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## Development of Smart Box Learning Media Based On Project Based Learning to Improve the Learning Outcomes of IPAS in Third-Grade of Surjo 03 Elementary School

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### Abstract

Smart Box is a learning medium in the form of an interactive box designed to be attractive and enjoyable, containing visual information such as images, text, or symbols. The Smart Box medium can be an effective tool to support the Project Based Learning process, which emphasizes student activity, creativity, and problem-solving skills. This study aims to describe the development design, feasibility, and effectiveness of the Project Based Learning-based Smart Box learning media on the learning outcomes of IPAS in third-grade of Surjo 03 Public Elementary School. The research method used is research and development with the ADDIE method (analysis, design, development, implementation, and evaluation). The research subjects were 18 third-grade students at Surjo 03 Public Elementary School. Product feasibility was obtained based on validation from media experts, while effectiveness was assessed from the results of students' pre-tests and post-tests when using the learning media. The results showed that the Smart Box media based on Project Based Learning obtained very feasible results in terms of design, material suitability, and learning media feasibility. Therefore, the learning media developed in this study is feasible to be used as an effort to improve student learning outcomes in elementary schools. Further research is recommended to develop learning media similar to different materials or grade levels and to conduct research with a larger sample size in order to obtain broader and more in-depth results.

**Keywords:** learning media, learning outcomes, project based learning, Smart Box

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### INTRODUCTION

Education is an important component of national development because it promotes growth and improvement in skills, human dignity, and quality of life. As stated in the Indonesian Education System Law No. 20 of 2003 concerning the National Education System, education is a fundamental and planned effort to create a learning environment and learning process that can develop students' potential to become individuals who are faithful, pious, noble, healthy, knowledgeable, skilled, creative, independent, and become democratic and responsible citizens. The objectives of education are largely determined by the learning process and its achievements. (Noviani & Putra, 2025).

The IPAS subject is a collaboration or combination of two subjects, namely Science and Social Studies, into one. The hope of combining these two subjects is to encourage students to manage the natural and social environment within a unified scope. The hope is that students will not only understand the reality of the natural environment around them but also understand the social environment of students. With this collaboration, it is hoped that the values or elements contained in the Pancasila student profile can be implemented well by students. (Asti Yunita Benu, 2024) According to Astuti (2022), there are several reasons for changing the subjects of science and social studies into IPAS, namely: 1) Elementary/MI students can view things holistically; 2) they can develop holistic thinking about the natural and social environment; 3) strengthening the Pancasila Student Profile. IPAS learning emerged

when schools began implementing the independent curriculum in their schools.

Based on observations and interviews conducted with third-grade teachers at Surjo 03 Public Elementary School, there are obstacles in terms of infrastructure. Teachers rarely conduct learning activities using digital media involving cell phones, because not all students have their own cell phones. Therefore, teachers prefer to use concrete objects around them or learning media, not only because these activities do not involve the use of mobile phones, but also because students appear to be more active when learning using concrete objects around them and learning media. However, the use of learning media is also very limited to certain materials, as not all materials have teaching aids that support learning activities in the classroom. In addition, third-grade teachers also revealed that there are difficulties in creating learning media, so if there is no learning media, teachers will explain the material without using appropriate learning media. The observation results show that learning activities are still dominated by teachers, and students are still passive because the role of teachers is still as the sole source of information and not yet as facilitators. Occasionally, teachers use learning media for exploration activities. Students appear more active and enthusiastic when they are given learning media and explore the material from the learning media. kemudian guru juga mengungkapkan bahwa murid sangat antusias ketika mereka diajak membuat project sederhana, mereka terlibat aktif untuk membuat atau menciptakan sesuatu yang tentunya sesuai dengan materi yang sedang dipelajari.

