

## Validity of LKPD Based Project Based Learning on Global Warming Material for Phase E Students at SMAN 1 Banuhampu

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### Abstract

The implementation of an independent curriculum requires adaptation in its application, especially in the readiness of project-based teaching materials. However, the LKPD in SMA N 1 Banuhampu is still not in accordance with the standards of teaching materials needed and expected in learning using an independent curriculum. The research method used in this research is R&D with a 4D research model consisting of four research steps, namely define, design, development, and disseminate. The data collection technique from this study uses a validation instrument that will be assessed by three validators. Based on the results, it was concluded that the results of making project-based learning LKPD on global warming material have obtained valid with a validity index of presentation aspects of 0.872, graphic aspects 1, feasibility aspects of content 0.914 and linguistic aspects of 0.889. Thus, project-based learning LKPD products phase E students can be used in the learning process.

**Keywords :** *LKPD, Project Based Learning, Independent Curriculum*

### INTODUCTION

The implementation of the independent curriculum in Indonesia has been regulated based on the Decree of the Minister of Education and Culture and Technology No. 56/M/2022 concerning Guidelines for Curriculum Implementation in the Framework of Learning Recovery. The independent curriculum is a curriculum launched by the government to restore learning affected by the pandemic (Ardiyanti & Nuroso, 2022). The presence of the implementation of an independent curriculum expects students to have a longer time in mastering essential materials, character development and student competencies (Khoirurrijal et al., 2022). Unlike the application of the previous curriculum, the 2013 curriculum uses one approach for all subjects, namely the scientific approach. The differences in the characteristics of learning applied in the 2013 curriculum and the independent curriculum are what affect the implementation of the independent curriculum in schools. The implementation of the independent curriculum requires adaptation in its application, especially in the readiness of project-based teaching materials (Baderiah, 2018).

The independent curriculum is designed with the characteristics of *project-based learning or Project Based Learning (PjBL)* for the development of *soft skills* and character in accordance with the Pancasila student profile (Pratycia et al., 2023). The PjBL model is a model that provides opportunities for educators to manage learning in the classroom by involving project work (Hosnan, 2014). *Project based learning* according to Trianto is a learning model that involves students in problem-solving activities and provides opportunities for students to work independently to construct their own learning activities and produce a product / work of realistic value (Trianto, 2011). Project-based learning is a learning model that requires students to design and create projects to produce a product which later the results of the project are presented in front of the class (Akmal & Aini, 2023). The learning project is expected to stimulate the development of thinking skills by placing emphasis not on memorization but on problem solving.

Teaching materials are all forms of materials used by teachers or students to facilitate the learning process (Akbar, 2015). Teaching materials are one of the important components that support learning in order to obtain success in achieving learning objectives. The use of learning models in teaching materials can be a support for students at work (Rahmi et al., 2019). One form of teaching material commonly used by teachers is student workbooks. Student workbooks or commonly called didi student worksheets (LKPD) function as a support in student learning activities so that everything can be documented clearly and completely (Kosasih, 2021).

According to Dhari and Haryono, interpreting a student worksheet (LKPD) is a sheet of student activities that have been programmed. In general, LKPD contains a description of the subject matter, the purpose of the activity, the tools and materials used during the activity, and structured work steps (Depdiknas, 2008). Learning using LKPD is expected to direct students in discovering and understanding concepts through learning activities alone and in work groups, assisting teachers in managing the learning process and monitoring student learning success in achieving learning goals (Salirawati, 2012). In independent curriculum learning, LKPD is expected to have *project-based learning-based characteristics* (Ware et al., 2022).

In phase E physics learning, learning outcomes contain one of the materials that students must learn is global warming material. Based on the results of observations made at SMA N 1 Banuhampu from readiness in teaching materials used in the independent curriculum for these materials only using printed books from the government and practical learning module books purchased from the publisher Viva Pikarando Creative Edition which were used as student worksheets. Based on the results of interviews with phase E teachers at SMA N 1 Banuhampu, it can be concluded that one of the teaching materials that has not been maximized is a project-based student worksheet (LKPD). This explanation is in line with Riyasni's research, that although teaching materials with project-based learning already exist, these teaching materials have not been able to develop students' ability to complete the project assignments given[15].

