon so the fishermen do not go to sea (Azizah, 2014). The offerings used in this ceremony are the result of the Muncar community garden. The contents of the offerings of various other types of plants are approximately 43 types of plants (Setiawan, 2016).

Several traditional rituals in Banyuwangi utilize biodiversity and natural products from local villagers, such as from plantations and agriculture. In general, students only know about this ritual as a traditional ceremony that is carried out regularly in Banyuwangi and so far, there has been no documentation about the ethnobotany of traditional rituals that took place in Banyuwangi. The biodiversity that is used for the ceremony preparation hence the offering included in the biodiversity studied in 10th grade.

In the learning process that is carried out in schools, teachers will experience challenges with various diverse characteristics of students. There are students who do not encounter problems during learning and there are also students who experience various difficulties in learning (Basiran, 2012: 2). Based on the results of the researcher's interview on August 1st, 2022 with a biology teacher at high school in Banyuwangi, it showed that the learning outcomes for biodiversity material are relatively low compared to other material. Many students scored below the minimum competence criteria (*KKM*), namely 70. This was due to several factors as follows: (1) students were less interested in plant material because it was considered difficult, (2) many Latin terms were difficult to memorize and there were many kinds of plant species so students are less interested in studying them, (3) learning only uses textbooks and has not been developed (Personal Communication, 2022)

To overcome this problem by using the local potential of Banyuwangi traditional rituals in learning, then connecting it with plant literacy and problem-solving abilities in students, namely by developing teaching materials based on local potential. The teaching materials developed later must be in accordance with the learning material in KD 3.2 Analysing various levels of biodiversity in Indonesia and their threats and conservation and in KD 3.2 this is closely related to students' problem-solving abilities. KD 4.2, namely Presenting the results of observations of various levels of biodiversity in Indonesia and proposed conservation efforts, also presents local potential, especially biodiversity used in traditional rituals in Banyuwangi.

Based on the explanation above, efforts are needed to improve plant literacy skills and students' problem-solving abilities by using local potential. Efforts have been made to develop ethnobotany teaching materials based on local potential, namely modules. Modules in learning activities can play a role in improving students' learning abilities without direct teacher assistance (Prastowo, 2014). The module developed is an ethnobotany of traditional rituals in Banyuwangi which is integrated with biodiversity material.

2. RESEARCH METHOD

This study uses the teaching material development method following the ADDIE model (analyze, design, develop, implement, evaluate). But developing this module is only limited to developing modules without implementation, the stages used are analysis, design, and development. Before the module can be used in learning, there are teaching material validation and readability tests on students.

Teaching material validation was carried out by two material experts and one teacher to find out whether the module developed was appropriate or not with the learning objectives. The feasibility of teaching material content or teaching material validation sheets can be used to obtain an overview of data from expert opinions (validators) regarding teaching materials to be used in learning activities. The validators were taken from three biology

lecturers to assess the due diligence guidelines. The due diligence guidelines used are in accordance with the provisions of the National Education Standards Agency (BSNP, 2014).

A cloze test on students can do the readability of teaching materials in the module. Readability is the level of students' understanding in reading the contents of the book and practicality comes from the basic word practical which means it is easy and you can also enjoy using it (KBBI, 2018). The gap test is done by removing part of the word from the sentence in the body of the text. The gap test can be carried out in two ways, namely random and systematic (Suhadi, 1996).

3. RESULT AND DISCUSSION

Module development is carried out with the analysis (analyse), design (design) and development (develop) stages. The following is an explanation of module development:

1. Analysis (*Analyse*)

The analysis stage is carried out by analysing KD (Basic Competency) and learning materials that will be used in accordance with the revised 2013 (K13) Curriculum content standards. The analysis used in this study includes:

a. Needs Analysis

Needs analysis has the goal of determining the main issues in biology learning activities and the development of teaching materials is needed. A needs analysis was carried out by conducting interviews with high school Biology teachers who would be doing research. In addition, literature studies and field studies were carried out. This is intended to find concepts or theoretical foundations that strengthen the development of teaching materials. The literature study was carried out with research that is relevant and related to the utilization of the local potential of traditional rituals in Banyuwangi Regency

b. Curriculum Analysis

Curriculum analysis is carried out by paying attention to the characteristics of the curriculum used, the point is to find out whether the development is carried out in accordance with the curriculum or not. Then describe Basic Competency (KD) into indicators and learning objectives. The KD that will be analysed is the material chapter on biodiversity which consists of KD 3.2 Analysing various levels of biodiversity in Indonesia and its threats and conservation and KD 4.2 Presenting the results of observations of various levels of biodiversity in Indonesia and proposed conservation efforts. The biodiversity material taught was developed from local potential, namely traditional rituals in Banyuwangi Regency, and developed in teaching materials, namely in the form of modules.

