

E-Student Worksheets Teaching Materials Based on Live Worksheets on Science Learning For Fifth Grade Elementary School Students

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ABSTRAK

Penggunaan bahan ajar berupa buku yang biasa dimanfaatkan pada pembelajaran menyebabkan kegiatan belajar menjadi monoton. Ketersediaan bahan ajar yang dirancang dengan menarik dapat berpengaruh terhadap atensi siswa untuk aktif dalam belajar. Tujuan penelitian ini yaitu menciptakan bahan ajar e-LKPD berbasis Live Worksheet pada pembelajaran IPA. Jenis penelitian ini adalah penelitian pengembangan dengan berpedoman pada model ADDIE. Subjek penelitian ini terdiri dari 3 ahli media, 2 ahli materi, 2 praktisi, dan 12 siswa untuk uji respon siswa. Metode pengumpulan data penelitian ini menerapkan metode kuesioner dengan instrumen rating scale sebagai instrumen pengumpulan data. Teknik analisis data yang digunakan adalah teknik analisis deskriptif kualitatif dan kuantitatif. Data yang diperoleh selanjutnya dianalisis untuk menghitung validitas internal serta validitas empiris. Hasil analisis validitas internal berada pada kriteria valid. Rata-rata skor penilaian validitas empiris berada pada kriteria sangat valid. Berdasarkan hasil analisis tersebut, bahan ajar e-LKPD berbasis Live Worksheet pada muatan IPA materi siklus air valid dan baik diterapkan pada proses pembelajaran.

ABSTRACT

The use of teaching materials in the form of books commonly used in learning causes learning activities to become monotonous. The availability of attractive teaching materials can affect students' attention to be active in learning. The purpose of this study is to create e-student worksheet teaching materials based on Live Worksheet in science learning. This type of research is development research based on the ADDIE model. The subjects of this study consisted of three media experts, two material experts, two practitioners, and 12 students to test student responses. The data collection method in this study applies a questionnaire method with a rating scale instrument as a data collection instrument. The data analysis technique used is descriptive qualitative and quantitative analysis techniques. The data obtained were then analyzed to calculate internal validity and empirical validity. The results of the internal validity analysis are in the valid criteria. The average score of the empirical validity assessment is in the very valid criteria. Based on the analysis results, the e-LKPD teaching materials based on the Live Worksheet on the water cycle material science content are valid and well applied to the learning process.

1. INTRODUCTION

Teaching materials can be interpreted as components of message content in the curriculum that must be conveyed to students in the form of facts, concepts, principles or rules, procedures, problems, and so on (Octaviana et al., 2022; Purnama & Suparman, 2020; Wahyuni et al., 2021). The use of teaching materials in teaching and learning activities is adapted to the era of the industrial revolution 4.0, namely all human activities utilize existing information technology (Darmawan & Yuwaningsih, 2021; Farman et al., 2021; Ramadhana & Hadi, 2021). Good learning activities can help students understand the lesson (Ariyani & Ganing, 2021; Indrapangastuti, 2014; Khofifah & Ramadan, 2021). The use of teaching materials that are interesting and different from before has a significant effect on the achievement of learning objectives. Interesting learning can be in the form of using teaching materials that can show the type of material and learning resources that have various types, both in the form of tests and in digital

form (Farman et al., 2021; Istiqomah et al., 2021; Prastika & Masniladevi, 2021). In implementing the 2013 curriculum, five important components support learning activities, including material (teaching materials), strategies, models/methods, media, and assessment (Adifta et al., 2022; Jessica et al., 2020; Lestari, 2018). Using interesting teaching materials in thematic learning, especially science content, is necessary to increase student activity during the teaching and learning process (Pratama et al., 2019; Susilawati et al., 2020; Wardani & Syofyan, 2018).

