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The Development of an Ethnobotanical Pocketbook on Traditional Games in Kapuas Hulu Regency

Winda Rahman[1], Hanum Mukti Rahayu[1*], Ahmad Faisal Amri[1]

[1] Biology Education Program, Faculty of Teacher Training and Education, Universitas Muhammadiyah Pontianak, Pontianak, Indonesia

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Corresponding Author:
Hanum Mukti Rahayu
hanum.rahayu@unmuhpnk.ac.id

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Abstract: This research aims to develop an ethnobotanical pocketbook based on traditional games from Kapuas Hulu Regency as a learning medium for biodiversity material in Year 10 at SMA Negeri 1 Suhaid. The method used is Research and Development (R&D) with a modified 4D model, namely define, design, and develop. The research instruments consisted of interview sheets, expert validation sheets for content, media, and language, as well as student response questionnaires. Interview data were analysed descriptively, while expert validation and practicality data were analysed using percentage formulas. The results of expert validation were 88.53% for content experts (very valid category), 87.02% for language experts (very valid category), and 86.54% for media experts (very valid category). The large-scale trial yielded an average score of 92.6%, while the small-scale trial resulted in an average score of 92.19%, both of which fall into the category of highly practical. Based on the findings, the locally-based ethnobotanical pocketbook developed is categorised as very valid and practical for use in biology learning on biodiversity topics.

Keywords: Ethnonotanical; Pocketbook; Traditional game

Introduction

Kapuas Hulu Regency is located in the eastern part of West Kalimantan Province, with approximately 60% of its area designated as conservation land. The regency is known for its rich cultural heritage and abundant biodiversity (Syukur, 2017). One of the local traditions that remains preserved in this region is the use of traditional games that incorporate plant-based but also embody important ethnobotanical knowledge that should be preserved and passed down to younger generations (Adhani & Nazarullail, 2020). However, the lack of educational efforts that integrating local wisdom has put this knowledge at risk of being forgotten amid modern developments (Has et al., 2023). Local wisdom plays a significant role in the development of scientific knowledge (Triannisa & Yuliyanti, 2024; Aldi et al., 2025). This local potential can be harnessed in the educational process, enabling students to learn study biology in a more engaging and accessible way (Febriyanda et al., 2022). Since local wisdom essentially reflects how communities respond to changes in their natural environment (Mei & Suryadarma, 2023; Diwi et al., 2025), it serves as a highly relevant contextual approach to learning that closely connects with students' everyday lives.

In the field of education, approaches based on local wisdom and ethnobotany are receiving increasing attention as contextual and meaningful learning strategies (Ilhami et al., 2021). Ethnobotanical studies have been shown to help students understand the relationship between culture and the environment, while also enhancing their awareness of conservation issues (Rukmana et al., 2021). Several previous studies have indicated that teaching materials developed from local potential-such as plant-based pocketbooks-are effective in improving students' conceptual understanding and learning motivation (Febriani & Widodo, 2021; Mastiah et al., 2021). The use of simple and easily accessible learning media, such as

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pocketbooks, has also proven effective in increasing student engagement and learning efficiency.

Nevertheless, there remains a significant lack of pocketbook media that specifically features traditional games based on local plants within the context of biology education. This represents an important academic gap that needs to be addressed, as culturally contextual learning can offer students with experiences that are more closely aligned with their lived realities, while also promoting the preservation of both culture and the environment (Eliezanatalie & Deta, 2023; Handayani et al., 2023). Therefore, there is a need for innovative teaching materials that not only deliver biological content but also integrate elements of local culture.

This study focuses on the development of an ethnobotanical pocketbook that features traditional games from Kapuas Hulu Regency as a learning medium for biology, specifically on the topic of biodiversity. The pocket book integrates botanical knowledge, local culture, and a visually informative approach, systematically designed using modern digital design platforms. In addition to serving as a teaching aid, the pocketbook also functions as a tool for documenting and preserving local ethnobotanical knowledge that is at risk of being forgotten.

The aim of this research is to examine the development process and validation results of an ethnobotanical pocketbook based on traditional games from Kapuas Hulu Regency, designed as an alternative learning medium for the topic biodiversity topic in Year 10 Biology. It also seeks to analyze students' responses to its use in contextual learning based on local wisdom. This pocketbook is expected to support students in the learning based on local wisdom. The pocketbook is expected to support students in the learning process, enhance learning efficiency, and contribute to improved educational outcomes.

Method

This research involves the development of an ethnobotanical pocketbook based on traditional games from Kapuas Hulu Regency. The study employed the Research and Development (R&D) method using the 4D model developed by Thiagarajan (1974), which was modified into three stages: define, design, and develop. The procedure for developing the learning materials using the 4D model is presented in Figure 1.

