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Research Article

Development of an ethnobotany-based encyclopedia on the use of banana species by the Sambas Malay community

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Abstract: The culture of the Sambas Malay community in using bananas must be upheld. Local wisdom could be preserved by employing educational resources. This study was aimed to develop an encyclopedia of banana species based on the ethnobotany of the utilization of the Malayu Sambas community which is used as a local wisdom-based learning resource and to determine the response given by students. In this study, the learning media to be developed is encyclopedia-based learning media because the encyclopedia is a form of print media that contains information and is accompanied by interesting illustrations according to the topics discussed. This research is designed to produce efficient learning materials and generate enthusiastic student feedback. Based on the ADDIE development model, this study used a five-stage process: analysis, design, development, implementation, and evaluation to conduct R&D. Data collection was based on interviews, observations, and questionnaires. Data were analyzed using a Likert questionnaire. Based on the assessment obtained, the refinement of the ethnobotany-based reference book of banana Species used by the Malay community in the Sambas area received high praise from the material expert (94.58%) and media expert (95.83%) as well as a huge response from the language expert (93.75%). Based on various factors such as content, language, usage, and appearance, 12 students provided affirmative responses, resulting in a 92.44% positivity rate in the small-scale trial, and 38 students gave positive answers of 91.96% in the large-scale experiment. The encyclopedia has been successfully compiled containing a QR code that provides information about the morphological characteristics of bananas and their uses in everyday life. Encyclopedia media can also be an educational tool that can maintain the existence of regional culture packaged using learning media.

Keywords: ADDIE; bananas species; encyclopedia; ethnobotany; Sambas Malay community

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1. Introduction

Indonesia has diversity in all aspects. Indonesia is the largest archipelago in the world (Almutahar & Saing, 2019). Indonesia is dubbed as an archipelago so Indonesia is rich in natural resources (Wahyudi & Palupi, 2023). One of the most diverse provinces in Indonesia is West Kalimantan. According to Supiandi et al., (2023), West Kalimantan ranks as Indonesia's fourth most extensive province. Malay tribes are located on the coast, one of which is in the Sambas district (Meisia et al., 2020). The Sambas community is also known as a community that strongly maintains and preserves its traditions and customs (Januardi et al., 2022). Banana utilization is one option that is feasible in Sambas Regency. This fact was revealed in interviews with the people of Sambas Regency who still consume bananas every day. Ethnobotany or biology can be utilized to investigate the utilization of bananas by the populace of Sambas Malay origin.

Ethnobotany is the scientific study of how plants and humans interact with each other and how these interactions contribute to daily life (Marima et al, 2023). According to Fajarinia et al., (2017), ethnobotanical research tries to study the relationship between humans and nature. The research Sharma et al (2020) says that ethnobotany is a branch of science that studies plants and humans. Local knowledge or traditional knowledge is generally acquired through oral tradition and develops in rural and remote inland areas (Muhith., 2022). Ethnobotany is a scientific endeavor that utilizes traditional knowledge and experience to improve human existence and the environment (Marpaung & Idris, 2022). According to Firdausi et al., (2015), ethnobotany refers to the utilization of plants to improve human welfare. The study of banana plant ethnobotany has been conducted across diverse regions of Indonesia, each with its own set of aims and viewpoints

(Cahyanto et al., 2020). Banana is a versatile plant (Chidinma et al., 2024). Banana utilization in Indonesia is not a new concept. Indonesian people still cultivate bananas traditionally (Erawan, 2019). Ethnobotanical information on bananas by the Malay community of Sambas Regency could serve as an educational tool. The concept of utilizing regional wisdom was endorsed as an educational asset by Nurdiansyah et al., (2021) who argued that education can be packaged effectively in each region to facilitate cultural transmission to future generations through knowledge integration. Learning resources can be used as learning media if packaged appropriately.