In addition, based on the results of the analysis of teaching material needs according to the demands of the independent curriculum. Based on the results of the analysis of teaching material needs according to the demands of the independent curriculum in Permendikbud no. 16 of 2022 concerning the standards of the independent curriculum learning process and principles, it is assessed that at SMA N 1 Banuhampu the teaching materials used by schools, especially LKS purchased from the book publisher Viva Pikarando Creative Edition have not contained *project-based learning* steps Implicitly and learning with an independent flow in accordance with the independent curriculum is also still not optimal.

Based on these data, it was obtained that the LKPD teaching materials contained in SMA N 1 Banuhampu were still not in accordance with the required teaching material standards and were expected in learning using the independent curriculum. Especially LKPD teaching materials are not *project-based learning* and according to the independent learning flow. Therefore, referring to the description that has been described, the formulation of the problem of this study is whether the PjBL-based LKPD for global warming material for phase E that is made is valid in order to help teachers meet the lack of availability of PjBL-based teaching materials according to the demands of the independent curriculum.

## METHOD

The purpose of the study was to obtain *project-based learning* LKPD on global warming material for phase E students. The type of research used in this study is *Research and Development* (R&D). The development model used in this study is a 4D development model. 4D model (*define, design, develop, disseminate*) is a development model developed by Thiagarajan in his book *entitled Instructional Development for Training Teachers of Exceptional Children* in 1974 (Winarti, 2021). It consists of four stages of development which include *Define, Design, Develop* and *Disseminate*. However, this study did not reach the *stage of product disseminate* but only to the validity of the product due to time and cost limitations.

The *define* stage, is a stage to analyze needs in development research consisting of initial final analysis, student analysis, task analysis, concept analysis, and learning objectives analysis. The *design* stage is the stage where researchers make *prototypes* or product designs. The *develop* stage, is the stage to produce a valid LKPD, through a validity test. The validity test aims to determine the feasibility of LKPD based on *project based learning* on global warming material.

The subjects of this study are three lecturers as validators who are UNP physics lecturers. The data collection used in this study consisted of questionnaire sheets and interviews were used to obtain initial data at the *define* stage which later questionnaire sheets were given to students and interview sheets were conducted to teachers. How to collect initial student data using google form.

The validation instrument is useful to find out whether the resulting LKPD is valid or not. The aspects contained in the LKPD validation instrument include presentation aspects, graphic aspects, content feasibility aspects, and linguistic aspects.

The data analysis technique in this study uses Aiken's V formula (Aiken, 1980). Validity test raters can be made on sequential integer scales, such as 1, 2, 3, 4, 5 or 0, 1, 2, 3 or -3, -2, -1, 0, 1, 2, 3 (Aiken, 1985). Assessment can be done using the Likert scale (score 1 = very less, score 2 = less, score 3 = sufficient, score 4 = good, score 5 = very good) (Retnawati, 2016).

Aiken's V formula is as follows:

$$V = \frac{\sum S}{[n(c - 1)]}$$

$s = r - lo$

Information:

V = validity index

lo = lowest rating number (in this study it was 1)

c = highest rating number

r = number provided by validator

n = many validators

S = sum of all s values of all validators

The value of Aiken's V coefficient ranges from 0-1. Validity values based on Aiken's V scale have categories in Table 1.

Table 1. Aiken'V scale category

Interval	Category
$\leq 0.4$	Low
$0.4 < V \leq 0.8$	Medium
$\geq 0.8$	High

(Retnawati, 2016)

## RESULT AND DISCUSSION

Based on the method that has been described to obtain the validity of LKPD products based on *project-based learning* on global warming material for phase E students, the research method used is the 4D method consisting of four steps, namely *define, design, develop and disseminate*. However, at the *stage disseminate* is not carried out due to time constraints and cost resources. This PjBL-based LKPD for global warming material was created using a Microsoft word 2010 application. Where in LKPD there are 5 sub-materials that are adapted to global extortion material.

