JPPIPA 10(7) (2024)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

Development of an Ethnobotanical Encyclopedia on the Antar Ajong Ceremony

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Received: March 28, 2024
Revised: May 07, 2024
Accepted: July 25, 2024
Published: July 31, 2024

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DOI: 10.29303/jppipa.v10i7.8350

Abstract: The Antar Ajong ceremony is a ritual before planting rice carried out by the Sambas Malay Tribe. Plant diversity in the Antar Ajong ceremony can be developed in the form of an encyclopedia to support learning at school. This study aims to measure the validity of the media and student responses to the encyclopedia developed. The research used Research and development (R&D) with a modified 4D development model that includes the define, design, and develop stages. Data collection used interviews, observations, and questionnaires. The data was analyzed using a Likert questionnaire. The validation test obtained a value from media experts of 96.88% (very valid), material experts of 91.66% (very valid), and linguists of 88.14% (very valid). Students gave very good responses to the small-scale (99.35%) and large-scale (98.25%) trials. So it can be concluded that the ethnobotanical encyclopedia media at the Antar Ajong ceremony of the Malay Tribe of Paloh District, Sambas Regency, is feasible to apply in learning and get a positive response. This encyclopedia medium can also be used as a medium for preserving the local wisdom of the Paloh Paloh District Malay community at the Antar Anjong ceremony.

Keywords: Antar Ajong; Encyclopedia; Ethnobotany; Research and development

Introduction

Indonesia is the world's biggest archipelago (Almutahar & Saing, 2019). Because of its abundance in natural resources, Indonesia is known as an archipelago (Wahyudi & Palupi, 2023). Every region has distinctive customs that set it apart from the others; Sambas Regency is one such location. The traditional rituals of Sambas Regency are a reflection of the many customs that exist in this region. The Antar Ajong Tradition is one of the customs that grew in Sambas Regency and is being upheld today (Lestari et al., 2022). One of the Malay community's customs in Sambas Regency, namely in Paloh District, is Antar Ajong. The community's customary ceremonial practice, known as Antar Ajong. For the community's prosperity, the people wish for a bountiful crop. Antar Ajong is often planted in March or June, which corresponds to the beginning and middle of the month. The practical application of traditional rituals as a component of human cultural goods is inextricably linked to the use of local resources, including flora (Triana et al., 2022).

Local wisdom is integrated with the character of the community because its existence is always carried out and preserved, even in certain conditions it is respected, certain conditions are highly respected (Thornhill-Miller et al., 2023). Education based on local wisdom or potential can protect each region's local potential and make the learning process more effective and meaning (Rummar, 2022; Wahyuni et al., 2021). In addition, the selection of learning resources must based on local potential (Yani et al., 2021). Learning based on local potential can improve students' relationship with the surrounding environment (Hartanti et al., 2024). Ethnobotany is the study of the relationship between plants and tribes or communities plants with tribes or

How to Cite:
Prawati, L., Sunandar, A., & Setiadi, A. E. (2024). Development of an Ethnobotanical Encyclopedia on the Antar Ajong Ceremony. *Jurnal Penelitian Pendidikan IPA*, *10*(7), 3957–3967. https://doi.org/10.29303/jppipa.v10i7.8350

communities (Hamzah et al., 2023). Ethnobotanical studies contributes significantly to the process of identifying natural resources in an area by gathering local wisdom from local communities (Has et al., 2023). Local wisdom plays an important role in the development of science (Triannisa & Yuliyanti, 2024). Students can study biology in an engaging and accessible way by utilizing their local potential (Ajmi et al., 2024; Febriyanda et al., 2022).

Basically, local wisdom describes how society responds to typical changes in the natural environment (Mei & Suryadarma, 2023). Some research results mention that ethnobotany can be incorporated into learning tools, that the implementation of biology learning biology learning implementation based on ethnobotany is applying the learning tools by combining material and environment, culture, social that exists in the surrounding environment (Nurjanah et al., 2024). The study of how plants are used on a daily basis in an indigenous population is known as ethnobotany. The utilisation of plants in various traditional and religious rituals has great meaning and value for local ethnic groups (Malabadi et al., 2023; Rijal et al., 2024). In addition to taxonomic botanical data, ethnobotanical studies also include local botanical knowledge in the form of association reviews and interpretations that examine the mutualistic relationship between humans and plants, as well as the applications of these plants for cultural advancement and the conservation of natural resources (Rahimah et al., 2019).

