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Development of Electronic Student Worksheets (E-LKPD) Pendap Bengkulu Based on Discovery Learning as A Learning Media for Additive Material

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Abstract: This research aims to develop the electronic student worksheets (E-LKPD) Pendap Bengkulu based on Discovery Learning as a Learning Media for Additive Material in Science lesson content for class VIII SMP. This study used the 4D development model (Define, Design, Develop, and Disseminate), which was limited to the development stage with limited trials conducted at SMPN 03 Bengkulu City, with a sample of 33 students from class VIII.1. To collect data, several questionnaires were distributed to media experts, material experts, participants, and students. Data analysis was carried out using descriptive statistical analysis techniques using percentage analysis. The results of the research showed that the feasibility test of E-LKPD involving 3 material experts, 2 media experts, and 2 participants resulted in an 92.3% percentage of validation test results, and it can be said that E-LKPD Pendap Bengkulu, which was developed as a learning medium for additive material for junior high school students, was very feasible to use. Analysis of student readability of E-LKPD Pendap Bengkulu as a learning medium for additive material for junior high school students resulted in a percentage of 89.8% readability response, indicating that E-LKPD is very well applied to junior high school students in grade VIII.

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Introduction

Natural Learning Sciences in junior high schools has an important role in forming students' understanding of natural phenomena. Science subjects aim at critical and scientific thinking skills. Science learning is closely related to critical thinking skills (Legina & Sari, 2022). Improving the quality of education in various fields of learning, including science, in the 21st century also requires students' ability to think creatively (Hidayati *et al*., 2024). The science process skills needed to foster students' curiosity, increase understanding of scientific concepts, and improve carrying out systematic and scientific investigations are requirements for science (Hidayati *et al*, 2024). Stimulating the learners' prior knowledge and making it active for use in the working memory as a foundation for new information is the key to productive and successful learning and Demonstrations can show students what to do, an effective element of a strong learning environment (Sarfo *et al*., 2022)

The science process skills needed to foster students' curiosity, increase understanding of scientific concepts, and improve carrying out systematic and scientific investigations are requirements for science learning(Rahman & Limatahu, 2020). Efforts to teach students science concepts actively and make discoveries about them. The concept of science is that the teacher provides an initial stimulus that encourages students to learn. According to Balim

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(2009), the discovery learning model is in accordance with constructivism because it allows students to learn more actively by building their own knowledge. According to Illahi (2012), the Discovery Learning model relies on direct experience in the field rather than on learning theories contained in textbook guidelines. The Discovery Learning Model is a collection of learning activities that emphasize critical thinking and analysis as a way to find and solve problems (Martaida *et al*., 2017). Learning local wisdom is decreasing Khaerani *et al*. (2020) found that local potential maintains original science ideas that are beneficial for students and the wider community because learning based on local wisdom makes learning more contextual so that students quickly understand what is being taught.

This form of support for preserving local wisdom by teaching students the values of local wisdom serves as the initial foundation for forming students' character in their learning process, and each region has a unique culture and lifestyle. Summary (2017) shows how important it is to learn science by linking local wisdom, which includes concepts, procedures, and context, so that students' scientific understanding of natural phenomena becomes more contextual and meaningful. Bakhtiar (2016) revealed that local wisdom-based learning can provide contextual and real learning because it is very close to students' real lives, making it easier for them to understand what they are learning. The student-community approach can be used as a learning resource based on local wisdom that integrates ideas with existing local wisdom.

One of the traditional foods that can be associated with science learning is a typical food from Bengkulu City, namely *pendap*. The local wisdom used as an approach in research is the ingredients used during the Pendap food production process using additives. In the process of processing, packaging, or storing food, compounds or mixtures of various compounds that are deliberately added to food are called additives. Additives are not used as the main ingredient in the process(Haryani *et al*., 2022). Additives are very important in modern life, especially in the food and manufacturing industries. However, it is important to understand that the use of additives must be strictly regulated and meet safety standards to ensure that users remain safe and healthy. Excessive use of food additives causes various health problems such as poisoning, damage to nerves, kidneys, and liver, birth defects, gastroenteritis, seizures, leg abnormalities, growth abnormalities, infertility, and even death (Yamin, 2020).

