

DEVELOPMENT OF PHYSICS E-LKPD WITH 3D PAGE FLIP BASED ON PROBLEM-BASED LEARNING ON STATIC ELECTRICITY**Aisyah Evi Nurhidayah*, Handoyo Saputro, Puji Hariati Winingsih**

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Abstract

This study aims to determine the quality and response of students to E-LKPD Physics. based on problem-based learning on static electricity material, developed to assist students in learning during the covid-19 pandemic for education which is required to learn online. This type of research is research and development (Research and Development) according to Sugiyono which is simplified into eight stages which include potential and problems, gathering product design information, product validation, product revision, product testing, product revision, and final product. The subjects of this study consisted of three validators and 16 students. Data analysis was carried out by descriptive analysis. The results of the feasibility test of the E-LKPD product obtained criteria for Very Good (68.11%), Good (29.71%), Less Good (2.18 %), Very Poor (0%) by the validator, and very good (100%) by student responses. Based on the test results, it can be concluded that the E-LKPD is suitable for learning physics.

Keywords: Development of E-LKPD, Problem Based Learning, 3D Pageflip

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INTRODUCTION

In the current era of independent learning, the development of science and technology is very impactful and brings changes to every aspect of human life, especially in the field of education. According to Ki Hajar Dewantara (Sagala 2013), teaching is part of education by giving knowledge or knowledge and providing skills to children that are useful for children's lives, both physically and mentally. subjects so that learning can run optimally and by the 2013 curriculum. Physics knowledge, understanding, and analytical skills of students towards the environment and its surroundings (Azizah, Yuliati, and Eny Latifah 2015). In physics learning so that students can be active, efforts need to be made to realize the involvement of students so that in learning a media and teaching materials are needed that increase the interest and enthusiasm of students in learning according to the curriculum and can meet the needs of students, especially in this current pandemic period. Covid-19 (coronavirus disease) is learning that is carried out online. The Minister of Education and Culture of the Republic of Indonesia stipulates online learning during the pandemic by Circular Number 4 of 2020 concerning the Implementation of Education Policies in the Emergency Period for the Spread of Corona Virus Disease (Covid-19) which is in line with (KH. Lalu Gede Muhammad Zainuddin Atsani 2020) that, as a solution to the impact of the Covid-19, educators are required to design learning media as innovations by utilizing online/online media.

Online learning during the Covid-19 pandemic lasted for a very long time so online teaching materials were needed to support online learning, namely with LKPD which was more innovative and could be accessed in an online form commonly called electronic LKPD. According to (Rozy and Anggana 2017), 3D PageFlip is a flash flipbook application that can be used to create PDF, Word, Learning Media Development Based on 3d Pageflip 3 PowerPoint, and Excel into flipbook form.

Online learning during the Covid-19 which lasted for a very long time so online teaching materials were needed to support online learning, namely with LKPD which was more innovative and could be accessed in an online form which is commonly called electronic LKPD. According to (Rozy and Anggana 2017), 3D PageFlip is a flash flipbook that can be used to create PDF, Word, Learning Media Development Based on 3d Pageflip 3 PowerPoint, and Excel into flipbook. In a pandemic period learning can run effectively and efficiently in addition to using the right teaching materials and media, it is also necessary to use the appropriate selection of learning models that are suitable for the needs of students at this time. One of the learning models is problem-based learning (PBL). Lismaya (2019) states that PBL is a learning model that uses real-world problems as a context for students to learn about thinking and problem-solving skills, as well as to acquire essential knowledge and concepts from subjects. In learning at SahabatQu High School, it was observed that

