



Development of Ethnobotany Module “Karang Kitri” Jampit Bondowoso Village Based on Project Based Learning (PjBL)

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Abstract

The research aims to develop a valid and practical PjBL-based ethnobotany module. The development model used is the ADDIE model with the stages of

analyze, design, develop, implement, and evaluate. The subject of this research were S1 student Biology Education Department of Jember State University. The module's validity test results by material experts obtained an average score of 86.6% and the average score validation by media experts at 95.6% which belongs to the category is very valid. Practicality test results, were obtained an average score of 95.8% which means very practical. Based on these results, it can be concluded that the modules are developed valid, practical, and worthy to be used in ethnobotanical learning.

Keywords: Development, Learning, Ethnobotany, Project Based Learning (PjBL)



Introduction

Indonesia is a country that has a very high diversity in various aspects of life, both social, cultural, religious, and biological resources, as well as other aspects of life. Indonesia has $\pm$ 633 tribes/ethnicities with different local wisdom and has the largest number of flora and fauna species after Brazil and Zaire, so it is called one of the megabiodiversity countries. One of the local wisdom that is still preserved today is the mutual relationship between the people of a particular tribe/ethnicity and plants and animals, which in the study of biological science is called ethnobotany (Alexiades, 1996; Martin, 2004).

Ethnobotanical knowledge in Indonesia is very diverse and has differences in each particular tribe/ethnicity, depending on the socio-cultural aspects of the community, the environment, and the needs of the community itself (Hakim., 2014). Like the Tengger tribe, people use coconut (*Cocos nucifera*) for cultural events such as weddings, welcoming the birth of babies, and several religious events (Purnomo et al., 2019). Ethnobotanical studies in the Mandailing tribe are known, people use rimbang (*Solanaum torvum*) to be used as a poison neutralizer (Nasution et al., 2018). The amount of local wisdom in various tribes in Indonesia, especially ethnobotanical studies, is able to contribute to various scientific fields such as environmental and plant conservation (Babaian & Twigg, 2011), health science development (Salehi et al., 2018), socio-cultural (Zulia et al., 2017), development of teaching materials in education (Artha et al., 2016), and various other sciences, so that future generations can maintain and preserve local wisdom in their regions.

Another area in East Java, precisely in Jampit Village, Bondowoso, also has local wisdom, namely yard management called “karang kitri”. “Karang Kitri” is unique because it has a fairly high aesthetic value compared to yards in other areas. In addition, the relationship between local communities and plants in “karang kitri” is also quite high. Local people plant and utilize plants for daily food needs, traditional medicine, environmental beauty, cultural and religious activities, and improving the community's economy. A needs analysis conducted on 14 students showed that 93% of students had never known 'karang kitri' in Jampit Bondowoso, so further study was needed.



In addition, students also said that during learning, they had never used an ethnobotany module on research results in a region and learning activities were more often with a discussion-presentation model. This data is reinforced by the results of interviews with lecturers, that learning activities are more presentations of the results of analyzing ethnobotanical research articles.

Based on the results of the needs analysis, the researchers chose to develop teaching materials in the form of project-based learning (PjBL) modules. The module was chosen because it is a teaching material that contains complete material (Ditjen PMPTK, 2008) and can be used by students independently without relying on other teaching materials and can measure abilities independently (Tjiptiany et al., 2016). The PjBL model was chosen because it is one of the innovative student-centered models (Kubiatko & Vaculová, 2011) that requires students to collaborate (Lavokos, 2011) in the form of project activities as a form of completion of learning competencies (Bell, 2010). The use of PjBL-based modules has proven effective in learning (Vendiktama et al., 2017) and student understanding (Khastini et al., 2019).

METHODS

This development research was conducted using the ADDIE development model with the stages analyze, design, develop, implement, and evaluate (Branch, 2009). This ADDIE development model was chosen because at each stage it can be revised (Figure 1).