Choosing appropriate and correct learning media aims to make the learning process easy for students. Learning outcomes can be achieved by using innovative and interesting learning methods (Zahwa & Syafi'i, 2022). One of them is electronic student worksheets (E-LKPD) based on Discovery Learning which makes students active in learning science. E-LKPD aims to grow students' ability to think and understand the material presented. E-LKPD can enable students to gain direct experience and be actively involved in making the material easier to understand (Syafruddin *et al*., 2022).

This research aims to develop the electronic student worksheets (E-LKPD) Pendap Bengkulu based on discovery learning as a learning media for additive material in science lesson content for class VIII SMP. The choice of additive material in science lessons for developing learning media was due to the fact that, from interviews and direct trials with students, the development media used during the learning process was still not appropriate because students' understanding was only based on ready-to-use worksheets and textbooks. The media used during the learning process is not interesting, making it difficult for students to understand what is being taught (Asmayanti *et al*., 2022). This research is important to

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carry out because it is hoped that it can become an alternative learning medium that can help the learning process, increase student activity, and make the material easier to understand.

Research Method

Research and development (R & D) was the research method employed in this study using the 4D model adapted from Thiagarajan (1974), which has been modified by (Novitasari & Wardani, 2020). The steps of the 4D model were defined, designed, developed, and disseminated. It was only up to the developing stage examined in this study. This was done because of the time and limitations of researchers to conduct development trials. Due to the existing limitations, 3D models are very helpful for researchers in conducting limited tests on the development of teaching materials. The test was carried out at the development stage when the product was developed and validated by practitioners and experts with a total of 33 samples.

The 4D development model was chosen because the stages match the research design to produce a learning media product. The 4D model learning design is simple (Rajagukguk et al., 2021). The use of this model is adjusted to the product features created by the researcher (Salsabila & Ninawati, 2022). The learning tools were carried out according to the media, and the researcher used the observation method in class VIII, SMPN 03, Bengkulu City. In the next stage, researchers created a questionnaire for the validation of experts, participants, and media experts. The expert validation questionnaire was addressed to media experts and material experts who are learning media lecturers and material experts at Bengkulu University, and the participant validation questionnaire was addressed to science teachers in class VIII, SMPN 03, Bengkulu City. Descriptive statistical analysis aims to analyze research data. Percentage analysis was used as a validation questionnaire for the suitability of the material and design of the product being developed, which has four options according to the content of the questions. The total assessment score can be calculated using the following formula Sugiyono (2014) :

$$P = \frac{\textit{jumlah skor hasil pengumpulan data}}{\textit{jumlah skor maksimal ideal}} \quad \frac{\text{Number of data collection scores}}{\text{Ideal maximum score}} \quad \frac{\text{Number of data collection scores}}{\text{Ideal maximum score}} \times 100$$

Information :
P : Eligibility percentage
The suitability data is used to determine the suitability level of the product produced.

Table 1. Assessment Criteria for Validation Results

Percentage	Category
76% - 100%	Very Good, or usable without revision
56% - 75%	Moderately Decent, or usable but needs minor revision
40% - 55%	Less Feasible, it is recommended not to be used because it needs major revisions
0% - 39%	Not Appropriate, or may not be used

Source : (Optiana & Muchlas, 2019)

Product trial questionnaires are used to find out how teachers and students respond to new products. In accordance with the content of the question, this teacher and student response questionnaire has four answer choices. It will be calculated using the following formula (Sugiyono, 2014) :

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$$PK = \frac{\text{Number of data collection scores}}{\text{Criteria score}} \frac{\text{Number of data collection scores}}{\text{Criteria score}} X$$

$$100 \frac{\textit{jumlah skor hasil pengumpulan data}}{\textit{skor kriteria}} \frac{\text{Number of data collection scores}}{\text{Criteria score}}$$

PK = Presentation Readability
Criteria score = Total maximum readability score.
According to Sarip *et al* (2022) readability test results whose percentages are known can be matched with the criteria according to Millah *et al* (2012) in Table 2 as follows:

Tabel 2. Percentage of calculation of student readability score range

Score Range	Category
>80%	Very Good
70% - 79%	Good
60% - 69%	Enough
50% - 59%	Less
<50%	Very Lacking