Based on conversations with teachers and students at SMAN 1 Jawai Selatan, it appears that the commonly used learning materials mostly consist of workbooks (LKS) and textbooks, and the students have never been exposed to local educational resources, such as different types of bananas. Findings from interviews with some students indicate that they show less enthusiasm for learning and are prone to boredom due to the lack of interesting educational materials. Based on the description above, the local ethnobotanical potential of bananas is needed by students to support the learning process in order to improve the quality of learning, and the information is packaged in the form of an encyclopedia.

Encyclopedia is a printed media that serves to increase students' knowledge and insight. The encyclopedia has the following characteristics; there are articles/topics and subtopics, the size of the encyclopedia is in accordance with ISO standards with a size of 21x29.7 cm, there is a definition of the article/topic and followed by a general explanation, there is a cross point or further, see also, a running index, etc., there are paragraphs, illustrative images, arranged systematically alphabetically and thematically historically-chronologically, there is an index, there are instructions for use.

The selection of encyclopedia learning media because the encyclopedia is a form of print media that includes informative content complemented by captivating illustrations relevant to the subject matter (Ubaidillah, 2017). According to the study conducted by Sabilla et al. (2023), the findings regarding the ethnobotanical-based encyclopedia focusing on wrapping plants among the Malay Tribe in Meliau District demonstrate high usability, with a validation rate of 91.67%, and the results of student responses strongly agree with this media. Khotima and Nurhasanah, (2021) Banten Local Wisdom-Based Cultural Encyclopedia Research on Social Studies subjects obtained expert validation test results with a percentage value of 90.57% so (very suitable) and the average student response of 99.05% (very good) used as local wisdom-based learning media.

Materials based on local possibilities can provide examples to students so that their learning activities are based on the local possibilities of their region (Novana et al., 2014). However, there are still many educational media that contain material on the potential of native plants in biodiversity. The concept of this teaching material is based on the 2013 Revised Curriculum. The basic competency that students must master is the analysis of various levels of biodiversity (genes, species, ecosystems) as well as threats and conservation in Indonesia. On the other hand, the learning situation required by the 2013 Revised Curriculum requires students to be more familiar with the subject matter. It can foster critical thinking skills in the science educational journey (Sarip et al., 2022).

According to previous studies, local capabilities can be utilized as an educational asset, such as in the format of an encyclopedia. The encyclopedia was chosen as this development product because it is identical to pictures and appears lighter, more interesting, and more concise (Renita, 2020). The use of media is important because it has a strategic position for the success of learning because media can arouse interest and motivation to learn, increase student understanding, and support the learning process to achieve learning objectives (Sevtia et al., 2022). The encyclopedia developed will be used to learn some of the material, find references, and broaden students' insights about the utilization of biodiversity better (Noviar, 2016). The conducted research can generate a teaching tool centered on biodiversity, which has the potential to enhance students' comprehension of the instructional process led by the teacher. From the results of previous studies, this researcher aims to develop an encyclopedia of banana species based on the

ethnobotany of the utilization of the Malayu Sambas community which is used as a local wisdom-based learning resource and to determine the response given by SMA 1 Jawai Selatan students.

2. Materials and Methods

2.1 Research design

The utilized research approach, recognized as research and development (R&D), entails crafting an ethnobotanical-focused encyclopedia exploring the utilization of various banana species in biodiversity biology education. This methodology aims to create a product, gauge its efficacy, and solicit student input. Sugiyono (2017) emphasizes that the research and development (R&D) method is a strategy employed to generate tailored products, encompassing studies that evaluate the efficacy of the model utilized in this process to transform identification outcomes into biological learning materials. The ADDIE model was applied through ethnobotanical exploration, aiming to convert the findings on banana variety utilization into educational media. This developmental model, ADDIE, consists of five key phases: analysis, design, development, implementation, and evaluation.