The Project Based Learning model is an innovative learning model that emphasizes active student involvement in completing challenging, collaborative, and contextual projects. According to Rehman et al. in (Budi et al. 2025), Project Based Learning acts as a catalyst for 21st-century skills, particularly critical thinking, problem solving, and collaboration. In implementing the Project Based Learning model, there are at least six stages carried out by teachers, in line with the independent curriculum. The six stages are 1) Determining fundamental questions, 2) Creating a product design plan, 3) Preparing a product creation schedule, 4) Monitoring student performance and project progress, 5) Assessing results, 6) Evaluating the learning experience. These steps need to be carried out completely so that the Project Based Learning model achieves optimal learning success (As'ari et al in Eni Restyowati, 2024). This project based learning model will be more effective when combined with concrete learning media to maximize learning activities, so that students can understand the material concepts and hopefully improve their learning outcomes.

There are many examples of concrete learning media, one of which is the smart box. The Smart Box is a learning medium in the form of an interactive box designed to be attractive and enjoyable, containing visual information such as images, text, or symbols (Oktavia et al., 2024). The Smart Box media is a concrete object designed to help students understand concepts through direct observation activities. The Smart Box allows students to search for information, explore materials, and complete projects either individually or in groups, which will later produce products that meet the project requirements. The use of Smart Boxes in collaboration with project-based learning can help teachers direct activities in a more structured manner, as each box can contain components that have been adapted to the stages of Project-Based Learning. Therefore, the Smart Box media can be an effective tool to support the Project-Based Learning process, which emphasizes student activity, creativity, and problem-solving skills. The selection of the Smart Box media was not without reason, as teachers had never used Smart Box media before, especially in IPAS subjects. It is hoped that this will improve student learning outcomes.

Learning outcomes are a set of experiences gained by students that cover the cognitive, affective, and psychomotor domains. Learning is not only about mastering theoretical concepts of a subject but also mastering habits, perceptions, enjoyment, interests and talents, social adjustment, various skills, aspirations, desires, and expectations. This is in line with the opinion of Oemar Hamalik as quoted by Rusman that learning outcomes can be seen from changes in perception and behavior, including improvements in behavior. Learning is a complex process, and changes in student behavior occur after assessment. Teachers should be able to observe these behavioral changes after assessment. These scores are obtained from the student's learning process over a certain period of time, followed by a final test. From this final test, teachers can determine the learning outcomes of their students. (Rusman in Mulia, 2021).

This study is based on previous research conducted by other researchers related to Project-Based Learning-based Smart Boxes and learning outcomes. Several previous scientific studies have examined the development of Project-Based Learning-based Smart Box learning media and student learning

outcomes, including the following.

Based on research conducted by Firli Maulidiana, et al. (2024) with the title. The results of the study showed that the Smart Box media had a validity level of 93% and was declared valid, the practicality level of the product reached 91% and was declared practical in its use and received a good response from learning practitioners. In addition, it also has a success rate of 90%, which means that students gave good feedback on the product and that it functioned well during the learning process. The similarity with the research to be conducted by the researcher is the development of Smart Box media for IPAS subjects, while the difference lies in the material contained in the Smart Box media.

Further research was conducted by Siti Aminah and Eka Yusnaldi (2024) entitled Development of Smart Box Media to Improve Student Learning Outcomes in Social Science Subjects in Madrasah Ibtidaiyah. The results of the study showed that the smart box media had a validity value of 92% and received 94% material validation. It also obtained a maximum score of 100% in the practicality test. This teaching trial obtained a learning outcome completeness score of 95% with a category of highly effective. Similar to the research to be conducted by the researcher is the development of a smart box, but what distinguishes this research is that it focuses on social studies content, while the researcher focuses on science content.

The next study by Ananda Rizky Fitriana and Wahyudi (2025) is entitled Development of Integrated Smart Box Media Using the Problem-Based Learning Model to Improve Critical Thinking in Elementary Schools. The results of this study show that this development has produced innovative learning media that meets the criteria of being valid, practical, and effective in the context of Pancasila education. All three aspects of validation consistently show that the smart box media is suitable for use in learning activities and meets quality standards. However, there are differences between this study and the study that the researcher will conduct, namely in the learning model and the subject content taken.