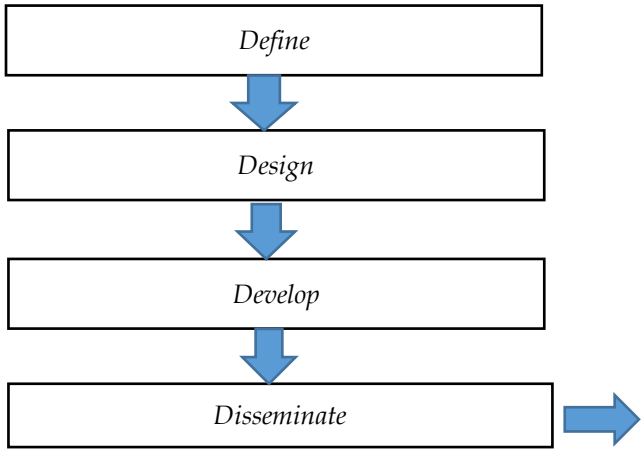

Figure 1. 4D Model R&D Stage

The types of data collected in this study included qualitative data obtained from interviews and feedback related to the development of the pocketbook, as well as quantitative data derived from questionnaire scores based on four response categories: strongly agree, agree, disagree, and strongly disagree. The quality of the pocketbook was evaluated by experts, a chemistry teacher, and students. This development research was conducted at SMA Negeri 1 Suhaid, involving Year 10 teachers and students as research subjects. The small-scale trial involved 12 students (approximately 20% of the relevant population), while the large-scale trial involved 30 students (around 50%), following the approach used by Prayitno (2017). The entire study took place at SMA Negeri 1 Suhaid, Kapuas Hulu Regency.

The instruments used in this study included interview sheets, validation forms completed by subject matter experts, media experts, and language experts, as well as student response questionnaires. Interviews were conducted to gather preliminary information regarding the need for learning media and the available local potential. Validation was carried out by three experts to assess the content, visual presentation, and language aspects of the pocketbook. Student responses were collected through questionnaires administered after the field trials.

The data obtained consisted of both qualitative and quantitative types. The qualitative data, in the form of feedback from teachers, students, and validators, were used as a basis for revising the product. The quantitative data were collected through questionnaires employing a Likert scale with four levels of agreement: strongly agree, agree, disagree, and strongly disagree. Each response category was assigned a weighted score: strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1. The validity percentage was calculated using the following formula:

$$P = \frac{\sum \quad x}{\sum \quad x\ maks} X\ 100\ \% \quad (1)$$

Description:

P : Percentage score

$\sum \quad x$: Total validation score

$\sum \quad x\ maks$: Maximum possible validation score

(Prawati et al., 2024)

Table 1. Validity Score

Scale Score (%)	Criteria
0 – 25	Very Invalid
26-50	Invalid
51-74	Valid
76-100	Very Valid

Source: (Handayani et al., 2024)

Practicality Test Formula:

$$P = \frac{\sum \quad x}{N\ x\ S\ maks} X\ 100\ \% \quad (2)$$

Description:

P = Practicality percentage (%)

∑× = Total number of scores obtained from all respondents

N = Number of respondents

Smaks = Maximum score per question item

(Ramanda et al., 2024)

Table 2. Practicality Category

Percentage (%)	Practicality Criteria	Information
76-100	Very Practical	Can be used without revision
51-75	Practical	Can be used but needs slight revision
26-50	Less Practical	Recommended not to be used due to high cost of revision
0-25	Not Practical	May not be used

Source: (Marsa et al., 2024)

The pocketbook is considered valid and practical if the score obtained exceeds 70% (Azizah et al., 2024). The practicality percentage is used to assess the practicality of the pocketbook based on local wisdom (Himawan et al., 2024). This approach aligns with the data analysis technique used by (Ramdani et al., 2024). To practicality of the media is measured the using a practicality percentage formula.

Result and Discussion

Definition Stage

The definition stage in this research includes five types of analyses, initial analysis, learner analysis, task analysis, concept analysis, and the formulation of learning objectives. The initial analysis was conducted through interviews with biology teachers and students at SMA Negeri 1 Suhaid to explore the current learning conditions. The interview results revealed that the learning process still relies on student worksheets (LKS) and videos, without integrating local potential as a learning resource. This indicates the need for additional references that are relevant to the local cultural context.