2.2 Research Subjects

This study took place at SMAN 1 Jawai Selatan Sambas Regency West Kalimantan Barat, with participants consisting of students from the eleventh grade. The material in this research is biodiversity. This study used 12 students for small-scale tests and 36 students for large-scale tests. This research was conducted on February 26, 2024. The place of data collection was conducted in Sambas Regency, South Jawai District, Semparuk, Sambas, and Paloh. Data collection was done through interviews, observations, and questionnaires.

2.3 Research Phase

2.3.1 Analysis

The main activities at this stage are analyzing the needs of developing new learning and mediating the feasibility of developing new learning media conditions. The objective of the analysis phase is to pinpoint challenges encountered during the educational process. The initial step, performance assessment, entails identifying the hurdles confronted by educators concerning the instructional materials employed in the learning process. The second step needs analysis, determines which learning media students need to improve the quality of their learning with needs-based media. At this stage, students need learning media that can support the learning process that utilizes local wisdom in the learning process. The third stage is curriculum competency standards and basic competencies of biology subjects are analyzed. This stage is a reference in the process of making encyclopedia media. The fourth stage is the analysis of banana seeds and their utilization in the form of encyclopedia-style educational materials. The primary emphasis of this phase is to pinpoint barriers that students may face and set appropriate research objectives. In this fourth stage, the researcher looks for local banana species that can be used as learning materials for biodiversity.

2.3.2 Design

At this stage, researchers design encyclopedia media by paying attention to the design aspects, materials, and language used. The illustration book will be made based on the design made by the researcher. To make this encyclopedia, researchers used Canva as supporting software. The design stage is a stage where the results in the form of data obtained during the observation and interview process of schools and banana varieties in Samba Regency are processed and become designs.

2.3.3 Development

The development stage is where the learning media designed at the design stage is modified and further developed. The development step in this study includes learning media modification activities. The goal of the development phase is to create an improved encyclopedia medium following expert validation. At this stage, media validation, language validation, and material validation were conducted. During the validation phase, each person used three validators. We conducted validation to evaluate the validity of the developed media. This process includes collecting feedback, analyzing the results, and making adjustments before publishing the final revision.

2.3.4 Implementation

At the implementation stage, researchers tested student responses to the developed media. This trial was conducted for class X students of SMA 1 Jawai Selatan using the Ethnobotanical-Based Encyclopedia media Utilization of Banana Species of the Malay Community of Sambas Regency to study biodiversity material. The implementation stage aims to test the encyclopedia product to obtain and collect the data needed for the student response test generated based on feedback gathered from the student questionnaire regarding the encyclopedia. The validity of the media can be known through the responses of the test subjects through filling out the student response questionnaire.

2.3.5 Evaluation

The assessment phase represents the final step within the ADDIE model. The evaluation phase is a process to see (evaluate) whether the media developed has met the initial development expectations or not. The evaluation stage consists of formative and summative evaluations (Sugihartini & Yudiana, 2018). The tools employed in this research encompass interviews conducted with both teachers and students and the Malay community of Sambas Regency. The data analysis approach used includes questions that are analyzed using a Likert scale with scores of 4, 3, 2, and 1. The media validity analysis is calculated using the Formula 1 (Sugiyono, 2017).

$$P: \frac{\sum X}{\sum Xi} x\ 100\ \% \quad (1)$$

Moreover, to ensure the credibility of the educational materials, validation was carried out by experts in media, subject matter, and linguistics. This was assessed using the formula: P = percentage of validity, ∑X = total validator scores, and ∑Xi = total expected ideal scores. The percentage of validation value resulting from the calculation will be explained by referring to Table 1 (Sugiyono, 2017).

