Journal of Educational Sciences

Development of Integrated Science E-Learning Modules Based on Bangka Belitung Ethnoscience Subjects in Junior High Schools

Firanita Fitriyah*, Siti Sriyati, Rika Rafikah Agustin

Faculty of Mathematic and Science Education, Universitas Pendidikan Indonesia, Bandung, Jawa Barat, 40154, Indonesia

ARTICLE INFO

A B S T R A C T

This study aims to integrate science learning with local wisdom in Bangka Belitung into teaching materials in the form of integrated science E-Modules based on ethnoscience to improve science process skills. This development follows the ADDIE development process, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The analysis stage focuses on the needs that are used as information for development. The design stage focuses on developing the content and format of the E-Module in accordance with the concept map and storyboard to produce an initial product. In the development stage, the initial product was validated by experts consisting of expert lecturers and teachers as science learning practitioners. The validation results showed that the developed E-Module was very suitable for use because it received a very valid category with a score of 85.80% from content validation and 86.99% from construct validation. In the implementation stage, the average response of students to the use of E-Modules in learning was 91.84%. Thus, the developed E-Module is considered feasible, practical, and effective in science learning.

1. Introduction

The rapid development of information and communication technology has changed and influenced the human learning process in the 21st century. In 21st-century learning, the development of science, technology, and information is occurring at a very fast and comprehensive pace. The ability to analyze, create, solve problems, think critically, and work together in teams are skills that are required in 21st-century education (Kwangmuang et al., 2021). In addition to teaching existing material, teachers are required to create learning that is in line with the demands of 21st-century education, which requires teachers to empower students' abilities to

create competitiveness in order to build a harmonious education system that is in line with global demands (Lubis et al., 2022). Teachers must develop comprehensive and systematic learning tools so that learning is interactive, inspiring, and enjoyable, which can then motivate students to participate actively (Ramdiah et al., 2020). Learning tools that are tailored to students' needs are crucial in learning because they can improve learning outcomes in line with the desired learning objectives (Melinia et al., 2024). The learning tools that need to be developed must be in line with the development of science and technology and the needs of 21st-century education.

Along with the development of science and technology, it is important to improve students' abilities to face 21st century education based on the results of the PISA Indonesia ranking survey. Indonesian students' science scores were 383 points. This score is still below the average score of OECD member countries, which ranges from 483 to 488 points. Indonesia's PISA score in science skills rose 6 places compared to 2018, but globally, Indonesia's overall ranking was 66th out of 81 countries in 2022, or 15th lowest in the world. This shows how students learn. Therefore, we must look at the skills that students have so that we can observe what happens in the classroom. Science learning that actively involves students in understanding scientific concepts through learning experiences can stimulate curiosity and provide experiences that develop students' ability to find answers to existing phenomena (Tahya et al., 2022). Thus, learning that can directly improve students' science process skills is very suitable to be developed.

Science process skills are skills acquired from training in basic physical, mental, and social skills. Science process skills are skills in generating new knowledge through learning activities that refer to behaviors that demonstrate students' understanding of the world (Melinia et al., 2024). Science process skills are skills used in observing student development during learning so that students' learning abilities can be improved. Science process skills require learning that can improve students' abilities, especially in accordance with the students' own environment, because learning that is in accordance with the students' environment can improve their way of thinking, doing work, interacting, communicating, and taking attitudes, which are necessary for solving problems in life. Science process skills are very much needed by students, especially secondary school students, in solving problems in their daily lives (Dwi et al., 2021). One type of learning that can be adapted to the surrounding environment is ethnoscience-based learning.

Ethnoscience-based learning is learning that integrates local wisdom and culture with scientific concepts (Jufrida et al., 2024). Ethnoscience itself is knowledge possessed by a nation, particularly a specific ethnic group or group (Widayanti et al., 2022). Ethnoscience-based learning is learning based on the recognition of culture as the foundation of education (Mahyuny et al., 2022). Ethnoscience-based learning can be used as a breakthrough in learning because it can improve and strengthen students' understanding of scientific concepts by studying culture and local wisdom to uncover scientific knowledge (Rusmansyah et al., 2023). The application of ethnoscience-based learning is very important because it can increase

students' knowledge and understanding and can foster positive traits and values in accordance with the local wisdom values that exist in their environment (Azizah Lubis et al., 2023). Therefore, ethnoscience-based learning is in line with the essence of learning, which is to understand material concepts and apply them in real life. One of the efforts that can be made in ethnoscience-based learning is to develop ethnoscience-based teaching materials.

