Liveworksheet-Based E-LKPD Feasibility Test to Improve Students' Critical Thinking Abilities

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Abstract: This research aims to create an E-LKPD supported by live worksheets to improve students' thinking skills regarding ecosystem material suitable for improving Natural Sciences (IPA) learning. The E-LKPD development method uses ADDIE which consists of 5 stages: (1) Analysis, (2) Design, (3) Development, (4) Evaluation. However, this research is only limited to development. The e-LKDP acceptance criteria are based on the assessment of 5 fifth-grade elementary school teachers. Data analysis uses quantitative descriptive methods. Validity criteria are determined from the validation results of Class V teachers who obtained the average percentage. The results of research data analysis show that e-LKPD developed using live LKS has an average score of 78.46%, which shows that it is suitable to be used as effective learning teaching material to improve students' thinking abilities.

Keywords: E-LKPD; Critical thinking; Liveworksheet

Introduction

The Covid-19 pandemic has an impact on human life. One of the biggest influences felt is in the world of education. Online learning which has been carried out for approximately the past two years due to the spread of the Covid-19 virus has had a low impact on students' results and ability to master learning material. Along with technological developments in the Industrial Revolution 4.0, education depends on technological developments (Deliviana, 2017). Learning activities should utilize existing technology, developments in technology and science influence the use of teaching media in schools and educational institutions. So the use of information technology in the classroom learning process has become mandatory as a demand in the era of industrial revolution 4.0 to increase the effectiveness and efficiency of learning, so that the learning process does not seem monotonous and boring it will hinder the learning process.

A problem that often arises in the world of education is that the use of technology to improve the quality of learning is not optimal (Dewi et al., 2022). The use of technology and information to improve the quality of learning can be done using computers and internet networks (Cholik, 2017). The use of computers in the learning process functions to improve the quality of learning (Sudarsana et al., 2018). A teacher in the learning process is required to be able to use computers to carry out various innovations by the current dynamics of science and technology (Asmaningrum, 2018). However, according to Suharwoto's research, only 40% of teachers who do not use technology (who do not teach ICT) are ready to use technology (Meianti, 2018). Through this activity teachers can improve their skills so they can create information technology-based learning media (Maharani et al., 2017). However, the use of media as a learning resource is still limited to the use of PowerPoint, while the use of PowerPoint has a weakness, namely that it can make students tend not to pay attention (Fardany et al., 2020). Learning media is

media created by teachers creatively and innovatively and used to convey lesson material so that students do not feel bored when following lessons in class (Ayu et al., 2019).

In the process of adapting to new learning habits after the Covid-19 pandemic, one of the things needed for the learning process is online teaching materials using media that are interesting and easily accessible to students (Alperi, 2020; Anugrahana, 2020). To create interesting learning, it is necessary to develop digital teaching materials packaged in online learning media in the form of electronic student worksheets. Student worksheets are one of the teaching materials that can be used and support the teaching and learning process (Prastowo, 2014). Worksheets presented in electronic form not only present material, but are also equipped with interesting videos and pictures that can improve or strengthen students' understanding in studying the material presented (Alhikma, 2021; Wahyuni et al., 2021).

Looking at the results of the last PISA that Indonesia participated in, namely in 2018, shows that in general students' critical thinking abilities are still low. Even compared to the previous year's PISA results, namely in 2015 there was a decline. In 2015 Indonesia was ranked 62nd out of 72 countries, while in 2018 it ranked 73rd out of 79 countries (Hidayah et al., 2019; Yusmar et al., 2023). This is not much different from the results of researchers' observations in class V SDIT Al Firdaus which still showed students' low critical thinking abilities. The learning atmosphere still looks passive because students are not yet active in responding to the teacher. Interaction only occurs between teacher and student. This phenomenon certainly affects students' understanding and learning outcomes. Therefore, there is a need for updates to support students to be more active, one of which is through Student Worksheets (LKPD).

According to the Ministry of National Education, LKPD is a sheet containing tasks that must be carried out by students, in the form of clear instructions or steps to complete the task (Widiyani et al., 2021). LKPD which is prepared based on students' needs is very important to facilitate effective learning activities. This is in line with what was said by Muskita et al. (2020) that LKPD helps facilitate learning activities so that effective interactions can be formed between students and teachers. This interaction can increase student activity in improving learning outcomes.

