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Evaluation of the Validity and Practicality of the Ethnobiology E-Module Based on Moi Tribe Local Wisdom Using the ADDIE Model

Sirojjuddin Sirojjuddin[1)*], Syamsul Bachri Tholib [2)], Firdaus Daud [3)*]
[1)] Doctoral Program in Educational Sciences, Universitas Negeri Makassar, Indonesia
[2)] Guidance and Counseling, Universitas Negeri Makassar, Makassar, Indonesia
[3)] Master's Program in Biology Education, Universitas Negeri Makassar, Indonesia

*Corresponding Author
Email: sirojjuddin.biologi3@gmail.com

Abstract

This study aims to evaluate the validity and practicality of an ethnobiology e-module based on the local wisdom of the Moi Tribe, developed using the ADDIE model. The development process followed five systematic stages: Analysis, Design, Development, Implementation, and Evaluation. The e-module was designed to integrate the local ecological knowledge of the Moi community as case-based learning content, supported by texts, infographics, videos, simulations, and interactive tasks, and made accessible in both PDF and Flipbook formats. Data collection was conducted using expert validation sheets and practicality questionnaires involving two biology education lecturers, 35 biology education students, and two content and media experts. The results of the material expert validation indicated that the e-module was categorized as "valid" in terms of content, presentation, language, and duration, with an average validity score of 3.6. Meanwhile, the media expert assessment placed the module in the "valid" category regarding layout, usability, consistency, graphics, and usefulness, with an average validity score of 3.35. The practicality tests also showed highly positive responses: both lecturers and students rated the module as "very practical," particularly in terms of quality, ease of use, integration of instructional content, and design layout. The average practicality score from students was 3.52, while lecturers gave an average score of 3.61. The integration of the e-module into the UNIMUDA Sorong LMS has further enhanced its monitoring and accessibility. Overall, the e-module is considered effective not only as an innovative digital learning tool but also as a medium for cultural preservation. This study confirms that learning media based on local wisdom can enhance the quality of biology education while supporting the development of 21st-century skills and contextual learning.

Keywords: Validity; Practicality; E-Modul; Etnobiology; Suku Moi

INTRODUCTION

The era of the Industrial Revolution 4.0 and society 5.0 has changed the paradigm of education as a whole. Education no longer only functions as a means of knowledge transfer, but also as a vehicle to develop 21st-century competencies, such as critical thinking, problem-solving, creativity, communication, collaboration, and information and digital literacy (Kaya et al., 2025; Muhali et al., 2025; Trilling & Fadel, 2009). The Ministry of Education and Culture of the Republic of Indonesia has also emphasized the importance of strengthening character education and life skills in the 21st century as the main pillar in the implementation of the Independent Curriculum (Fatmawati & Jaya, 2025). This is a challenge as well as an opportunity in the process of developing learning tools, especially in the fields of science and biology, to be more contextual, meaningful, and adaptive to the needs of the times (Wisacita, 2020).

In the context of biology learning, the integration of local values through ethnobiological approaches is a strategic step to link scientific concepts with the reality of people's lives (Sotero et al., 2020). Ethnobiology as the study of the relationship between humans and biological resources in the framework of local culture, can present a learning narrative that is not only scientific, but also of cultural and ecological value (Hornborg, 2010; Hunn, 2007). Indigenous peoples' traditional knowledge of plant classification, animal utilization, natural medicine, and

environmental conservation becomes an authentic, inspiring, and consistent learning resource for contextual learning (Irfan et al., 2024). However, the reality of education in areas rich in local biodiversity and culture, such as the Southwest Papua region, has not fully integrated such local richness into curricula and learning tools. One example is the Moi Tribe, as an indigenous tribe in Sorong Raya (Arumintyas, 2019; Yapsenang et al., 2022), who have local knowledge that is very rich in terms of sustainable management of natural resources. This knowledge includes local taxonomy of animals and plants, traditional hunting practices that do not damage ecosystems, as well as oral traditions that describe the harmony between humans and nature (Luzyawati & Lissa, 2020; Sirojjuddin et al., 2025). Unfortunately, this local wisdom has not been widely documented, let alone raised in digital learning media that is by the character of today's students.