However, in reality, the lack of teaching materials often becomes an obstacle in the learning process (Ali & Zaini, 2023). Therefore, innovation in the development of teaching materials is needed. Teaching material innovation that is integrated with local wisdom is expected to be learning and preparation for facing the era of globalization, which is achieved by adhering to regional cultural values. Local wisdom-based learning is the regeneration of local wisdom values in students. The development of ethnoscience-based teaching materials is expected to develop students' skills (Dewi et al., 2021). One innovation in the development of ethnoscience-based teaching materials in line with technological developments is the development of teaching materials, namely ethnoscience-based E-Module IPA. The development of ethnoscience-based E-Module IPA as an innovation in ethnoscience teaching materials can improve the quality of learning. Ethnoscience-based development can also reduce misconceptions among students in several science concepts (Martawijaya et al., 2023). In reality, ethnoscience-based E-Modules are still rarely found in science education that can reveal the cultural realities surrounding students (Febriansyah et al., 2021; Martawijaya et al., 2023; Ramdani et al., 2021). Through analysis, it is hoped that this will guide research into the development of E-Modules for science as innovative teaching materials based on ethnoscience that are in line with relevant technological advances and contextual to the students' surrounding environment.

The abundance of marine resources in Indonesia, due to its vast ocean waters, has led the community to think of ways to increase the value of these marine resources, one of which is by producing them as processed foods that are unique to the region. One region with abundant marine resources is the Bangka Belitung archipelago, which produces rusip, a processed food made from fermented fish, making rusip a specialty food of Bangka Belitung (Yuliana, 2007). Rusip can be used as the main material or topic in developing ethnoscience-based teaching materials. The relevance of rusip as the main topic in developing ethnoscience-based teaching materials is because rusip is a processed food from fermentation, making it relevant to biotechnology material. Based on the above explanation, this study aims to develop ethnoscience-based teaching materials in the form of an ethnoscience-based Integrated Science E-Module that aims to improve students' valid and appropriate science process skills in science learning and is practical for use by teachers and students by integrating science concepts with the local wisdom of the Bangka Belitung community. Through the developed E-Module, it is hoped that students can improve their understanding of biotechnology material and improve their learning outcomes because the learning is contextual and relevant to their daily lives.

2.   Methodology

This research on the development of an integrated science E-Module based on ethnoscience uses the ADDIE Instructional Design model developed by Dick & Carry in 1996, which consists of five stages, namely Analyze, Design, Development, Implementation, and Evaluate (Mulyatiningsih, 2011). The ADDIE model was used because it has systematic steps so that the research can be clearer and more efficient, making it suitable for developing teaching materials in the form of E-Modules to achieve the desired learning objectives. The ADDIE research model can be seen in Figure 1.
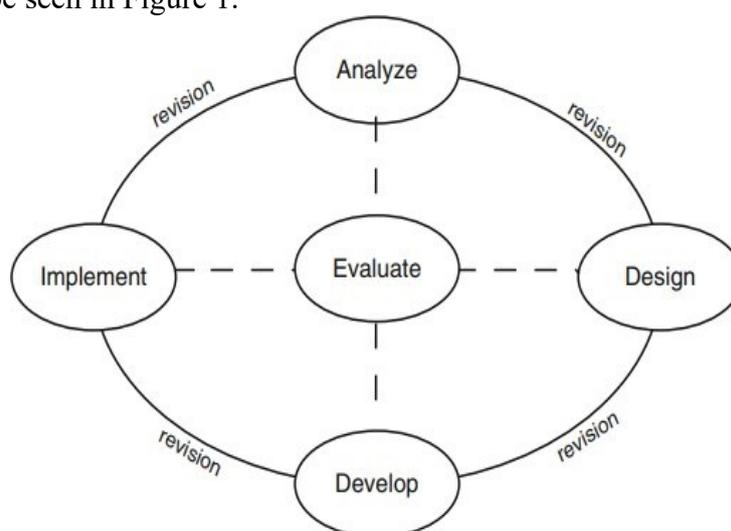