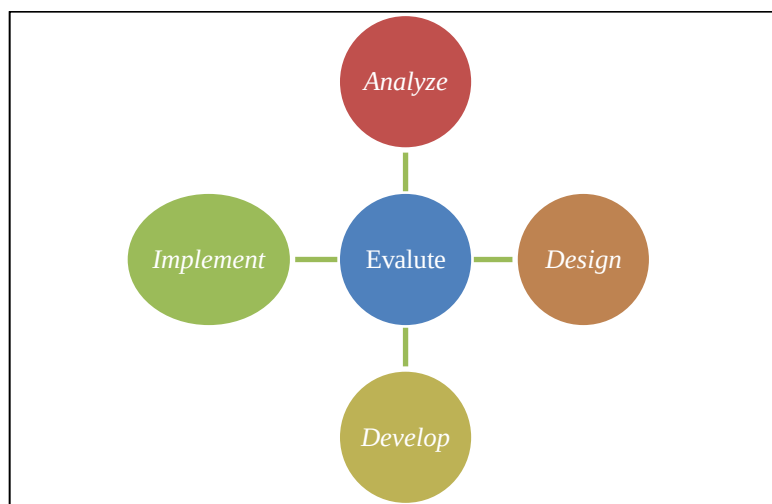
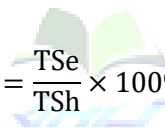


Figure 1: Stages of the ADDIE Development Model (Branch, 2009)



In the analyzing stage, a needs analysis was conducted to undergraduate biology education students at Jember State University who had taken ethnobotany courses and conducted unstructured interviews with lecturers teaching ethnobotany courses (Dr. Iis Nur Aisyah, SP., MP.). In the design stage, the researcher designs the initial design (prototype) of the module design to be developed. The development stage is to develop the module according to the design that has been prepared, validate the module to material experts (Dr. Fatchur Rohman, M.Si.) and media experts (Dr. Endang Suarsini, M.Ked). Validation was carried out by giving a questionnaire to each validator. The data generated in this study are qualitative and quantitative data. Qualitative data is in the form of comments, criticisms, and suggestions from validators, while quantitative data is in the form of an average score of validation results analyzed using the formula below (Akbar, 2013). The calculation results were then matched with the validation criteria presented in Table 1.



$$V = \frac{TSe}{TSh} \times 100\%$$

Description:

V = Validation score

TSe = Respondent's answer in one item

TSh = Number of ideal scores in one item

Table 1. Module Validity Criteria

Percentage	Validity Category	Description
85,01% - 100,00%	Very valid	Very usable with minor revisions
70,01% - 85,00%	Valid	May be used with minor revisions
50,01% - 70,00%	Less valid	May be used with major revisions
01,00% - 50,00%	Invalid	Not to be used

(Source: Akbar, 2013)



The implementation stage is to conduct a practicality test to 31 students by distributing a practicality questionnaire. The score of the practicality test results is calculated by the formula as above, and the results are matched with the practicality criteria as in Table 2. The last stage of this development model is to evaluate.

Table 2. Module Practicality Criteria

Percentage	Practicality Category	Description
85,01% -100,00%	Very practical	Very usable with minor revisions
70,01% - 85,00%	Practical	Usable with minor revisions
50,01% - 70,00%	Less practical	May be used with major revisions
01,00% - 50,00%	Not practical	Not usable

(Source: Akbar, 2013)

RESULTS

The results of the validation of the ethnobotanical module were obtained from the ethnobotanical content/material expert assessment. The content/material validity assessment uses a validation sheet with 44 statement items. The statements on this content/material validation sheet include the suitability, accuracy, and currency of the material. Data from the validation of ethnobotanical content/materials can be seen in Table 3.

