



Design of Integrated Natural Science E-LKPD Based on Integrated Local Potential Project of Rejang Lebong Regency

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Abstract. The Student Worksheet (LKPD) is a means to assist students and teachers as well as facilitate the process of teaching and learning activities so as to form an effective interaction. Every teaching and learning process requires active students and teachers. Teachers are required to think more critically, creatively and critically in conveying the learning process well. In integrated science learning at the junior high school level (SMP) is in dire need of LKPD that is integrated with local potential in practicum. In Rejang Lebong Regency, the use of the Integrated IPA LKPD is not integrated into the existing local potential. The purpose of this study was to design an E- Student Worksheet (LKPD) in Science Integrated practicum-based integrated Local Potential. The type of research used is a 4D model R & D with the Define and Design stages. The instruments used in data collection were questionnaires and interviews. Based on the results of the *Define* Phase consisting of an analysis of teacher needs, analysis of student characteristics, analysis of learning concepts, task analysis and analysis of the formulation of learning objectives with the conclusion that project-based E-LKPD design in Integrated Science subjects is needed; The *Design* Phase consists of compiling a benchmark reference test, selecting media and selecting a format, so as to produce an E-LKPD design.

Keywords: E-LKPD · Integrated Natural Sciences · Integration of Local Potential of Rejang Lebong Regency

1 Introduction

Independent Curriculum is a curriculum that aims to hone interests and talents learners. So that learning does not only focus on pedagogical competence but also focuses on psychomotor competence and character development of students. An independent curriculum is defined as a learning design that provides opportunities for students to learn in a calm and fun way, as well as stress-free and pressure-free. Freedom to learn means to focus on freedom and creative thinking in learning.

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Teachers as implementers of learning activities in schools must prepare themselves for the implementation of the Independent Curriculum. This statement is in line with the results of research from [1], that teachers in implementing the Independent Curriculum need to learn a lot to be more skilled and easier to implement. Teachers must be creative and innovate in carrying out the teaching and learning process [2]. The role of the teacher is to determine efforts to improve the quality of student learning [3]. Said that these cases show that the Indonesian nation has experienced a crisis of character. The quality of education in Indonesia needs to be improved in terms of mastery of science and technology and children's character.

The science learning process involves various activities between teachers and students in gaining knowledge, forming scientific attitudes and developing skills as an important aspect of life skills. An important scientific attitude to develop is curiosity [4]. When students have a high curiosity, they will try to understand, explore, and analyze various phenomena, symptoms, and natural events including natural phenomena around them. It can help students to hone understanding, connect old and newly acquired information, and train critical thinking. The science learning process is only centered on cognitive development, without involving the development of affective aspects such as attitudes, motivation, and morals [5].

According to [6] the lack of curiosity is caused by passive discussion and question and answer activities between teachers and students, teachers usually ask questions or problems with low cognitive levels. The questions given are only answer-oriented in the book and do not encourage students to provide feedback and they cannot explain their own ideas or thoughts. Curiosity development can be done through open-ended, active discussion activities with the support of interesting teaching materials and the use of technology in learning.

One of the learning tools that is often used is the student activity sheet or abbreviated as LKPD. LKPD according to Permendikbud No 8 (2016) is an LKPD that can direct students to active learning. Similarly, [7] asserts that LKPD is a supporter in the learning process that is made interesting and systematic so that it can help students to be active in learning both independently and in groups. The requirements for the development of a good LKPD are didactic elements (the process of students discovering concepts), construction (clear and easy-to-understand language), and technical (attractive appearance). In the technical element, there are weaknesses, namely the printed worksheets circulating in schools have a colorless appearance so they do not attract students' interest in learning. Then the limited number of LKPD in learning, resulting in students having difficulty in remembering the material and feedback is also less fast.

[8] explains that the LKPD published by publishers circulating in schools is only a summary of material and practice questions that have not been presented in an interesting way, thus making students less active during learning. Furthermore, [8] explained that the questions given were less varied and in the form of multiple choices which did not trigger students to think at a higher level.

The national education system requires the preparation of a curriculum to take into account the diversity of regional and environmental potentials, as stated in Article 36 of Law no. 20 of 2003 concerning the National Education System (Law of the Republic of Indonesia Number 20, 2003). The integration of local potential into learning in schools is very necessary, especially in the current situation where the younger generation is experiencing a degradation of respect for local potential and culture. The integration of regional potential into learning will provide insight to students regarding regional potential and the values of local wisdom. The introduction of regional potential can increase students' respect for local potential, recognize the values of local wisdom and experience the internalization of values that can lead students to become individuals with character.

This is in line with [9] The integration of local potential can improve student learning outcomes and respect for the environment [10]. Increasing the living values of honesty and cooperation through learning physics based on local potential is more effective [11]. The advantage of developing LKPD integrated with local potential makes learning more interesting. Learning activities are very close to the lives of students and are contextual in nature [12]. LKPD IPA based on the 7E learning cycle integrated with the local potential of the Parangtritis beach effectively improves students' critical thinking.