Ethnobotany is the study of community culture utilizing plants that benefit humans, including food (Firdawati et al., 2021; Helmina & Hidayah, 2021) Ensuring that traditional knowledge is transmitted to the next generation might be facilitated by education. Instruction in local wisdom is an essential component of the learning approach (Nengsih, 2020). Innovations are needed to support learning (Cahyanti et al., 2021). This finding is supported by previous research which states that local wisdom-based picture books have the potential to be a learning resource in schools (Ferdiantini et al., 2023). Introduction to local wisdom is important as a form of preserving local culture (Hasibuan, 2022). Utilisation of local potential as a learning resource can facilitate students to experience and real situations (Malabadi et al., 2023; Manalu, 2023)

The results of student interviews show that a sizable portion of the population is still ignorant of the biodiversity that is right outside their door. Thus, the plant potential of West Kalimantan is not introduced. Novel teaching resources that can communicate real knowledge with potential in their sector are therefore needed in order for students to understand the content and build a sense of environmental responsibility, which may have an impact on efforts to protect it. One of the media options is an Encyclopedias are one type of learning resource that may be utilized. Encyclopedia is a book that contains information such as definitions, background, and bibliographic data systematically organized in alphabetical order (Syaflin et al., 2023). The use of encyclopedias can enhance learning outcomes as well as give learning activities fresh color and aid in students' comprehension of the material taught by the teacher. This is because encyclopedias typically blend text and images in an engaging manner (Julianti et al., 2021). Collaborating different methods with diverse media can motivate students in the teaching and learning process (Magdalena et al., 2021; Puspita, 2019). The teaching and learning process requires media that is used as support in the learning process (Erawati et al., 2020).

The source of biological knowledge is nature. As a result, media literacy that is connected to theory, visuals, and forms is necessary for pupils to get enrichment. Practical learning materials that enable pupils to learn on their own are therefore required. Among the educational materials that may be created to aid pupils in comprehending morphology, features, and categorization serve as instructional resources in the format of encyclopedias (Rostikawati & Susanto, 2019). The encyclopedia is intriguing due to its more contemporary packaging, which includes a backdrop and images of potential local vegetation. The focus of the encyclopaedia relates to basic information about science and other knowledge (Sari et al., 2024). It can help students grasp abstract biological ideas in addition to being better looking, which can increase learning motivation (Mulia & Jufri, 2019). Local wisdom media provides advantages to learning (Suantara et al., 2023). The local potential that exists in the Paloh sub-district of Sambas district is the Antar Ajong ceremony. The Antar Ajong ceremony is a ritual before planting rice performed by the Sambas Malay Tribe. Plant diversity in the Antar Ajong ceremony can be developed in the form of an encyclopedia to support learning in schools. Based on the findings of earlier research, the researcher's objectives are to ascertain the answers provided by SMAN 1 Paloh students and to create an encyclopedia of ethnobotanical types at the Antar Ajong ceremony of the Malay Tribe of Paloh District, Sambas Regency, which is used as a local wisdom-based learning resource.

Method

This research uses the Research and Development (R&D) method. This research aims to produce a product and test the effectiveness of the product (Harahap et al., 2020). The product developed in this research is an

ethnobotanical encyclopedia on the Antar Ajong ceremony of the Malay Tribe of Paloh District, Sambas Regency. The development of this encyclopedia follows a modified 4D development model that includes the define, design, and develop stages. Without disseminating due to cost and time considerations. Contains how data is collected, data sources and how to analyze data. This research was conducted at SMAN 1 Paloh. The research subjects were in class X: 18 students for the small-scale test and 42 students for the large-scale test. The object of this research is an ethnobotanical encyclopedia on the Antar Ajong ceremony of the Malay Tribe of Paloh District, Sambas Regency. Data collection was done through interviews, observations, and questionnaires. The data obtained in this study are in the form of product validation questionnaire scores by media validators, material validators, and language validators to assess the validity of the products developed. In addition, the data from the student response questionnaire was analyzed to assess the practicality of the encyclopedia developed.