the facilities and infrastructure in the learning process were adequate, but for learning during this pandemic, online still cannot run optimally due to the lack of online such as the E-LKPD used. As well as the printed LKPD teaching materials used are less attractive to students in the learning process so that learning is less effective and students are less enthusiastic in learning, especially physics subjects are exact subjects so that it is difficult to understand the subject matter, so an E-LKPD is needed which can help students in learning. Research (Dasmasea, Winingsih, and Saputro 2021) on the development of problem-based learning stated that needs analysis itself is a tool or method for identifying problems to determine appropriate actions or solutions that must be taken. Teachers need learning models and teaching materials that can improve creative thinking skills. In a previous study conducted by (Sry Astuti 2018) on the Development of PBL-Based LKPD to Improve Students' Critical Thinking Skills on Chemical Equilibrium Material. PBL-based LKPD is said to be practical and effective, because of the practicality and effectiveness test. However, this LKPD is still in the form of a printed LKPD and has not been in the form of electronic/online so it still does not attract interest in learning and has not met the learning needs of students during the Covid-19. In research (Hidayah, Winingsih, and Amalia 2020) problem-based learning with 3D page flip can help students understand concepts by problem-solving, and students play an active role in learning the material which in this case is equilibrium and rotational dynamics. Based on some of the studies above, encourages researchers to conduct research entitled Development of E-LKPD (Electronic Student Worksheets) Physics with 3D Pageflip Based Problem Based Learning on the subject of Static Electricity Class XII. researchers conducted research to develop, test the feasibility, and test the responses of E-LKPD physics students based on problem-based learning on Static Electricity material.

RESEARCH METHODS

This research belongs to the type of Research and Development developed by Sugiyono, but due to time and cost limitations, it is simplified into eight stages (Sugiyono, 2017). The eight stages are shown in Figure 1.

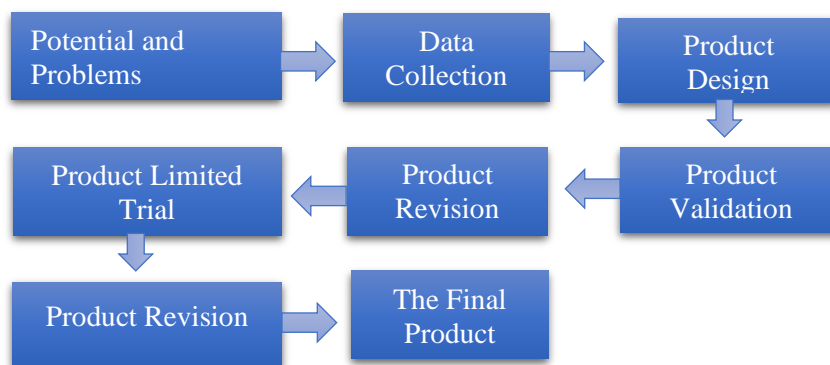


Figure 1. Research Stages

Tabel 1. Problem Based Learning

No.	Learning Stages	Description
1	Student orientation to the problem	Students observe the video listed on the E-LKPD and identify problems with the teacher's guidance from the video by providing various problems.
2	Organizing students for learning	Students pay attention to the explanation of the tasks in the E-LKPD and study the E-LKPD with other literature related to the concept of static electricity, and the teacher encourages students to formulate a problem related to the phenomena they observe
3	Guiding individual experience.	Students collect information (data) for problem-solving and teachers encourage and facilitate students
4	Develop and present the work	Students identify problem-solving and plan and prepare problem-solving designs.
5	Analyzing and evaluating the problem-solving process	students analyze the relationship between the concepts of static electricity and conclude information that can be analyzed, the teacher also facilitates students to reflect or evaluate the problem-solving process carried out.

Subjects and Objects of Research The object of this research is E-LKPD using 3D PageFlip -based Problem Based Learning on the subject of static electricity for class XII. The subjects in the study were validators consisting of two physics lecturers and one high school physics teacher and class XII students on the developed E-LKPD.

Data Collection Techniques

Data collection techniques used in the study were observation, interviews, and questionnaires. Observations were carried out online and offline by looking at the school environment, interviews were conducted online via phone WhatsApp with a physics teacher at SahabatQu High School. Meanwhile, research questionnaires or questionnaires are carried out online through a zoom meeting by sharing a google form and a questionnaire form that uses a multilevel scale. Filling out the questionnaire is done online.

