



## An Ethnobotany-Based on Wrapping Plant of Malays Tribe in Meliau Subdistrict

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### ABSTRAK

Pemanfaatan tanaman sebagai pembungkus pangan merupakan kearifan lokal yang perlu dilestarikan. Pelestarian tentang pengetahuan tradisional ini dapat dilakukan melalui media pembelajaran. Penelitian ini bertujuan untuk menghasilkan media pembelajaran yang valid dan mendapatkan respon positif dari siswa. Penelitian menggunakan Research and Development (R&D) dengan model pengembangan ADDIE yang terdiri dari 5 tahapan yaitu tahap Analysis, Design, Development, Implementation, and Evaluation. Pengumpulan data didapatkan dari hasil wawancara, observasi, dan angket. Berdasarkan hasil validasi pengembangan ensiklopedia berbasis etnobotani tumbuhan pembungkus Suku Melayu Kecamatan Meliau mendapatkan penilaian sangat valid dari ahli materi (91,67%), ahli media (95,83%) dan valid dari ahli bahasa (79,86%). Pada uji coba skala kecil 14 siswa memberikan respon sebesar 76,67% (positif) dan pada uji skala besar 42 siswa memberikan respon sebesar 89,80% (positif) berdasarkan aspek materi, bahasa, keterlaksanaan, dan tampilan. Hasil menunjukkan media pembelajaran ensiklopedia berbasis etnobotani tumbuhan pembungkus suku Melayu kecamatan Meliau yang dikembangkan sangat layak untuk digunakan dalam proses pembelajaran dan mendapatkan respon positif. Media Ensiklopedia yang berhasil dikembangkan memuat ciri morfologi tumbuhan, produk makanan yang dibungkus, dan Qr-code yang menampilkan proses pembungkusan makanan menggunakan tumbuhan pembungkus. Media ensiklopedia ini juga dapat dijadikan media pelestarian kearifan lokal masyarakat Melayu kecamatan Meliau dalam memanfaatkan tumbuhan sebagai pembungkus makanan ramah lingkungan.

### ABSTRACT

Utilization of plants as food wrappers is a local wisdom that needs to be preserved. The preservation of traditional knowledge can be done through learning media. This research aims to produce valid learning media and obtain a positive response from students. The research uses Research and Development (R&D) with the ADDIE development model consisting of 5 stages: Analysis, Design, Development, Implementation, and Evaluation. Data collection was obtained from interviews, observations, and questionnaires. Data were analyzed using a Likert scale questionnaire. Based on the validation results, the development of an ethnobotany-based encyclopedia on wrapping plants of the Malay Tribe in Meliau Sub-district obtained a highly valid assessment from subject matter experts (91.67%), media experts (95.83%), and valid from language experts (79.86%). In the small-scale trial, 14 students responded positively by 76.67%, and in the large-scale trial, 42 students responded positively by 89.80%, based on aspects of content, language, implementation, and appearance. It can be concluded that the Ethnobotany-based Encyclopedia on wrapping plants of the Malay Tribe in Meliau sub-district, developed as a learning media, is highly suitable for use in the learning process and has received a positive response. The successfully developed encyclopedia media contains the morphological characteristics of plants, food products wrapped with them, and QR codes displaying the process of food wrapping using wrapping plants. This encyclopedia media can also serve as a means of preserving the local wisdom of the Malay community in Meliau Sub-district in utilizing plants as eco-friendly food wrappers.

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## 1. INTRODUCTION

Kalimantan, the enchanting island, boasts an astounding array of biodiversity, both in its magnificent flora and fauna, with their diverse applications (Nurmasari et al., 2022; Susilawati & Marlina, 2016). The botanical marvels of this region exhibit a breathtaking spectrum of forms, structures, colors, quantities, and other characteristics, as they flourish within their respective ecosystems (Saptasari & Murni, 2007; Wahyuni et al., 2021). Moreover, the island of Kalimantan stands proudly as a testament to the rich tapestry of ethnicities and cultures it harbors (Julung et al., 2018; Ramdiah et al., 2020). Among these treasures lies the indigenous Malay community of Kecamatan Meliau in West Kalimantan, known for their profound wisdom regarding the use of plants as food wrappers. Embedded within the daily lives of the Malay community of Kecamatan Meliau, the utilization of plants as food wrappers is firmly rooted in their ancestral wisdom. Through insightful interviews, it becomes evident that these traditions persist even today, as the Malay people of Meliau steadfastly embrace the practice of employing plants as both traditional food wraps and agricultural coverings. Remarkably, the Malay community of Kecamatan Meliau passionately attests that utilizing natural materials as food wrappers not only imparts tantalizing flavors but also ensures the preservation and resilience of the delectable treats they enfold. Reassuringly, previous study affirm that the use of plants bears no harmful chemicals detrimental to one's well-being (Sari et al., 2019). The act of employing plants as wrappers is a heritage lovingly passed down through generations, cherished by the Malay people of Meliau, urging us to undertake steadfast endeavors in safeguarding this invaluable knowledge against the tides of cultural modernization, thus enabling its preservation for generations to come.