At the *define* stage, five steps of analysis are carried out, namely initial final analysis, student analysis, material analysis, task analysis and formulation of learning objectives. In the early-final analysis, researchers conducted an analysis of the needs of teaching materials at SMA N 1 Banuhampu and interviews with phase E physics teachers regarding the use of teaching materials used during the learning process. The results of the analysis of teaching material needs at SMA N 1 Banuhampu are known that the teaching materials used in schools have not been in accordance with

the demands of the independent curriculum in Permendikbud no. 16 of 2022 concerning process standards and learning principles of the independent curriculum. The teaching materials used by schools, especially LKS purchased from the publisher of the book Viva Pikaran Creative Edition have not contained *project based learning* steps implicitly and learning with an independent flow in accordance with the independent curriculum is also still not optimal.

At the time of observation during the learning process, the teaching materials used by teachers are printed science books provided by the government. While students use LKS books purchased from the publisher Viva Pikarando Creative Edition, where the use of LKS students are not required to buy the book. Project activities to achieve learning outcomes and learning objectives have not been directed in a structured manner because the LKS purchased from the publisher does not contain the project steps implicitly, so it is clear that SMA N 1 Banuhampu needs a *project-based learning* LKPD according to the independent curriculum for phase E class students.

Based on observations and interviews with phase E physics teachers, information was obtained that SMA N 1 Banuhampu has implemented project-based learning in physics subjects. However, the implementation has not been optimal because it has not been structured according to the syntax of PjBL. Thus, the work steps carried out by students are not structured because the delivery of the project making step is only delivered orally and done independently by students without LKPD support. Finally, it causes how many projects are not successful because there are wrong steps. Therefore, schools need *project-based LKPD basad learning* to direct students in a structured manner in project activities. During the learning process as well, teachers also use conventional methods supported by learning videos from YouTube or power points and whiteboards, so that the learning process using an independent learning flow is not optimal.

Based on the results of student analysis, observations and filling out questionnaires in classes E1-E4 showed that most students did not seem to use teaching materials provided by the school in the form of books / LKS from publishers, students tend to pay attention to the teacher's explanation only on the blackboard / power point / learning video displayed using infocus. This can be seen from during the learning process most of the students just close their teaching materials on the table, store them in drawers and do not use them during the learning process. However, based on data from filling out questionnaires conducted in class X / E3 SMAN 1 Banuhampu which in one class consisted of 35 students. As a result of the analysis, 64.3% of students who filled out the form considered physics not a difficult material because they were able to understand what was explained by the teacher, while 42.9% considered physics to be a difficult material. Even so, according to students' views on the teaching materials used during the learning process is still not interesting and has not made them active in learning. In addition, learners recognize that they need other learning resources.

Based on the results of task analysis from the learning outcomes of the independent curriculum, students are required to have the ability to be responsive to global issues. These abilities must later be communicated by students in the form of simple projects or visual simulations using technological applications related to global warming. That is, the end of student learning objectives based on learning outcomes is learning that produces simple projects. The results of the material analysis obtained the allocation of learning time for global warming material is 18 JP with sub-chapters limiting global warming material filled from (1) facts of environmental change, (2) greenhouse effect, (3) human activities that result in global warming and (4) global warming solutions.

The results of the formulation of learning objectives are obtained from the analysis of learning outcomes There are seven learning objectives on global warming material including (1) students are expected to be able to analyze the facts of environmental changes as the impact of global warming, (2) students can conclude the understanding of global warming, (3) students are expected to be able to analyze the relationship between the facts of environmental changes with the sustainability of living things and ecosystems, (4) Participants Students are expected to be able to analyze environmental changes as the impact of global warming, (5) students analyze the process of the greenhouse effect, (6) students are expected to analyze human activities that cause environmental changes as a result of global warming, and (7) students are expected to create solutions to overcome environmental changes as a result of global warming.

At the *design* stage, three steps are carried out, namely, selecting media, choosing formats and making designs. Media selection is carried out by selecting supporting media because in LKPD there are explanations related to the environment. The media needed in LKPD is in the form of images that show the facts of environmental changes as a result of global warming, in addition to an explanation of images of the process of the greenhouse effect. Another media needed in LKPD is learning videos contained in barcodes or links.

The next step is to make a preliminary design. The initial design of the LKPD begins at the stage of making a *prototype* of the LKPD to be made. This *prototyping* stage is useful for giving an overview of product results, starting from the design form, the use of colors, layout and layout, the use of fonts and font sizes. LKPD is designed using a blue and orange background, using cambria writing font, writing size 12 pt and for title writing size 25-30 pt. The following are the design results of PjBL-based LKPD products for global warming materials.