Figure 1. ADDIE Development Model (Dick, 2019)

The subjects of this study were ninth-grade students at SMPN 1 Tempilang in the 2025/2026 academic year. The data collection techniques used interviews and questionnaires. Interviews were conducted with teachers at SMP Negeri 1 Tempilang, and questionnaires were given to validators from the Science Education Department of the Indonesia University of Education and science learning practitioners, namely teachers at SMPN 1 Tempilang, to assess the validity of the integrated science E-Module based on ethnoscience that was developed. In addition, after conducting validation with the validators, a trial of the developed E-Module was conducted with students and a questionnaire was administered to observe the students' responses to the practicality and effectiveness of the developed E-Module.

Instrument validation was conducted to examine the validity of the E-Module in terms of content validity and construct validity. Content validity is used to measure the validity of the learning content, while construct validity is used to measure the appropriateness of the language and graphics used in the E-Module. The validation of the Integrated Science E-Module based on ethnoscience used instruments with a grid that can be seen in Table 1.

Table 1. Grid of Validation Questions for the Integrated Science E-Module Based on Ethnoscience

Indicator	Question Number
Learning content	1,2,3,4,5,6,7,8,9,10,11,12,13,14
Local wisdom	15,16
Components of science process skills	17,18,19,20,21,22,23,24,25,26
Presentation suitability	27,28,29,30,31,32,33,34,35,36,37,38 ,39,40,41,42
Linguistics	43,44,45,46,47,48,49,50,51,52,53,54
Graphics	55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,7 1,72,73,74,75

The validation of the integrated science e-module based on ethnoscience was compiled using a scale of 1-4. The questionnaire scale can be seen in Table 2.

Table 2. Validation Sheet Questionnaire Scale

Assessment criteria	Score
Very good	4
Good	3
Not enough	2
Very less	1

Source: (Arikunto, 2018)

To calculate the average percentage score of the questionnaire, use the following formula.

$$P \frac{\sum Fx}{\sum N} \text{ x } 100\%$$

Information:
P = Validation percentage
$\sum Fx$ = Total validator assessment score
$\sum N$ = Maximum Score
Next, the percentage of eligibility obtained is then presented into eligibility categories based on Table 3 below:

Table 3. Validation Assessment Criteria

Score	Category	Interpretation
81%-100%	Very Valid	Very Worthy
61%-80%	Valid	Worthy
41%-60%	Quite Valid	Quite Decent
21%-40%	Less Valid	Less than worthy
>21%	Very Less Valid	Not feasible

Source: (Arikunto, 2018)

To evaluate students' responses regarding the feasibility and effectiveness of the E-Module after learning using the integrated science E-Module based on ethnoscience, the researchers used a questionnaire with a grid as shown in Table 4.

Table 4. Student Response Questionnaire Grid for the Ethnoscience-Based Integrated Science E-Module

Aspect	Question Items
Practicality	1,2,3,4,5,6,7,8,9,10
Effectiveness	11,12,13,14,15
Science Process Skills Competence	16,17,18,19,20,21,22

Student response to learning using integrated science E-Modules based on ethnoscience was measured using assessment criteria in accordance with Table 5.

Assessment criteria	Score
Strongly agree	4
Agree	3
Don't agree	2
Strongly Disagree	1

After the students had assessed the E-Module, the researcher analyzed the responses that had been collected with assessment scores that can be seen in Table 6.