The preservation of traditional knowledge among the younger generation can be achieved through education. Education about local wisdom needs to be incorporated into the learning process (Nengsih, 2020; Nurdiansyah et al., 2021). The K13 curriculum emphasizes contextual learning, requiring teachers to provide easily understandable contextual examples for students. The topic of biodiversity is one that often requires contextual examples in teaching. This subject aligns well with a learning approach based on the research findings of ethnobotany on plant wrappers used by the Malay community of Kecamatan Meliau, where the data generated is linked to biodiversity, particularly in relation to the utilization of biodiversity, and presented through a learning medium (Jahun et al., 2022; Khan & Jahl, 2019). Previous study emphasizes the importance of teachers delivering materials using strategies and a variety of learning media to achieve successful learning outcomes (Rusiadi, 2020). Education provides global insights, enabling students to enter the era of globalization. The inclusion of local wisdom in education is expected to cultivate and enhance conservation values in students (Istiawati, 2016; Ramadina et al., 2023; Suradi, 2018). Educational media play a crucial role in the field of education and can be classified into various types, including print media, such as books produced through printing technology (Chandra et al., 2020; Maria & Harahap, 2018). The selection of learning media is important for teachers to consider, as it should align with the characteristics of the students and be applicable to their daily lives (Setyorini, 2023). A good textbook is one that sparks students' interest in reading and is tailored to their specific needs. Therefore, the inclusion of a new learning resource, such as an encyclopedia, that provides information on biology education is necessary (Etobro & Fabinu, 2017; Harahap et al., 2016; Piotrowska et al., 2022).

An encyclopedia is a book that is bound together, containing discussions on a specific field of knowledge (Cahyawulan & Rachmawati, 2018). Encyclopedias present a collection of writings that provide extensive, comprehensive, and easily understandable descriptions of various types of information about scientific knowledge or specific scientific fields. They are arranged alphabetically or by category and printed in book form (Cahyawulan & Rachmawati, 2018; Orkha et al., 2020). Previous research findings state that encyclopedias can enhance students' learning outcomes and are suitable for use as learning media (Mulia et al., 2019). The study conducted by previous study showed that the fern encyclopedia improved students' learning outcomes and was deemed appropriate for implementation as an additional learning resource (Renita et al., 2020). Encyclopedias combine text and images in a collaborative manner, capturing students' interest in learning. Thus, this encyclopedia can increase readers' interest in exploring information due to its appealing presentation, enhancing the uniqueness of scientific knowledge with a more realistic and contextual approach, while also exploring biodiversity. The aims of this developmental research is to analyze the suitability and student response to a learning media in the form of an encyclopedia based on the ethnobotany of plant wrappers used by the Malay community of Kecamatan Meliau.

## 2. METHOD

This research uses the Research and Development (R&D) method. The research and development process involves several stages to produce a product (Suryani & Setiawan, 2018). The product developed in this study is an ethnobotany-based encyclopedia on plant wrappers used by the Malay community of Kecamatan Meliau. The development of this encyclopedia follows the ADDIE development model. The ADDIE model consists of five stages: analysis, design, development, implementation, and evaluation. The model is shown in Figure 1.