Along with the increasing penetration of information technology among students, the development of interactive e-modules is one of the effective strategies in supporting independent and flexible learning (Danuri, 2019; Muhammad Yusuf et al., 2023; Nuryantini et al., 2020). E-modules are digital forms of printed modules that allow the integration of multimedia elements, interactivity, and ease of access through digital devices such as laptops and smartphones (Sirojjuddin et al., 2024). Research shows that the use of e-modules can significantly increase learning motivation, student involvement, and learning outcomes, especially in applicative and visual materials (Iftakhar, 2016). However, the development of quality e-modules requires a systematic and needs-based instructional design approach (Yuliana & Sari, 2000). One of the most popular and proven effective learning tool development models is the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model (Aldoobie, 2015; Branch, 2009; Zulkarnaini et al., 2022). This model emphasizes a structured and interactive process in the development of learning media by prioritizing formative evaluation at each stage (Aldoobie, 2015; Branch, 2009). ADDIE's approach allows developers to design e-modules that not only suit the characteristics of the material and learners, but also meet pedagogical, technological, and content aspects in a balanced manner (Adesfiana, Astuti, and Enawaty 2022; Zulkarnaini et al. 2022a). Departing from this background, this study aims to evaluate the validity and practicality of ethnobiological e-modules based on Moi tribal local wisdom using the ADDIE development model. The main focus of the research is on the aspects of content validity, media appearance, and practicality of use from the perspective of teachers and students. This research is very important considering the lack of learning resources based on Papuan local wisdom that are digitally packaged and under the needs of 21st-century education. In addition, the development of learning media that contain local values can contribute to cultural preservation and strengthening student identity.

This research has a very important urgency for the world of education, especially in Papua, because 1). The need for contextual digital learning media (Cinantya et al. 2025). The majority of learning media available today is still general and does not accommodate the local characteristics of students, especially in the Eastern Indonesia region. This results in a lack of a sense of engagement and a sense of deep learning; 2). Strengthening competencies in the 21st century. Through local ethnobiology content, students are invited to think critically about the relationship between humans and nature, develop creativity in solving environmental problems, and improve cultural and technological literacy through the use of e-modules (Hidayat, Marwoto, and Widiyatmoko 2024); 3). Efforts to preserve local wisdom. Many indigenous peoples' traditional ecological values and practices are threatened with extinction due to modernization and the loss of natural cultural heritage. The integration of local wisdom in learning media becomes an effective cultural conservation strategy (Alves and Souto 2015; Tohri et al. 2022); 4). Availability of scientific data and documentation. The local wisdom of the Moi Tribe is still very minimal in the context of formal education and scientific publications. This research can contribute to the documentation of local knowledge that can be accessed by academics and the wider community (Fadhilah and Sumarni 2025); 5). Digital literacy gap and learning resources:

This study also answers the challenge of learning resource gap in 3T (disadvantaged, frontier, outermost) areas, by providing e-modules that can be accessed flexibly and support online and offline learning (Iwan et al. 2023).

RESEARCH METHODS

This research is a research *and development* that aims to produce learning media products in the form of ethnobiological e-modules based on the local wisdom of the Moi Tribe and evaluate its validity and practicality aspects. The development model used is ADDIE**,** which consists of five systematic stages: *Analysis, Design, Development, Implementation*, and *Evaluation* (Ghani & Daud, 2018; Nugroho et al., 2023; Zulkarnaini et al., 2022b). The stages of the research are detailed in figure 1. This model was chosen because it provides a comprehensive teaching tool development structure, is flexible, and allows for adaptation to the local context and the needs of learners. The research was carried out descriptively, quantitatively, and qualitatively. Quantitative data was obtained through validation sheets and practicality questionnaires, while qualitative data was in the form of observation notes, suggestions, and inputs from validators and users.