Define

The initial step in development research is called the defining stage, often known as the design stage (Define). The current phase involves defining and establishing the development requirements. Initial analysis, learner analysis, task analysis, idea analysis, and learning aim formulation are all included in this specified level. In order to understand the backdrop of the necessity for the production of teaching materials, an initial investigation was conducted to identify and define the fundamental issues encountered in the biology learning process. In order to learn more about the plants used in the Antar Ajong ceremony, informal interviews with the traditional leaders of the ceremony were also undertaken. Additionally, the identification of ethnobotany requires during the Malay Tribe's Antar Ajong Ceremony in Paloh District, Sambas Regency.

Design

At this point, researchers focus on the materials, language, and design elements while creating encyclopedia media. The researcher's design will serve as the basis for the creation of this illustrated book. Canva was a supporting program that the researchers utilized to create this encyclopedia. The data gathered from the observation and interview phase of schools and banana varieties in Samba Regency is analyzed and turned into designs during the design stage.

Develop

The creation of a development product takes place throughout the development stage. This phase is divided into two parts: developmental testing and expert evaluation with revision. Easy-to-understand text and supporting images may be found in the ethnobotanical encyclopedia on the antar ajong ritual of the Malay tribe of Paloh District, Sambas Regency, West Kalimantan, which will serve as the basis for the plant biodiversity material generated for this project. The degree of truth in the results reached after a study is known as its validity. The validity of the encyclopedia learning medium is assessed using the validation findings. The following is how the validation findings are analyzed (Fithriyah, 2013).

$$P = \frac{\sum_{i=1}^{4} Xi}{\sum_{j=1}^{4} Xj} \times 100\% \quad (1)$$

Additionally, validation was carried out by professionals in the domains of media, learning materials, and language to guarantee the legitimacy of the instructional materials. The evaluation is based on the following formula: P is the percentage of choice; ∑xi is the expert's overall assessment score; and ∑xj is the top answer's total score. Table 1 will be used as a reference to explain the percentage of validation value that was obtained from the computation.

Table 1. Criteria for Learning Media Validity

Scale Value (%)	Criteria
80 - 100	incredibly true
66 - 79	True
56 - 65	Sufficiently valid
40 - 55	Less reliable
30 - 39	Not Valid

The next stage is to assess the student response questionnaire using the percentage value of each aspect's response to a statement's answer after obtaining the validity percentage. Sambas Regency seeks to determine the proportion of encyclopedias created using the following formula by examining student replies to the Ethnobotanical Encyclopedia medium of the Antar Ajong Ceremony of the Malay Tribe of Paloh District:

$$P = \frac{\sum_{i=1}^{4} Xi}{\sum_{j=1}^{4} Xj} \times 100\% \quad (2)$$

Table 2. Learner Interpretation Criteria

Scale Value (%)	Criteria
84 < score ≤ 100	Extremely favorable
68 < score ≤ 84	Good
52 < score ≤ 68	Typical
36 < score ≤ 52	Adverse
20 < score ≤ 36	Extremely Adverse

Formula 2 makes use of the student response calculation formula. Details P stands for percentage of choice, ∑xi for the number of expert-assessed response scores, and ∑xj for the number of highest answer scores. The next step is to find the criterion value for the percentage of student response scores per indication by consulting after computing the student response score for each answer item Table 2.