Table 6. Percentage of E-Module Response Questionnaire

Score	Category
81%-100%	Very good
61%-80%	Good
41%-60%	Enough
21%-40%	Not enough
0%-21%	Very less

Source: (Arikunto, 2018)

3.   Results and Discussion

This development research resulted in an integrated ethnoscience-based E-Module designed for teaching biotechnology to ninth-grade junior high school students. The use of local wisdom from Bangka Belitung, namely rusip processed food, is a unique feature of this product. The traditional food processing method, which uses fermentation, makes this E-Module suitable for teaching biotechnology as the intended learning outcome. Through this E-Module, students are invited to understand the concepts in science in a more contextual and concrete way because the material taught is relevant to the students' everyday lives. In addition to improving students' understanding, this E-Module can also enrich students' knowledge of local wisdom, making learning more meaningful and relevant because it involves student participation in the learning process. Student involvement in the learning process can improve their science process skills. The ADDIE model used in this development includes five stages, namely Analysis, Design, Development, Implementation, and Evaluation. The following are the results obtained from the development process.

Analysis Stage

This stage was carried out to analyze the information needed by identifying existing problems for product development. The analysis stage included interviews with

teachers at SMPN 1 Tempilang and analysis through questionnaires given to ninth-grade students via Google Forms. The analyses examined were needs analysis, student analysis, curriculum analysis, and material analysis. The findings of the analysis stage included: 1) the limitations of the tools available at the school made it difficult for teachers to conduct scientific learning activities, so that learning activities requiring practical work were often difficult to carry out, resulting in: 2) Conventional teaching methods such as lectures are often used, and the lack of scientific activities makes learning boring for students. 3) The teaching materials used in learning often consist of books available at the school due to the limitations of teachers in developing interactive teaching materials, especially since teachers have never developed teaching materials that integrate local wisdom and therefore do not know the meaning of ethnoscience-based learning. Therefore, teaching materials that integrate local wisdom into science education are needed to improve students' scientific process skills, thereby raising their awareness of the local potential in their region. Learning with E-Modules that integrate local wisdom can foster sensitivity to the environment and promote local wisdom values (Mudjid et al., 2022). This is in line with (Dewi & Kuswanto, 2023) that interactive learning can improve understanding of the material and improve student learning outcomes.

Design Stage

At this stage, researchers design an integrated science E-Module based on ethnoscience, which will produce Prototype I or the initial E-Module product. Concept charts and storyboards will be used as references in the development of the E-Module, which consists of three important components, namely the introduction, content, and conclusion. The researchers collected materials such as readings from books and journals, images, and relevant videos from various sources to be used as references in the product creation. The E-Module was compiled using the Canva application. Prototype 1, or the initial design of the integrated ethnoscience-based E-Module for science, can be seen in Figure 1.

Figure 1. Initial E-Module Product

(https://drive.google.com/file/d/1UpuNiZ4P2b4AxLse3I11feDZRLw hPAB/view?usp=sharing)

Development Stage

The initial product or prototype I that has been developed will be validated by validators or experts. Validation is carried out to obtain values and input regarding the suitability of the E-Module that has been developed in accordance with the criteria that have been provided. The results of this process are used as a basis for making improvements before field trials are carried out. The feasibility assessment of the E-Module is carried out by expert lecturers and science learning practitioners, namely teachers who teach science. The assessment of the developed E-Module includes content validation and construct validation of various indicators. The indicator constructs include: presentation feasibility, language, and graphics. The results of the content validation assessment consist of several indicators, such as learning content and relevance to local wisdom. The results of the content validation for each indicator can be seen in Table 7.

Table 7. Validation Results of the Content of the Integrated Science E-Module Based on Ethnoscience

Indicator	Validator					Average Percentage (%)	Category
	V1	V2	V3	V4	V5		
I1	100	75	89	76	91	86.42	Very Valid
I2	100	50	100	75	100	85	Very Valid
I3	100	75	92.5	75	87.5	86	Very Valid

Based on Table 8, the validation results for the learning content indicator obtained a score of 86.42%, and the indicator for relevance to local wisdom obtained a score of 85%. Based on the data obtained, the content validation for each indicator was categorized as very valid. For the construct validation assessment, the indicators assessed included presentation feasibility, language, and graphics. The results of the content validation for each indicator can be seen in Table 8.