Based on the above explanation, the researcher is interested in developing Smart Box learning media based on Project Based Learning to improve the learning outcomes of third-grade students at Surjo 03 Public Elementary School, focusing on the material on various landscapes found in Chapter 5: My Surrounding Environment.

## **METHOD**

Research design serves as a guideline for researchers in carrying out all research processes. This study uses a Research & Development (R&D) approach. Research and development, often referred to as Research & Development (R&D), is a strategy for developing a product in the field of education. Research and development has the function of validating and developing products. Validating a product means that the product already exists, and researchers only test the effectiveness or validity of the product. Developing a product in a broad sense can be in the form of updating an existing product (so that it is more practical, effective, and efficient) or creating a new product that did not previously exist. (Sugiyono, 2023)

According to Angko and Mustaji (in Meilani, 2022), there are several reasons why the ADDIE model is highly relevant for use, namely (1) the ADDIE model can adapt very well to various conditions, allowing it to continue to be used to this day; (2) the ADDIE model is highly flexible in responding to problems, yet it remains effective to use and many people are familiar with the acronym ADDIE; (3) the ADDIE model provides a structured general framework for the development of instructional interventions with revisions and evaluations at each stage.

According to Sugiyono (2023), the ADDIE model consists of five stages, namely: Analysis, Design, Development, Implementation, and Evaluation. In accordance with the selected ADDIE model, (1) in the analysis stage, an analysis is carried out on the existing needs and problems in the form of textbooks, learning conditions, and learning media used; (2) in the design stage, several activities are carried out, such as formulating learning objectives, determining the material to be studied, followed by compiling teaching materials with a system tailored to the needs of students; (3) the development stage involves preparing and creating learning media in the form of Project-Based Learning-based Smart Boxes; (4) the implementation stage involves using the development product in the form of Project-Based Learning-based Smart Boxes in learning activities; (5) the evaluation stage is carried out formatively at the product development stage in accordance with the model used.

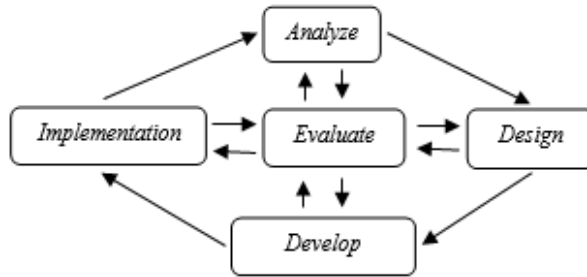


Figure 1. ADDIE Model Stage

Gustafson and Branch in (Sugiyono, 2023) state that in instructional development, the most important core is ADDIE. Namely, analysis of the background and needs of students, design of a set of specifications for an effective, efficient, and relevant learning environment, development of all materials for learning and organizing those materials, implementation of the resulting instructions, and formative and summative evaluation of the development results.

## RESULTS AND DISCUSSION

### Results

After completing the 5 stages of ADDIE, there are 3 results regarding the ADDIE model in the development of Smart Box media, the feasibility of learning media based on the validation of subject matter and media experts, and the effectiveness of learning media based on the results of student pretest and posttest scores.

### The ADDIE Model in Project-Based Learning-Based Smart Box Development

In developing a Project-Based Learning-based Smart Box, a development model is needed to maximize the results so that they are in line with the theory and the quality can be guaranteed. According to Januszewski and Molenda in (Meilani Safitri, 2022), the ADDIE model uses a systematic approach, which divides the learning planning process into several steps, arranges the steps into a logical sequence, and then uses the output from each step as input for the next step.