Result and Discussion

The result of this research is an ethnobotanical encyclopedia on the Antar Ajong ceremony of the Malay tribe in Paloh sub-district, Sambas Regency. Using a modified 4D model which includes the define, design, develop stages. Initial analysis, learner analysis, task analysis, idea analysis, and learning objective formulation are all included in the define step. Teachers at SMAN 1 Paloh were interviewed for an initial study. The results showed that additional references were required to enhance the learning process because the use of textbooks and photographs as learning materials had never incorporated local potential connected to the content. Additionally, interviews with villagers between the ages of thirty and sixty, the Sambas Malay Tribe's traditional head, Both neighborhood shops and local shamans can provide information on the herbs used in the antar ajong ceremony. Additionally, observation was used to determine the demands for ethnobotany on biodiversity sub-materials at the Antar Ajong Ceremony of the Malay Tribe of Paloh District, Sambas Regency. Learner analysis was carried out through interviews with SMAN 1 Paloh class X pupils. Task analysis: the researcher examines the fundamental competencies at this point in the study before going into depth about the learning material indicators. Concept analysis aims to determine the material. The material used is biodiversity. The goal of concept analysis is to identify the content. Biodiversity is the source material. Creating Learning Objectives The objective is to elucidate the fundamental ideas and classifications of biodiversity in light of West Kalimantan's potential locally. Finding out about the plants used in the antar ajong ritual—there are 27 different types of plants that are part of 18 families—was the goal of the first round of interviews conducted with the customary leader of the Sambas Malay Tribe, locals aged 30 to 60, community stores, and village shamans. Arecaceae is the family with the greatest number of plant species; Apiaceae, Asparagaceae, Bromeliaceae, Fabaceae, Lamiaceae, Lygodiaceae,

Musaceae, Pandanaceae, Poaceae, Rubiaceae, Styraceae, Vitaceae, and Zingiberaceae are the families with the fewest, with only one type each. In the antar ajong ritual, plants are used in two ways: first, without processing, and then, with processing (splitting, grating, drying, boiling, grinding, burning, and roasting) Table 3.

Table 3. Plants at the Antar Ajong Ceremony of the Malay Tribe of Paloh District, Sambas Regency

Family	Scientific Name	Local Name	Parts that Used	How to use
Arecaceae	Areca catechu	Pinang	Fruit	Split later, Put in betel untalan
	Cocos nucifera	Kelapak	Fruit, leaf	Weaved young leaves for diamond nests and the fruit is grated.
	Nypa fruticans	Nipah		Sun-dried leaves are made like cigarettes
	Metroxylon sagu	Sagok	Stem mother	Carved into ornaments
Apiaceae	Coriandrum sativum	Ketumbor	Seeds	Put in plastic as a provision spice
apocynaceae	Alstonia sp.	Pelaek	Trunk	Carved as material boatbuilders
	Cerbera manghas	Tibar	Leaves	Unprocessed, direct used for the bepapas
Asparagacea	Cordyline fruticosa	Nyuang	Leaves	Unprocessed, direct used for the bepapas
Bromeliaceae	Ananas comosus	Nanas	Fruit	Unprocessed, direct Put in boat
Fabaceae	Albizia saponaria	Langger	Trunk	Dried and sliced
Lamiaceae	Ocimum sp.	Bunge selasih	Flowers	Put in a container filled with water for the iron stage
Liliaceae	Allium cepa	Bawang merah	Tubers	Put in plastic as a provision spice
	Allium sativum	Bawang putih	Tubers	Put in plastic as a provision spice
Lygodiaceae	Lygodium microphyllum	Ribu-ribu	Leaves	Unprocessed, direct used for the bepapas
Musaceae	Musa paradisiaca	Pisang kapok	Leaf, Fruit	to various wrappers banana leaf putu cake kapok and its fruits directly inserted into the boat
Pandanaceae	Pandanus amaryllifolius	Pandan	Leaves	Put in a container filled with water for the iron stage
Piperaceae	Piper betle	Sirih	Leaves	Made betel untalan

Family	Scientific Name	Local Name	Parts that Used	How to use
	Piper ningrum	Sahang	Seeds	Put in plastic as a provision spice
Poaceae	Bambusa sp.	Paring	Trunk	Used for propping up the boat
	Cymbopogon nardus	Sarai	Root, stem, leaves	Unprocessed, direct Put in boat
	Oryza sativa	Padi	Root, stem, leaves	Unprocessed, direct Put in boat
Rubiaceae	Gardenia augusta	Bunge piring	Flowers	Put in container for stage ironak
Solanaceae	Capsicum Frutescens	Cabek	Fruit	Put in plastic as a provision spice
	Nicotiana tabacum	Tembakau	Leaves	Put inBetel nut
Stryracaceae	Stryrax sp.	Kemenyan	Getah	Burned
Vitaceae	Leea sp.	Moli	Leaves	Unprocessed, direct Insert used For the bepapas stage
Zingiberace-ae	Curcuma longa	Kunyik	Rhizome	Milled with rice