Table 1. Criteria for the Percentage Classification of Validity

Score Percentage (%)	Criteria
81 - 100	Very Valid
61 – 80	Valid
41 – 60	quite valid
21 – 40	less Valid
0 – 20	Not Valid

After getting the percentage of validity numbers, the next step is to analyze the student response questionnaire using the percentage response value of each aspect to the answer of a statement. Analyzing students' responses to the Ethnobotanical-Based Encyclopedia media Utilization of Banana Species of the Malay Community of Sambas Regency aims to measure the percentage of encyclopedias developed using the Formula 2 (Sugiyono, 2017).

$$\text{Average Percentage Value (NRP) (\%)} = \frac{\sum \text{NRP}}{\text{NRP Maximum}} \text{ x } 100\% \quad (2)$$

The student response calculation formula is used in Formula 2. Description NRP (%): Percentage of Learner Response Value, ∑ NRP: Total Response Value (NRP SS + NRP S + NRP TS + NRP STS), Maximum NRP: ∑ R x best choice score = ∑ R x 4. ∑ R = number of responses that choose the answer. After calculating the student response scores for each answer item, the next step is to determine the percentage criteria value of student response scores per indicator by referring to Table 2.

Table 2. Percentage Criteria for the Classification of Validity

Score Percentage (%)	Criteria
81 - 100	Very Valid
61 – 80	Valid
41 – 60	Quite Valid
21 – 40	Less Valid
0 – 20	Not Valid

3. Results

3.1 Analysis

The first stage is analysis which includes performance analysis, needs analysis, curriculum analysis, and banana type analysis. From a summary of interview findings with biology instructors at SMAN 1 Jawai Selatan teaching materials are used a lot in the form of LKS books or textbooks so teachers find it difficult to deliver material related to local potential. The findings from observations concerning the content that poses challenges for eleventh-grade students, called as biodiversity material because it is included in the material that is quite complex and the absence of local potential banana species and their utilization are used as learning media.

The coverage of biodiversity material discussed tends to be more writing in the form of reading, less showing examples with interesting and colorful pictures so that students are less interested in reading and learning it while the results of interviews with the community, banana sellers, and customs shops obtained several types of bananas and their use in daily life are identified the Table 3.

Table 3. The Species bananas and their use & by the Sambas Malay Community

No	Local name	Scientific Names	Used parts of the banana	Utilization
1	Pisang Ambon	*Musa-Eumusa-AAA-subgr.Ambon*	Petiole and stems	Gun toys, and Ship toys
			Fruit	Banana Cake
2	Pisang Barangan	*Musa-Eumusa-AAA*	Fruit	Banana kusoi, banana cake, traditional medicine
			Petiole	Bird nest
3	Pisang Mas Kirana	*Musa-Eumusa-AA-subgr.Sucier*	Petiole	Bird nest
			Fruit	Pung Tawar offerings
4	Pisang Mas Rejang	*Musa-Eumusa-AA-subgr.Saucier*	Leaf	Animal Breeding
5	Pisang Madu Os	*Musa-Eumusa-AA-*	Fruit	Kusoi piang, banana cake
6	Pisang Nipah	*Musa-Eumusa-ABB-subgr.Saba*	Stem	Goulash, Ship Games

No	Local name	Scientific Names	Used parts of the banana	Utilization
			Male bud	Traditional Vegetables
			Fruit	Chips, Pung Tawar offerings, kulak
			Leaf	Huwankey Banana, tempeh wrappers, naga sari cake wrappers, food wrappers, passing cake wrappers, lemper cake wrappers
7	Pisang Nangka	*Musa-Eumusa-AAB-subgr.Pisang Nangka*	Fruit	Chips
8	Pisang Raja	*Musa-Eumusa-AAB-subgr.Pisang Raja*	Petiole	plant seedling protectors
9	Pisang Rawa	*Musa paradisiaca cv awak*	Petiole	Doll toys
10	Pisang Tanduk	*Musa-Eumusa-ABB-subgr.Plantain*	Fruit	Chips
11	Pisang 40 Hari	*Musa-Eumusa-AA-subgr.Saucier*	Stem	Ship toys
			Fruit	Pung Tawar offerings