### Analyze

This analysis was conducted through oral interviews with teachers as sources, followed by classroom observation activities. Then, students and teachers filled out a needs questionnaire containing questions or statements about learning activities. Next, an analysis of planning was carried out based on learning objectives and learning outcomes that students were expected to achieve. After the analysis was carried out, the results of the analysis were evaluated. This evaluation activity focused on formative evaluation to ensure suitability of needs.

### Design

In the design stage, learning objectives are developed, tests are developed to serve as guidelines for learning activities, and student learning outcomes are improved based on the material to be delivered. At this stage, the learning process is clarified so that learning outcomes, learning objectives, learning steps, and improved learning outcomes can be achieved. Next, the learning media to be created, namely the Project-Based Learning-based Smart Box, is designed as follows.

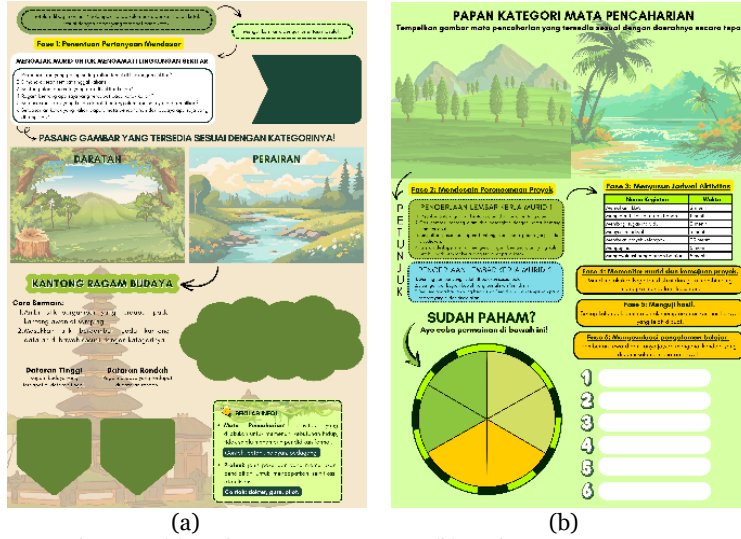


Figure 2. (a) Main Smart Box Part 1, (b) Main Smart Box Part 2

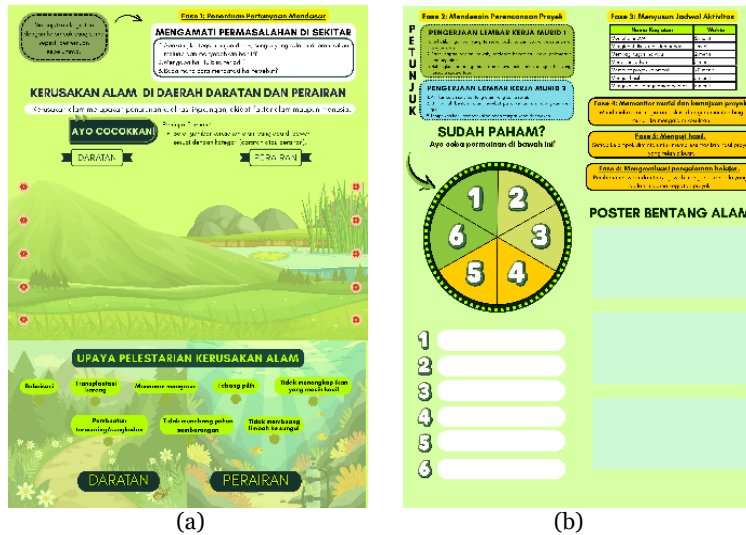


Figure 3. (a) Main Smart Box Part 3, (b) Main Smart Box Part 4



Figure 4. Mini Smart Box 1



Figure 5. Mini Smart Box 2



Figure 6. Mini Smart Box 3



Figure 7. Mini Smart Box 4

After designing the learning media, an evaluation was conducted before starting to develop it. The evaluation included assessing the project based learning stages, images used, fonts used, whether the colors used were too striking or not, and whether the appearance was attractive enough.