Results and Discussion

Pendap Bengkulu

Pendap is a typical food of Bengkulu Province. Savory and spicy in taste, this dish consists of fish processed with special spices and grated coconut cooked in taro leaves and banana leaves. To make pendap, you can use various types of fish, such as jenihin, snapper, canal, or rumbling. The process is quite long—about 8 hours—until the taro leaves no longer cause itching on the skin and the fish is completely cooked. The results of an interview with a legendary pendap maker in Bengkulu City, explained that the special spices used were shallots, garlic, candlenut, grated coconut, galangal, turmeric, red chili, sugar, orange leaves, bay leaves, lemongrass, salt, tamarind, and kencur. All spices are mixed except candis acid, orange leaves, and bay leaves. These three components are used as a complement to the boiling process to create a fragrant aroma and relieve itching in taro leaves. During the boiling process, the flavoring must be constantly filled with water if the cooking water is reduced so that it does not dry out. Several different Pendap manufacturers are in the manufacturing process. Steaming time varies; some say just overnight, and some say a minimum of 8 hours. During the steaming process, the fish bones become soft because they are pinched by the taro leaves (Iktarastiwi & Marwanti, 2023). This will certainly make it easier for customers to consume it.

In this boiling process, two stages are carried out every 4 hours, where flipping the position of the flavoring is carried out so that boiling is evenly distributed. At the same time, water returns after 4 hours of the boiling process, and candis acid and salt are added again after adding water to the boiling process. Cahyani (2018) Kanaya & M. (2021) The ethyl acetate fraction of candis acid contains phenolic compounds, flavonoids, alkaloids, saponins, hydroxycitric acid, and ascorbic acid to protect the body from free radicals. Studies show that to increase shelf life, you can add salt and citric acid when boiling. Adawiyah (2008) Kanaya & M. (2021) They concluded that, in order to maintain the quality of production, the amount of salt given is very important. Regularly changing water will prevent the spread of microbes in fish, and salt serves as a preservative and creates a savory taste.

It can be concluded that, in order to maintain the quality of production, the amount of salt given is very important. Regularly changed water will prevent the spread of microbes in fish, and salt serves as a preservative and creates a savory taste (Kanaya & M, 2021). Similar

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to orange leaves, bay leaves also have a function as a flavorer, which also contains essential oils. The last additive in the boiling process is lemongrass as an aromatic, but not only that (Dwi *et al*., 2021) found that lemongrass contains active ingredients, minerals, vitamins, essential oils, and antioxidants that are good for the body. Lemongrass can also help reduce irritation and has antifungal and antiseptic properties. The process of making pendap has several stages: preparing tools and ingredients, then mixing these ingredients, such as onion, garlic, candlenut, grated coconut, galangal, turmeric, red pepper, sugar, salt, candis acid, and kencur, as additives, then adding fresh fish and wrapping in taro leaves. The addition of additives is not without reason; there are functions and contents in each ingredient added. Turmeric and red pepper, in addition to providing flavoring, are also coloring ingredients in cooking due to the presence of yellow curcumin and red pigments from carotenoids, which are reinforced in research (Puspitasari *et al*., 2015). Curcumin is one of the compounds that make turmeric yellow, or curcuminoid. Red chili turmeric is also used as a carotenoid dye for traditional cooking (Sudaryati *et al*., 2014).

Mixing candlenut as a flavor enhancer in food where candlenut as a natural flavoring, MSG, and hazelnut substitutes contain many amino acids in the form of essential and non-essential that boost the immune system (Rahayu et al., 2016). The addition of onion, garlic, salt, kencur, and grated coconut as flavors. The content of garlic is antiseptic and antibacterial because it contains essential oils, and according to Aryanta (2019), shallots contain a lot of potassium minerals, which are important for metabolic processes. Red onions contain calcium and phosphorus minerals that are important for maintaining blood pressure balance, preventing hardening of blood vessels, cleaning blood vessels from bad cholesterol deposits, regulating skeletal muscle contractions and smooth muscles, and helping nerve and brain function. Salt, besides being used in the boiling process, is also used as a flavoring, where it is the salty flavor giver in cooking. According to Yusmita (2017) and Novianti (2020), table salt is a chemical consisting of sodium and chlorine that produces a salty taste in cooking and is usually used as a flavoring seasoning. Salt has the ability to selectively stop certain polluting microorganisms.