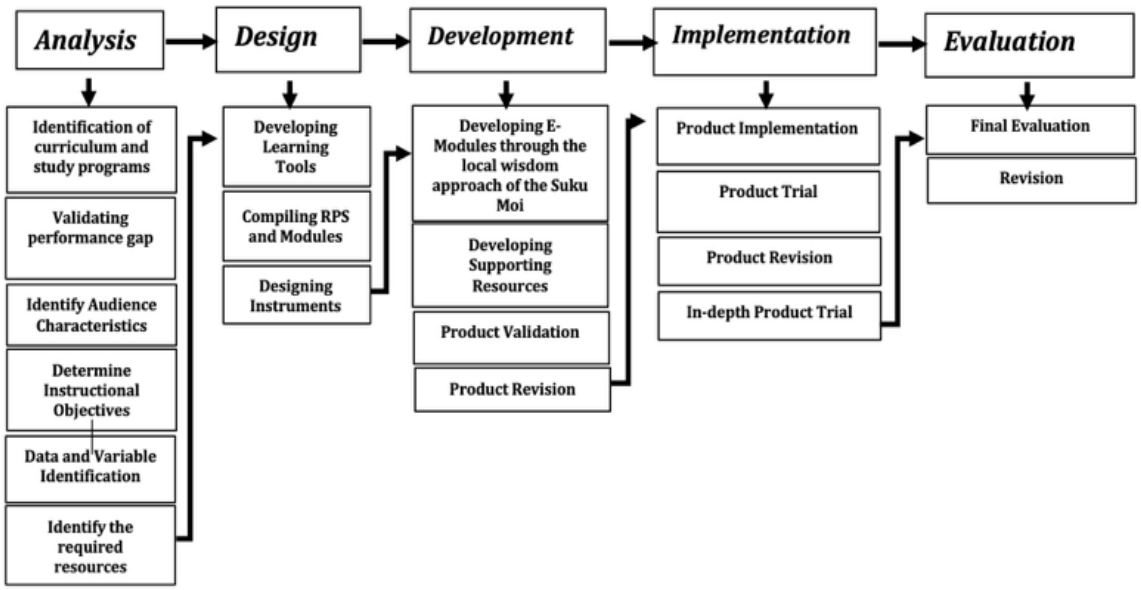

Figure1. The Stages of the Research

The subjects of this study are students of the 1st semester biology education study program, with a total of 35 people, the Biology Education Lecturer Team (2 Lecturers), while the Validators consist of 1 Material/Content Validator and 1 Media Validator. The variables of this study consisted of 1). The independent variable, namely the Ethnobiology module based on the Wisdom of the Moi tribe, is the dependent variable, is the Validity and Practicality of the E Module.

RESULT AND DISCUSSION

1. Development of Ethnobiology E-Module Based on Moi Tribe Local Wisdom

This study uses RnD research with the ADDIE model, with the following stages:

a) Analyze

The purpose of this study was to gather information on the need to develop an ethnobiology e-module. According to the data collected, the ethnoboiology course curriculum has not been integrated with the current environmental environment. In addition, the process of identifying existing curriculum and lecture programs has caused students to have difficulty finding learning references to support lectures. In addition, the students of the Biology Education Study Program at UNIMUDA Sorong are mostly Indigenous Papuans. RPS is needed to keep up with current developments, and students' ability to think critically is still very low.

b) Design

At this stage, the problems that have been identified at the design stage are solved by creating new learning media. Researchers combine learning theory and curriculum to create learning tools. In addition, research instruments are created that are appropriate to the research topic. This instrument includes a questionnaire that is used to measure the validity of the instrument, the validity of the product, and the level of practicality.

c) Development

The development of this ethnobiology e-module based on local wisdom is designed by combining elements of text, image visualization, and infographics to support students' understanding of ethnobiology concepts more comprehensively. This module specifically integrates local knowledge from the Moi Tribe as a case study in each learning topic, with the aim of not only enriching students' scientific insights, but also strengthening the contextualization of learning materials to the socio-cultural realities of indigenous peoples in the Sorong region, which is the customary land of the Moi Tribe.