### Development

At this stage, the activities that will take place during learning are developed and recorded. The IPAS learning plan is determined using Smart Box media based on Project Based Learning. Then, the necessary teaching materials also need to be reviewed and developed. The most important thing in this development process is the instructional development system, which consists of the development of learning strategies, learning media, tools and materials, and evaluation tools that are appropriate to the needs. After all these sub-stages, validation of all the stages that have been completed is required. The following are the results of the learning media development based on the design that has been created.



Figure 8. Main Smart Box



Figure 9. Main Smart Box Part 1

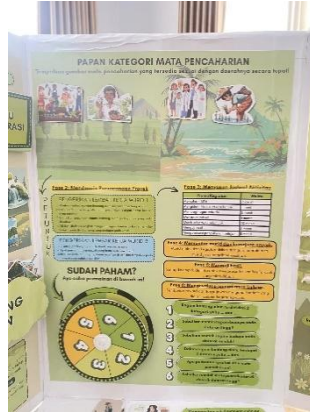


Figure 10. Main Smart Box Part 2



Figure 11. Main Smart Box Part 3



Figure 12. Main Smart Box Part 4



Figure 13. Mini Smart Box 1



Figure 14. Mini Smart Box 2



Figure 15. Main Smart Box 3



Figure 16. Main Smart Box 4

After developing learning media based on the previously created design, the learning media and learning tools must undergo a validation stage by subject matter and media experts to test whether the media is suitable for trial use. The following are the results of the validation by subject matter and media experts.

Table 1. Results of Subject Matter and Media Expert Validation Test

Validator	Validation	Total Score	Percentage
Fitria Dwi Prasetyaningtyas, S.Pd., M.Pd.	Material	72	90%
Abtadi Tris Hamdani, S.Pd., M.Pd.	Media	76	95%

After going through the validation stage by subject matter and learning media experts, there were several inputs from the validators for the learning media. The inputs from the validators were to make several revisions to the learning media. After going through the revision stage, it continued to the next stage, which was a small-scale trial with the learning media. The small-scale trial was conducted with 8 fourth-grade students from Surjo 03 Public Elementary School. From this small-scale trial, the following pretest and posttest scores were obtained.

Table 2. Small-Scale Trial Results

Student Code	Grade		Description	
	Pre	Post	Pre	Post
M 1	65	90	Incomplete	Complete
M 2	65	90	Incomplete	Complete
M 3	65	85	Incomplete	Complete
M 4	70	95	Complete	Complete
M 5	65	90	Incomplete	Complete
M 6	65	90	Incomplete	Complete

M 7	60	90	Incomplete	Complete
M 8	55	85	Incomplete	
<b>Total</b>	<b>510</b>	<b>715</b>		
<b>Average</b>	<b>63,8</b>	<b>89,4</b>		

**Implementation**

After conducting small-scale trials, there were no revisions needed. This was followed by large-scale trials with 18 third-grade students from Surjo 03 Public Elementary School. The results of these large-scale trials are as follows.

Table 3. Large-Scale Trial Results

Student Code	Grade		Description	
	Pre	Post	Pre	Post
Murid 1	55	90	Incomplete	Complete
Murid 2	45	85	Incomplete	Complete
Murid 3	45	80	Incomplete	Complete
Murid 4	40	70	Incomplete	Complete
Murid 5	70	95	Complete	Complete
Murid 6	60	85	Incomplete	Complete
Murid 7	65	90	Incomplete	Complete
Murid 8	45	85	Incomplete	Complete
Murid 9	70	95	Complete	Complete
Murid 10	80	95	Complete	Complete
Murid 11	50	85	Incomplete	Complete
Murid 12	30	75	Incomplete	Complete
Murid 13	45	85	Incomplete	Complete
Murid 14	50	90	Incomplete	Complete
Murid 15	55	90	Incomplete	Complete
Murid 16	60	85	Incomplete	Complete
Murid 17	45	85	Incomplete	Complete
Murid 18	55	90	Incomplete	Complete
Total	965	1555		
Average	53,6	86,4		