However, reality shows that it is still rare to find digital teaching materials in teaching and learning activities. This results in the quality of learning being classified as low because it is still guided by the old method. Problems in the learning process can impact student activities in learning to be less active. In this case, students' activeness during the learning process is very much needed in the current curriculum. Learning is more student-centered in the 2013 curriculum, which uses integrated thematics (Amaliyah, 2021; Siringo-ringo et al., 2021). Referring to the results of the preliminary study that was carried out by distributing questionnaires regarding the online learning process submitted to fifth-grade teachers at SD Negeri 3 Banjar Tegal, Buleleng District, it shows that: 1) Learning activities are carried out through the WhatsApp Group application, and the teacher is only guided by thematic books when teaching, 2) The assignments given to students were only taken from the questions in the supporting book without any additional sources, 3) The lack of discussion of material on the science content of the water cycle material in the supporting book caused students not to understand the material, 4) The teacher only providing printed student worksheets so that it slightly hinders the teaching and learning process during online learning, 5) There is still a lack of use of technology by teachers in the learning process, especially for using electronic student worksheets. So problem-solving is needed to overcome the problems that exist in online learning.

Efforts that can be made to overcome existing problems are to develop electronic teaching materials to make it easier for students to use and access them during online learning. One of the teaching materials that can be developed is electronic student worksheets. Electronic student worksheets or e-student worksheets are teaching materials in the form of sheets that contain subject matter, summaries, and instructions that students in digital/electronic form must complete. The use of e-student worksheets can assist teachers in online learning, with a creative and innovative appearance that can attract students' attention to learning and understand the material because it is easily accessible to students (Apriliyani & Mulyatna, 2021; Suryaningsih & Nurlita, 2021; Widiyanti, 2021). In making e-student worksheets, the Live Worksheet application is used to support the conversion of traditional worksheets into interactive online exercises where the results are automatically corrected to save teacher time and make it easier for students to work on them (Augustha et al., 2021; Puspita & Dewi, 2021; Rochman JK, 2021). The development of e-student worksheets and teaching materials based on Live Worksheets in science learning can increase student activity in learning. Students can understand the material optimally because it can be accessed repeatedly (Fitriani et al., 2021; Khikmiyah, 2021; Widyaningrum & Prihastari, 2020).

Some related research that has been done previously includes developing e-student worksheets teaching materials based on Live Worksheets on valid flat shape materials to use (Yakub et al., 2019). Research states that project-based e-student worksheets are feasible and practical to use in learning (Rochman JK, 2021). The design of Live Worksheet-based e-student worksheet teaching materials is complete with illustrative pictures, videos related to water cycle material provided, and display of e-student worksheets with color compositions as attractive as possible (Pribadi et al., 2021; Putra et al., 2021). The advantages of using e-student worksheets based on Live Worksheets in teaching and learning activities include creating learning activities with new methods and atmosphere because they use digital teaching materials and can attract students' attention so that they can stimulate the development of students' insights (Fitriani et al., 2021; Khikmiyah, 2021). The difference between the existing Live Worksheet-based e-student worksheets developed lies in the topics and materials used. The topic developed is on the environmental theme 8 of our friend, science content with a discussion of the water cycle. This study aims to develop and create e-student worksheets based on Live Worksheets on the science content of the water cycle material in fifth-grade elementary schools tested for internal and empirical validity.

2. METHOD

This research is development research in the form of e-student worksheets teaching materials based on Live Worksheets in science learning. This development research aims to produce and develop teaching materials that have been tested for internal and empirical validity. This study uses the ADDIE model with five stages: Analyze, Design, Development, Implementation, and Evaluation (Muruganatham, 2015; Patel et al., 2018). This development model is chosen because it is easier to understand and implement. After all, it has been systematically arranged and contains evaluations at each stage. The

subject of this study was the development of Live Worksheet-based e-student worksheet teaching materials, which were tested for internal validity by three media experts and two material experts, as well as empirical validity by two teachers as practitioners and 12 students to test student responses.