One of the free online sites used to create or compile interactive LKPD is liveworksheets. This site can be accessed at www.liveworksheets.com for free, but users must register to get an account. The types of questions that can be created on this site are very diverse. Teachers can choose drop-down, multiple choice, check boxes, joint with an arrow, drag-drop, or listening-speaking question types (Hazlita, 2021). Teachers can also use questions that have been created by other users by copying the question link and sharing it with students' WA groups. Another advantage of this site is that after completing the evaluation, the system will automatically provide a score on the worksheets completed by students.

Based on the results of observations and interviews with class V teachers at SDIT Al Firdaus who have used the Merdeka Curriculum, the ecosystem learning process does not use certain learning tools and is classical in nature. This is supported by the statement of the class teacher who has never developed digital-based LKPD during science learning. The class teacher also stated that the LKPD used so far had limitations and was not by the competency achievement indicators. The LKPD used is not accompanied by activity steps that guide students to carry out activities actively following the steps in the chosen learning model. This condition requires teachers to innovate by developing LKPD that is appropriate to the chosen learning model, for example, interactive LKPD based on live worksheets

Method

This research is a type of Research and Development (R&D) research to create new products or improve existing products (Rofiqoh et al., 2020). Meanwhile, according to Sugiyono (2018), the development research method is a research method that produces certain products until their effectiveness is tested. The e-LKPD development model uses the ADDIE model which includes Analyze, Design, Development, Implementation, and Evaluation. However, this research is only limited to the development stage. The reason researchers use the ADDIE model is that the sequences of product development activities in the form of electronic learning media, namely e-LKPD, require descriptive and systematic development steps (Tegeh et al., 2014). The following is the flow of the ADDIE development model.
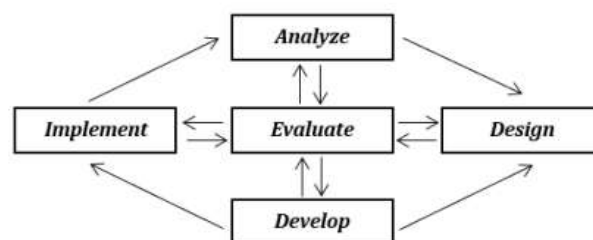

Figure 1. Flow of the stages of the ADDIE model

The first stage of the ADDIE development model is analyzed. The aim is to dig up information related to conditions in the field to find out problems in learning and analyze the reasons for the need to develop teaching materials, especially LKPD (Fuadi et al., 2022). Starting with an analysis of learning due to the impact of the pandemic with pre-research results in the form of an interview with one of the class teachers. Then, the design stage involves designing learning media to produce a product in the form of a viable e-LKPD. This stage begins with preparing material based on basic competencies, selecting learning media in the form of e-LKPD assisted by a live worksheet platform on ecosystem sub-materials to improve critical thinking skills. The development stage is the final stage aimed at producing a product in the form of e-LKPD and getting an assessment (review and validation) as an aspect of feasibility in science learning. Data on feasibility results (validity, practicality, and effectiveness) using the review-validation sheet instrument will obtain quantitative data. The study of e-LKPD aims to obtain qualitative assessments (criticism and suggestions) from class V teachers which can be used as a benchmark for improving e-LKPD. The validity of e-LKPD was carried out by ten class V teachers who were selected randomly. The validity assessment is obtained through the results of the assessment sheet instrument analysis (validation) of the e-LKPD product to be developed. The quantitative descriptive method is used in analyzing validation data in the form of percentages using a Likert scale according to the following table.

Table 1. Scala Likert (Ridwan, 2016)

Criteria	Scala value
Very Invalid	1
Less Valid	2
Fairly Valid	3
Valid	4
Very Valid	5

The resulting data is in the form of ordinal data or qualitative data in the form of scores for the categories of each item (Izzati, 2017). The next analysis is that the ordinal data is transformed to obtain data on an interval scale (Waryanto et al., 2006). The percentage gain will be analyzed using MSR (Method of Summated Ratings) to obtain valid results. The formula used is as follows.

$$(\%)\text{validity} = \frac{\sum total\ score}{\sum scriteria\ core} \times 100\% \qquad (1)$$

The feasibility of e-LKPD in terms of validity can be determined through the results of the validation analysis which will be interpreted into the following criteria.