c. Analysis of Student Characteristics

It was carried out to determine student attitudes towards the learning that was carried out. The characteristics observed are related to age, motivation, academic ability, and student experience. After knowing the characteristics of students, teaching development is made that is suitable for students

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2. Design or Planning (*Design*)

The design stage is designing teaching materials by utilizing the local potential of traditional rituals in Banyuwangi Regency. The design phase is carried out by preparing a teaching material framework based on the local potential that will be developed. There are several designs at this stage, including:

a. Determining Indicators according to KD

The indicators used in module development are in accordance with the 2016 revision of K13, which are as follow:

Table 1. Basic Competencies Indicators

Basic Competency (KD)	Indicators of Competence Achievement
3.2 Analyse the various levels of biodiversity in Indonesia and their threats and conservation	1. Describe the concept of biodiversity in Indonesia, especially in Banyuwangi 2. Analyse differences in biodiversity at various levels, namely the level of genes, species, and ecosystems 3. Identifying biodiversity at the gene, type, and species level, especially plants used in traditional rituals in Banyuwangi 4. Describe the local wisdom of traditional rituals in Banyuwangi in utilizing biodiversity in traditional rituals 5. Analyse the factors that can threaten the existence of biodiversity in Indonesia, especially in the ethnobotany of traditional rituals in Banyuwangi 6. Analysing efforts that can preserve biodiversity in Indonesia, especially in the ethnobotany of traditional rituals in Banyuwangi

Basic Competency (KD)	Indicators of Competence Achievement
4.2 Present the results of observations of various levels of biodiversity in Indonesia and proposed conservation efforts	1. Presenting the results of observations of biodiversity, especially in the ethnobotany of traditional rituals in Banyuwangi through the study of relevant literature (articles, books, or web) 2. Presenting efforts to preserve biodiversity in Indonesia, especially in Banyuwangi through relevant literature studies (articles, books, or web).

b. Creating Teaching Materials Framework

The framework of the teaching materials used in the development of the ethnobotany module of customary rituals on biodiversity is 1) introduction, 2) content, and 3) closing. The introductory section consists of a) an introduction, b) brief description, c) a concept chart, and d) instructions for using the module. The content section consists of a) biodiversity, b) level of biodiversity, c) distribution of flora in Indonesia, d) utilization of biodiversity, and e) threats to biodiversity in Indonesia and efforts to conserve it. The closing section consists of a) summary, b) practice questions, c) bibliography and d) glossary

c. Arranging Teaching Materials Instruments

The preparation of the instrument was carried out in several ways, namely by interviewing the biology teacher regarding the needs and expected modules, field observations and direct interviews during traditional rituals, literature studies, and expert validation for the teaching materials developed, namely the biodiversity module based on ethnobotany customary rituals on biological diversity material. The rituals used are *seblang Bysari*, *seblang Bakungan*, and *petik laut Muncar*.

3. Development (*develop*)

The development stage is the product realization stage. The development of teaching materials based on local potential is designed in such a way according to the design. This stage is carried out by making teaching materials on the basis of modules and student activity sheets. Before this module is realized in learning, the teaching material validation process is carried out.

Teaching materials that have been made are then validated before being used so that they are valid and appropriate. The validation carried out is the feasibility of teaching materials which consist of several criteria, namely material coverage, material accuracy, material up-to-date, insight, appearance, and writing. There are criteria for evaluating the feasibility of teaching materials adapted from Riduwan (2015) which can be seen in Table 2 below:

Table 2. Criteria for the Feasibility Assessment of Teaching Materials

No	Criterion	Presented
1.	Not Eligible	0 – 20%
2.	Less Eligible	21 – 40%
3.	Moderate	41 – 60%
4.	Worthy	61 – 80%
5.	Very Worthy	– 100%

The eligibility criteria for teaching materials can be described as follows:

1. Very Eligible and Eligible: minor revisions are necessary according to the validator's comments and there is no need for re-validation.
2. Moderate: major revisions are needed and no validation is required.
3. Inadequate: major revisions are needed and validation is required again (Khasan & Dafik, 2012).