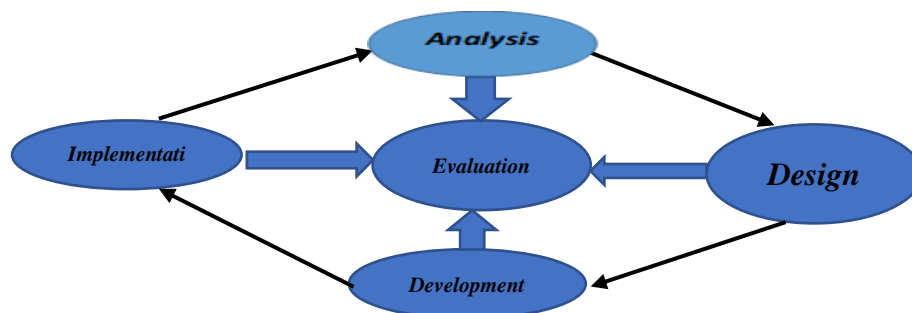


Figure 1. ADDIE Development Model

The research was conducted at SMAN 01 Meliau. The subjects of the research were 14 students from the 10th grade science class for the small-scale test and 42 students for the large-scale test. The object of this research was the ethnobotany-based encyclopedia on plant wrappers used by the Malay community of Kecamatan Meliau. Data collection was done through interviews, observations, and questionnaires. The data obtained in this study include scores from the product validation questionnaire by material validators, language validators, and media validators to assess the validity of the developed product. Additionally, data from the questionnaire on students' responses were analyzed to assess the practicality of the developed encyclopedia. The questionnaire included questions that were analyzed using a Likert scale with scores of 4, 3, 2, and 1. The categories are shown in Table 1 and Table 2.

Table 1. Validation Assessment Categories

Score	Category
1	Strongly Disagree
2	Disagree
3	Agree
4	Strongly Agree

Table 2. Student Response Assessment Categories

Score		Category
Positive	Negative	
1	4	Strongly Disagree
2	3	Disagree
3	2	Agree
4	1	Strongly Agree

First, calculate the percentage of validation results from subject matter experts, language experts, media experts, and student response questionnaires, then calculate the average rating using the Likert scale scores to determine the suitability of the product. The assessment categories are shown in Table 3.

Table 3. Assessment Categories

Score	Validity level	Practicality level
82-100%	Highly valid, or can be used without revision	Highly practical
63-81%	Valid, or can be used with minor revision	Practical
44-62%	Less valid or should not be used	Less Practical
25-43%	Not valid, or should not be used	Not Practical

### 3. RESULT AND DISCUSSION

#### Result

The result of this research is an encyclopedia based on ethno-botany of packaging plants of the Malay Tribe in Meliau Subdistrict. The research utilized the ADDIE development model, which consists of 5 stages: Analysis, Design, Development, Implementation, and Evaluation. The Analysis stage involved performance analysis, needs analysis, curriculum analysis, and analysis of packaging plants. Performance analysis was conducted through interviews with biology teachers of Grade X at SMAN 01 Meliau, revealing that the use of PowerPoint presentations and textbooks was insufficient to fully explore students' knowledge. Needs analysis was carried out by distributing questionnaires via Google Forms. Curriculum analysis revealed that the school adopted the K13 curriculum. The researcher developed the encyclopedia for the topic of biodiversity in Grade X, first semester, with the indicator being the presentation of observations on the benefits of Indonesia's biodiversity. Analysis of packaging plants involved interviews with informants, including local community members and traditional cake vendors aged between 30 and 60 years. A total of 21 types of packaging plants used by the Malay community in Meliau Subdistrict were identified as show in [Table 4](#).

**Table 4.** Food Wrapping Plants of the Malay Tribe in Meliau Subdistrict

No	Local Name	Latin Name	Used part of plants	Dish
1	Buluh Lemang	Schizostachyum brachycladum	Stem	Lemang
2	Cuncong	Etlingera elatior	Leaf	Pepes ikan
3	Engkubong	Macaranga gigantea	Leaf	Pembungkus Nasi
4	Entuyut	Nepenthes mirabilis	Pouch	Lontong
5	Jagung	Zea mays		Wajik Ketan
6	Jambu Eropah	Bellucia axinantha	Leaf	Tempe
7	Keladi Manis	Colocasia esculata	Leaf	Pembungkus Nasi
8	Kunyit	Curcuma longa	Leaf	Pepes Ikan
9	Ledang	Pandanus furcatus	Leaf	Ketupat
10	Lembak	Curculingo latifolia	Leaf	Pembungkus Nasi
11	Lerek	Phrynium pubinerve	Leaf	Sungkui
12	Mangkokan	Nothopanax scutellarium	Leaf	Pepes Ikan
13	Mengkudu	Morinda citrifolia	Leaf	Botok Ikan
14	Pisang Kepok	Musa acuminata X balbisiana	Leaf	Lepat lau, Nagasari, Lepet Pisang
15	Pohon Kelapa	Cocos nucifera	Leaf	Ketupat, lontong
16	Pohon Ketapang	Terminalia catappa	Leaf	Tempe
17	Pohon Nangka	Artocarpus heterophyllus	Leaf	Apam
18	Pandan Wangi	Pandanus amaryllifolius	Leaf	Jorong-jorong
19	Senggang	Hornstedia reticulata	Leaf	Pembungkus Nasi
20	Simpor	Dillenia indica	Leaf	Pembungkus Nasi
21	Waru	Hibiscus tiliaceus	Leaf	Tempe

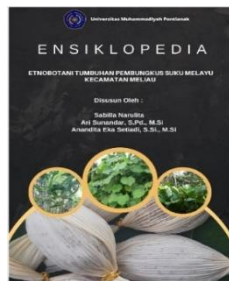
Based on these interview findings, the researcher conducted observations and documentation of the morphological characteristics of vegetative and generative plant organs. The results of morphological identification and their utilization will be included in the encyclopedia product.