[13] in his research stated that learning with the web-LKPD integrated with Local Potential is effective [14]. The effectiveness of e-LKPD based on scientific literacy has very high criteria [15]. States that the Digital LKPD which contains sample questions can train students to solve problems and make students more challenged to solve problems and explore the material [16]. Student Activity Sheets (LKPD) based on local potential that are developed are classified as practical [17]. Learning based on local potential needs to be done so that students better understand and care about the environment, and better understand concepts [18]. The local potential integrated book can also become an alternative-learning mode.

Based on the results of observations of the local potential in Rejang Lebong district, there are quite a lot, however are not used as learning resources or have not been integrated into the learning process. Based on the results of interviews with junior high school teachers in Rejang Lebong district, the integration of local potential into Integrated Science learning at the first school level in Rejang Lebong district has not been widely carried out. This is due to the burden of too many teachers, the absence of an adaptable learning model; limited facilities, funding, and time. Besides that, The main obstacle that arises is because teachers do not understand how to properly integrate the potential of the environment in the Integrated Science learning process.

The integration of local potential in Integrated Science learning needs to be directed at the overall learning achievement of students in accordance with the nature of science, namely students who have science knowledge, have science skills, have a scientific attitude, and are able to apply science knowledge in everyday life. -day, so that it can lead students to become individuals who have science literacy. Therefore, it is necessary to design an Integrated Natural Science E-LKPD based on an Integrated Local Potential Project in Rejang Lebong Regency.

2 Method

The method in this research is to apply Research and Development (R&D). The research design carried out by researchers in developing this LKPD was adapted from the 4D development model offered by Thiagarajan, Semmel, and Semmel. The 4D development model consists of four stages of development, namely define, design, develop, and disseminate [19]. In this study, researchers only conducted research up to the analysis and design stage. The respondents in this study were teachers of the Integrated Natural Sciences Junior High School in Rejang Lebong district. The data was obtained from the results of the distribution of the needs analysis questionnaire conducted online using google forms.

3 Results and Discussion

This research focuses on the design of a product in the form of: E-LKPD IPA Integrated Project-based Integrated Local Potential Rejang Lebong district. The planning process is described using a 4D model and is limited to the *define* and *design stages*.

1. *Define stage*.

The first stage is the *define stage*. This stage is the analysis stage, which consists of analysis of teacher needs, analysis of student characteristics, analysis of learning concepts, task analysis and analysis of the formulation of learning objectives.

a. Teacher needs analysis

Based on the results of the analysis of teachers who teach Integrated Science in Rejang Lebong Regency as resource persons, it was found that E-LKPD based on Integrated Local Potential projects Rejang Lebong district is needed for Integrated Science subjects at the junior secondary level [20]. The advantages of this interactive LKPD have been proven through the results of the product feasibility test which obtained very good and good qualifications. The implication of this research is that technology continues to develop causing the teaching materials provided by the teacher to students must also develop, so that the existence of interactive worksheets by utilizing technology is necessary so that students are technologically literate. The conclusion of the teacher needs analysis questionnaire can be seen in the following Table 1.

Based on the results of the distribution of teacher questionnaires, it can be seen that the project-based E-LKPD based on the Integrated Local Potential of the Rejang Lebong district needs to be made because it is very much needed in Integrated Science learning. Students will be more enthusiastic and motivated because they learn directly from the natural life around them.

b. Analysis of the characteristics of students

The results of the analysis of the characteristics of students as many as 24 respondents obtained the nature and attitudes of students in Integrated Science learning activities. Students need an integrated project-based E-LKPD with local potential. Analysis of student needs can be presented in the following Table 2.

Table 1. The results of the teacher's needs analysis questionnaire.

No	Component	Questionnaire Results
1	Integrated science learning aspects	Response stated that the teacher stated that some students had difficulty in learning some of the material in the Integrated Science subjects.
2	Integrated aspects of local potential	Learning so far has not been integrated with local potential in Rejang Lebong district. It seems that Integrated Science learning will be more meaningful when it can be integrated with local potential. The teacher is confused about how to integrate the material with the type of local potential.
3	Aspects of Project-based E-LKPD	From the data obtained, the teacher has never used E-LKPD. So far, they have only used existing LKPDs in schools, but the limited number of LKPDs has been constrained. The teacher stated that it was necessary to design and develop a project-based E-LKPD with a colorful image display, an attractive display complemented by video and still include short material and have varied practice questions. From a total of 11 respondents, there are 3 teachers who apply the project learning model to integrated science subjects, the rest use practicum and demonstration models.