The front-end analysis aimed to identify the main problems in learning biology, particularly in the topic of biodiversity. The researchers found that the media used had not effectively facilitated students' contextual understanding. Based on interviews with teachers and students, it was revealed that the existing learning media was not interactive and did not reflect local richness. Furthermore, a learner analysis was conducted by distributing questionnaires to Grade X students. The results showed that most students expressed a need for learning media that is more visual, concise, and directly related to their environment (Agustin et al., 2025; Wardani et al., 2025). This findings serves as the basis for developing media that aligns with the characteristics and academic abilities of the students.

Task analysis was carried out by reviewing the competency standards and basic competencies related to biodiversity material. Based on this analysis, more specific learning indicators were formulated as the foundation for developing the media content. This was followed by a concept analysis, which focused on the utilization of biodiversity in Kapuas Hulu Regency. The material in the pocketbook is systematically and contextually organized to meet students learning needs.

The formulation of learning objectives was adjusted based on the results of the concept analysis. Students are expected to understand biodiversity material through an ethnobotanical-based approach integrated into traditional games. These objectives served as a guideline in the development of the pocketbook content. The material in the pocketbook was developed based on the research of Sonia Mariska (2023), which documented the morphological characteristics and uses of local plants in traditional games. Of the 46 traditional games recorded, only 26 still practiced and utilize 29 plant species from 21 families. These games include gasing (spinning top), wooden sword, senapang perujak, yam leaf necklaces, and propeller made from cassava stalks. This information was used to enrich the pocketbook content from both scientific and cultural perspective.

Table 3. Plants used in Traditional Games of Kapuas Hulu Regency

Family	Scientific name	Local name	Part used	Game name
Fabaceae	Mimosa pudica	bunga putri malu	Fruit	Selasih putri malu
		Entamur		Kapal-kapalan
	Pterocarpus indicus	Keranji	Stem	Sabung buah keranji
	Dialium indum		Bark	
Pontedereaceae	Eichhornia crassipes	Enceng gondok	Root, Stem dan Leaf	Kapal piambang, Masak-masak, Unsul-unsul
Poaceae	Imperata cylindrical	Ilalang	Leaf	Terumpit lalang
	Glyceria striata	Rumput teki	Stem and Flower	Main ulat
	Dendrocalamus asper	Bambu betung	Stem	Bedil, Kaki panjang, Kelayang, Senapang perujak
			Flower and Stalk	Sabung rumput manuk
	Eragrostis cilianensis	Gulma/rumput liar		
Dilleniaceae	Dillenia excelsa	Pohon Bunggur	Stem and Leaf	Main kelili
Lythraceae	Legerstroemia speciosa	Bungur	Stem and Leaf	Sabung kayu
Polypodiaceae	Pyrrosia piloselloides	Daun sisik naga	Leaf	Meretit daun
Euphorbiaceae	Manihot esculenta	Singkong	Stalk and Leaf	Kalung tangkai ubi, Keriting rambut, Rumah buntak, Terumpit tangkai ubi
	Hevea brasiliensis	Karet	Seed	Kasti, Main karit, Main yeye
Pandanaceae	Pandanus dubius	Gernis	Leaf	Gelang gernis
Myrtaceae	Psidium guajava	Jambu Biji	Stem	Panah
Marantaceae	Donax canniformis	Bemban	Stem	Papap bemban, Senapang batang bemban
Rubiaceae	Cephalanths occidentalis	Putat	Stem and Flower Leaf	Lompat tiung,
	Mitragyna speciosa	Purik/ keratom		Mahkota daun purik
	Ixora coccinea	Asoka	Flower	Kalung bunga jarum
Arecaceae	Cocos nucifera	Kelapa	Stem and Fruit	Belangkau, Kerbit
Nyctaginaceae	Bougainvillea glabra	Bunga Kertas	Leaf	Pampit daun
Alismataceae	Echinodorus cordifolius	Melati Air	Flower and Stem	Perhiasan batang melati aik
Davalliaceae	Davallia denticulata	Pakis ikan	Leaf and Stem	Tato pakuk
Musaceae	Musa paradisiaca formatipita	Pisang Kepok	Leaf and Stem	Anyam daun pisang, Belangkau, Papap pisang
Lygodiaceae	Lygodium microphyllum	Daun jari lima	Stalk and Leaf	Mahkota daun lima jari
Convolvolaceae	Merremia hederacea	Kemibit	Stalk and Leaf	Mahkota daun kembibit
Areceae	Calamus paspalanthus	Rotan	Stem	Lompat tali
Asteraceae	Eclipta prostrata	Urang aring	Flower	Bundil
Loganiaceae	Pagraea fragrans	Tembesuk	Stem	Congklak, Gasing, Labuk-labu, Pedang kayu, Perau serumbak

The information in this handbook is based on plant identification conducted during traditional games of the Kapuas Hulu District. The pocket guide is divided into three main sections: the introduction, the body, and the conclusion.