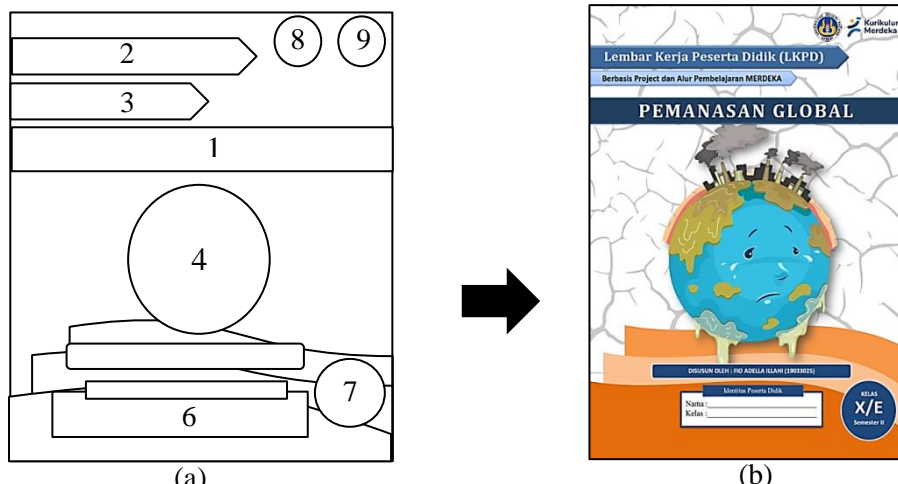


Figure 1.( a) *prototype* cover from LKPD, (b) LKPD cover design that has been completed

After making the design of the PjBL-based LKPD, the next stage is the *development* stage. At the *development* stage, it is limited to conducting expert assessments or validation tests of the products that have been made. This validity assessment questionnaire from LKPD contains four aspects of assessment, namely the presentation aspect, graphic aspect, content feasibility aspect and linguistic aspect.

Based on the assessment results from the presentation aspect, this LKPD is stated with a very valid. The results of the presentation validity test can be seen in table 2 below.

Table 2. The results of the assessment of the validity test of the presentation aspect

No	Assessment Indicators	V	Ket	
1	Components of LKPD presentation	a.	0,833	High
		b.	0,75	Medium
		c.	0,917	High
		d.	0,917	High
		e.	0,75	Medium
		f.	0,75	Medium
		g.	0,75	Medium
		h.	0,833	High
		i.	0,833	High
		j.	0,833	High

2	TP Clarity	a.	1	High
		b.	1	High
		c.	1	High
		d.	1	High
3	Concept Demands	a.	0,917	High
		b.	0,833	High
		c.	0,917	High
		d.	0,917	High
4	Image/video		1	High
5	Presentation of material		0,75	Medium
6	Inter-activity awareness		0,833	High
7	Integrity of meaning		0,917	High
8	Questions		0,833	High
9	Bibliography		0,833	High
<b>Sum</b>			<b>0,872</b>	<b>High</b>

Based on the results of the assessment from the graphic aspect, this LKPD is declared very valid. The results of the validity test can be seen in the following table 3.

Table 3. The results of the assessment of the validity test of graphic aspects

No	Assessment Indicators	V	Ket
1	Use of color	1	High
2	Clear image/video	1	High
3	Use of fonts	1	High
4	Font size	1	High
5	Inscription color	1	High
6	Design layout	1	High
7	Design view	1	High
<b>Sum</b>		<b>1</b>	<b>High</b>

Based on the assessment results from the aspect of content feasibility, this LKPD is declared very valid. The results of the validity test can be seen in the following table 4.