Table 2. Kriteria Interpretasi Kevalidan (Ridwan, 2016)

Criteria	Percentage
Very Invalid	0-20
Less Valid	21-40
Fairly Valid	41-60
Valid	61-80
Very Valid	81-100

Based on the criteria in Table 2, e-LKPD is declared appropriate (content, language, presentation, and graphics) if the percentage of research results obtained is ≥61% (very valid), meaning that the e-LKPD can be tested in learning activities.

Instruments are media that have the function of facilitating and facilitating research. Furthermore, after preparing the e-LKPD based on the liveworksheets application, the research instruments and instruments needed to assess the e-LKPD that are being created and developed are also carried out.

Table 3. Teacher Validation Grid (Aditama et al., 2019)

Grille	Assessment Criteria
Material (content)	1. Materi The material in the product is by Basic Competencies (KD) 2. The material presented in the product is sequential to the 2013 Curriculum 3. Learning objectives are written in the product 4. The material in the product is by the learning objectives 5. The information used is relevant to the current situation 6. The materials used in students' ecosystem learning are complete 7. Instructions for completing the questions are clear 8. The product contains questions that can train students' critical thinking skills
Layout	1. Suitability of images, colors, symbols, and materials 2. Pictures and videos about the ecosystem are visible 3. The color composition is by the characteristics of elementary school children 4. The composition of the writing and images, both cover and attractive images
Language	1. The language used in the product is raw and interesting 2. The grammar in E-LKPD is correct 3. The spelling used in the product is correct 4. The sentences in the product are structured according to PUEBI rules 5. The sentence structure used in the product is correct 6. The words or terms used in the product are correct and consistent

Questionnaire instrument, this instrument is in the form of a user response questionnaire designed in E-LKPD to guide and make it easier for students to discover material concepts. This questionnaire is also in the form of a developed E-LKPD attractiveness test questionnaire. The questionnaire used is in the form of a sheet containing questions to determine the attractiveness of E-LKPD. The data analysis technique in this research displays a development product, namely E-LKPD based on the live worksheets application. Files or data obtained via the questionnaire provided were then analyzed by researchers to test the feasibility and attractiveness of the liveworksheets application-based learning media being developed.

The research data was analyzed using a percentage formula which is used to analyze quantitative data. Analysis techniques are tools for answering problem formulations based on data that has been obtained. The results obtained are then written down for each component in a questionnaire. The values presented are the E-LKPD validation criteria based on the liveworksheets application which is presented in the assessment of the questionnaire in the form of a score of 5 to 1. The data is then analyzed in the form of a percentage of 80% < Score ≤ 100% getting very valid qualifications, 60% < Score ≤ 80% received valid qualifications, 40% < Score ≤ 60% received quite valid qualifications, 20% < Score ≤ 40% received less valid qualifications, 0% < Score ≤ 20% received invalid qualifications (Bintiningtiyas et al., 2016).

Results and Discussion

The focus of this research is to develop a teaching material product in the form of an electronic LKPD (e-LKPD) containing science on ecosystem material that can be used by teachers and students to support learning activities. The e-LKPD developed by researchers presents learning activities that students must carry out in studying ecosystem material. The learning activity steps in e-LKPD are adapted to the characteristics of the problem-based learning model and contain ecosystem content that exists in the environment around students. The ADDIE stages used in developing e-LKPD in this research are explained as follows:

Analyze

The analysis stage is the first stage carried out to identify problems in science learning in class V SDIT Al Firdaus and determine the needs of students. Based on the results of interviews conducted by researchers with Mrs. Rohmatun Nikmah as the class V teacher, it is known that class V has not implemented the independent curriculum, still using the 2013 curriculum.

However, in the thematic learning process, she said that the implementation of the independent curriculum has not been optimal. This is because the methods that are often used during learning are still lectures, questions and answers, and giving assignments so students are not very active during the learning process. The teacher also said that he had never implemented digital LKPD which made students actively involved in learning through problem-solving activities.

The design stage is related to the design of research products (Fuadi et al., 2022). The researcher carried out the e-LKPD planning stages based on the live worksheet application, the stages of which include (a) determining the content that will be studied and loaded on the e-LKPD. The material on e-LKPD is presented through learning activities that are structured in such a way as to suit the characteristics of the Problem-Based Learning model which stimulates students to be able to discover and learn material concepts through problem-solving activities (Aini et al., 2019).