In addition, salts have the ability to influence the water activity of a substrate, which allows them to control the development of microbes. With the addition of additives in the form of flavoring, namely kencur, because of the content of essential oils, kencur has anti-inflammatory, antimicrobial, antidiarrheal, antiviral, and anticancer properties *(Irmayanti et al*., 2023). Old coconut is added as a flavoring, making food savory. Because old shredded coconut has protein content (amino acids), coconut turns into fat with age, so the fat content in the coconut endosperm increases with age. The fat content in some older types of coconut ranges between 19.25 and 32.20% (Aswan *et al*., 2021). The addition of sugar aims to create the sweetness of the cooked food and strengthen its taste. Granulated sugar serves as a natural sweetener for foods and beverages by providing texture and flavor through a shutting reaction. The sugar content consists of 97.1% sucrose, 1.24% reduction sugar, 0.96% water, and 0.7% organic compounds other than sugar. One of the disaccharides that function in the food processing process is sucrose, which consists of glucose and fructose molecules(Dwi *et al*., 2021).

According to the results of interviews with several sources of pendap makers in Bengkulu City, the types of fish used in making pendap are jenihin fish *(Lutjanus analyst),* red snapper *(Lutjanus campechanus),* and canal fish *(Johnius carouna).* The fish used are those that do not have many bones. The original pendap from ancient times only used sea fish, but from an interview with Rusniayati, who is a pendap producer on Beringin Street, I

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learned that currently he also produces pendap from freshwater fish. This is driven by diverse consumer needs. The use of taro leaves when making flavoring ensures that spices, sea fish, and shredded coconut are not destroyed so that water does not enter the ingredients during the boiling process. Pendap has a savory taste and a more spicy flavor than other flavors. Boiling that takes up to 8 hours to avoid itching over high heat makes this cooking unique and interesting.

Development of Electronic Student Worksheets (E-LKPD) based on Discovery Learning

Define

1) Front-end analysis

The results of observations and teacher interviews were used to evaluate problems that arose during the learning process of learning tools at SMPN 03 Kota Bengkulu. The findings showed that students felt bored and not interested in learning additive material only with books and LKS. It is different if students receive the product and find the additives. Because students do not see the manufacturing process and the materials used, they still have difficulty classifying the types and sources. It was also discovered by Istyadji & Hafizah, (2023). In additive material, science learning only depends on learning textbooks. However, the book is limited to concept depictions due to the large amount of text writing and few images, so it lacks showing real-life events. Later studies by Wahyuningsih *et al*. (2023). found that basic competencies in additives are studied in science class VIII. This material is very relevant in everyday life. Miranti *et al*. (2021) also stated that students in Indonesia are faster to solve problems often or have encountered them (routine problems) and have difficulty when facing unusual problems (nonroutine problems). It is also stated that students in Indonesia are faster to solve problems often or have encountered them *(routine problems)* and have difficulty when facing unusual problems *(nonroutine problems).*

2) Learner analysis

Additive material is found in grade VIII junior high school; in this class, students are usually aged 13–14 years. In line with research by Nainggolan (2021), the child begins logical thinking and formal operations (13–17 years). At this age, students already have the ability to organize hypothetical situations, and they also have the ability to think logically. The results of an interview with a science teacher at SMPN 03 Kota Bengkulu, show that the use of digital teaching materials with a discovery learning approach is in accordance with the character of students and that the use of digital teaching materials is something new for students. Not only that, this observation takes place at the time the researcher is teaching additive material using LKS and textbooks. Students feel bored and even ignore the negative impact of using additives.

3) Task Analysis

In order for students to achieve minimum competency, they must identify the abilities that must be possessed. An analysis of the core competencies and basic competencies of various additives in food and beverages, as well as their impact on health, from the 2013 curriculum on the content of science additives to be achieved.

4) Concept analysis

Concept analysis is used to find, explain, and structure concepts that are in line and taught systematically. Learning objectives are based on this analysis. In this step, an analysis of class VIII junior high school material on additive materials is carried out. This is done by analyzing core competencies (IC) and basic competencies (KD) and making concept analyses.