The following are the results of the validation of the developed teaching materials.

a. Teaching Material Feasibility Instrument

The validation process was carried out by instrument validators according to their fields, namely from two teaching materials development experts and one materials expert. The results of the eligibility validation of teaching materials can be seen in Table 3 below:

Table 3. Result of the Feasibility Validation of Teaching Materials

Validator	Assessment Criteria	Score	Final Score
SS	Material coverage	91,6	87,61
	Material accuracy	90	
	Material up-to-date	87,5	
	Outlook	75	
	Appearance	91,6	

Validator	Assessment Criteria	Score	Final Score
	Writing	90	
AM	Material coverage	91,6	89,70
	Material accuracy	90	
	Material up-to-date	75	
	Outlook	100	
	Appearance	91,6	
	Writing	90	
MD	Material coverage	91,6	88,80
	Material accuracy	95	
	Material up-to-date	87,5	
	Outlook	75	
	Appearance	93,75	
	Writing	90	

The validation results of the three experts show that the first validator has a validity of 87.61% with a very decent category, the second validator has a validity of 89.70% with a very feasible category and the third validator has a validity of 98.23% with a very decent category. The average validity of the module is 88.70% with a very high category. The results of the validity show that the module is very feasible to use and a small revision is needed according to the suggestions from the validator.

The results of the module validation are carried out after a series of revisions and input from supervisors and validators. Revisions and input are used as material for evaluating the modules that will be developed and will later be used in learning activities.

There are several things contained in the module, they are the introduction, content, and closing. The introductory section contains the background, instructions for using the module, and concept charts, the contents section contains material on biodiversity based on the ethnobotany of Banyuwangi traditional rituals and the closing contains conclusions, glossary, and bibliography. In addition, there is a plant literacy zone in the form of plant literacy exercises to increase plant literacy and solve problems that contain exercises about ability problems based on ethnobotany customary rituals. In addition, there is *firut jare mother* (kata emak) which provides information about local wisdom, and *kanggo riko* to provide important information about the material. The module section can be seen in Figures 1, 2, 3, 4, 5, and 6 below.

Figure 1. Cover

Figure 2. Petunjuk Penggunaan Modul

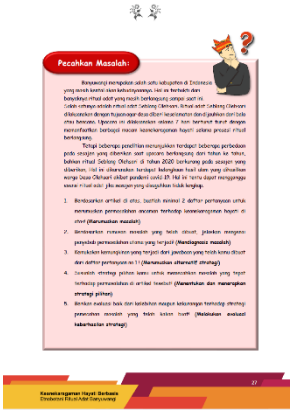

Figure 3. Zona Literasi Tumbuhan

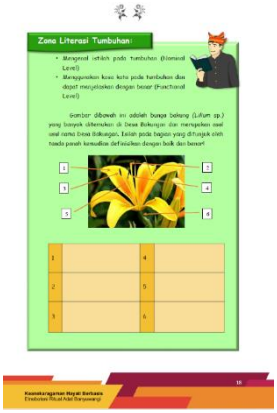

Figure 4. Pecahkan Masalah

Figure 5. Kanggo Riko (Untuk Kamu)

Figure 6. Jare Emak

The teaching materials used will be more interesting for students, specially equipped with pictures that are close to everyday life. This is reinforced by the opinion of Suciyati and Adian (2018) stating that teaching materials must attract students' interest, which can be seen through the fashion format; used such as size, font, and image. In addition, local content can provide real experiences for students so that they are easily understood by students (Rahmatih et al, 2017).

b. Gap Test (*cloze test*)

The module readability test is given to students, namely the gap test which contains several discourses from the module. The gap test is carried out by paraphrasing the text as a whole, there are five discourses consisting of 43 questions. The gap test refers to Taylor (1953) with several criteria, namely 1) Selected discourse. The results of the gap test tested on 31 students are shown in Table 4 below.

Tabel 4. Module Readabillity Test Result

No	Description	Score
1.	The number of students	31
2.	The number of questions	43
3.	Total score	985
4.	Maximum score	1.333
5.	Readability rate (%)	73%
Category		**High**

Based on the results of the readability test for the biodiversity module based on the ethnobotany of Banyuwangi's customary rituals, it obtained a score of 985 out of a maximum number of 1,333. Based on the results of the readability analysis of the module, the readability level is 73%. Suhadi (1996) showed that 73% > 57% which indicated the biodiversity module based on customary ritual ethnobotany had a high level of legibility. Based on the results of the readability analysis, shows that this module has a high level of legibility so that the modules developed in the readability aspect are easy for students to understand. According to Dewi and Florentina (2018), it is stated that reading with a high level of readability will have an impact on readers in increasing learning interest and memory, maintaining reading habits, and also able to increase reading speed and efficiency. In addition, the presence of local facts presented can increase students' knowledge in enriching their insights into the competencies that must be mastered (Faridah, 2019).

4. CONCLUSION

The development of teaching materials in the form of biodiversity modules based on the ethnobotany of Banyuwangi's customary rituals shows the results of validating the eligibility of teaching materials, namely the validity results of 88.70% with a very good category, which means that the module is very feasible to use and requires minor revisions according to the validator's directions, while the readability of teaching materials shows value by 73% in the high category which shows the module developed in the readability aspect is easily understood by students.

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