The Design stage aims to design the ethnobotany-based Encyclopedia of Wrapping Plants of the Malay Tribe in Meliau District through material composition and encyclopedia product design. The content of the encyclopedia is derived from the identification of wrapping plants of the Malay Tribe obtained from interviews with informants in Meliau District. The wrapping plant encyclopedia includes descriptions of each plant, plant classification, local and scientific names of the plants, chemical contents, plant distribution, and utilization as wrappers. The developed encyclopedia consists of three main sections: the introductory section, the content section, and the concluding section. Components of wrapping plant is show in [Table 5](#).

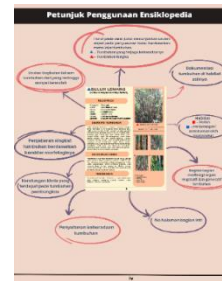
**Table 5. Components of the Wrapping Plant Encyclopedia**

No	Section	Components
1	Beginning	Cover, Foreword, table of contents, introduction, and user guide.
2	Content	Plant morphological characteristics, plant descriptions, distribution, chemical contents, utilization of plants as wrappers, QR codes containing videos demonstrating the wrapping process using various types of wrapping plants
3	End	References, glossary, author profile.

The Development stage aims to produce a learning media which is an ethnobotany-based encyclopedia on wrapping plants used by the Malay tribe in Meliau subdistrict, which is deemed suitable for use based on input from experts (validators), development testing and product refinement. The learning media is considered valid if it meets the aspects of validity assessment. The validity assessment is based on input from content experts, media experts, and language experts who have filled out the questionnaire. The created encyclopedia consists of 62 pages following ISO standards with dimensions of 21x29.7 cm. The visual presentation of the encyclopedia can be seen in Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, and Figure 7.



**Figure 2. Cover**



**Figure 3. User Guide**



**Figure 4. Material**



**Figure 5. Utilization of Plants**



**Figure 6. Qr-Code for wrapping techniques**



**Figure 7. References**



The media of learning that has been produced can be considered appropriate if it meets the validity aspects. The expert validation results for the material show 91.67% (Very Valid), for media 95.83% (Very Valid), and for language 79.86% (Valid) as show in [Table 6](#).

**Table 6. Results of Expert Validation Assesment**

No	Validasi Ahli	Percentage	Criteria
1	Material	91.67%	Very valid
2	Media	95.83%	Very valid
3	Language	79.86%	Valid

In the implementation phase, the aim is to assess students' response to the developed learning media in the form of an ethnobotanical encyclopedia of wrapping plants from the Malay Tribe in Meliau Subdistrict. The student response is evaluated through small-scale and large-scale trials. The small-scale and large-scale trials are conducted after validation by subject matter experts, media experts, and language experts. The large-scale trial is performed to assess the encyclopedia media with a larger number of students. The aspects evaluated in the small-scale and large-scale trials include material suitability, language, usability, and appearance. The overall assessment consists of 16 statements, with 8 positive statements and 8 negative statements. The results of the small-scale trial show 76.67% (practical), and the results of the large-scale trial show 89.80% (very practical) as show in [Table 7](#).

**Table 7. Student Response Assesment Categories**

No	Experiment	Percentage	Criteria
1	Small Scale	76.67%	Practical
2	Big Scale	89.80%	Very Practical

In the evaluation phase, the researcher uses formative evaluation and summative evaluation. Formative evaluation is conducted to gather data throughout all stages of the ADDIE model. In the formative evaluation stage, the learning media is improved or revised based on the feedback received during the validation process. Revisions are made based on suggestions from the material, language, and media validators. Then, for the summative evaluation, it is based on the analysis of student response questionnaires to determine the impact of using the ethnobotanical encyclopedia of wrapping plants from the Malay Tribe in Meliau Subdistrict in the learning process.