The data collection method in this study is the questionnaire method. Questionnaires are a data collection method in the form of sheets containing written questions to obtain some information from respondents according to the indicators to be achieved (Pranatawijaya et al., 2019). The data collection instrument in this study was the form of a rating scale. The rating scale is an assessment technique using a certain scale which is the basis for an assessment from the lowest level to the highest level with a numeration of 1-5 (Coleman et al., 2010; Ölmez & Ölmez, 2019). In this study, the validity of the instruments that have been compiled is tested to show a good instrument. The stages of determining the instrument's validity include: 1) compiling the grid, 2) coordinating and consulting the supervisor, and 3) compiling the instrument. The live worksheet-based e-student worksheets validity instrument grids are shown in Table 1, Table 2, Table 3, and Table 4.

Table 1. Media Expert Instrument Grid

No	Aspect	Indicator	Item Number	Total Item
1	Media Design	The quality of the images and videos displayed	1,2	2
		The quality of the displayed text	3,4	2
		Display of e-student worksheets, teaching materials	5,6,7,8,9	5
		Layout	10	1
2	Language Use	Quality of language use	11,12	2
3	Ease of Use	Ease of use of e-student worksheets and teaching materials	13,14,15	3
Total Item				15

Table 2. Grid of Material Expert Instruments

No	Aspect	Indicator	Item Number	Total Item
1	Language Use	Quality of language use	1,2,3	3
		Sentence quality	4,5,6	3
2	Content of Question Material	Relevance of material and questions to Basic Competency	7,8	2
		Relevance of material and questions to Indicators	9,10	2
		Relevance of material and questions to learning objectives	11,12	2
		Relevance of material and questions to the level of development of students	13	1
3	Presentation of Material and Questions	Material Display and questions	14,15	2
Total Item				15

Table 3. Practitioner's Instrument Grid

No	Aspect	Indicator	Item Number	Total Item
1	Language Use	Quality of language use	1,2,3	3
		Sentence quality	4,5	2
2	Content of Question Material	Question relevance	6,7,8	3
3		Media Design	The quality of the images and videos displayed	9,10
4	Presentation of material and questions	The quality of the displayed text	11,12	2
		Display of e-student worksheets, teaching materials	13,14,15,16	4
		Layout	17	1
4	Presentation of material and questions	Material Display and questions	18	1
5		Ease of Use	Ease of use of teaching materials	19,20
Total Item				20

Table 4. Student Response Instrument Grid

No	Aspect	Indicator	Item Number	Total Item
1	Teaching Material Display.	The appearance of e-student worksheets teaching materials is attractive and good	1	1
		The letters on the e-student worksheets teaching materials can be read clearly	2	1
		Pictures and videos on e-student worksheets teaching materials clearly	3	1
		The instructions for working on the questions on the e-student worksheets teaching materials can be understood well	4	1
2	Language Use	The language used is easy to understand	5	1
3	Ease of Use	E-student worksheets and teaching materials are easy to use.	6	1
		E-student worksheets teaching materials can help students understand the material	7	1
4	Content of Question Material	The problem material on the e-student worksheets teaching materials is easy to understand	8	1
		The material questions can generate curiosity and try continuously	9	1
		The questions presented in the e-student worksheets teaching materials were answered well	10	1
Total Item				10

This study's methods and data analysis techniques are descriptive qualitative, and quantitative. Qualitative descriptive analysis techniques are related to processing words or sentences through comments, suggestions, criticisms, and expert reviews to improve the e-student worksheets and teaching materials produced in research. Quantitative descriptive analysis techniques are applied to process numerical data. In the product test results, the data obtained is then analyzed to determine internal and empirical validity. The internal validity test data were analyzed by calculating scores from media and material experts. In contrast, the average empirical validity test results were obtained by calculating scores from teachers (practitioners) and students. To make decisions regarding the development of e-student worksheets teaching materials to be meaningful, the accuracy shown in [Table 5](#) is used.