Table 8. Validation Results of the Ethnoscience-Based Integrated Science E-Module Construct

Indicator	Validator					Average Percentage (%)	Category
	V1	V2	V3	V4	V5		
Presentation suitability	98.4	75	96.9	77.8	95.3	88.68	Very Valid
Linguistics	100	75	85.4	75	91.7	85.41	Very Valid
Graphics	100	71.42	92.9	76.2	95.2	87.14	Very Valid

Based on Table 9, the results of the assessment of each indicator in the construct validation. The results of the validation instrument for presentation feasibility obtained a score of 88.68%, linguistic 85.41%, and graphical 87.14%, which are included in the very valid category. The overall assessment includes 75 questions. The validation results of the ethnoscience-based integrated science e-module from all validators are shown in Table 9.

Table 9. Recapitulation Results of Ethnoscience-Based Science E-Module Validation.

No	Assessment Aspects	Percentage (%)	Category	Interpretation
1.	Content Validation	85.80%	Very Valid	Very Worth Using
2.	Construct Validation	86.99%	Very Valid	Very Worth Using

Based on the table above, the results of the validation from the validator based on the content of the integrated Science E-Module developed obtained a score of 85.80% which is included in the very valid category and for validation based on the construct obtained a score of 86.99% which is also included in the very valid category so that based on content validation and construct validation, the E-Module developed by researchers is very suitable for use in learning. The high validation results from experts can be concluded that learning that is relevant to the student's environment can improve student abilities so that ethnoscience-based learning is very necessary (Nisa' et al., 2024) .

Implementation Stage

At the end of the meeting, students responded to the use of the integrated E-Module Science based on ethnoscience. This assessment aims to determine the extent to which the E-Module can be used practically and effectively, and to see the competency in improving science process skills. A response questionnaire was administered to 27 ninth-grade students at SMPN 1 Tempilang. Based on the analysis that has been carried out, the practicality aspect obtained a score of 92.04%, the effectiveness aspect 91.11%, and the science process skills competency obtained a score of 91.84%. The data obtained from the results of the response questionnaire from 27 students are shown in Figure 2 below.
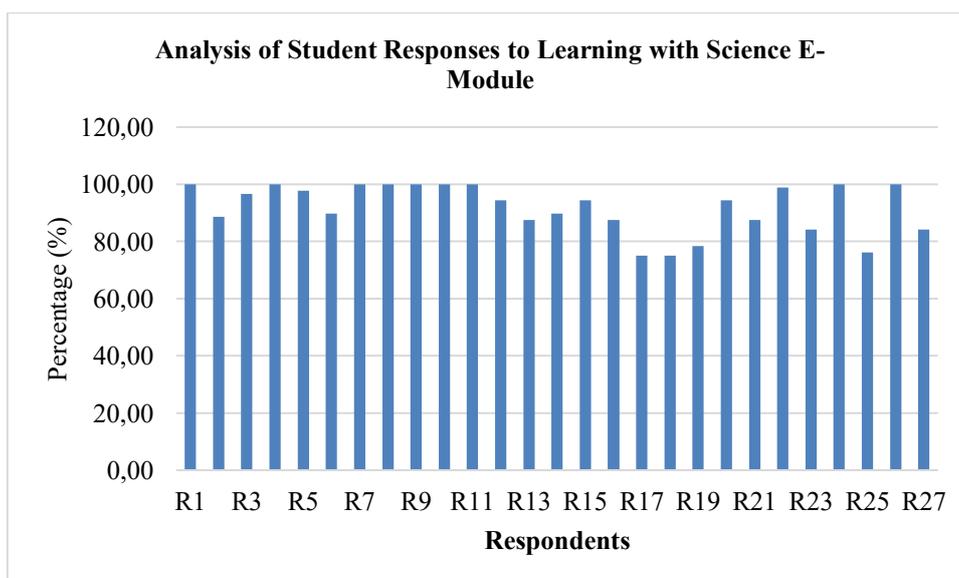
The results of student responses regarding the practicality, effectiveness, and competency of science process skills indicate that the developed Integrated Science

E-Module is practical and effective for use in science learning for students. This is in line with (Dewi, & Kuswanto, 2023) that relevant and contextual learning with students can improve students' understanding of local potential which is useful in maintaining potential thereby reducing its impact on the environment. Learning with an integrated science E-Module based on ethnoscience can also help students improve their science process skills in science learning (Pieter et al., 2024) .