Table 3. Recapitulation of Content/Material Validation Results

Assessment Indicator	Average (%)	Category
Appropriateness of Material Description	87,5	Very valid
The accuracy of the material	85,4	Very valid
Up-to-date material	80,0	Valid
Evaluation	81,3	Valid
Presentation Technique	83,3	Valid
Supporting Presentation	100,0	Very valid
Learning Presentation	90,0	Very valid
Average Validity	86,6	Very valid



Based on the results of the validation of ethnobotanical materials, the average validity of ethnobotanical materials is 86.6%, which is included in the very valid category according to the validity criteria developed by Akbar (2013). The media validity assessment uses a validation sheet with 45 statement items. The statements on this media validation sheet include module characteristics and module graphic feasibility. The results of ethnobotanical media validation can be seen in Table 5.

Table 5. Recapitulation of Media Validation Results

Assessment Indicator	Average (%)	Category
Module Cover Design	100,0	Very valid
Module Content Design	95,5	Very valid
<i>Self Instruction</i>	95,0	Very valid
<i>Self Contained</i>	87,5	Very valid
<i>Stand Alone</i>	87,5	Very valid
<i>Adaptive</i>	100,0	Very valid
<i>User Friendly</i>	95,0	Very valid
Average Validity	95,6	Very valid

The overall results of module validation by material experts and media experts show that the developed module is feasible to be implemented in learning, but revisions need to be made according to comments and suggestions from the validators. The results of this validation are a reference for implementation to students, namely to test the practicality of the module that has been developed. The practicality test of the ethnobotanical PjBL module was obtained from a questionnaire distributed to 31 students to determine the attractiveness of the module and ease of use. The results of the practicality test can be seen in Table 7.



Table 7. Module Practicality Test Results

Assessment Indicator	Average (%)	Category
Attractiveness of Module Display	95,0	Very Practical
Ease of Use of Module	97,0	Very Practical
Module Writing and Language	95,3	Very Practical
Average Practicality	95,8	Very Practical

The average score of the practicality test results obtained was 95.8% with a very practical category (Akbar, 2013). Criticisms and suggestions given by students include, among others, the selection of module designs can be more interesting, the images are more clarified, and there are some sentences and commands that are a little confusing / ambiguous.

DISCUSSION

Module Validity Test

The validity test in this development research includes content/material validation and media validation. Aspects tested on the validity of the content/material include the suitability of the material, the currency of the material, evaluation and material presentation techniques (Drost, 2011). The results of the module content/material validation conducted by material experts obtained an average percentage of validity of 86.6% and an average percentage of validity of the question instrument of 93.1%, both of which were included in the very valid category (Akbar, 2013).

The suitability and accuracy of the ethnobotanical material in the developed module received a score of > 85% (Table 3) which included a very valid category. This category shows that the ethnobotanical material presented is in accordance with scientific principles (Galvin & Neill, 2013), the material is in accordance with the curriculum (Depdiknas, 2008), the material has covered all components of the course learning outcomes (Lestari et al., 2019) and in accordance with scientific developments (Prabowo et al., 2016), so that it is in accordance with the characteristics of the module, namely self contained and adaptive. The material presented in the



module is the definition of ethnobotany in general, ethnobotanical research techniques, and ethnobotany “karang kitri” of Jampit Village, Bondowoso Regency which explains some of the plant utilization carried out by the community. During learning, the material presented clearly and more specifically, can help students to be more directed during learning (Gustinasari et al., 2017).

The results of the validation of the presentation aspect of the material received a score of >85% (Table 3) which included a very valid category. In this developed module, there are clear learning objectives, learning achievement indicators, clear and systematic project-based worksheets, and simple and communicative language. This is in accordance with the characteristics of the module, namely self instructional and user friendly. The complete presentation of this material helps students in working on the LKM critically analyzing articles, and preparing ethnobotanical projects. According to Mustami et al. (2017) the presentation of material in the module which is equipped with pictures, tables, and other information, can facilitate students in understanding the material presented.

The results of validation conducted by learning media experts show an average percentage of validity of 95.6% which is included in the very valid category (Akbar, 2013), which includes aspects of module design/appearance and module characteristics. The results of the validation of the design / appearance aspects of the module obtained a score of 95% which means very valid. The selection of colors used in the module is contrasting, so that it is clearly visible the difference in each content presented. The font selection in the module is suitable for students (Putri et al., 2018), the layout and size of tables and images are also appropriate and clear (Hamid et al., 2017), and the use of language is also in accordance with the rules of good and correct Indonesian language, so that the information presented is conveyed clearly (Susanti et al., 2019).