Design Stage

In the design stage, the main objective is to develop a display flow framework that clearly outlines the structure and content of the ethnobotanical pocketbook on traditional games of Kapuas Hulu Regency, in accordance with the research by Handayani et al (2023). This outline includes learning elements, activities, and the materials to be presented. Additionally, this stage involves designing validation instruments to assess the quality of the pocketbook from the perspectives of media experts, subject matter experts, and linguists. A concept comprehension test instrument was also developed to evaluate the effectiveness of the ethnobotanical pocketbook.

The pocketbook will include illustrations of plants and traditional games, along with brief, easy-to-understand narratives and the use of communicative language. The design pocketbook follows an outline format that presents the content flow systematically, including the following sections: cover page, identity page, foreword, table of contents, learning objectives, instructions for use, concept map, main material covering the types of plants and traditional games, morphological description of plants, scientific classification, plant distribution, illustrative images, glossary, and bibliography.

The design of the pocketbook was carried out using the Canva graphic design application. Canva was chosen because it offers a wide range of attractive and diverse design options, which can enhance the creativity of both teachers and students in developing learning media, thanks to its many available features (Sabilla et al., 2023). At this stage, information was also gathered regarding the scarcity of locally developed teaching materials, particularly those related to the preservation of regional culture. As a response, learning media in the form of pocketbooks was developed. The selection of traditional games-themed pocketbooks as the development product is based on previous research, which indicates that presenting material in an engaging manner incorporating local cultural elements and illustrations of traditional games can help students better understand concepts related to local wisdom. Moreover, the visually appealing design of the pocketbook is believed considered to enhance students learning motivation (Pranata et al., 2025), thereby supporting researchers in creating a visually engaging layout (Gultom et al., 2024).

Figure 2. Instructions for Use

Figure 3. Contents, including description, classification, plant morphology, plant photographs, and gameplay intructions

The pocketbook is designed with dimesions of 14 x 10 cm, making it practical and easy for students to carry, especially during field-based practical activities. This size and format supports the application of the contextual learning approach, which connects subject matter to student's real-life environment. The visual element presented in the book such as images of plants and traditional games are attractively designed to enhance students understanding of plant morphology while also introducing local cultural values.

Through this approach, the pocketbook is expected to serve as an effective, contextual, and relevant learning medium for students at SMA Negeri 1 Suhaid, praticularly in understanding biodiversity topics rooted in local wisdom. The choice of a traditional games themed pocketbooks as development medium is based on its use of bright, colorful images and understandable content (Aini et al., 2024). Furthermore, learning based

on local wisdom is considered highly compatible with the implementation of the independent curriculum, which emphasizes character building (Fitriani et al., 2019). This goal can be effectively achieved through the development of innovative and contextualised teaching materials.

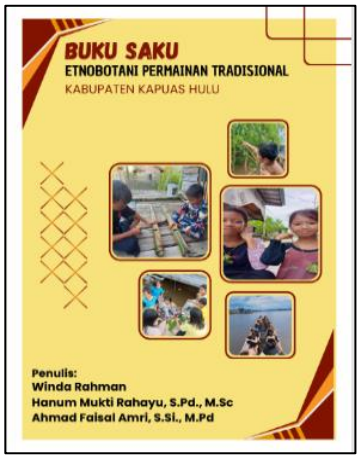

Figure 4. Pocketbook Cover

Figure 5. Author Profile

Development Stage

The development stage includes the creation of the introduction, content, and cover, which are the main components of the developed pocketbook. This stage aims to produce educational material in the form of a pocketbook about plants used in traditional games in Kapuas Hulu Regency. This material will be evaluated for feasibility by experts (validators), followed by development testing and product refinement (Sianturi et al., 2021). To ensure the validity of the ethnobotanical pocketbook on traditional games in Kapuas Hulu Regency, a series of validity tests were conducted during the production stage based on input from expert validators. This research also guided the selection of an appropriate pocketbook format (Mirnawati et al., 2021). The aspects evaluated in the validity test include media feasibility, content/material feasibility, and language feasibility (Febriani & Widodo, 2021). The results of the validity test are presented in Table 4.