3.2 Design

The next phase in the ADDIE model involves formulating the blueprint for the Ethnobotanical-Based Encyclopedia of Banana Utilization of the Malay Community of Sambas Regency. In the first design, designing the media size selection according to ISO standards with a size of 21 x 29.7 cm using A4 paper, determining the images to be used, and designing the shape and color selection of the encyclopedia. Designing encyclopedia media by designing the cover, the front, and the back cover. In the second stage of design, namely the preparation of material as the content of the encyclopedia. The content within this encyclopedia medium incorporates findings derived from research conducted during the analysis phase, encompassing various banana types and their respective applications. The material is equipped with pictures, the morphology of each type of banana, and its utilization found in Sambas Regency. The closing part of this encyclopedia is composed of a glossary, bibliography, and also the author's profile.

3.3 Development

The third step within the ADDIE developmental framework is the development phase, which is geared towards assessing the viability of the Banana Species Encyclopedia media and its utilization in biodiversity material. After getting a feasibility assessment, if there are revisions from the Encyclopedia media experts the criticisms and suggestions of the next validator, namely improving the media that has been revised by the experts. Validators consist of 2 lecturers and 1 teacher, namely lecturers of material experts, and media experts while linguists use 1 lecturer and 2 teachers. The presentation of the encyclopedia by referring to Figure 1.

Figure 1. The Display of encyclopedia based on ethnobotany of banana species and their utilization for Sambas Malay community

Table 4 presents the outcomes of validating the ethnobotanical-focused encyclopedia concerning banana varieties and their usage within the Malay community of Sambas Regency.

Table 4. The material, media, and language validation results

No	Expert Validation	Mean (%)	Criteria
1	Material	94.58	Very valid
2	Media	95.83	Very valid
3	Language	93.75	Very valid

Derived from the outcomes of the validation assessment for the Ethnobotany-Based Encyclopedia of Banana Species and Their Utilization for the Malay community of Sambas Regency, an assessment of 94.72 was obtained, including very valid criteria or feasible to use (Table 4).

3.4 Implementation

The implementation phase is aimed at evaluating students' responses to the educational material developed, which takes the form of an Ethnobotany-Based Encyclopedia detailing Banana Species and Their Utilization within the Malay community of Sambas Regency. These responses were assessed through both small-scale and large-scale trials, conducted subsequent to validation by subject matter experts, media specialists, and linguists. The large-scale trial aimed to evaluate the encyclopedia's effectiveness with a broader student population. Aspects evaluated in both trials included material relevance, language clarity, usability, and presentation. The small-scale trial involved 12 students, while the large-scale trial involved 36 students. Statements during this phase comprised both positive and negative feedback. Results from the small-scale trial yielded a 92.44% rating (excellent), while those from the large-scale trial showed a 91.96% rating (excellent) (Table 5).

Table 5. Response Students Data of SMAN 1 Jawai Selatan

No	Test Scale	Mean (%)	Criteria
1	Small	92.44	Very Good
2	Large	91. 96	Very Good

3.5 Evaluation

During the evaluation phase, researchers employed both formative and summative evaluations. Formative evaluation, which gathers data throughout all phases of the ADDIE model, focuses on refining or revising the learning material based on feedback obtained during the validation stage. These revisions are guided by input from validators specializing in content, language, and media. Subsequently, summative evaluation involves analyzing student response questionnaires to ascertain the influence of utilizing the Ethnobotany-based Encyclopedia of Banana Species and Utilization on the learning experience within the Sambas Malay community.