Researchers observed and recorded the morphological traits of plants based on the information gathered from the conducted interviews. The encyclopedia product that will be built will incorporate the findings of morphological identification and its application. Through the encyclopedia's materials and product design, the design stage seeks to create an ethnobotanical encyclopedia for the Antar Ajong Ceremony of the Malay Tribe of Paloh District, Sambas Regency. The information in this encyclopedia is derived from plant identifications made at the Malay Tribe's Antar Ajong ritual, which was done through informant interviews conducted in Paloh District. The introduction, content, and close are the three primary sections that make up the developed encyclopedia. The botanical elements utilized in the Antar Ajong ritual are displayed in Table 4.

Table 4. Components of Plant Encyclopedia in Antar Ajong Ceremony

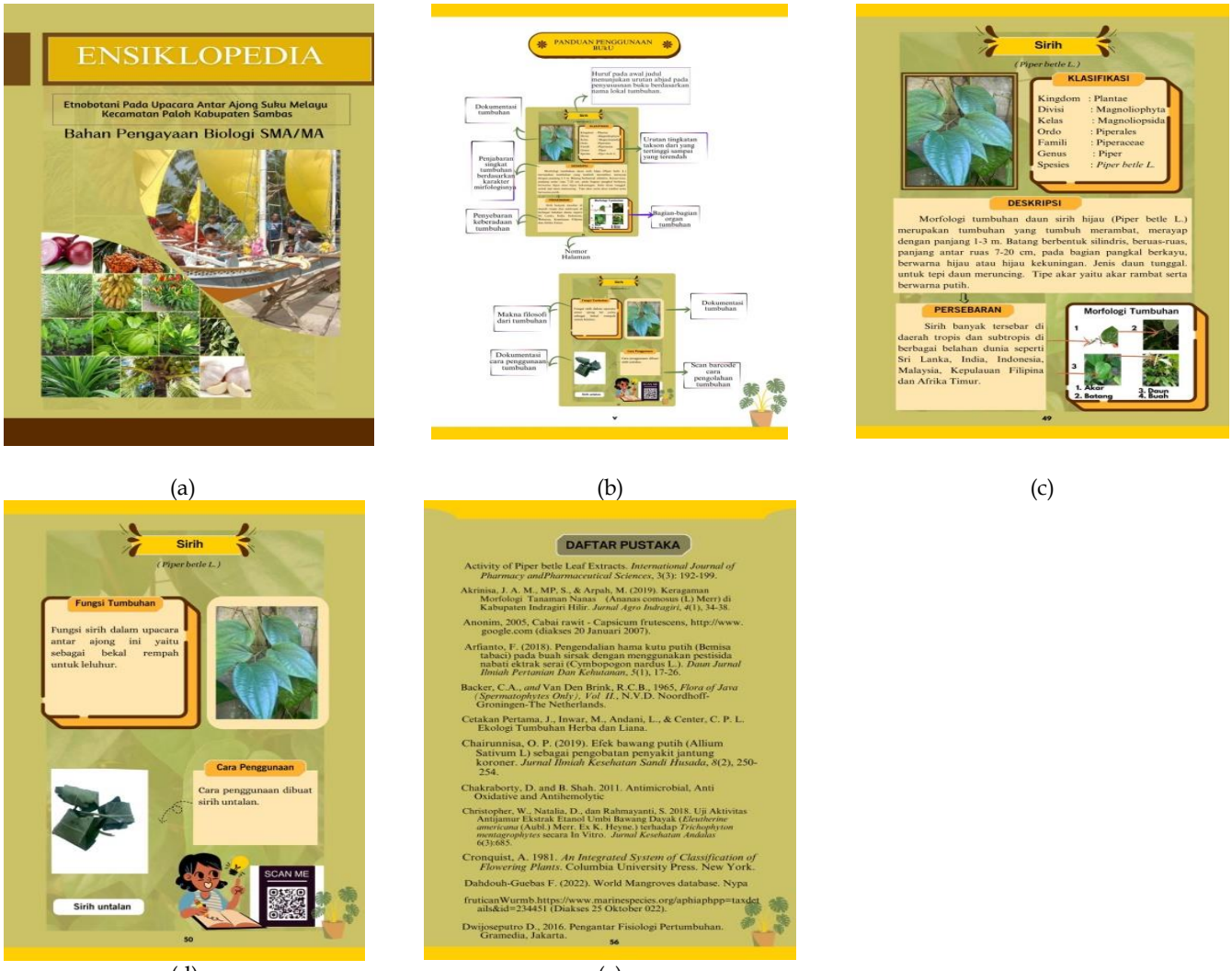
Section	Component
First	Table of contents, introduction, cover, preface, and usage guide.
Contents	Features of plant morphology, description, distribution, and function
	How to utilize plants during the inter-ajong ceremony A video demonstrating the preparation of plants used in Inter-Ajong rituals may be found by scanning the QR code.
End	Glossary, author bio, and references