Table 5. Five Scale Conversion Guidelines

Score Range	Assessment category	Description
$4,21 \leq Va < 5,00$	Very Valid	It can be used without revision
$3,41 \leq Va < 4,20$	Valid	It can be used with a little revision
$2,61 \leq Va < 3,40$	Enough	It can be used with many revisions
$1,81 \leq Va < 2,60$	Not enough	It cannot be used and still requires consultation.
$1,00 \leq Va < 1,80$	Bad	It cannot be used and must be reviewed and total revision.

3. RESULTS AND DISCUSSION

Results

This study aims to create teaching materials in the form of e-student worksheets based on Live Worksheets on the science content of the water cycle material for fifth-grade elementary school students. Teaching materials for e-student worksheets based on Live Worksheets were tested on three lecturers as media experts, two lecturers as material experts to test internal validity, two teachers as practitioners, and 12 fifth-grade elementary school students to test empirical validity. This development research was based on the ADDIE research model, including analysis, design, development, implementation, and evaluation. However, due to limited research time and seeing the learning situation during the pandemic, the evaluation phase could not be carried out.

Several stages were carried out in the analysis stage: needs analysis, curriculum, and student characteristics. A needs analysis was carried out to find out the needs of teachers and students during online learning, which was marked by observation activities and distributing questionnaires to fifth-grade elementary school teachers. Curriculum analysis is carried out by analyzing core competencies, basic

competencies, competency achievement indicators, learning objectives, and material in teacher books and student books to be used as guidelines in preparing e-student worksheets on the water cycle material. Analysis of student characteristics was carried out to find out the character of students at the fifth-grade level of elementary school. In this case, students are at the concrete operational stage where real teaching materials are needed to make it easier for students to understand and learn the material described. The results of the curriculum analysis found material mapping, which included a discussion of the water cycle in science learning, shown in Table 6.

Table 6. Mapping the Material

Basic competencies	Competency Achievement Indicator (GPA)
3.8 Analyze the water cycle and its impact on earth's events and the survival of living things.	3.8.1 Examine the meaning of the water cycle. 3.8.2 Describe the impacts of human activities that can affect the water cycle. 3.8.3 Detect the stages of the water cycle.

In the design phase, designing student worksheets using the Canva application is carried out, and then converting them into e-student worksheets using the Live Worksheet application. The developed Live Worksheet-based e-student worksheet teaching materials are equipped with a cover, the material identity, which includes Basic Competencies and competency achievement indicators, work instructions, learning videos, questions, and columns for answering questions. The cover design and material identity are shown in Figure 1. Moreover, the display of the learning videos and the questions are presented in Figure 2.

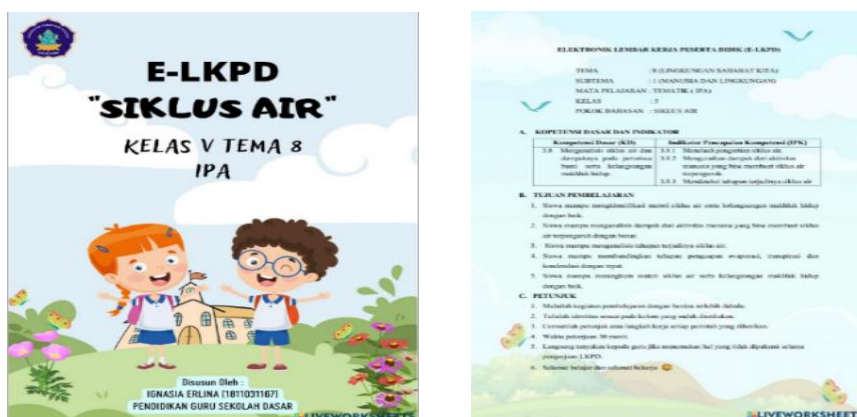


Figure 1. Cover and Material Identity



Figure 2. Display of Learning Videos, Materials, and Questions

At the development stage, experts carried out product trials, including media experts, material experts, and practitioners, as well as student response assessments. The instrument validity test involved three lecturers as judges, and the internal validity test involved three lecturers as media experts and two as material experts. Meanwhile, the empirical validity test involved two teachers as practitioners and 12