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Design

To improve students' science process skills, researchers design initial product prototypes or interactive E-LKPD product designs with Discovery Learning model-based direct worksheets on additives. The E-LKPD product is created based on the following steps:

1) Media Selection

E-LKPD is created using Canva educational software and a worksheet platform, where media are selected based on analysis of student needs, concept analysis, and characteristics of target users. Media selection to find learning media that is relevant to the material and in accordance with student needs.

2) Forma Selection

The Discovery Learning learning model was used to select this development format. The model includes phases of stimulation, problem formulation, data collection, data processing, verification, and generalization. This model is also integrated with indicators of basic science process skills such as stimulation, problem statements, data collection, data processing, verification, and generalization. This model is integrated with indicators of basic science process skills, which include observing, predicting, classifying, measuring, communicating, and inferring.

3) Initial Design

The result of this effort is the design of the E-LKPD storyboard, called Draft I. The storyboard contains the first page of the cover, which contains the logo of Bengkulu University, Tut Wuri Handayani and Kampus Merdeka, the title of E-LKPD, pictures, names and classes of students, names of authors and supervisors, and the designation of e-modules (for junior high school / MTs Class VIII)) Introduction (preface, table of contents, info on using E-LKPD, instructions for using E-LKPD, KI-K, achievement indicators, learning objectives) Content (pictures, questions, videos, questions, let's play, answer questions) Concluding (evaluation, Important information, glossary) Bibliography (bibliography, bibliography details) Author profile (author bio, author bio details).

4) Instrument design

The instrument design in this study consists of validation instruments for material experts, media experts, participants, and student response questionnaires.

Develop

After making changes based on validator suggestions and test data, the development stage is completed until the final form of the product is in the food load of Pendap Bengkulu.

Figure 1. Pendap Bengkulu

The end of the product can be accessed at the following link : https://shorturl.asia/8y6jI and Learning videos can be accessed at the link : https://shorturl.asia/sFTlS. The media was developed and then entered the validation stage by being given a questionnaire instrument sheet with validators and student readability tests as many as 33 samples of grade VIII.1 students of SMPN 3 Bengkulu City.

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Expert Appraisal

Expert assessment is aimed at obtaining substantive changes and validating or evaluating the feasibility of the product concept. As supported by Salsabila & Ninawati (2022) validation aims to get input on the feasibility of media and materials that have been designed and prepared. Here is an expert explanation of validation:

1) Validation Test

Validation was carried out by six validators, consisting of two media experts, two material experts, and two practitioners. The results of E-LKPD validation can be seen in Table :

Table 3. Validation Test Results

No	Validation Test Results	Percentage (%)	Category
1.	Material Expert	91,6 %	Very Good
2.	Media Expert	92,5 %	Very Good
3.	Practitioners	92,9 %	Very Good
	Average Percentage	92,3 %	Very Good

In accordance with the calculations, the validation test has an average percentage of 92.3% in the "very good" category, with each material expert scoring of 91.6% in the "very good" category, 92.5% of media experts in the "very good" category, and practitioners showing a figure of 92.9% in the "very good" category.

2) *Development Testing*

Products are improved using test results. After improvement, the product is tested until it obtains the results of the student readability test. Students totaling 33 students from grade VIII from 1 SMPN 03 Kota Bengkulu were surveyed and received a questionnaire with 15 questions for the trial. This questionnaire provides an assessment ranging from aspects of interest to material components and language in E-LKPD. The following readability results for E-LKPD can be seen in the table:

Table 4. Student Response Test Results

No	Feasibility Aspect	Percentage (%)	Criterion
1.	Interest	89,5 %	Very Good
2.	Material	90,3 %	Very Good
3.	Language	89,8 %	Very Good
	Average Percentage	89,8 %	Very Good