Table 4. Validator assessment results

Validator	Validity Percentage (%)	Criteria
Media	86,54	Very valid
Language	87,02	Very valid
Materials	88,53	Very valid
Average	87,36	Very valid

Three experts specializing in media, content, and language participated in the validity testing process. The experts played an important role in evaluating the quality of the pocketbook. The validation results from the media, material, and language experts each received high scores, indicating that the pocketbook met the criteria for being very valid. The suggestions provided by the experts were taken into account during the revision stage of the pocketbook. The results showed an average score of 86.54%, for media, 87.02%, for language 88.53% for material, all of which fall under the very valid category. Therefore, the pocketbook is considered ready for field testing with only minor revision. Similar findings were reported in a study by Samudra & Yulkifli (2021), where media, material, and language validation stages also received high scores and met the very criteria.

The product trial stage was conducted through both small scale and large scale experiments, with the aim of measuring student responses to the developed pocketbook. In the small-scale trial, 12 students participated, while on a large scale trial 30 percent of the total population. The sample size for the small-scale trial represented 20 percent of the population, whereas the large-scale trial involved 50 percent of the population (Prayitno, 2017).

Teble 5. Practicality of Small Scale Trial and Large Scale Trial Results

Respondents	Percentage	Criteria
Small Scale	92.19 %	Very Practical
Large Scale	92.6 %	Very Practical

The final result of this research and development is a pocketbook designed to meet the needs of Grade X students. The purpose of this pocketbook is to support students' understanding of biodiversity, particularly regarding aspects of exploitation, which is a key focus in the learning process. Several studies have shown that the use of pocketbooks can enhance learning outcomes, conceptual understanding, learning motivation, and students' critical thinking skills (Kustandi et al., 2021). These findings are consistent with the results reported Aulia et al (2024), who stated that the developed

pocketbook met the criteria for practicality, with 80% of respondents indicating that the media was interesting and enjoyable, making it suitable for classroom use.

Other researchers have also found that students responded positively to the developed learning activities (Rohmawati et al., 2018). Furthermore, students' responses to the implemented products were classified as very valid and practical for application in biology learning (Isatunada & Haryani, 2021). According to Gillet-Swan (2017), learning becomes more practical when supported by instructional media tools.

One of the challenges encountered in the classroom is the limited availability of locally developed learning resources, particularly in science education related to biodiversity. In this context, teachers are expected to adapt learning materials to align with local culture, especially considering that most educational resources available in schools do not reflect indigenous cultural values or the environmental conditions of local communities (Eliezanatalie & Deta, 2023).

Since this pocketbook contains information on local wisdom and biodiversity, the inclusion of traditional games has the potential to serve as a source of knowledge in ethnoscience research and to increase students' interest in learning (Hikmawati et al., 2020). Learning that incorporates local wisdom can also broaden students' understanding of regional culture and contribute to both cultural and environmental preservation (N. K. T. Handayani et al., 2023).

The definition stage revealed that students enjoyed the biology learning process, they expressed a need for more varied learning resources to avoid boredom an observation that aligns with the characteristics of this stage. Students found the learning material more engaging when it was presented visually, using bright colors and connected to local resources within their community, rather than in the from of standard textbooks. This finding is consistent with studies indicating that students prefer visually appealing and illustrated teaching materials (Ardianti et al., 2019). The integration of reading texts with unique illustrations has been shown to effectively in capture children's attention and convey information in an enjoyable manner (Mastiah et al., 2021). Previous research also found that the content and presentation of materials in the traditional games pocketbook were rated very positively, as they align with curriculum objectives and are adapted to the general competencies of secondary school students (Harahap et al., 2020). This suggests that the writing was developed using appropriate conventions, with simple language, standard sentence structures, and easily understandable content—thus facilitating students reading and comprehension (Anggraini et al., 2022). It is important to note that the trial conducted at SMA Negeri 1 Suhaid, Kapuas Hulu Regency, could be implemented with only minor modifications. Given that students are able to participate actively in the learning process under teache guidance, learning media play a crucial role in enhancing the quality of student learning (Lafifa et al., 2022).

Conclusion

Based on the research findings, one of the learning resources used at SMA Negeri 1 Suhaid and evaluated by Year 10 students is an ethnobotanical pocketbook titled Ethnobotanical in Traditional Games of Kapuas Hulu Regency. This pocketbook demonstrated a very high level of validity as a learning medium in terms of visual presentation, language use, and content quality. The large-scale trial yielded an average score of 92.6%, while the small-scale trial resulted in an average score of 92.19%, both of which fall into the category of highly practical. Therefore, the ethnobotanical pocketbook is considered suitable for use in learning activities and received positive responses from students. In addition to serving as a learning medium, the pocketbook also contributes to the preservation of local wisdom within the Kapuas Hulu community.

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There is no conflicts of interest in this article.