Evaluation Stage

In this evaluation stage, the researcher conducted an evaluation at each stage of ADDIE starting from the analysis, design, development and implementation stages. In the analysis stage, it was found that there was a lack of teaching materials that integrated with the surrounding environmental conditions so that the researcher developed teaching materials based on Bangka Belitung local wisdom with the theme of rusip fermentation that was relevant to biotechnology material in the form of an E-Module. In the design stage, the e-module was arranged according to the concept chart and storyboard. This E-Module was equipped with interactive features such as videos, automatic buttons from Hyperlinks and evaluation questions that were equipped with automatic answers and scores so that they could facilitate students' independent learning. At this stage, prototype 1 or the initial E-Module product was produced which became the initial product and would then be validated by the validator. In the development stage, the E-Module that had been developed was suitable for use in learning based on the validation results by experts. In the implementation stage, the developed E-Module was proven to be practical, effective, and able to help students in improving their science process skills through the questionnaire responses given.

4. Conclusion

Based on the research findings and discussion presented above, the integrated science E-Module based on ethnoscience was successfully developed through five stages of research. The validation results from the validators, namely lecturers and science teachers, showed that the content validation test results were classified as highly valid. The results of the validity test of the developed E-Module are very suitable for use in ethnoscience-based learning to improve science process skills in biotechnology material. From the analysis of student responses to the E-Module, the average response of students to the use of the Integrated Science E-Module based on ethnoscience was that it was very practical and could make learning more effective in understanding the material, thereby helping to improve students' scientific process skills. Therefore, based on the results of the validity testing and student responses, the Integrated Science E-Module that was developed is very suitable for use in learning and can help students improve their scientific process skills.

References
Ali, L.U., & Zaini, M. (2023). Development of Interactive e-modules Based on

Local Wisdom Using Android to Improve Students' Higher Order Thinking Skills (HOTS). *Journal of Science Education Research* , *9* (11), 10091–10100. https://doi.org/10.29303/jppipa.v9i11.4515

Arikunto, S., & Cepi, S. A. J. (2018). *Evaluation of Education Programs* (Third Edition). Bumi Akasara.

Azizah Lubis, J., Saputra, R., Tuah, S., Adrian, M., Padhilah, S., Tapanuli Selatan, M., Sutan Mohd Arief No, J., & Ayumi Julu, B. (2023). Canva-assisted biotechnology module based on Marsialap Ari's local wisdom: The endeavor to improve students' creativity skills. *Jurnal Biolokus: Jurnal Penelitian Pendidikan Biologi Dan Biologi* , *6* (2), 168–177.

Dewi, P. S., & Kuswanto, H. (2023). The effectiveness of the use of augmented reality-assisted physics e-module based on pedicab to improve mathematical communication and critical thinking abilities. *JOTSE* , *13* (1), 53–64.

Dick, W., Lou, C., & James, O.C. (2019). *The Systematic Design of Instruction, 7th Edition.* Pearson Education Limited

Dwi, M., Ernawati, W., Perdana, R., & Septi, SE (2021). *Journal of Progressive Education for Middle School Science Subject in Indonesia* . *1* (2), 258–274. https://doi.org/10.23960/jpp.v1

Febriansyah, F., Herlina, K., Nyeneng, I. D. P., & Abdurrahman, A. (2021). Developing Electronic Student Worksheet (E-Worksheet) Based Project Using Fliphtml5 To Stimulate Science Process Skills During the Covid-19 Pandemic. *INSECTA: Integrative Science Education and Teaching Activity Journal* , *2* (1), 59–73. https://doi.org/10.21154/insecta.v2i1.2555

Jufrida, J., Wawan, K., & Basuki, F. R. (2024). Ethnoscience learning: how do teachers implement to increase scientific literacy in junior high school. *International Journal of Evaluation and Research in Education* , *13* (3), 1719–1730. https://doi.org/10.11591/ijere.v13i3.26180