**Feasibility Test Results**

Several tests were conducted, namely: validation testing by validators, validity testing, reliability testing, difficulty level testing, item discrimination testing, and normality testing. In the material validation stage by subject matter experts, a score of 90% was obtained, and a score of 95% was obtained for the media validation results. Next, there are validity, reliability, difficulty level, item discrimination, and normality tests on the instrument consisting of 50 items.

Table 4. Validity Test

Question Number	Validity Test Results	Total
1, 2, 3, 5, 6, 7, 8, 9, 12, 13, 15, 17, 20, 22, 26, 34, 36, 42, 44, 46, 47, 49, 50	Valid	23 questions
4, 10, 11, 14, 16, 18, 19, 21, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33, 35, 37, 38, 39, 40, 41, 43, 45, 48	Invalid	27 questions
<b>Total</b>		<b>50</b>

From the validity test, there were 23 valid questions and 27 invalid questions. After the validity test, Cronbach's Alpha reliability test was conducted, and the result obtained was  $0.726 > 0.60$ , which can be considered reliable.

Table 5. Reability Test  
Reliability Statistics

Cronbach's Alpha	N of Items
,726	50

Next, a difficulty level test was conducted with 32 medium-level questions and 18 easy questions. This was followed by a test of the discriminating power of the questions, with an even distribution or all categories filled with questions of varying difficulty levels.

Table 6. Difficulty Level Test

Question Number	Level of Difficulty	Total
-	Difficult	0
1, 2, 3, 6, 8, 11, 12, 13, 14, 15, 16, 17, 19, 20, 22, 25, 28, 30, 32, 33, 35, 36, 37, 38, 42, 44, 45, 46, 47, 48, 49, 50	Moderate	32
4, 5, 7, 9, 10, 18, 21, 23, 24, 26, 27, 29, 31, 34, 39, 40, 41, 43	Easy	18
<b>Total</b>		<b>50</b>

Table 7. Difference Power Test

Question Number	Interpretation of Discriminatory Power	Total
6, 22, 46	Very Good	3
1, 2, 5, 8, 9, 13, 17, 20, 25, 37, 41, 44, 47, 50	Good	14
3, 7, 10, 12, 15, 26, 34, 36, 43, 45, 49	Fair	11
14, 16, 21, 23, 24, 27, 29, 31, 33, 35, 38, 39, 40, 42	Poor	14
4, 11, 18, 19, 28, 30, 32, 48	Very Poor	8
<b>Total</b>		<b>50</b>

Finally, there was a normality test for the instrument. Since there were fewer than 30 respondents, the Shapiro-Wilk test was used. Based on Table 8, the pre-test result was 0.676 and the post-test result was 0.034.

Table 8. Test of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	,146	18	,200 <sup>*</sup>	,964	18	,676
Posttest	,250	18	,004	,887	18	,034

**Effectiveness Test Results**

The effectiveness test results were obtained from nonparametric tests and N-Gain Score tests. The nonparametric test results based on Table 9 were  $0.001 < 0.05$ , indicating that there was a significant difference between the pre-test and post-test.