The data based on the results of the distribution of the questionnaire on the characteristics of the students can be seen that the Integrated Science learning has been boring so far because the monotony makes the point participants not challenged. The LKPD used is also unattractive so that students are less enthusiastic [21]. Shows that the experience of project activities has a significant effect on the scientific literacy skills in three competencies.

c. Learning concept analysis

The concept of this research is the design concept of an Integrated IPA E-LKPD based on an integrated Local Potential project. The third stage is the concept analysis stage according to [22] and [23] concept analysis is carried out by identifying the main material that needs to be taught and included in the material, collecting information and selecting relevant materials, identifying core competencies, basic competencies, indicator (Table 3).

Table 2. Results of the questionnaire Analysis of student needs.

No	Component	Questionnaire Results
1	Integrated science learning aspects	Students said that so far, Integrated Science learning was carried out in the classroom once in a while in the school environment. Science learning is boring, because it is not challenging.
2	Integrated aspects of local potential	From the results of the questionnaire, 24 student respondents stated that they had never studied with the integration of the local potential of the Rejang Lebong district, such as in Suban Air Panas, Mas Bestari Lake, Tri Sakti Waterfall, Madapi Forest, Making Lemea (Typical Food of Rejang Lebong). Students said they would be happy to learn with integrated local potential because learning is not tense, more relaxed and fun because they can directly learn in nature.
3	Aspects of project-based E-LKPD	Of the 24 respondents, students stated that they were interested in learning to use the project-based Integrated IPA E-LKPD. Based on the distribution of the results of the questionnaire, it was found that 33% of students studied using a project-based learning model in Integrated Science subjects. The remaining 67% of students stated that learning uses a practicum and demonstration model.
4	Aspects of the Learning experience	From the data, it can be seen that students tend to have difficulty learning integrated science subjects during the practicum section, due to the limitations of tools and materials in the laboratory. Learning so far is monotonous, so students are limited in being creative and innovating.

d. Task analysis

Task analysis aims to identify the skills that will be included in the tasks on the E-LKPD, which are divided into 2, namely content structure analysis and procedural analysis. The content structure analysis will determine the material from the predetermined indicators. In the procedural analysis is to determine the project-based stages in the E-LKPD which consists of problem identification, project design, preparation of project loading monitor schedule, assessment and evaluation. The results of the project can vary, among others, can be in the form of picture posters from the results of the research that will be displayed in the classroom or at school [24]. Support school included pictures on posters, pictures used in social narratives, and visual cues on a student's desk or a teacher's lanyard.

Table 3. The Local Potential of Rejang Lebong Regency That can be Integrated

Core Competencies	Junior High School Integrated Science Materials	Local Potential in Rejang Lebong Regency	Activities/Discussions that can be done
1. Appreciate and live honest behavior, discipline, responsibility, caring (tolerance, mutual cooperation), polite, confident, in interacting effectively with the social and natural environment within the reach of the association and its existence. 2. Understanding knowledge (factual, conceptual, and procedural) based on his curiosity about science, technology, art, culture related to visible phenomena and events. 3. Trying, processing, and presenting in the concrete realm (using, parsing, assembling, modifying, and creating) and abstract realms (writing, reading, counting, drawing, and composing) according to what is learned in school and other sources from the same point of view/theory.	Environmental pollution	Hot Water Suban River Lake Mas Bestari	1. Observing various pollutions in the hot spring suban river and Mas Bestari lake 2. Measuring the level of acidity or alkalinity with universal indicators by looking at changes in pH 3. Classify the properties of solutions of acids, bases, and salts through appropriate tools and indicators 4. Record changes in odor, color, taste, and temperature 5. Observing the types of microorganisms (protists present in river flows)
	Temperature and Heat	Hot Water Suban Kaba Hill Coffee production	1. Measuring the temperature of the "hot spring" water using a thermometer 2. Measuring heat on changes in body temperature of fellow friends before entering the hot tub and after entering the hot tub 3. Looking for information/interviews with hot spring guards about the origin of the hot water and linking it with other references 4. Crater temperature measurement 5. Observing the change in the shape of coffee due to the influence of heat when roasting
	Forest Resource Potential	Madapi Forest Kaba . Hill Forest	1. Observing, recording and reporting on forest resources, benefits, types and spread of Madapi Forest, and Bukit Kaba Forest.
	Standard and Nonstandard Units	Coffee plantations Use of cupak	1. Calculates coffee weight in cups and compares to Kg units. 2. Calculating the length of "sedepo seseto" (one and a half cubits) in coffee cultivation

(continued)

Table 3. (continued)