The information contained in this E-LKPD is about the scope of additives, including the types and sources of additives, the process of making Bengkulu pendap, and the impact of excessive use of additives. Based on the validation results, which contain the interest component of E-LKPD, which makes students more enthusiastic about studying science because of the illustrations and videos of additive material, the material components in E-LKPD arouse curiosity, and the discussion material can be understood with clear pictures and complete explanations because the delivery of material in the Bengkulu pendap E-LKPD is related to everyday life. A language component that uses sentences, paragraphs, language, and letters that are easy to understand, simple, and easy to read. The results of the discussion assessment show that students understand the E-LKPD material and can answer questions. This is supported by research findings conducted by (Hardiningrum *et al*., 2023) that the existence of video media can make learning more effective in describing abstract or real learning by developing learning videos based on local wisdom. Based on the validation results, it was found that the feasibility test was 89.8%, and it was concluded that E-LKPD was very feasible to use. According to Desilva et al. (2020) the presentation is 81-100% feasible by going through the stages of critique and constructive advice in this study.

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Conclusion

The feasibility test of electronic student worksheets (E-LKPD) involving 3 material experts, 2 media experts, and 2 participants resulted in a 92.3% percentage of validation test results, and it can be said that E-LKPD Pendap Bengkulu, which was developed as a learning medium for additive material for junior high school students, is very feasible to use. Analysis of student readability of E-LKPD Pendap Bengkulu as a learning medium for additive material for junior high school students resulted in a percentage of 89.8% readability response, indicating that E-LKPD is very well applied to junior high school students in grade VIII.

Recommendation

In order for teacher performance to increase so that learning objectives can be achieved, it is hoped that science teachers can develop the ability to teach and learn activities on additive material based on discovery learning using the Pendap Bengkulu E-LKPD as an effort to support local wisdom. Students can pay attention to the work steps in E-LKPD so that learning objectives can be successful. Apart from that, students actively demonstrate a scientific attitude, and electronic learning media can be used as a learning resource both at school and at home. Future researchers are expected to be able to conduct broader research to reach a large-scale distribution stage.

References

Aryanta, I. W. R. (2019). Bawang Merah Dan Manfaatnya Bagi Kesehatan. *Widya Kesehatan*, *1*(1), 29–35. https://doi.org/10.32795/widyakesehatan.v1i1.280

Asmayanti, A., Budiyono, H., & Syuhada, S. (2022). Penggunaan Media Video Berbasis Poowton pada Pembelajaran Tematik untuk Siswa Tunagrahita di Sekolah Luar Biasa. *Ranah Research : Journal of Multidisciplinary Research and Development*, *4*(3), 231–241. https://doi.org/10.38035/rrj.v4i3.488

Aswan, M., Bahri, S., & Ibrahim, A. R. (2021). Karakteristik Kandungan Kimia Endosperm dan Air Kelapa Bido Pada Tingkat Umur Buah yang Berbeda. *Prosiding Seminar Nasional Agribisnis 2021*, 97–102.

Bakhtiar, D. (2016). Bahan Ajar Berbasis Kearifan Lokal Terintegrasi STM (Sains, Teknologi, dan Masyarakat) pada Mata Pelajaran Fisika. *Seminar Nasional Pendidikan*, *1*, 650–660.

Desilva, D., Sakti, I., & Medriati, R. (2020). Pengembangan Instrumen Penilaian Hasil Belajar Fisika Berorientasi Hots (*Higher Order Thinking Skills*) Pada Materi Elastisitas Dan Hukum Hooke. *Jurnal Kumparan Fisika*, *3*(1), 41–50. https://doi.org/10.33369/jkf.3.1.41-50

Dwi, F. H., Herfian, M., Trias, M. M., Wahyudi, M. C., & Hasanah, R. (2021). Studi Etnobotani Minuman Pokak di Desa Clarak Kabupaten Probolinggo Sebagai Potensi Wisata Kuliner. *Experiment: Journal of Science Education*, *1*(2), 63–70.

Hardiningrum, E. D., Djudin, T., & Nurdini, A. (2023). Pengembangan Media Video Animasi Berbasis Kearifan Lokal untuk Meningkatkan Literasi Lingkungan pada Pembelajaran IPA. *Journal Visipena*, *12*(3), 998–1005.

Haryani, N., Hadi, L., & Rasmawan, R. (2022). Pengembangan Modul Zat Aditif Berbasis Kearifan Lokal Pengolahan Makanan Masyarakat Desa Karimunting. *Jurnal Education and Development*, *10*(3), 43–50.