## Discussion

This research and development study resulted in the creation of an encyclopedia product intended for 10th-grade students in the science stream. The encyclopedia was designed to assist students in understanding biodiversity, particularly in the utilization of biodiversity. According to previous study an encyclopedia was chosen as a learning development product because of its lightweight, attractive, concise, and easily understandable nature ([Chandra et al., 2020](#)). Encyclopedias have the ability to provide visualizations of content and are highly associated with images, which can capture readers' interest and enhance students' learning motivation. During the analysis phase, the researcher conducted a needs analysis, student analysis, curriculum analysis, and analysis of wrapping plant species. Performance analysis was carried out to identify issues with the learning media used in the school. Based on interview results, the learning media used by teachers were PowerPoint presentations (PPT) and textbooks. Although these media were already being used, teachers still faced difficulties in explaining the biodiversity topic, particularly related to the utilization of biodiversity, as these media were insufficient for exploring students' knowledge. Therefore, teachers greatly desired a media tool that could explore local biodiversity, specifically related to the students' surrounding environment, as local-based learning media was not commonly available in schools. The presence of learning media that highlights local potential can provide additional insights and information to students. Collaborating different methods with diverse media can motivate students in the teaching and learning process ([Laila Puspita, 2019](#); [Magdalena et al., 2021](#)).

The needs analysis phase revealed that students enjoyed learning biology and were pleased with the existing learning media. However, they also expressed the need for alternative learning media to avoid monotony. Students particularly enjoyed learning materials that incorporated illustrations and colors, connected to local potential within their surroundings, and were unfamiliar with using encyclopedias as a learning medium. This aligns with research conducted which indicates that students prefer colorful learning materials with detailed illustrations ([Ardianti et al., 2019](#)). The curriculum analysis revealed the

implementation of the K13 curriculum, specifically the biodiversity topic in the KD 4.2, which presents observations of various levels of biodiversity (genes, species, and ecosystems) in Indonesia and proposes efforts to preserve Indonesian biodiversity based on the analysis of the conservation threats to various species of Indonesian fauna and flora using various forms of media. The use of local-based learning media can help students learn independently and gain knowledge about the potential and culture in their region, creating awareness about environmental preservation (Ningrum et al., 2022; Ulya et al., 2022). The analysis of wrapping plant species identified 21 types of wrapping plants to be included in the learning media within the encyclopedia. The second phase involved designing the encyclopedia product using Canva. Canva has several advantages, including a variety of attractive designs, which enhance teachers' and students' creativity in designing learning media due to the many available features. Canva allows for practical creation without the need for a laptop, as it can be done on mobile devices (Lastari & Silvana, 2020; Monoarfa & Haling, 2021). The design process began with the introduction section, including the cover, preface, table of contents, introduction, and usage instructions. The content section contained information about 21 wrapping plants, including plant images, local names, Latin names, plant identification, descriptions, distribution, chemical content, morphological features, positive impacts as wrappers, and plant utilization as wrappers. The final section consisted of references, a glossary, and the author's profile. The design phase focused on selecting contrasting background.

The next stage conducted by the researcher is the development phase. Validation tests were conducted with 3 subject matter experts, 3 language experts, and 3 media experts. Based on the average validation results from the subject matter experts, a percentage of 91.67% (very valid) was obtained. This indicates that the developed encyclopedia is suitable according to the Core Competencies stated in the curriculum. According to previous study the content and presentation of the encyclopedia materials are excellent because they adhere to the learning objectives specified in the curriculum and the material is adjusted to the general level of high school students' abilities (Harahap et al., 2016). The language validation results obtained a percentage of 79.86% (valid). This shows that the language aspect used is light, well-written according to the applicable writing rules, the sentences used are standard, easy to understand and digest, thus facilitating students in reading and comprehending the material (Anggraini et al., 2022; Julianti et al., 2021; Nuraida & Nisa, 2017).

Meanwhile, the media validation obtained a percentage of 95.83% (very valid) because the presentation of the media is systematically and completely in line with the created table of contents, using design and layout, clear images, and contrasting colors. The criteria for images and design used in the encyclopedia are adjusted to the criteria of having good brightness, not blurry or fragmented, the colors used are not too striking, and the images are accompanied by captions so that the addition of color combinations in the design can visualize objects and provide an enjoyable atmosphere for readers (Maria & Harahap, 2018; Saraswati et al., 2019). Therefore, it can be concluded that the assessment of the content, language, and media of the ethnobotany-based encyclopedia of wrapping plants of the Malay tribe in Meliau sub-district is categorized as highly feasible for testing with minor revisions. The encyclopedia also includes reference sources listed in the bibliography. According to previous study the bibliography included in the encyclopedia is useful for helping students identify the reference sources used (Anggraini et al., 2022). In addition to the bibliography, references are also included on the species pages because there are several references that can be further consulted if users want to read more information about a species. The evaluation phase was conducted to determine whether the media developed by the researcher met the criteria. Formative evaluation was conducted at each stage of the ADDIE process for revision purposes. Summative evaluation took place at the final stage of development. Based on the results of the validity and practicality stages, highly valid results were obtained from the expert validators, and highly practical results were obtained from the students as users of the encyclopedia product. Therefore, it can be concluded that the developed media is suitable for use as an additional learning media for biodiversity topics in the 10th-grade Science class at SMAN 01 Meliau.