References

Adhani, D. N., & Nazarullail, F. (2020). Penerapan Permainan Tradisional Berbahan Dasar Alam Di RA (Raudatul Athfal) Di Bangkalan Madura. *Jurnal Golden Age*, *4*(2), 369–378. Retrieved from https://e-journal.hamzanwadi.ac.id/index.php/jga/article/view/2625/1548

Agustin, D. I., Hamdu, G., & Muharram, M. R. W. (2025). Analisis Kebutuhan Media Augmented Reality Berbasis Literasi Sains Pada Materi Ekosistem Di

Sekolah Dasar. *Jurnal Pendidikan Teknologi Informasi (JUKANTI)*, *10*(1), 333–341. Retrieved from https://jurnal.lppmamanah.org/index.php/janah/article/view/28

Aini, S., Setiadi, A. E., & Sunandar, A. (2024). Development of encyclopedia based on local vegetables North Kayong Regency as biology learning media. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, *10*(1), 38–46. https://doi.org/10.22219/jpbi.v10i1.31557

Aldi, M., Barizi, A., Uin, P., Malik, M., & Malang, I. (2025). Filsafat Ilmu dalam Perspektif Budaya Alam Minangkabau: Membangun Kearifan Lokal untuk Pengembangan Pengetahuan. *Teaching and Learning Journal of Mandalika*, *6*(1), 2828–7126. Retrieved from http://ojs.cahayamandalika.com/index.php/teacher212

Anggraini, A., Syafi'i, W., & L.N., F. (2022). Pengembangan Ensiklopedia Mini Kingdom Plantae Berbasis Android Untuk Pembelajaran Biologi Sma Kelas X. *Biogenesis*, *18*(2), 122. https://doi.org/10.31258/biogenesis.18.2.122-131

Ardianti, S. D., Wanabuliandari, S., Saptono, S., & Alimah, S. (2019). A needs assessment of edutainment module with ethnoscience approach oriented to the love of the country. *Jurnal Pendidikan IPA Indonesia*, *8*(2), 153–161. https://doi.org/10.15294/jpii.v8i2.13285

Aulia, R., Fitri, R., Ristiono, & Yogica, R. (2024). Meta-Analysis of Puzzle Media in High School Lessons by Practicality Test. *Bioilmi: Jurnal Pendidikan*, *10*(1), 51–57. https://doi.org/10.19109/bioilmi.v10i1.22182

Azizah, N. I., Roza, Y., & Kartini. (2024). Development of Electronic Teaching Materials Based on Contextual Teaching and Learning (CTL) Approach to Improve High School Students' Mathematical Problem Solving Skills Nurul. *Jurnal Paedagogy*, *11*(3), 637–646. https://doi.org/10.33394/jp.v11i3.12108

Diwi, M. A., Adisel, & Iqba, M. (2025). Nilai-Nilai Pendidikan Pada Tradisi Melemang Sebagai Kearifan Lokal Masyarakat Padang Guci Kecamatan Tanjung Kemuning Kabupaten Kaur Masni. *Didaktik : Jurnal Ilmiah PGSD FKIP Universitas Mandiri*, *11*(2), 123–133. Retrieved from https://www.journal.stkipsubang.ac.id/index.php/didaktik/article/download/6275/3726

Eliezanatalie, S., & Deta, U. A. (2023). Needs analysis of physics learning media integrated local wisdom. *International Journal of Research and Community Empowerment*, *1*(2), 39-45. https://doi.org/10.58706/ijorce.v1n2.p39-45

Febriani, A. V., & Widodo. (2021). Pengembangan Ensiklopedia Keanekaragaman Cendawan di Desa Bleber Bener Purworejo sebagai Sumber Belajar Mandiri Siswa SMA/MA. *Journal Of Biological Education*, *1*(1), 39–49. https://doi.org/10.14421/neuron.2021.11-04

Febriyanda, Y., Sunandar, A., & Setiadi, A. E. (2022). Habitat Utilization by Long-Tailed Monkeys (Macaca fascicularis) in Gunung Palung National Park as a Biology Learning Resource. *Jurnal Penelitian Pendidikan IPA*, *8*(5), 2392–2398. https://doi.org/10.29303/jppipa.v8i5.1869

Fitriani, N., Efendi, I., & Harisanti, B. M. (2019). Pengembangan Modul Pembelajaran Ipa Berbasis Kearifan Lokal Desa Sembalun Untuk Peningkatan Hasil Belajar Kognitif Siswa MTs. *Bioscientist: Jurnal Ilmiah Biologi*, *7*(1), 68. https://doi.org/10.33394/bjib.v7i1.2386