Hidayati, S. A., Hariyadi, S., & Putra, P. D. A. (2024). Development of STEM-Based Educational Games As Differentiated Learning Media to Improve Students'

Creative Thinking Skills. *Jurnal Paedagogy*, *11*(1), 1. https://doi.org/10.33394/jp.v11i1.9589

Iktarastiwi, N., & Marwanti. (2023). Pendap as a Bengkulu Culinary Treasure. *MUDRA Jurnal Seni Budaya*, *38*(2), 130–140.

Irmayanti, L. I., Ayu, D., & Permatasari, I. (2023). Identifikasi Sakarin dalam Sediaan Jamu Instan Beras Kencur yang Beredar di Pasar Gede Kota. *Jurnal Medika Nusantara*, *1*(4).

Istyadji, M., & Hafizah, E. (2023). Pengembangan Media Pembelajaran Interaktif *Articulate Storyline* Materi Zat Aditif Kelas VIII SMP. *Jurnal Pendidikan, Sains Dan Teknologi*, *2*(4), 1071–1075.

Kanaya, O. N., & M, D. (2021). Studi Etnobotani Sate Padang di Keluruhan Gurun Laweh, Kecamatan Nanggalo, Kota Padang. *Prosiding SEMNAS BIO 2021*, 563–574.

Khaerani, S. H., Utami, S. D., & Mursali, S. (2020). Pengembangan Perangkat Pembelajaran IPA Berbasis Kearifan Lokal untuk Meningkatkan Hasil Belajar Kognitif Siswa. *Journal of Banua Science Education*, *1*(1), 35–42.

Legina, N., & Sari, P. M. (2022). Pengembangan Media Pembelajaran Interaktif Articulate Storyline Berbasis Keterampilan Berpikir Kritis pada Pembelajaran IPA bagi Siswa Sekolah Dasar. *Jurnal Paedagogy*, *9*(3), 375. https://doi.org/10.33394/jp.v9i3.5285

Martaida, T., Bukit, N., & Ginting, E. M. (2017). The Effect of Discovery Learning Model on Student ' s Critical Thinking and Cognitive Ability in Junior High School. *IOSR Journal of Research & Method in Education (IOSR-JRME)*, *7*(6), 1–8. https://doi.org/10.9790/7388-0706010108

Miranti, K., Syahmani, & Santoso, Uripto, T. (2021). Kepraktisan Perangkat Pembe;ajaran Dengan Model Pembelajaran Inkuiri Terbimbing pada Materi - Materi Zat Aditif dan Zat Adiktif. *Jounal of Banua Science Educationnal of Banua Science Education*, *2*(1), 9–14.

Nainggolan, A. M., & Daeli, A. (2021). Analisis Teori Perkembangan Kognitif Jean Piaget dan Implikasinya bagi Pembelajaran. *Journal of Psychology*, *2*, 31–47.

Novianti, T. (2020). Kajian Pemanfaatan Daging Ikan Kembung (*Rastrelliger Spp*) sebagai Bahan Penyedap Rasa Alami Non MSG dengan Pendekatan Bioekonomi Perikanan. *Barakuda 45: Jurnal Ilmu Perikanan Dan Kelautan*, *2*(2), 56–68. https://doi.org/10.47685/barakuda45.v2i2.76

Novitasari, L., & Wardani, N. S. (2020). Pengembangan Instrumen Sikap Toleransi Dalam Pembelajaran Tematik Kelas 5 SD Kurikulum 2013 di Indonesia dengan Standar Kompetensi Lulusan Bhinneka Tunggal Ika yang dengan arti berbeda-beda tetapi tetap. *Penelitian Tindakan Kelas Dan Pengembangan Pembelajaran*, *3*(1), 41–52. https://doi.org/10.31604/ptk.v3i1.41-52

Optiana, N., & Muchlas. (2019). Pengembangan Panduan Penilaian Berbasis E-Portofolio Menggunakan Edmodo dalam Pembelajaran Pratikum Fisika untuk Sekolah Menengah Atas. *Jurnal Riset Dan Kajian Pendidikan Fisika*, *6*(2), 1–5. https://doi.org/10.12928/jrkpf.vxix.xxxx