#### 4. CONCLUSION

Based on the research findings, the Ethnobotanical Encyclopedia of Wrapping Plants of the Malay Tribe in Meliau Subdistrict is considered as one of the learning media used in SMAN 01 Meliau, which has been tested on 10th-grade science students. The developed Ethnobotanical Encyclopedia of Wrapping Plants of the Malay Tribe in Meliau Subdistrict as a learning media has achieved a level of suitability in terms of content is very valid, language aspect with is valid, and media aspect is very valid. The small-scale test resulted practical, while the large-scale test indicate that very practical. The ethnobotanical Encyclopedia of wrapping plants of the Malay Tribe in Meliau subdistrict is valid and practical, thus it can be utilized in the learning process.

## 5. REFERENCES

- Anggraini, A., Syafi'i, W., & Firdaus, L. N. (2022). Pengembangan Ensiklopedia Mini Kingdom Plantae Berbasis Android untuk Pembelajaran Biologi SMA Kelas X. *Biogenesis*, 18(2), 122–131. <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>.
- Cahyawulan, W., & Rachmawati, D. (2018). Pengembangan Ensiklopedia Pekerjaan Bidang Matematika dan Ilmu Pengetahuan Alam (MIPA) untuk Peserta Didik Kelas X di SMA Suluh Jakarta. *INSIGHT: Jurnal Bimbingan Konseling*, 7(2), 140–146 10 21009 072 03.
- Chandra, A. M., Amirah, A. A., Pratiwi, A. D., Pratama, J. A., Wigati, I., Yuniar, Y., Hapida, Y., Habisukan, U. H., & Nurokhman, A. (2020). Pembuatan Ensiklopedia pada Materi Plantae di SMA / MA. *Prosiding Seminar Nasional Pendidikan Biologi*, 3(1), 125–132. <https://doi.org/http://proceedings.radenfatah.ac.id/index.php/semnaspbio/article/view/527>
- Etobro, A. B., & Fabinu, O. E. (2017). Students' Perceptions of Difficult Concepts in Biology in Senior Secondary Schools in Lagos State. *Global Journal of Educational Research*, 16(2), 139. <https://doi.org/10.4314/gjedr.v16i2.8>.
- Harahap, S. R., Harahap, F., & Hasruddin, H. (2016). Pengembangan Bahan Ajar Mikrobiologi Pangan Berbasis Masalah. *Jurnal Pendidikan Biologi*, 5(3), 187–192. <https://doi.org/10.24114/jpb.v5i3.4319>.
- Istiawati, N. F. (2016). Pendidikan Karakter Berbasis Nilai-Nilai Kearifan Lokal Adat Ammatoa Dalam Menumbuhkan Karakter Konservasi. *CENDEKIA: Journal of Education and Teaching*, 10(1), 1. <https://doi.org/10.30957/cendekia.v10i1.78>.
- Jahun, W., Juniartin, J., Tabaika, R., & Amin, A. M. (2022). Pengembangan Bahan Ajar Booklet Studi Etnobotani Tumbuhan Obat Masyarakat Ternate. *Al-Nafis: Jurnal Biologi Dan Pendidikan Biologi*, 2(1), 65–75. <https://repository.iain-ternate.ac.id/id/eprint/117>.