The design or design of the e-LKPD developed by researchers consists of a front cover, identification of the LKPD (education unit, class, subject, time allocation, basic competencies, learning objectives, and study instructions), instructions for using the e-LKPD, description of the ecosystem material (meaning ecosystem, learning videos, evaluation questions. The results of the questionnaire showed that all the teachers at SDIT Al Firdaus had never made digital LKPD. So far the teachers have used conventional LKPD. Even though the facilities and infrastructure at SDIT Al Firdaus were relatively complete.

Development

The development stage is the stage for developing the entire teaching material product that was designed in the previous stage to produce the initial e-LKPD product. Making the LKPD concept framework using Canva software. Canva is a software that can be used to create various designs, both images and videos and attractive templates are provided. This software was launched in 2013 (Canva, n.d.). The results of the e-LKPD design using Canva which is the material for this product can be accessed via the link https://www.canva.com/design/DAFPHx0VrDg/q1 MTbbRLh07HpfrrVC3lww/edit?utm_content=DAFPH x0VrDg&utm_campaign=designshare&utm_medium=l ink2&utm_source=sharebutton or can be seen in figure 3.

After the design process is complete, the product is saved in pdf form and then imported to the liveworksheet site. A more detailed explanation regarding the results of preparing the e-LKPD is as follows.

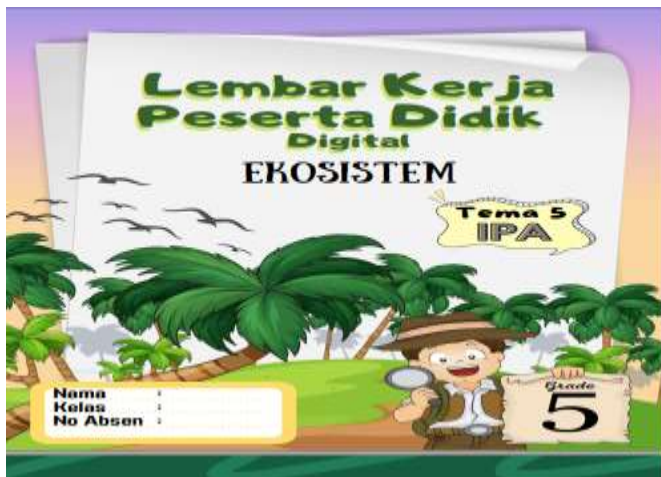**Figure 2**. Product design results via canva

Figure 3. Front cover

The front cover theme depicts an illustration representing the ecosystem topic containing the e-LKPD title, class level, and student identity which includes name, class, and absence number. The student identity section can be filled in directly by clicking on the column provided.
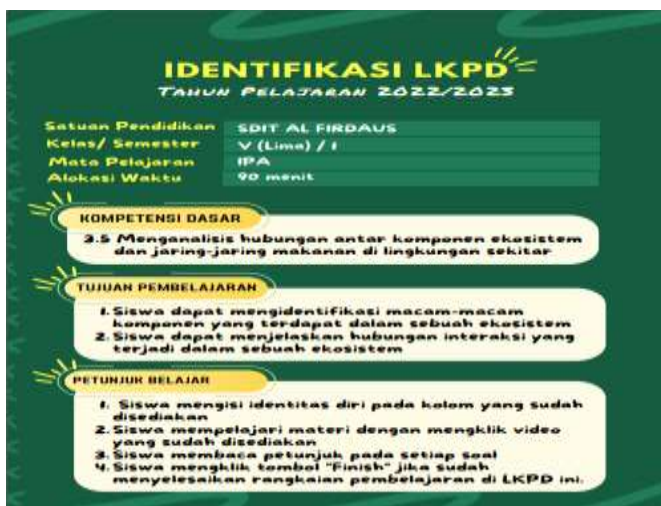

Figure 4. Identification of e-LKPD

Identification of LKPD containing educational units, classes, subjects, time allocation, basic competencies, learning objectives, and study instructions. This identification writing aims to provide explanations, directions, and instructions for students while using this e-LKPD.

Figure 5. Material about ecosystems

Figure 6. Material about ecosystems in the form of videos

The material is divided into two parts. The first part of the *Let's Read* activity. Students are presented with a discourse to discover phenomena that exist in the environment. The second part of the *Let's Watch* activity contains learning videos taken via YouTube which can be accessed via the link https://youtu.be/o3wOlOjYdWg. After students complete the reading and watching mission, students

are given feedback in the form of appreciation sentences to provide motivation and enthusiasm for students.