Puspitasari, D., Bidiono, J. D., & Suparno, G. (2015). Kunyit (*Curcuma Domestica Val.*) sebagai Pewarna Alternatif Pewarnaan Tulang Embrio Ayam (*Gallus-Gallus*). *Jurnal Bioedu Berkah Ilmiah Pendidikan Biologi*, *4*(1), 827–831. http://ejournal.unesa.ac.id/index.php/bioedu%0AKUNYIT

Vol. 11 No. 2 : April 2024
E-ISSN: 2722-4627
pp. 364-374

Rahayu, I. mbbang D., Sutawi, & Hartatie, E. S. (2016). Aplikasi Bahan Tambahan Pangan (BTP) Alami dalam Proses Pembuatan Produk Olahan Daging di Tingkat Keluarga. *Jurnal Dedikasi*, *13*, 69–74.

Rahman, R. A., & Limatahu, I. (2020). Melatihkan Keterampilan Proses Sains Siswa SMA Negeri 8 Kota Ternarte melalui Penerapan Model Pembelajaran CCDSR (Condition, Construction, Development, Simulation, Reflection). *JPPS (Jurnal Penelitian Pendidikan Sains)*, *9*(2), 1783–1789. https://doi.org/10.26740/jpps.v9n2.p1783-1789

Rajagukguk, K. P., Lubis, R. R., Kirana, J., & Rahayu, N. S. (2021). Pelatihan Pengembangan Media Pembelajaran Model 4D pada Guru Sekolah Dasar. *Jurnal Pengabdian Kepada Masyarakat*, *2*(1), 14–22. https://jurnal.stkipalmaksum.ac.id/index.php/jpkm/article/view/144

Salsabila, I., & Ninawati, M. (2022). Pengembangan Media Pembelajaran Pop-up Book Berbasis Kontekstual Muatan Pelajaran PPKN Kelas IV Sekolah Dasar. *Jurnal Paedagogy*, *9*(4), 684. https://doi.org/10.33394/jp.v9i4.5665

Sarfo, F., Debrah, P., Amankwah, F., & Mensah, F. (2022). Development of expertise in science at basic schools: The effect of first principles of instruction with computer animation and chart and their functional effect on gender. *Cogent Education*, *9*(1). https://doi.org/10.1080/2331186X.2021.2016557

Sarip, M., Amintarti, S., & Utami, N. H. (2022). Validasi dan Keterbacaan Media Ajar E-Booklet untuk Siswa SMA/MA Materi Keanekaragaman Hayati. *JUPEIS: Jurnal Pendidikan Dan Ilmu Sosial*, *1*(1).

Sudaryati, Latifah, & Hermawan, D. E. (2014). Pembuatan Bubuk Cabe Merah Menggunakan Variasi Jenis Cabe dan Metode Pengeringan. *Jurnal Teknologi Pangan*, *16*(1), 74–80

Sugiyono. (2014). *Metode Penelitian Kuantitatif Kualitatif dan R&D*. Bandung : Alfabeta.

Syafruddin, I. S., Pamungkas, A. S., Khaerunnisa, E., & Rafianti, I. (2022). Pengembangan E-LKPD untuk Mendukung Kemampuan Literasi Matematis pada Materi Aritmatika Sosial. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *06*(03), 3214–3227.

Wahyuningsih, M. E., Tamam, B., Bagus, D., Astid, R., Sutarja, M. C., & Hadi, W. P. (2023). Pengembangan Modul Inkuiri Berbasis Scientific Reasoning Ability pada Materi Zat Aditif. *Jurnal Natural Science Educational Research 6*, *6*(1), 16–25.

Yamin, M. (2020). Mengenal Dampak Negatif Penggunaan Zat Adiktif pada Makanan terhadap Kesehatan Manusia. *Jurnal Pengabdian Magister Pendidikan IPA*, *3*(2). https://doi.org/10.29303/jpmpi.v3i2.517

Zahwa, F. A., & Syafi'i, I. (2022). Pemilihan Pengembangan Media Pembelajaran Berbasis Teknologi Informasi. *Equilibrium: Jurnal Penelitian Pendidikan Dan Ekonomi*, *19*(01), 61–78. https://doi.org/10.25134/equi.v19i01.3963