Gultom, N., Mulyati, Y., Sastromiharjo, A., & Halimah. (2024). Development of Digital Phonology Teaching Materials Using Shadowing Techniques for Korean BIPA Learners Nanda. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *10*(3), 1103–1112. https://doi.org/10.33394/jk.v10i3.12584

Handayani, N. K. T., Gading, I. K., & Widiana, I. W. (2023). Media Interaktif Berbasis Kearifan Lokal Tri Hita Karana Berbantuan Articulate Storyline untuk Meningkatkan Hasil Belajar PPKn Siswa. *Jurnal Imiah Pendidikan Dan Pembelajaran*, *7*(3), 528–536. https://doi.org/10.23887/jipp.v7i3.61599

Handayani, R. H., Miaz, Y., Hidayati, A., & Bentri, A. (2024). Development of Interactive Multimedia Based on Adobe Flash CS6 to Improve Learning Outcomes. *Jurnal Penelitian Pendidikan IPA*, *10* (SpecialIssue), 46–52. https://doi.org/10.29303/jppipa.v10ispecialissue.7838

Harahap, F., Nurliza, N., & Nasution, N. E. A. (2020). Pengembangan Ensiklopedia Perbanyakan Tanaman Melalui Kultur Jaringan Sebagai Sumber Belajar Tambahan Untuk Siswa Sma. *Jurnal Pelita Pendidikan*, *8*(1), 52–61. https://doi.org/10.24114/jpp.v8i1.17301

Has, D. H., Marpaung, S. S. M., Jati, E. D., Hartati, B. R., Fitrianto, I., Yulianti, I., Nugroho, S. P. A., Rahmila, Y. I., Rahmayanti, F. D., Fadilah, R., Bukhari, B., Simanjuntak, A. P., Algiffari, M. F., & Lubis, D. A. (2023). Ethnobotany of Food Plants in The Penghulu Tribe Community in Sarolangun, Jambi. *Jurnal Penelitian Pendidikan IPA*, *9*(9), 7705–7712. https://doi.org/10.29303/jppipa.v9i9.4972

Hikmawati, H., Suastra, I. W., & Pujani, N. M. (2020).

Ethnoscience-Based Science Learning Model to Develop Critical Thinking Ability and Local Cultural Concern for Junior High School Students in Lombok. *Jurnal Penelitian Pendidikan IPA*, *7*(1), 60–66. https://doi.org/10.29303/jppipa.v7i1.530

Himawan, R., Suyata, P., & Kusmiatun, A. (2024). Developing Project-Based Learning-Based eBook "Critical and Creative Reading" to Improve Students' Critical Thinking Skills. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *10*(1), 392–404. https://doi.org/10.33394/jk.v10i1.10316

Ilhami, A., Diniya, D., Susilawati, S., Sugianto, R., & Ramadhan, C. F. (2021). Analisis Kearifan Lokal Manongkah Kerang di Kabupaten Indragiri Hilir, Riau sebagai Sumber Belajar IPA Berbasis Etnosains. *Sosial Budaya*, *18*(1), 20. https://doi.org/10.24014/sb.v18i1.12723

Isatunada, A., & Haryani, S. (2021). Development of Science Learning Tools using the STEM Approach to Train Problem Solving Ability and Students Activeness in Global Warming Material. *Jurnal Pendidikan Sains Indonesia*, *9*(3), 363–375. https://doi.org/10.24815/jpsi.v9i3.19599

Kustandi, C., Farhan, M., Zianadezdha, A., Fitri, A. K., & L, N. A. (2021). Pemanfaatan Media Visual Dalam Tercapainya Tujuan Pembelajaran. *Akademika*, *10*(02), 291–299. https://doi.org/10.34005/akademika.v10i02.1402

Lafifa, F., Parno, P., Hamimi, E., & Setiawan, A. M. (2022). Development of STEM Animation Learning Media with Feedback to Facilitate Students' Critical Thinking Ability on Global Warming Materials. *Proceedings of the Eighth Southeast Asia Design Research (SEA-DR) & the Second Science, Technology, Education, Arts, Culture, and Humanity (STEACH) International Conference (SEADR-STEACH 2021)*, *627*, 8–15. https://doi.org/10.2991/assehr.k.211229.002

Marsa, S., Sunandar, A., Qurbaniah, M., & Sunandar, A. (2024). Development of an Encyclopedia of Woven Plants of the Malay Tribe of Natuna District. *JPPIPA*, *10*(9), 7030–7037. https://doi.org/10.29303/jppipa.v10i9.8369