Table 9. Non Parametric Test  
Test Statistics<sup>a</sup>

	Z	Posttest - Pretest
		-3,750 <sup>b</sup>
Asymp. Sig. (2-tailed)		,001

Then, the N-Gain score test results in Table 3.17 obtained a mean of 0.7168. Because the result obtained was 0.72 (rounded), then  $0.72 > 0.7$ , it has high criteria. (Guntara, 2021)

Table 10. N-Gain Test  
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Ngain_Skor	18	,50	,83	,7168	,08501

Ngain_ Persen	18	50,00	83,33	71,6811	8,50124
Valid N (listwise)	18				

**Discussion**

**Definition of the ADDIE Development Model**

The ADDIE development model is one of the most frequently used frameworks in instructional development at various levels of education. According to Molenda in (Torang Siregar, 2025), this model was first developed by Florida State University in 1975 on the initiative of the Center for Educational Technology to meet the training needs of the United States military. The ADDIE model consists of five main phases, namely Analysis, Design, Development, Implementation, and Evaluation, which work systematically and are interrelated.

The ADDIE stages or steps carried out are as follows: first, the analysis stage, which involves analyzing learning outcomes and learning objectives, observing learning activities, and interviewing teachers as resource persons about how learning activities have been carried out so far, as well as filling out questionnaires by teachers and students. The design stage involves designing learning plans and designing Project-Based Learning-based Smart Boxes that will be created in accordance with the results of the analysis conducted in the initial or first stage. In the third stage, or the development stage, learning plans are created and validated by subject matter experts, followed by the creation of Project-Based Learning-based Smart Boxes. After validation by media experts, small-scale trials are conducted. After the small-scale trial, implementation was carried out as the fourth stage with the use of Project Based Learning-based Smart Box learning media on a large scale. The final stage was evaluation, which was carried out at each stage that had been passed.

**Feasibility Test**

After developing learning media, the results must undergo a validation stage by validators who are experts in their respective fields. The validators who will validate the media are content validators and media validators (Dwi Putri Harefa, 2021). The assessment aspects used for media expert validation consist of content feasibility, format feasibility, and language feasibility. This feasibility test is used by media experts with the aim of obtaining results, suggestions, and comments from expert validators so that the learning media developed becomes a quality product that is suitable for use in the learning process. (Aimi Marlinda, 2023)

The material validation results obtained 72 points out of a maximum of 80 points with a percentage of 90% and was categorized as very feasible. This is because in the calculation table, the percentage range of 81% - 100% is categorized as very feasible. This is similar to the research conducted by (Siti Dwi Amriani, 2024), which obtained 94% material validation with a very feasible category. The validator also provided suggestions and input, namely: cutting and pasting stickers so that they are neater and adjusted to the area where the stickers will be placed; the Smart Box lock should not be separate but integrated with the side of the Smart Box so that it is more sturdy, and the finishing should use clear spray paint so that the Smart Box is not easily damaged when it is scratched.

In addition to content validation, there is also media validation with a score of 76 out of a maximum of 80 points, representing a percentage of 95% and falling into the highly suitable category. This is because, according to the calculation table, a percentage range of 81% - 100% is categorized as highly suitable. Similar to previous research by (Jihan Alifa, 2024), which obtained a 98.07% very feasible criterion by media experts.

After conducting a validity test on 50 items as shown in Table 4, the results showed that 23 items were valid and 27 items were invalid. After conducting the validity test, a Cronbach's Alpha reliability test was conducted, with a result of 0.726 with N of items equal to 50 as shown in Table 3.8. The figure of 0.73 (rounded) indicates that the entire instrument is reliable because  $0.73 > 0.60$  according to Arikunto in (Adi Darma Surya, 2023).

At the test difficulty stage, there were 32 questions with a medium level of difficulty and 18 questions with a low level of difficulty, as shown in Table 6. At this test difficulty stage, there were no questions with

a high level of difficulty. In the test of item discrimination, the following results were obtained: 3 items in the excellent category, 14 items in the good category, 11 items in the fair category, 14 items in the poor category, and 8 items in the very poor category, as shown in Table 7.