The development stage seeks to create educational materials in the form of a plant encyclopedia for the Malay Tribe's ethnobotany-based Antar Ajong traditional ceremony in Paloh District. These materials will be evaluated for suitability for use by experts (validators), development tests, and product enhancement. In order to ascertain the validity of the ethnobotanical encyclopedia created at the Antar Ajong Ceremony based on expert input (validators), validity tests were conducted during the production stage. Research informs the encyclopedia format selection (Renita, 2020). Media feasibility, material feasibility, and linguistic feasibility are the elements evaluated in the validity test (Febriani & Widodo, 2021). The validity test's findings are in Table 5.

Table 5. Validator Assessment Results

Expert Validator	Validity Percentage %	Criteria
Media	96.88	Very Valid
Material	91.66	Very Valid
Language	88.14	Very Valid

Three media experts, three material experts, and three language experts participated in the validity test. Expert advice was taken into consideration while making revisions to the encyclopedia. Positive outcomes are seen in the validation findings that have been completed. As a result, the created encyclopedia may be tested in the field with minimum modification. According to the evaluation findings provided by the specialists, the outcomes are displayed in Figure 1.



(a) (b) (c)

(d) (e)

Figure 1. Description of the encyclopedia display at the Antar Ajong ceremony: (a) Cover of an Encyclopedia; (b) Usage Instructions; (c) The content part includes the following: distribution, description, classification, plant morphology, and plant photos; (d) The purpose of plants, their use in the Antar Ajong ritual, and a QR code that links to a video that explains how to prepare plants for the ceremony; (e) Reference

Large- and small-scale experiments were used to conduct the product trial stage, which measured the students' reactions to the created encyclopedia. Twenty students participated in the small-scale experiment, and 54 percent in the large-scale one. 20% of the population was sampled in the small-scale trial and 60% of the population in the large-scale experiment (Prayitno, 2017). The results of the student trials are in Table 6.

Table 6. Student Response Data

Experiment	Percentage (%)	Criteria
Small Scale	99.35	Very Positive
Large Scale	98.25	Very Positive

The end product of this study and development is an encyclopedia that science students in grade 10 require. The purpose of this encyclopedia is to aid students in their understanding of biodiversity, particularly in relation to its exploitation. Many researchers state that the use of encyclopaedias can improve learning outcomes, concept understanding, learning motivation and critical thinking, students critical thinking (Kustandi et al., 2021; Mulyani & Armiati, 2021; Suratno et al., 2023). The issue that students face in the classroom is the dearth of locally produced educational resources, particularly when it comes to studying science content related to biodiversity. Teachers must be able to adapt instructional materials to the local culture since the learning resources that are accessible in schools are not restricted by the original cultural aspects and the local community's surroundings (Eliezanatalie & Deta, 2023). Since the encyclopedia includes information on local wisdom and biodiversity, the presence of a plant

encyclopedia at the Antar Ajong ceremony has the potential to be used as a source of knowledge in ethnoscience research to spark students' interest in learning (Hikmawati et al., 2020). Learning that linking local wisdom can also increase students' insight into the culture of the surrounding area and support the preservation of their culture and environment. and support the preservation of their culture and environment (Handayani et al., 2023).