Data Analysis Techniques

This study uses data analysis with descriptive statistical methods such as the data from this study (Budiwanto 2017). Descriptive analysis methods used include; (1) Presentation of data in the form of percent for each category score, (2) Presentation of data in tabular form or frequency distribution, (3) Presentation of data in a visual form such as bar charts, histogram pie charts, or polygons. Technical analysis of the data in this study is as follows: (a) Processing of data from validation sheets by teachers and lecturers and (b) Processing of student response questionnaires.

RESEARCH RESULTS AND DISCUSSION

The research was conducted at SahabatQu High School which is located at Jalan Nusa Indah, Condongcatu, Kec. Depok, Sleman Regency, Special Region uses the Research & Development (R&D) design which is adapted from the research and development model, according to (Sugiyono 2015) this research and development model consists of 10 stages which have then been simplified so that they are carried out into eight stages. This research and development resulted in an E-LKPD physics with problem-based learning on the subject of static electricity class XII. 1. Research and development results. product and validation. In this stage of making the E-LKPD, the researcher uses the 3D Pageflip application and designs the E-LKPD as attractively as possible with the font size according to the display by designing it using CorelDraw and attractively packaged in word so that it becomes a PDF and can be imported in 3D Pageflip. The components in this E-LKPD consist of the E-LKPD cover, inside cover, author's page, foreword, table of contents, list of pictures, list of tables, description of E-LKPD, instructions for using E-LKPD, competency standards, concept maps, steps PBL learning steps, materials, electric charge activities, electrostatic interactions, and Coulomb's Law and Electric Field Strength, competency test, bibliography, and author profile. The development of E LKPD which is equipped with various activities in it and supported by interesting features or content, makes the products in this research quality and suitable for use based on validation tests and student response tests, especially in online learning during the Covid-19 pandemic, E-Learning The LKPD with the 3D page flip application is more relevant than previous studies which were still in the form of a printed LKPD and had not used a learning model.

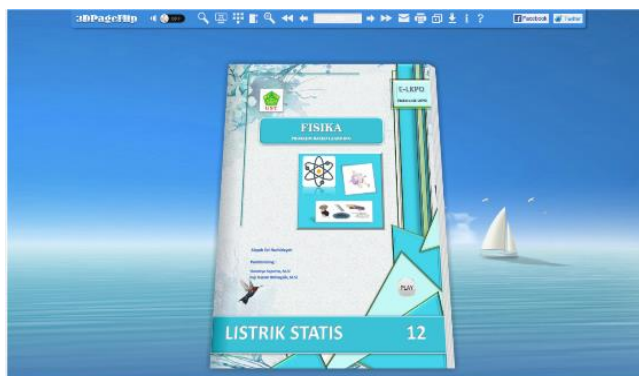


Figure 2. E-LKPD Cover Display

The cover design contains the title, and author's name, and there are also pictures related to static electricity, the E-LKPD cover design is made with a blue theme with the aim that blue has a positive effect on

the mind and body so that it can cause the body to produce calming and relaxing chemicals exudes a feeling of serenity so that when students learn they can grow enthusiasm.

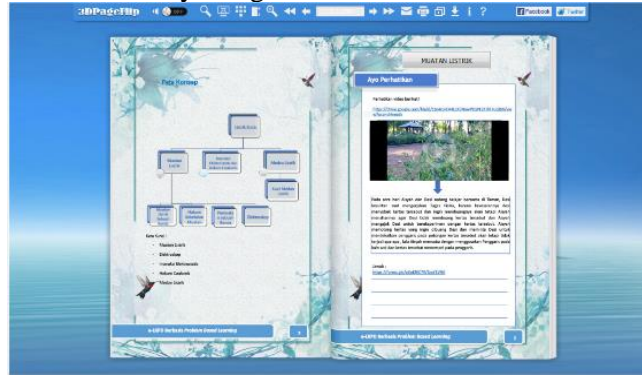


Figure 3. Concept Map Display

The concept map page contains the relationship between materials on the subject of static electricity. Concept maps are made to make it easier for students to understand the relationship between static electricity material so that it can help the learning process. On the concept map, there are buttons on each material that can make it easier for students to open the page.