4. Discussion

This research and development produces an encyclopedia product intended for grade 10 students in the field of science. The primary goal of this encyclopedia is to facilitate students' comprehension of biodiversity, particularly in its utilization. The problem experienced at school is the lack of local-based learning media used by students, especially in learning science material biodiversity. So in this s, researchers focused on producing a local-based product that can make learning more fun. Indigenous knowledge is reflected in local wisdom as an understanding of the narratives and culture that develop among the community. The learning materials available at school are not limited by the original cultural and environmental factors of the local community so teachers must be

able to modify teaching materials by adjusting to local culture (Eliezanatalie & Utama, 2023). The learning media that the author wants to produce is a media encyclopedia based on the local wisdom of the community. Moreover, the encyclopedia aids in simplifying students' comprehension of the material and fosters the development of their cognitive abilities through interactive activities incorporated within its pages (Saputri et al., 2024). Research by Sabilla et al., (2023) proved that encyclopedias can provide visualization of content and are closely related to images so that they can attract readers and increase student learning motivation. Based on existing research encyclopedias are very suitable for use as learning media because encyclopedias are presented differently from other books, encyclopedias can increase students' creativity and critical thinking skills, especially in biodiversity material.

The analysis stage is needed whether this research is needed. The analysis stage includes specific research techniques such as needs analysis, goal analysis, and task analysis. At this stage, the researcher identifies the problem, and the source of the problem and determines the solution (Muruganantham, 2015). At this stage, a problem was found, namely that the teacher still had difficulty in explaining biodiversity material, especially related to the use of local plants in Sambas Regency. Therefore, teachers want a media tool that can explore students' local knowledge, especially those related to the surrounding nature, because local media is not widely available at school. Local wisdom refers to the insights acquired by specific community groups through accumulated experiences, which are then articulated and amalgamated into an appreciation of the cultural and environmental aspects of a particular locale (Widiastuti et al., 2020). The utilization of local wisdom in learning, especially in basic education, is a very good approach because it can instill the value of love for the country and can pass on existing knowledge (Watthanakuljaroen, 2023).

A needs assessment is conducted to identify the educational resources required by students to enhance the quality of learning, tailored to meet their specific needs (Renita, 2020). At the needs analysis stage, researchers spread questionnaire sheets to students to find out the needs of students. This is in accordance with research Farhana et al. (2022) at the needs analysis stage students are given a series of questionnaires to fill out. At this stage, information is obtained about the lack of local-based learning media, especially learning media on biodiversity material. So the learning media that you want to develop is encyclopedia learning media. The encyclopedia media created is a special encyclopedia that contains the sub-material of the utilization of Indonesia's biodiversity. Curriculum analysis. The concept of curriculum analysis is used as a theoretical foundation in planning and implementation issues (Chen et al., 2021). Curriculum analysis is carried out to find out the references used in the preparation of encyclopedias to match the guidelines used by schools on class X biodiversity material. The 2013 Revised Curriculum requires students to be more familiar with the object of learning so that it can trigger critical thinking skills in the science learning process (Sarip et al., 2022).

Bananas are a very popular fruit in tropical and subtropical countries. It is cheap and contains many nutrients so bananas are widely recognized by the public. Analysis of banana species and their utilization that will be used as encyclopedia learning media. Research on banana ethnobotany in various regions, especially in Indonesia, has been widely conducted and studied. Banana is also utilized in almost all parts of the banana plant, both as food and as a local variety (Syamsuri et al., 2023). Banana is a versatile plant (Chidinma et al., 2024). Parts of the banana plant that can be utilized are the fruit, leaves, male but, and petiole (Mukhoyyaroh & Hakim, 2020). Banana is one part of biodiversity and as a biology study material that is very important for students, because the material touches various aspects that students often encounter in their daily lives. Banana diversity needs to be conveyed to students because it is the natural wealth of Indonesia. It is important that nature knowledge is taught to students for a positive understanding of nature and a tendency to conserve natural resources (Gerl et al., 2021).