fifth-grade elementary school students in testing student responses regarding the teaching materials being developed. The results of the internal validity of the instrument rating items calculated using the CVR formula get an average score with a range of $0 < x < 1$ with a valid category. Regarding the empirical validity test, the results of the instrumented assessment are calculated using the Mean formula as a whole, obtaining an average score with a range of $4.21 \leq Va < 5.00$ with a very valid category. After evaluating the Live Worksheet-based e-student worksheet teaching materials, there were several suggestions, inputs, and comments, so the product revision stage was carried out. This product revision aims to improve the teaching materials developed in the hope that they can be used optimally.

The implementation phase is carried out by implementing Live Worksheet-based e-student worksheets to be applied to the learning process. The implementation phase was carried out with two teachers and 12 fifth-grade elementary school students at SD Negeri 3 Banjar Tegal and SD Negeri 1 Banjar Jawa. Implementing Live Worksheet-based e-student worksheets will assist teachers when delivering material in online and offline learning to create interesting learning and increase student activity in the learning process.

Discussion

The ADDIE development model guides the development of e-student worksheets based on the Live Worksheet with five stages. The analysis phase is carried out by analyzing the needs, curriculum, and student characteristics. After the analysis phase, it is continued with the design stage. At this stage, the design of instruments that will be used to validate and assess the teaching materials that have been developed is carried out. In addition, teaching materials were designed using the Canva application and Live Worksheet and a mentoring process with the relevant lecturers. The third stage is the development stage. At this stage, product assessment activities are carried out by experts to obtain internal validity and empirical validity of the developed Live Worksheet-based e-student worksheet teaching materials. The final stage is the implementation stage applying the resulting media to the learning process. The use of Live Worksheet-based e-student worksheet teaching materials can make it easier for teachers and students to access them, assist students in understanding the material being taught, and foster student interest and activity in the learning process (Wahyuni et al., 2021; Widiyanti, 2021).

The results of the internal validity of the developed Live Worksheet-based e-student worksheet teaching materials show that the average score of the material experts as a whole is 0.94, and the average score of the media experts as a whole is 0.97 with valid criteria. Meanwhile, based on the empirical validity of the developed Live Worksheet-based e-student worksheet teaching materials, the average score of practitioners is 4.8, and the average score of student responses is 4.88, with very valid criteria. So, this shows that the analysis of empirical validity test data for teaching materials e-student worksheets based on live worksheets for fifth-grade elementary school students on the water cycle material is stated to be very well used in the ongoing learning process (Puspita & Dewi, 2021; Rochman JK, 2021).

The application of Live Worksheet-based e-student worksheets teaching materials has implications for teachers and students. With this Live Worksheet-based e-student worksheet teaching material, it can assist teachers in delivering material on theme 8 sub-theme 1 water cycle material in creative and innovative ways. In the learning process using e-student worksheets teaching materials based on Live Worksheets, the teacher invites students to take advantage of existing technology for use in the learning process, in which the e-student worksheets teaching materials provide learning videos and various variants of practice questions. This Live Worksheet-based e-student worksheet can be used in direct or indirect learning, considering that e-student worksheets are flexible in their use (Puspita & Dewi, 2021; Putra et al., 2021). This research is limited to the scope of research, especially research subjects that involve only 12 students. It is hoped that future research will deepen and broaden the scope of research related to Live Worksheet-based e-student worksheet teaching materials in natural science content.

4. CONCLUSION

Teaching materials for e-student worksheets based on Live Worksheets on science content on the water cycle material for fifth-grade elementary school students that have been developed are suitable for use in the online and offline learning process. It can be seen from the internal validity test assessment results to get media experts and material experts assess a valid category. Teachers and students assessed a very valid category.

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