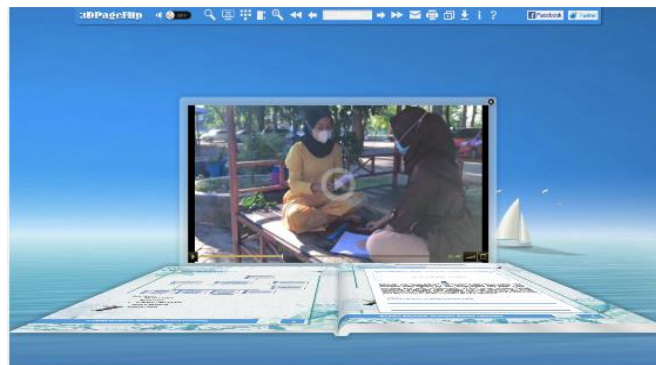


Figure 4. Video Display in E-LKPD

The “Let’s Pay Attention” page contains a video about static electricity experiments in which students can find problems from the video and solve them. Researchers consulted with supervisors regarding the developed E-LKPD. Researchers receive suggestions and input from supervisors so that researchers can improve the E-LKPD according to suggestions and input from supervisors. Then after the E-LKPD was deemed suitable for use, the researchers consulted with three validators, namely two physics lecturers and one physics teacher at SahabatQu High School. The researcher also developed an instrument to be consulted by the three validators. Validation of this product design is carried out using a feasibility and quality assessment instrument to measure the feasibility and quality of the E-LKPD. Researchers also received suggestions from the three validators to improve the E-LKPD. In the next stage, the researchers conducted a physics E-LKPD trial with the PBL model on the subject of static electricity. This trial was conducted at SMA SahabatQu class XII MIPA with 16 students as respondents. This is done to find out the response of students to the physics E-LKPD that was developed, several stages were carried out so that the developed E-LKPD was feasible and of good quality to be used.

Feasibility Test

The feasibility test is carried out through a validation process carried out by the validator, in this validation aims to determine the feasibility and quality of the E-LKPD Physics of static electricity material developed, in this validation, there are suggestions and input from the validator to perfect the E-LKPD so that it is suitable for use in learning. a validation instrument that contains a content feasibility component, a linguistic component, a presentation component, and a graphic component with criteria 4 very good, 3 good, 2 not good, and 1 very bad.

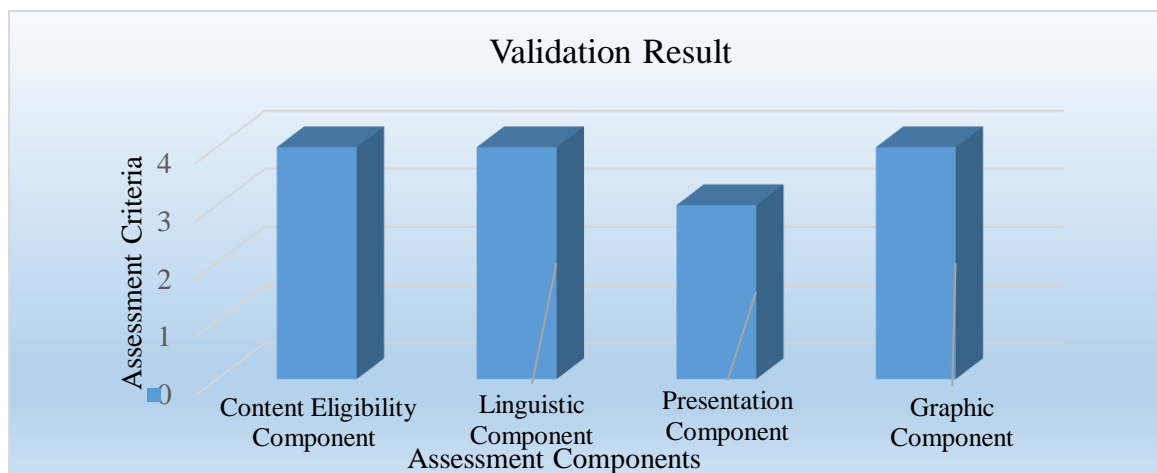


Figure 6. Validation Results

Based on the steps taken to measure the feasibility and quality of the E-LKPD, a feasibility study was carried out with validation carried out by the validator with a very good rating of 69%, good 29%, and not good 2%. Two expert lecturers carried out validation and one physics teacher at SahabatQu High School in the diagram showing the results of the study that according to the three validators, the quality of the E-LKPD validation results from the E-LKPD developed in the study was excellent dominating criteria for the content, linguistic and feasibility components. graphics and dominates both for presentation components. Based on the results of this validation, the physics E-LKPD on the subject of static electricity that was developed could be declared qualified and feasible for testing on students with improvements according to suggestions from the validator.