Figure 7. Evaluation questions in the form of descriptions and drop-downs

Students fill in the evaluation questions by moving the box to the space provided.

Figure 8. Evaluation questions in the form of fields

Students fill out evaluation questions by writing "True" or "False" in the column provided.
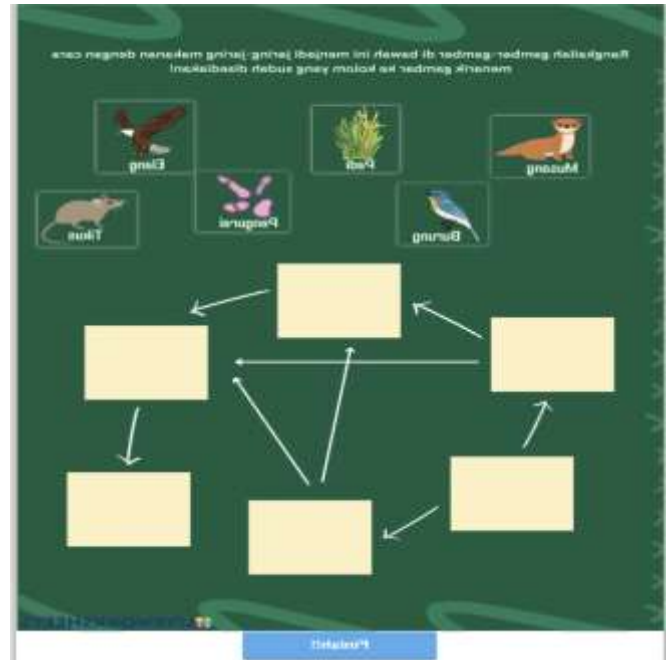

Figure 9. Evaluation questions in the form of drag-drop

Students work by moving the image to the column provided and then pressing the "Finish" button to end the activity.

The student evaluation section consists of description, matching, and true-false questions. For description questions, students can write answers in the column provided below the question. To evaluate students' understanding of biotic and abiotic material, the form of evaluation is to match the available statements and then adjust them to the column that includes biotic or abiotic.

Next, to test students' level of thinking, a statement is provided and then students can answer with the keywords "True" or "False". The form of evaluation that the researchers applied was matching by randomizing animal pictures, then students shifted the pictures to assemble them into a food web.

A series of e-LKPD development results were then validated by five class V teachers at SDIT Al Firdaus to assess the quality and suitability of e-LKPD in terms of material, appearance, and language by the assessment indicators that had been developed. The assessment from the validators uses an assessment instrument in the form of a validation sheet containing predetermined aspects. Apart from that, the validator also provides suggestions and comments to provide material for improvement if it is to be implemented with students. The results of the e-LKPD validity test can be seen in table 4.

The average of the validators' assessment results shows a percentage of 78.46% in the valid or suitable

category for use as learning material in the form of live worksheet-based e-LPKD to improve students' thinking abilities. There is advice from Mrs. Riski regarding the size of the letters when filling in the answers which need to be enlarged. However, overall it is suitable to be used as learning material.

Table 4. Validator Assessment Results

Validator	Value Earned
Santoso, S.Pd.	78.53%
Riski Widya Pambudi, S.Pd.	74.68%
Rohmatun Nikmah, S.Pd.	81.11%
Gunawan, S.Pd.	75.41%
Kholil Mujib, M.Pd.	82.59%
Average	78.46%

Conclusion

E-LKPD, developed using live worksheets, was declared to meet the eligibility criteria and can be used as a learning medium, especially as ecosystem material in Class V elementary schools. This digital LKPD has several advantages over conventional LKPD because it is more interesting, follows technological developments, and is more effective because the material can be packaged in narrative, audio, or video learning versions. Apart from that, there are various types of evaluation such as description, matching, and drag and drop. The results of the validity test from five validators who are teachers who teach class V show that in terms of material, appearance, and language, an average score of 78.46% was obtained. So the e-LKPD that has been developed is considered interesting and suitable for application in the learning process.

Author Contributions
All authors contributed to writing this article.

Conflicts of Interest
No conflict interest.

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