This e-module is designed to be easily accessible to students, both in the form of downloadable PDF files and through shared online links. The modules are displayed in an interactive Flipbook format with an attractive interface design and user-friendly navigation, thus enhancing the learning experience. Other interactive features include embedding videos, images, graphs, practice questions, and simulations that serve to help students test their understanding of the material they have learned actively and reflectively. The use of technology in the development of this e-module is directed to encourage the strengthening of students' critical thinking skills and expand access to learning resources outside the formal classroom. As a form of integration with the institution's digital learning system, this e-module has been implemented into the Learning Management System (LMS) of UNIMUDA Sorong. Thus, lecturers can directly monitor student activities and progress during the learning process. Access to the UNIMUDA Sorong LMS can be done through the official website: https://siakad.unimudasorong.ac.id. At this stage, the validity or feasibility of the e module is also measured both in terms of material and as a learning medium; the results are as follows:

Table 1. Result of Validity of E-Module Material test by Material Experts

No.	Validation Aspects	Average	Information
1	Material	3.5	Valid
2	Presentation Format	3.5	Valid
3	Language	3.4	Valid
4	Time	4	Highly Valid

Table 2. Result of the E-Module Test by Media Experts

No	Validation Aspects	Average	Information
1	Display Screen Design	3.6	Valid
2	Convenience for Users	3	Valid
3	Consistency	4	Highly Valid
4	Graphic	3.25	Valid
5	Benefits	3	Valid

Based on these results, the resulting e module is declared valid and suitable for use.

d) Implementation

The implementation of the ethnobiology e-module and evaluation was initially carried out on students in a predetermined class. This is the next stage in the development process.

Table 3. Results of the Recaputulation of Lecturer Responses

No	Lecturer's Response	Number of Lecturers
1	Proper	2
2	Quite Decent	0
3	Not Eligible	0

Table 4. Results of the Recapitulation of student Responses

No	Student Responses	Number of Students
1	Proper	35
2	Quite Decent	0
3	Not Eligible	0

Based on this, lecturers and students agreed that the module is suitable for use.

e) Evaluation

Evaluation is carried out in two stages: formative evaluation and summative evaluation. Formative evaluations are conducted during development and implementation, where lecturers, students, and a team of media experts provide input for improvement. Summative evaluation is carried out at the end of the study to find out how effective the teaching materials are and get feedback from various parties.

1. Practice Test of Ethnobiology E-Module Based on Local Wisdom of the Moi Tribe

The practicality test aims to assess the ease of use of e-modules by lecturers and students, measure the function and attractiveness of the e-module interface, evaluate whether e-modules can be used independently by students, and assess the integration of content with digital learning media**.** The Practicality Test Method uses respondents, A team of lecturers (2 lecturers) and students totaling 35 people who use a practicality test instrument with a likert scale of 1-4 which includes aspects of e-module quality, learning (material integration), function (ease of access and navigation), display/layout. The results of the Practicality Test are interpreted into the Practicality Score Interpretation table (Riduwan, 2015). The results of the test are as follows:

Table 5. Results of Practically Test Ethnobiology E-Module Based on Local Wisdom of the Moi Tribe According to the Team

No.	Aspects	Average	Category
1	Quality	3.33	Very Practical
2	Learning	3.67	Very Practical
3	Function	3.71	Very Practical
4	Display/Layout	3.75	Very Practical

Based on the average score above, it shows that e-modules are considered practical and feasible to use in the learning process by lecturers. This practicality is not only seen from the

content, but also from the technical functionality and ease of integration into the LMS of UNIMUDA Sorong. As for the results of the student practicality test, the results are as follows:

Table 6. Results of Practicality Test Ethobiology E-Module Based on Local Wisdom of the Moi Tribe According to Students

No.	Aspects	Average	Category
1	Quality	3.71	Very Practical
2	Learning	3.33	Very Practical
3	Function	3.66	Very Practical
4	Display/Layout	3.38	Very Practical

Based on the table above, students **feel** that the e-module is easy to use, relevant to the lecture material**,** and has an attractive appearance. The high score in terms of quality and function indicates a good level of student acceptance of the use of e-modules in independent and collaborative learning**.** The results of the study are by research conducted by Iftakhar (2016), which states that interactive e-modules can increase the effectiveness of students' learning and digital literacy. The high validity and practicality score of the developed e-modules is due to the following important factors:

1. Results of Content with the Curriculum and Local Context

The ethnobiology material presented refers to the learning outcomes of the biology education curriculum and is directly related to the local context of the Moi Tribe, so that the content feels relevant and authentic. This reinforces the validity of substance, as emphasized by Branch (2009), that the relevance of content to learning objectives and students' experiences is the main indicator of the validity of teaching materials.