Student Response Test

The E-LKPD readability trial which was conducted online through a zoom meeting at SahabatQu High School consisted of 16 respondents. The results of the student response questionnaire to the E-LKPD. The results of the questionnaire given, students provide opinions in the suggestions and input column on the questionnaire that according to students, the developed E-LKPD is interesting and easier to learn. Students also provide suggestions for more similar E-LKPD developments, so that online learning can be more effective and increase students' enthusiasm for learning. Based on the results of student responses to the developed E-LKPD, it can be declared qualified and feasible to be used as one of the teaching materials for students. In research and development of E-LKPD (Electronic Student Worksheets) Physics with 3D Based Problem Based Learning on the subject of static electricity, it can be said to be of high quality and suitable for use in learning.

Table 2. The results of the Student Response Questionnaire to the Physics E-LKPD

No.	Component Rating	Number Statement	Frequency				Percentage (%)			
			1	2	3	4	1	2	3	4
1	Component Feasibility	1	0	0	0	16	0	0	0	100
		2	0	0	0	16	0	0	0	100
		3	0	0	0	16	0	0	0	100
		5	0	0	0	16	0	0	0	100
		8	0	0	0	16	0	0	0	100
2	Language Components	4	0	0	0	16	0	0	0	100
		6	0	0	0	16	0	0	0	100
		11	0	0	0	16	0	0	0	100
		15	0	0	0	16	0	0	0	100
3	Presentation Components	7	0	0	0	16	0	0	0	100
		12	0	0	0	16	0	0	0	100
		14	0	0	0	16	0	0	0	100
		16	0	0	0	16	0	0	0	100
4	Graphics	9	0	0	0	16	0	0	0	100
		10	0	0	0	16	0	0	0	100
		13	0	0	0	16	0	0	0	100

Based on the data in table 1 and Figure 6 shows the results of the response questionnaire filled out by students, it is known that students are very comfortable and interested in the E-LKPD which was developed with the criteria of strongly agree (100%), agree (0%), disagree (0%), strongly disagree (0%). Figure 30 shows the presentation of the results of student responses in conducting a readability test, showing a bar chart of the frequency of student responses to each questionnaire statement number, where the frequency indicates the number of students who gave assessment criteria between strongly disagree, disagree, agree, and strongly agree. each statement number in the student response questionnaire. The results of this study are in line with research that has been carried out in previous studies, with the advantage of being able to understand theory easily and being able to simulate directly in the media because there are videos that are presented related to daily life and can display digital formats containing text or images that can be read through devices. computer so that students can easily access it. Meanwhile, the disadvantage of using PageFlip 3D media is that learning media cannot be made in print. PBL-based LKPD can be said to be practical and effective, because of the practicality and effectiveness test. However, this LKPD is still in the form of a printed LKPD and has not been in the form of electronic/online so it still does not attract interest in learning and has not met the learning needs of students during the Covid-19.

CONCLUSION

Based on the results of the research that has been done, it can be concluded that product development in the form of E-LKPD Physics with 3D Pageflip based on Problem Based Learning on the subject of static electricity that the feasibility of E-Physics with 3D Pageflip based on Problem Based Learning on the subject of static electricity has been carried out. validation according to two expert lecturers and one high school physics teacher shows that the criteria are very good. From the criteria that have been obtained, it can be concluded that the E-LKPD is feasible to be used as one of the teaching materials for physics in learning activities at school. The response of students to E LKPD Physics with 3D Pageflip -based Problem Based Learning on the subject of static electricity in all aspects received a very good assessment.

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