The overall validity level of the module characteristics aspect scored >85% which means it is very valid. As previously explained that the ethnobotanical PjBL module developed has contained specific material in accordance with learning indicators and examples that support the material (self contained) (Pamelasari & Wusqo, 2015), there is feedback on each learning activity, practice questions, project work order sentences, and sentences that explain each indicator



measured (self instruction) (Setiyadi et al., 2017). The material component in the module is clear enough by adding pictures and tables as explanations (Karnela et al., 2018), so there is no need to use other teaching materials when studying the module or answering questions in the module (stand alone). According to Setambah et al. (2017), a valid module can help educators in creating student centered learning, increase motivation and creativity, and develop higher order thinking skills.

Based on the results of the validation and trial, the PjBL-based ethnobotany module is valid and feasible to be implemented in learning. This result is in line with the research of Herditiya et al., (2020) which shows that the PjBL module with a score above 85% is feasible to implement and has fulfilled the didactic, construction, and technical aspects (Sari, 2017), and can be used without researchers or developers (Ayriza, 2008).

Module Practicality Test

The practicality test includes several aspects that are measured, including the attractiveness of the appearance, ease of use, and writing and language of the module which are contained in the form of statements on the questionnaire sheet. The results of the analysis conducted on 31 questionnaires that have been filled in by students, show an average practicality score of 95.8% which according to Akbar (2013) is included in the very practical category. In the aspect of module attractiveness, it is known that the module developed is in accordance with the characteristics of the module, namely having an attractive appearance, clear writing and using simple language (user friendly) (Wulandari et al., 2016), and the module is easy to understand (adaptive) (Zubail et al., 2018) and can be used easily during learning (Pramesti et al., 2019). This is indicated by student responses, among others, saying that the layout of the table images is appropriate, the module design is good enough, but there are still some typo sentences and language is a little ambiguous. This student response was taken into consideration by researchers in revising the module that had been developed.



The ease of use of the module by students can be seen when the model lecturer asks students to explain the characteristics of ethnobotanical research, students are able to explain in sufficient detail as presented in the module. When students perform critical analysis of ethnobotanical articles, students are also helped by the material presented in the module, making it easier to analyze, students are able to find differences in background, type of research, research methods, and data analysis techniques in each article found. The developed module also contains worksheets that are structured in accordance with the PjBL syntax (self instructional), in learning activity 1 the student worksheet is to critically analyze the article whose results are used as a reference in compiling an ethnobotanical research project in learning activity 2, so the module is very helpful for students when working on ethnobotanical mini-research (Wulandari et al., 2016).

This module also contains formative evaluation and feedback at the end of each learning activity, so that it can measure competency achievement independently (stand alone) (Sukiminiandari et al., 2015; Zulfah & Aznam, 2018). The ethnobotanical module developed has also contained material that is in accordance with the competencies to be achieved (self contained), namely critical and creative thinking skills. Like the research conducted by Yulastri et al. (2017), valid and practical modules can help students understand the material, and can be used as one of the references for future module development research (Ahmad et al., 2011). Overall, the ethnobotanical PjBL module developed is feasible, practical (Irsalina & Dwiningsih, 2018), and effective (Putra et al., 2018) used to measure and help improve students' critical and creative thinking skills (Jasmaini et al., 2018).

CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the results of validation by material and media experts, as well as practicality tests, the results show that the PjBL module developed is valid and practical to be used as an alternative teaching material in ethnobotany learning.



Suggestions

1. It is necessary to conduct further studies on ethnobotany in various regions to enrich students' insights into the local wisdom of a region.
2. This PjBL module needs to be tested further regarding its effectiveness in supporting learning outcomes and various 21st century skills.

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