Table 4. The results of the validity test assessment of the feasibility aspect of the content



No	Assessment Indicators	V	Ket	
1	CP & TP Compliance	0,75	Medium	
2	Material according to TP	0,75	Medium	
3	Material in real context	0,917	High	
4	Student observation activities	1	High	
5	Image/video accuracy	0,833	High	
6	Encourage curiosity	0,833	High	
7	Creating the ability to ask questions	0,833	High	
8	Contains Pancasila Student Profile	a.	1	High
		b.	0,917	High
		c.	1	High
		d.	0,833	High
		e.	0,917	High
		f.	0,917	High
9	Model PjBL	a.	0,917	High
		b.	0,917	High
		c.	1	High
		d.	1	High
		e.	1	High
		f.	0,833	High
10	Independent Flow	a.	1	High
		b.	1	High
		c.	1	High
		d.	1	High
		e.	0,917	High
		f.	0,917	High
		g.	1	High
11	According to learning style	a.	0,833	High
		b.	0,833	High
		c.	0,833	High
12	Conclusion	0,917	High	
<b>Sum</b>		<b>0,913</b>	<b>High</b>	

Based on the results of the assessment from the linguistic aspect, this LKPD is declared very valid with an average validity index value equal to 0.888889. The results of the validity test can be seen in the following table 5.

Table 5. The results of the assessment of the validity test of linguistic aspects

No	Assessment Indicators	V	Ket
1	Communicative	0,833	High
2	Motivate	0,833	High
3	No double meaning	0,917	High
4	Grammar	0,917	High
5	Clarity of information	0,917	High
6	EYD Compliant	0,917	High
<b>Sum</b>		<b>0,889</b>	<b>High</b>

The results of the validity test have shown that the PjBL-Based LKPD made is valid both in terms of components, graphics, content feasibility and language, so that it is suitable for use in the learning process. The validity test graph can be seen in figure 4 as follows.

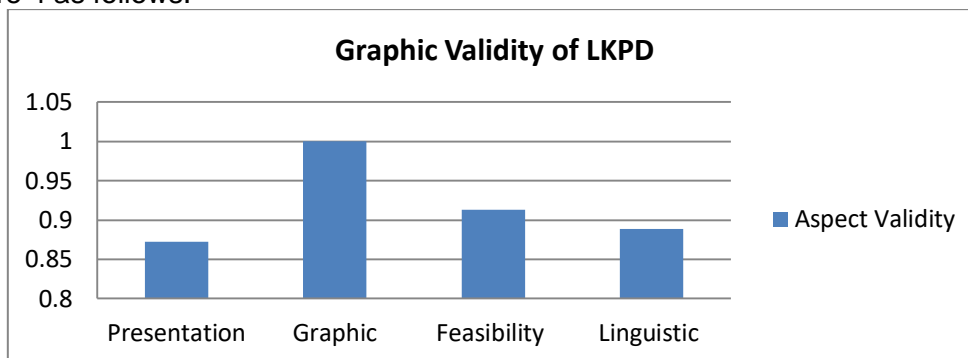


Figure 4. PjBL-Based LKPD Validity Value Graph

During the validation process, there were a number of criticisms and suggestions from validator lecturers that became the basis for consideration for revising this *project-based learning-based* LKPD. Then, after the product is declared valid by experts, the *project-based learning* LKPD product can be used in the learning process..

Based on the results of the assessment of the presentation aspect, this LKPD obtained an average validation index value of 0.872 with a very valid category. This means that the presentation of the PjBL-based LKPD is in accordance with the applicable curriculum rules and demands, namely the independent curriculum (Sakinah et al., 2023).

Based on the results of the content feasibility aspect, this LKPD obtained an average validation index value of 0.914 with a very valid category. This means that this LKPD has met the feasibility of the content in accordance with the independent curriculum and in accordance with the learning outcomes described in the learning objectives (Sutia et al., 2022).

Viewed from the linguistic aspect, this LKPD obtained an average validation index value of 0.889 with a very valid category. That is, the language used in this LKPD is in accordance with the review of Indonesian and EYD rules, does not have a double meaning and has been communicative (Kosasih, 2021).

After conducting validity tests to experts, it was concluded that the project-based learning LKPD on global warming material for phase E students that was made was valid and could be used, because overall this LKPD was in accordance with the learning needs in the independent curriculum.

## CONCLUSION

Based on the results of the research that has been conducted, it was concluded that the results of making *project-based learning* LKPD on global warming material for fase E students have obtained valid products with a validity index of presentation aspects of 0.872, graphic aspects 1, feasibility aspects of content 0.914 and linguistic aspects of 0.889. LKPD products LKPD *based on project based learning* on global warming material for fase E students can be used in the learning process.

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