The second stage includes designing encyclopedia products using Canva. Canva can be used as an application for designing. Canva has a variety of features that can lead to

creativity in designing learning media. Canva is a visual design tool that makes it easy to create graphics. Canva is a complete design application that makes it possible to create and modify visually appealing visuals. This app is ideal for improving writing skills. Canva can be used to help improve learning (Candra et al., 2022). The design starts from designing the cover of the introduction section comprising elements such as the front cover, foreword, table of contents, introduction, and guidelines for utilizing the encyclopedia. The content section contains 11 species of bananas found in Sambas Regency which include pictures of bananas, local names, spesies, classification, description, chemical content, distribution, and utilization as well as barcode scans containing videos of how to manage or utilize banana species. The last section consists of references, a glossary, and an author profile.

Following is the development phase, during which validation tests were conducted by professionals. Experts in this stage are media, material, and language experts. Each expert consists of 3 validators. Based on the average validation results from material experts 94.58% (very valid). This shows that the encyclopedia developed is by the core competencies listed in the curriculum. According to previous research, the content and presentation of encyclopedia materials are very good because based on factors such as subject matter, additional information, affective considerations, interface, navigation, pedagogy, and durability (Saylendra & Susanto, 2023). The language validation results yielded a percentage of 93.75% (highly valid), indicating that the language is expressive and engaging for student readers. The validation results obtained a percentage of 95.83% (very valid). This assertion is supported by prior studies advocating for encyclopedia-style educational materials, as encyclopedias encompass printed media featuring informative content complemented by engaging illustrations relevant to the discussed subjects (Ubaidillah, 2017). From the three validators, an average assessment of 94.72 was obtained so that the media Encyclopedia Based on Ethnobotany of Banana Species and Utilization of Sambas Malay community was included in the criteria very valid or feasible to use with minor revisions.

The fourth stage is implementation which is carried out at SMAN 1 Jawai Selatan. At this stage, the small-scale test score was 92.44% (very good), and the large-scale test results showed 91.96 (very good). Sabilla et al., (2023) suggested that the ethnobotanical-based encyclopedia focusing on wrapping plants among the Malay Tribe of Meliau District is highly practical, with a validation rate of 91.67%, and student responses strongly support its efficacy. Additionally, other studies indicate positive student feedback from both small-scale and large-scale trials. For instance, research conducted by Aini et al. (2024) on the development of a local vegetable encyclopedia in North Kayong Regency for biology learning media revealed very favorable responses, with a small-scale trial scoring 78.83% (very good) and a large-scale trial achieving 84.47% (very valid). Similarly, findings from Saputri et al., (2024) show that both small-scale and large-scale trials for the encyclopedia of woven plants yielded very positive results, with averages of 85.06% and 85.50%, respectively, indicating a high level of student interest in learning through this medium.

During the evaluation phase, researchers utilized both formative and summative evaluation methods. Formative evaluation was employed to gather data across all stages of the ADDIE model. This process involves refining or revising the learning materials based on feedback received during the validation phase, incorporating suggestions from validators specializing in content, language, and media. The evaluation process uses several instruments (Almomen et al., 2016). Subsequently, the summative evaluation focused on analyzing student response questionnaires to assess the impact of utilizing the Ethnobotany-based Encyclopedia of Banana Species and Utilization within the Sambas Malay community during the learning process. Consequently, it can be concluded that the developed media is suitable for use as supplementary learning material for biodiversity topics in the 11th-grade Natural Sciences class at SMAN 1 Jawai Selatan.

5. Conclusions

Derived from the findings of the study, the Ethnobotany-Based Encyclopedia of Banana Species and Utilization of Sambas Malay community is one of the learning media used at SMAN 01 Jawai Selatan which has been tested on students of class X IPA. In accordance with the outcomes of the pilot study, the Ethnobotany-Based Encyclopedia of Banana Spesies and Utilization of Sambas Malay Community as learning media has reached the level of suitability in terms of very valid content, valid language aspects, and very valid media aspects. The small-scale test produced very good results, while the large-scale test showed very good results. Therefore, the Ethnobotany-Based Encyclopedia of Banana Species and Utilization of Sambas Malay community is valid and very good so that it is applicable for integration into the educational journey.

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