- Julianti, R., Asra, R., & Yelianti, U. (2021). Pengembangan Ensiklopedia Tumbuhan Obat Masyarakat Kerinci Sebagai Sumber Belajar Materi Keanekaragaman Hayati Untuk Siswa SMA. *Biodik*, 7(01), 13–22. <https://doi.org/10.22437/bio.v7i01.11314>.
- Julung, H., Supiandi, M. I., Ege, B., Mahanal, S., & Zubaidah, S. (2018). Analisis Sumber Pengetahuan Tradisional Tanaman Obat yang Digunakan oleh Masyarakat Suku Dayak Desa. *Proceeding of Biology Education*, 2(1), 67–74. <https://doi.org/10.21009.2-1.9>.
- Khan, P. A., & Johl, S. K. (2019). Nexus of Comprehensive Green Innovation, Environmental Management System-14001-2015 and Firm Performance. *Cogent Business and Management*, 6(1). <https://doi.org/10.1080/23311975.2019.1691833>.
- Laila Puspita. (2019). Pengembangan modul berbasis keterampilan proses sains sebagai bahan ajar dalam pembelajaran biologi Module development based on science process skills as teaching materials in biological learning. *Jurnal Inovasi Pendidikan IPA*, 5(1), 79–87. <https://doi.org/10.21831/jipi.v5i1.22530>.
- Lastari, D. S., & Silvana, R. (2020). the Effects of Summarizing Using Infographics on Efl Learners' Reading Comprehension. *Globish: An English-Indonesian Journal for English, Education, and Culture*, 9(2), 128. <https://doi.org/10.31000/globish.v9i2.2707>.
- Magdalena, I., Fatakhatu Shodikoh, A., Pebrianti, A. R., Jannah, A. W., & Susilawati, I. (2021). Pentingnya Media Pembelajaran Untuk Meningkatkan Minat Belajar Siswa Sdn Meruya Selatan 06 Pagi. *EDISI: Jurnal Edukasi Dan Sains*, 3(2), 312–325. <https://doi.org/https://ejournal.stitpn.ac.id/index.php/edisi/article/view/1373>.
- Maria, M., & Harahap, F. (2018). Development Of General Genetic Ensiklopedia As Asource Of Biological Learning In Heredity Material In Class XII IPA. *Prosiding Seminar Nasional Biologi Dan Pembelajaran*, 4(2), 1–9 35550 1. <http://digilib.unimed.ac.id/id/eprint/35550>.
- Monoarfa, M., & Haling, A. (2021). Pengembangan Media Pembelajaran Canva dalam Meningkatkan Kompetensi Guru. *Seminar Nasional Hasil Pengabdian*, 1085–1092. <https://ojs.unm.ac.id/semnaslpm/article/download/26259/13283>.
- Mulia, A., Jufri, M., & Syamsiah, S. (2019). Pengembangan Ensiklopedia Tumbuhan Obat Berbasis Potensi Lokal di Daerah Sinjai Sebagai Sumber Belajar Materi Plantae (Spermatophyta). *Seminar Nasional Biologi*, 209–217. <https://ojs.unm.ac.id/semnasbio/article/download/10536/6157>.
- Nengsih, S. W. (2020). Kearifan Lokal Dalam Legenda Keagamaan Masyarakat Banjar. *Jurnal Bahasa, Sastra Dan Pembelajarannya*, 10(1), 41. <https://doi.org/10.20527/jbsp.v10i1.8395>.
- Ningrum, R. D. S., Manalu, K., & Rambe, R. N. (2022). Pengembangan Modul Bioteknologi Berbasis Potensi Lokal Cocos nucifera Di Kabupaten Batu-Bara Untuk Kelas XII SMA Negeri 1 Sei. *Balai. Jurnal*