Kwangmuang, P., Jarutkamolpong, S., Sangboonraung, W., & Daungtod, S. (2021). The development of learning innovation to enhance higher order thinking skills for students in Thailand junior high schools. *Heliyon* , *7* (6), e07309. https://doi.org/10.1016/j.heliyon.2021.e07309

Lubis, S. P. W, Suryadarma, I. G. P., Paidi, & Yanto, B. E. (2022). The Effectiveness of Problem-based learning with Local Wisdom oriented to Socio-Scientific Issues. *International Journal of Instruction* , *15* (2), 455–472. https://doi.org/10.29333/iji.2022.15225a

Mahyuny, S. R., Nursamsu, N., Hasruddin, H., & Muslim, M. (2022). Development of Students Worksheet Learning Tools Made by Ethnoscience Based on Science Literacy. *Journal of Science Education Research* , *8* (4), 2294–2301. https://doi.org/10.29303/jppipa.v8i4.1949

Martawijaya, M. A., Rahmadhanningsih, S., Swandi, A., Hasyim, M., & Sujiono, E. H., (2023). The effect of applying the Ethno-STEM-Project-based learning model on students' higher-order thinking skills and misconceptions of physics topics related to Lake Tempe, Indonesia. *Indonesian Journal of Science Education* , *12* (1), 1–13.

Melinia, S., Yusup, M., & Melinia, S. (2024). *Development of Physics Module Based on Ethnoscience with the Local Wisdom of House Limas Palembang*

to Improve Thinking Ability . *10* (11), 8319–8327. https://doi.org/10.29303/jppipa.v10i11.8654

Mudjid, R. M., Supahar, Putranta, H., & Hetmina, D. S. (2022). Development of Android Physics Learning Tools Based on Local Wisdom Traditional Game Bola Boy as a Learning Source. *International Journal of Interactive Mobile Technologies* , *16* (6), 92–112. https://doi.org/10.3991/ijim.v16i06.27855

Mulyatiningsih, E. (2011). *Applied Research in Education & Engineering* 1st Edition). UNY Press.

Nisa', K., Suprapto, N., Shofiyah, N., & Cheng, T. H (2024). How does ethnoscience-students' worksheet (ESW) influence science learning? *Journal of Education and Learning* , *18* (2), 403–412. https://doi.org/10.11591/edulearn.v18i2.21178

Pieter, J., Risamasu, P. V. M., & Pieter, J. (2024). Integrating Ethnoscience in Physics Teaching Materials and its Impact on Student's Science Process Skills and Mastery Concept. *Journal of Science Education Research* . *10* (6), 2948–2955. https://doi.org/10.29303/jppipa.v10i6.7210

Ramdani, A., Jufri, A. W., Gunawan, Fahrurrozi, M., & Yustiqvar, M. (2021). Analysis of students' critical thinking skills in terms of gender using science teaching materials based on the 5e learning cycle integrated with local wisdom. *Indonesian Journal of Science Education* , *10* (2), 187–199. https://doi.org/10.15294/jpii.v10i2.29956

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

Rusmansyah, R., Leny, L., & Sofia, H. N. (2023). Improving Students' Scientific Literacy and Cognitive Learning Outcomes through Ethnoscience-Based PjBL Model. *Journal of Innovation in Educational and Cultural Research* , *4* (1), 1–9. https://doi.org/10.46843/jiecr.v4i1.382

Tahya, D., Dahoklory, F. S., & Dahoklory, S. R. (2022). Development of Local Wisdom-Based Chemistry Modules to Improve Students' Science Process Skills. *Journal of Science Education Research* , *8* (2), 731–739. https://doi.org/10.29303/jppipa.v8i2.1424

Widayanti, W., Amaliah, K., Sholikhah, A. U., & Kurniawan, A. (2022). Ethnoscience-Based Interactive E-Module: E-Module Development on Nonrenewable Resources Topic. *Indonesian Journal of Science and Mathematics Education* , *5* (3), 261–270. https://doi.org/10.24042/ijsme.v5i3.13806

Yuliana, N. (2007). Fermentation Profile of Rusip Made from Anchovies. *Agritech: Journal of the Faculty of Agricultural Technology, UGM* , *27* (1), 12–17.