2. **Application of ADDIE Instructional Design Principles**

The use of the ADDIE model provides a systematic framework for designing, developing, and evaluating e-modules. Each stage is carried out with careful pedagogical and technical considerations. This model is widely recognized as an effective approach in the development of learning media (Aldoobie, 2015; Branch, 2009)

3. **Integration of Cultural Values and Local Wisdom**

This e-module presents content based on the **local wisdom of the Moi Tribe**, such as animal classification practices, traditional conservation, and local mythology. This increases the emotional involvement and cultural identity of students is an important element in culturally responsive teaching (Gay, 2010).

4. Visual Design and Interactive Interface

The appearance of the e-module is attractive, consistent, and easy to navigate making users feel comfortable. The placement of images, videos, icons, and interactive quizzes follows the principles of Multimedia Learning from Mayer (2005), which improves comprehension and retention of information.

5. Flexibility of Use

Modules can be accessed via digital devices (laptops, tablets, smartphones) and support both independent and collaborative learning. Flexibility and accessibility are the main reasons why e-learning tools are considered practical by users (Iftakhar, 2016; Moll et al., 2001; Yuliana & Sari, 2000).

Discussion

The results of the study show that the ethnobiology e-module based on the local wisdom of the Moi Tribe, developed using the ADDIE model, is declared valid and very practical to be used in the learning process. Assessments from material and media experts gave high scores on the aspects of substance, presentation, and appearance, while the practicality test showed positive acceptance from lecturers and students. The validity of the modules is supported by the suitability of the content with the curriculum, the integration of local cultural values, and the successful application of instructional design principles. These findings corroborate the statement that the

validity of teaching materials is greatly influenced by the relevance of the content to the context of students. The Moi Tribe's local knowledge, such as the classification of local animals, eco-friendly hunting practices, and traditional mythology, is an added value in enriching the substance of learning (Branch, 2009).

The practicality aspect is also reflected in the user-friendly interface design, interactive features such as videos and quizzes, and compatibility with the Learning Management System (LMS). These results are in line with research (Iftakhar, 2016) and (33), which emphasize that the attractive appearance and interactivity of the modules are able to increase student motivation and participation in learning. Furthermore, the success of this e-module emphasizes the importance of *culturally responsive teaching strategies* (Gay, 2010) where learners not only understand scientific content, but also internalize their cultural values. Strengthening local cultural identity through digital learning media can contribute to the conservation of local wisdom values that have been threatened by modernization. Thus, this e-module is not only relevant as a learning tool in an academic context but also as a medium for cultural preservation and strengthening ecological literacy. This study provides empirical evidence that the development of locally-based digital learning media can be a solution to overcome the challenges of digital literacy and the lack of learning resources in 3T regions, such as Southwest Papua.

CONCLUSION

This study aims to evaluate the validity and practicality of ethnobiology e-modules based on Moi tribal local wisdom developed using the ADDIE model. The results of the evaluation show that the e-modules developed received a "valid" assessment from material and media experts, both in terms of content, language, visual appearance, and integration of local wisdom. This shows that the e-modules are substantially in line with the needs of the curriculum and relevant to the local context of students in Sorong, Southwest Papua. The practicality test involving lecturers and students also showed "very practical" results**,** characterized by ease of use, availability in flexible digital formats (PDF and Flipbook), and interactive features that support active learning and strengthening 21st-century skills, especially critical thinking. The integration of e-modules in the Learning Management System (LMS) of UNIMUDA Sorong also strengthens the monitoring and sustainability of the use of this media in teaching and learning activities. Overall, this e-module not only acts as an innovative learning medium but also as a means of preserving local knowledge through an educational approach. The findings of this study confirm that the development of media based on local wisdom can improve the quality of biology learning, strengthen students' cultural identities, and support efforts to decolonize knowledge in the world of higher education.

Thus, the ethnobiology e-module based on the local wisdom of the Moi Tribe that was developed is suitable for use in the learning process and has the potential to be replicated or adjusted in the context of other local wisdom in Indonesia.

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