- Biogenerasi*, 7(1), 68–79. <https://doi.org/10.30605/biogenerasi.v7i1.1641>.
- Nuraida, D., & Nisa, U. M. (2017). Pengembangan ensiklopedia morfologi, anatomi dan fisiologi pada tumbuhan berkarakter khusus. *Proceeding Biology Education Conference*, 503–507. <https://jurnal.uns.ac.id/prosbi/article/viewFile/18484/14658>.
- Nurdiansyah, E., Faisal, E. E., & Sulkipani, S. (2021). Pengembangan Ensiklopedia Identitas Nasional Berbasis Kearifan Lokal. *Jurnal Civic Hukum*, 6(2), 112–123. <https://doi.org/10.22219/jch.v6i2.14612>.
- Nurmasari, N., Syamswisna, S., & Tenriawaru, A. B. (2022). Kelayakan Ensiklopedia Pada Submateri Pemanfaatan Keanekaragaman Hayati Dari Hasil Etnobotani Tumbuhan Obat. *Didaktika Biologi: Jurnal Penelitian Pendidikan Biologi*, 5(2), 85–92. <https://doi.org/10.32502/dikbio.v5i2.4438>.
- Orkha, M. F., Anggun, D. P., & Wigati, I. (2020). Pengembangan Modul Pembelajaran Berbasis Mind Mapping Pada Materi Sistem Peredaran Darah Sma. *Bioilmi: Jurnal Pendidikan*, 6(2), 77–85. <https://doi.org/10.19109/bioilmi.v6i2.7011>.
- Piotrowska, I., Cichoń, M., Sypniewski, J., & Abramowicz, D. (2022). Application of Inquiry-Based Science Education, Anticipatory Learning Strategy, and Project-Based Learning Strategies. *In Didactic Strategies and Resources for Innovative Geography Teaching*, 23–50. <https://doi.org/10.4018/978-1-7998-9598-5.ch002>.
- Ramadina, N. M., Kaspul, K., & Zaini, M. (2023). Kepraktisan Ensiklopedia Famili Anacardiaceae Koleksi Kebun Raya Banua untuk Melatihkan Keterampilan Berpikir Kritis. *Bio Educatio: (The Journal of Science and Biology Education)*, 8(1), 27–35. <https://doi.org/10.31849/bl.v10i1.13035>.
- Ramdiah, S., Abidinsyah, A., Royani, M., Husamah, H., & Fauzi, A. (2020). South Kalimantan local wisdom-based biology learning model. *European Journal of Educational Research*, 9(2), 639–653. <https://doi.org/10.12973/eu-jer.9.2.639>.
- Renita, A., Setyowati, E., Fauziah, A., & Purwanto, N. (2020). Pengembangan ensiklopedia tumbuhan paku sebagai sumber belajar keanekaragaman hayati. *Jurnal Biologi Dan Pembelajarannya (JB&P)*, 7(1), 1–6. <https://doi.org/10.29407/jbp.v7i1.14797>.
- Rusiadi, R. (2020). Variasi metode dan media pembelajaran guru pendidikan agama Islam. *Jurnal Alwatzikhoebillah: Kajian Islam, Pendidikan, Ekonomi, Humaniora*, 6(2), 10–21. <https://doi.org/10.37567/alwatzikhoebillah.v6i2.226>.
- Saptasari, & Murni. (2007). *Buku Ajar Botani Tumbuhan Bertalus Alga*.
- Saraswati, S., Linda, R., & Herdini, H. (2019). Development of Interactive E-Module Chemistry Magazine Based on Kvisoft Flipbook Maker for Thermochemistry Materials at Second Grade Senior High School. *Journal of Science Learning*, 3(1), 1–6. <https://doi.org/10.17509/jsl.v3i1.18166>.
- Sari, Y., Afriyansyah, B., & Juairiah, L. (2019). Pemanfaatan Leaf Sebagai Bahan Pembungkus Makanan Di Kabupaten Bangka Tengah. *EKOTONIA: Jurnal Penelitian Biologi, Botani, Zoologi Dan Mikrobiologi*, 4(2), 48–56. <https://doi.org/10.33019/ekotonia.v4i2.1686>.
- Setyorini, D. (2023). Kebutuhan Pengembangan Media Pembelajaran Keanekaragaman Hayati Berbasis Potensi Lokal Taman Nasional Lore Lindu. *Jurnal Teknologi Pendidikan*, 12(2), 223–231. <https://doi.org/https://ejournal2.uika-bogor.ac.id/index.php/TEK/article/view/158>.
- Suradi, A. (2018). Pendidikan Berbasis Multikultural dalam Pelestarian Kebudayaan Lokal Nusantara di Era Globalisasi. *Jurnal Studi Islam Dan Sosial*, 5(1), 112–129. <https://journal.walisongo.ac.id/index.php/wahana/article/view/2566>.
- Suryani, & Setiawan, P. (2018). *Media Pembelajaran Inovatif Dan Pengembangannya*. Pt. Remaja Rosdakarya.
- Susilawati, N., & Marlina, R. (2016). Kelayakan Media Buklet Etnobotani di Desa Arus Deras Pada Submateri Manfaat Keanekaragaman Hayati SMA. *Jurnal Pendidikan Dan Pembelajaran Khatulistiwa (JPPK)*, 5(1). <https://doi.org/10.26418/jppk.v5i1.13327>.
- Ulya, H., Arsih, F., Alberida, H., & Rahmi, Y. L. (2022). Pengembangan Buku Digital Berbasis RANDAI Terintegrasi Potensi Lokal pada Materi Keanekaragaman Hayati. *Biodik*, 8(1), 97–108. <https://doi.org/10.22437/bio.v8i1.16576>.
- Wahyuni, S., Afidah, M., & Ramadansur, R. (2021). Etnobotani Tumbuhan Pangan di Desa Cipang Kiri Hulu Provinsi Riau. *Jurnal Pendidikan Biologi*, 8(2), 174–179. <https://doi.org/10.31849/bl.v8i2.7986>.