		3. Conducting interviews with local communities about the use of non-standard units
Classification of living things And non-living things	Madapi Forest Tri Sakti Waterfall Kaba Hill Mas Lake Hot Water Suban	1. Observing plants based on their morphology and habitat in Madapi Forest/Waterfall/Bukit Kaba/Mas Lake/Suban Hot Springs 2. Observing animals by class and phylum in Madapi Forest/Waterfall/Bukit Kaba/Mas Lake/Suban Hot Springs 3. Observing living things and objects in the surrounding environment based on the characteristics observed in the Madapi Forest/Waterfall/Bukit Kaba/Mas Lake/Suban Air Panas
Living Creatures and the Environment	Madapi Forest Tri Sakti Waterfall Kaba Hill Mas Lake Suban Hot Water	1. Observing the ecosystem in Madapi Forest / Waterfall / Bukit Kaba / Mas Lake / Suban Hot Water 2. Observing biotic and abiotic factors and their interrelationships in the Madapi Forest/ Waterfall/Bukit Kaba/Mas Lake/Suban Air Panas .

e. Formulation of learning objectives

Learning objectives are formulated based on predetermined indicators so that they can be used as a reference for E-LKPD activities. Learning objectives include cognitive and affective aspects (attitudes) [25]. Mentions ability to behave properly marked with the improvement of various capabilities that make human beings' religious creature (submissive to the concept of God), and fulfill their duty as the leaders of the world.

2. Stage of design.

This stage includes the preparation of benchmark reference tests, media selection, format selection. At this stage, it produces practice questions that will be included in the E-LKPD, selects the media, structure and layout and then arranges them so that they become the E-LKPD form as the initial design.

a. Preparation of benchmark reference tests

The practice questions in the E-LKPD are arranged at the end, in the form of an essay based on the established indicators [26]. Adds that the preparation of this test is based on the specification of learning objectives and student analysis so that it can be adjusted to the abilities of students.

b. Media Selection

The selection of media is done to choose the right media to be used for learning content according to the needs of the teacher and the characteristics of the students [27]. Educators are required to design learning media as innovations by utilizing online media. The media used is E-LKPD and the selection of tools and materials used for project completion activities by students.

c. Format Selection

The format used is based on the media that will be designed in the E-LKPD. The design of the E-LKPD uses the help of Canva. The completed LKPD draft is then inputted into the *Flip PDF application*. Format selection is also made based on consideration



Fig. 1. E-LKPD cover design and Integration of Local Potential of Rejang Lebong Regency

POTENSI LOKAL

KABUPATEN REJANG LEBONG



PENCEMARAN LINGKUNGAN

<https://youtu.be/XYtyukOGMTk>



SUHU DAN KALOR

https://youtu.be/MPIGc_tsCs



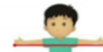
POTENSI SUMBER DAYA HUTAN

<https://youtu.be/alS5Vs-VdeM>

Mengukur Panjang dengan Alat Ukur Tidak Baku



Jengkal



Depa



Hasta

SATUAN BAKU DAN TAK BAKU

<https://youtu.be/7bikHF7GBjc>



KLASIFIKASI MK.HIDUP & TAK HIDUP

<https://youtu.be/EbTU0D7S06s>



MAK.HIDUP & LINGKUNGANNYA

<https://youtu.be/GvJk9dPutQ>

Fig. 1. (continued)

of LKPD quality including format, layout, font shape and size, as well as space and provisions. The components in the LKPD consist of: Introduction, table of contents, instructions for using LKPD, summary of material accompanied by Core Competencies and appropriate local potential [28]. The components in the LKPD, namely introduction, table of contents, instructions for using LKPD, summary of material with SK, KD, indicators, and learning objectives, exercises, student worksheets, self-reflection, and literature. The LKPD design developed is as shown in the Fig. 1.

The integration of each local potential of the Rejang Lebong district can be seen on the YouTube link available on the E-LKPD. In the link, it is explained that every material in the Integrated Science subject can use some of the local potential that exists in Rejang Lebong Regency. Teachers can choose local potentials that will be integrated according to the distance from the nearest school or for some other reason. According

to [29] there are many components that affect ability because teachers ensure students are safe, supported, challenged, involved, and healthy.

The link also includes what activities or discussions must be done, and of course the teacher can also modify it again according to the needs of each student's characteristics. According to [12] the integration of local potential in LKPD refers to learning based on the needs of students to understand the surrounding environment in depth, so that students are expected to be able to take advantage of the potential of their environment. In the E-LKPD, short material is presented so that it does not bore students. This is in line with [30] stated that in science learning, most students enjoy reading books that explain short and explicit material and short and sequential problem-solving.

4 Conclusion

Based on the research that has been done, it can be concluded as follows:

1. The *Define stage* consists of an analysis of teacher needs, analysis of student characteristics, analysis of learning concepts, task analysis and analysis of the formulation of learning objectives with the conclusion that project-based E-LKPD design in Integrated Science subjects is needed.
2. *Design Phase* consists of compiling a benchmark reference test, selecting media and selecting a format, so as to produce an E-LKPD design.

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