Mastiah, M., Mutaqin, N. S., & Tirsa, A. (2021). Pengembangan Buku Cerita Rakyat Berbasis Kearifan Lokal Suku Dayak Randuk. *CaLLs (Journal of Culture, Arts, Literature, and Linguistics)*, *7*(1), 53. https://doi.org/10.30872/calls.v7i1.5113

Mei, O. Z., & Suryadarma, I. G. P. (2023). Utilization of Traditional Conservation of Sumatran Tiger as a Potential Development of Biology Teaching Materials. *Jurnal Penelitian Pendidikan IPA*, *9*(12), 11911–11924. https://doi.org/10.29303/jppipa.v9i12.5565

Mirnawati, M., Harjono, A., & Makhrus, M. (2021). Pengembangan Media Pembelajaran Buku Saku Berbasis Konflik Kognitif untuk Meningkatkan Pemahaman Konsep dan Keterampilan Berpikir Kritis IPA (Fisika) Peserta Didik. *Jurnal Ilmiah Profesi Pendidikan*, *6*(3), 447–454. https://doi.org/10.29303/jipp.v6i3.271

Pranata, A., Rahayu, H. M., & Qurbaniah, M. (2025). Development Of An Ethnobotanical Pocket Book Of Postnatal Herbal Medicine For The Malay Community Of Ketapang As A Biology Learning Resource. *Didaktika Biologi: Jurnal Penelitian Pendidikan Biologi*, *9*(1), 31–39. https://doi.org/10.32502/didaktikabiologi.v9i1.451

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

Ramanda, P., Qurbaniah, M., & Setiadi, A. E. (2024). Development of an encyclopedia of flora and fauna motifs in Singkawang hand-written batik as a biology learning resource A. Introduction. *BIO-INOVED: Jurnal Biologi-Inovasi Pendidikan 6*(3), 286–294. https://doi.org/10.20527/bino.v6i3.19549

Ramdani, A., Purwoko, A. A., Sukarso, A., & Sucilestari, R. (2024). Science Learning Innovation Using Augmented Reality Technology to Achieve Sustainable Development Goals (SDGs) through Increasing Students' Critical Thinking Abilities. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *10*(4), 1675–1684. https://doi.org/10.33394/jk.v10i4.12911

Rohmawati, E., Widodo, W., & Agustini, R. (2018). Membangun Kemampuan Literasi Sains Siswa Melalui Pembelajaran Berkonteks Socio-Scientific Issues Berbantuan Media Weblog. *Jurnal Penelitian Pendidikan IPA*, *3*(1), 8. https://doi.org/10.26740/jppipa.v3n1.p8-14

Rukmana, R., Mukhtar, M., & Zulkarnain, Z. (2021, November). Kajian etnobotani untuk menggali potensi tanaman obat. In *Prosiding Seminar Nasional Biologi* 7(1), 232-236. https://doi.org/10.24252/psb.v7i1.24201

Sabilla, S. N., Sunandar, A., & Setiadi, A. E. (2023). An Ethnobotany-Based on Wrapping Plant of Malays Tribe in Meliau Subdistrict. *Jurnal Penelitian Dan Pengembangan Pendidikan*, *7*(2), 254–263. https://doi.org/10.23887/jppp.v7i2.64370

Samudra, E. Y. A., & Yulkifli, Y. (2021). Validity of interactive student worksheets based on inquiry

based learning models to improve knowledge competence. *Journal of Physics: Conference Series*, *1876*(1). https://doi.org/10.1088/1742-6596/1876/1/012033

Sianturi, A. S. R., Retnoningsih, A., & Ridlo, S. (2021). Development of Interactive E-Book of Ferns Materials Through a Scientific Approach With HOTS Problems to Improve Student Learning Outcomes. *Journal of Innovative Science Education*, *10*(3), 230–236. https://doi.org/10.15294/jise.v10i1.43091

Syukur, M. (2017). Kerajinan Tangan Hasil Pengolahan Tumbuhan Hutan Oleh Masyarakat Desa Nibung Kecamatan Selimbau Kabupaten Kapuas Hulu. *Piper*, *13*(24), 96–104. https://doi.org/10.51826/piper.v13i24.64

Triannisa, D., & Yuliyanti, E. (2024). Diversity of Wood Plants and Its Utilization as a Learning Source. *Jurnal Penelitian Pendidikan IPA*, *10*(1), 165–171. https://doi.org/10.29303/jppipa.v10i1.4698

Wardani, H. K., Pramartaningthyas, E. K., Rohman, T., & Alimin. (2025). Development of Interactive E-Module to Foster EFL Students' Critical Thinking in Essay Writing. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *11*(1), 190–202. https://doi.org/10.33394/jk.v11i1.13577