The defining stage found that students enjoy learning biology, but they mentioned that in order to avoid boredom, they needed different learning resources, according to the defining stage. When learning materials are colorful and visually appealing, relate to local resources in their community, and aren't encyclopedias, students find them very appealing. This is consistent with studies that demonstrate how much students like vibrant, well-illustrated learning materials (Ardianti et al., 2019). The combination of reading text with unique images can attract children's attention so that information is conveyed in a fun way, childrens attention so that information is conveyed in a fun way (Mastiah et al., 2021). Selection of encyclopedia media as the media developed because the encyclopedia is a learning media that contains pictures with bright colours and easy-to-understand information. with bright colours and information that is easy to understand (Aini et al., 2024). Local wisdom learning is very appropriate for an independent curriculum that emphasises character building (Fitriani et al., 2019; Widiya et al., 2021). These objectives can be communicated effectively by developing appropriate andinnovative teaching materials (Bell & Vachhani, 2020). Contextual learning can be applied to obtain effective learning (Naziah et al., 2020).

The second stage includes designing encyclopedia products using Canva. Canva has several advantages, including diverse and attractive designs that increase the creativity of teachers and students in designing learning media because of the many features available (Sabilla et al., 2023). Information about the dearth of locally produced educational materials, particularly those pertaining to biodiversity, was gathered at this point. An encyclopedia-style learning medium is therefore what has to be built. The encyclopedia was selected as a learning development product, according to earlier study, because of its beautiful packaging, which includes a backdrop and images of prospective local flora. It can help students grasp abstract biological ideas in addition to being better looking, which can increase learning motivation (Mulia & Jufri, 2019).

Here is where the validation test is conducted by experts throughout the development stage. Experts in media, content, and language make up this level. Each expert has three validators in it. 91.66% (extremely valid) is the average validation result based on the material experts' results. This demonstrates how the encyclopedia that was created adheres to the curriculum's list of essential competences. Previous study indicates that the encyclopedia material's content and presentation are excellent because they align with the curriculum's learning objectives and are tailored to the general aptitude of high school students (Harahap et al., 2020). Meanwhile, media validation obtained a percentage of 96.88% (very valid) because the media presentation was carried out systematically and completely according to the table of contents made, using design and layout, clear images, and contrasting colors. The fact that This demonstrates that the writing is good in accordance with the relevant writing standards, the linguistic elements are light, and the sentences are standard, understandable, and easy to digest, making it simpler for students to read and comprehend the content (Anggraini et al., 2022).

It is extremely possible to test the tribe of Paloh District, Sambas Regency, with only small modifications.Because students may actively participate in their education in addition to teachers actively delivering information, sof learning media is crucial to the caliber of student learning (Lafifa et al., 2022).

Conclusion

Based on the research findings, one of the learning resources utilized at SMAN 1 Paloh that has been evaluated with class X IPA students is the Ethnobotanical Encyclopedia on the Antar Ajong Ceremony of the Malay Tribe in Paloh District of Sambas Regency. The Inter Ajong Ceremony of the Malay Tribe in Paloh District's Ethnobotanical Encyclopedia has attained the level of acceptability as a learning tool in terms of very valid media elements, very valid language aspects, and very valid content. Both the large-scale test, which yielded an average result of 99.25%, and the small-scale test, which yielded an average result of 99.35%, demonstrated extremely favorable outcomes. ethnobotanical encyclopedia media at the Antar Ajong ceremony of the Malay Tribe, Paloh District, Sambas Regency is feasible to be applied in learning and received a positive response. Paloh Sambas Regency is feasible to be applied in learning and gets a positive response. Media encyclopedia media can also be used as a medium for preserving the local wisdom of the Malay community of Paloh District Paloh Paloh in the Antar Anjong ceremony.

Acknowledgments

The Paloh District residents of Sambas Regency, West Kalimantan, who agreed to serve as informants and share

details on the Antar Ajong event are much appreciated by the investigator. We are grateful to the biology instructor for allowing us to conduct research in the school and to the SMAN 1 Paloh-West Kalimantan students who are eager to participate in the study.

Author Contributions
L.P., Methodology, data analysis, manuscript writing, review and editing. A.S., Manuscript writing, review, reference finding and editing. A.E.S., Article writing; review; and editing.

Funding
No external funding

Conflicts of interest
There is no conflicts of interest in this article.

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