Normality testing plays an important role in educational research because it allows researchers to compare learning outcomes between pretest and posttest. This test can be performed using the Kolmogorov Smirnov, Shapiro Wilk, and Liliefors methods. If the data meets the assumptions of normality, then the data is considered stable and suitable for statistical analysis that requires a normal distribution (Muliana S, 2025). In the normality test for this study, the Shapiro Wilk test was used because the respondent data was less than 100. At the normality test stage, there were two different results. This was because in the initial normality test, the posttest data was not normally distributed. Since the posttest result was  $<0.05$ , a non-parametric test was required because the data was not normally distributed.

Based on Table 9, it can be seen that after conducting the Wilcoxon non-parametric test, the result was Sig. (2-tailed)  $0.001 < 0.005$ , which can be said to have a significant result.

### **Effectiveness Test**

The effectiveness of learning in this study was analyzed through non-parametric tests and N-Gain score tests to determine the improvement in student learning outcomes before and after the treatment was given. This analysis aimed to see whether the learning model applied was able to influence students' understanding of the material on various landscapes. According to Eubank, nonparametric regression allows for flexible modeling and is able to capture complex and non-linear relationship patterns. Its main advantage is its ability to capture complex and non-linear relationship patterns without being bound to a specific parametric model. (Mitha Rabiyyatul Nufus, 2025)

Based on the nonparametric test results, a significance value of 0.001 was obtained. This value is smaller than the significance level of 0.05 ( $0.001 < 0.05$ ). This indicates that there is a significant difference between the students' pre-test and post-test scores. Thus, it can be concluded that the learning method applied in this study has an effect on improving student learning outcomes. This difference in scores indicates that after participating in the learning process, the students' understanding of the material improved compared to before the learning took place.

The effectiveness of the developed product was tested by students as research subjects. Researchers test the effectiveness of the product by comparing the results of the pretest and posttest. The pretest and posttest questions are designed to be challenging and are tailored to the learning objectives. Effectiveness is determined by analyzing the pretest and posttest data using the Normalized Gain or n-gain formula. (Lestari, 2023). The effectiveness of learning was analyzed using the N-Gain score test to determine the level of improvement in student learning outcomes. Based on the calculation results, the average (mean) N-Gain value was 0.7168, which was then rounded to 0.72. Based on the N-Gain criteria, a value of  $0.72 > 0.7$  is classified as high. This indicates that the improvement in student learning outcomes after participating in the learning process was at a high level. According to Guntara (2021), an N-Gain value in the high category indicates that a learning process is effective in improving student learning outcomes.

From a theoretical perspective, this study reinforces the understanding that learning using Project-Based Learning-based Smart Boxes plays an intrinsic role in improving student learning outcomes. These results can be used as a basis for developing more contextual Smart Boxes with various learning methods. From a practical perspective, this study shows that the integration of Project-Based Learning-based Smart Boxes in learning can be a solution to the problem of low student learning outcomes in certain areas. Teachers can use this media to increase student engagement, especially for students who are often inactive in class. The pedagogical implications of these findings emphasize the importance of integrating learning media into learning activities, training teachers in the effective use of Project Based Learning-based Smart Boxes, and continuously evaluating the effectiveness of using Project Based Learning-based Smart Box media.

### **CONCLUSION**

Based on the results of the study, the development of Project-Based Learning-based Smart Box media was carried out using the ADDIE model, which includes the stages of analyze, design, development,

implementation, and evaluate. The Smart Box media consists of one main Smart Box and four mini Smart Boxes that contain the steps of Project-Based Learning. The main Smart Box contains exploration cards, various landscapes, cultural diversity, and livelihoods in the first meeting, as well as examples of land and water damage and conservation efforts in the second meeting, which are arranged according to the PjBL stages. The four mini Smart Boxes contain projects that students work on individually or in groups, divided into land and water themes. The feasibility test results showed that the Project Based Learning-based Smart Box media was very feasible to use, as evidenced by the material expert validation score of 72 out of 80 (90%) and the media expert validation score of 76 out of 80 (95%) with a category of very feasible. The effectiveness test results showed a significance value of  $0.001 < 0.05$ , which means that there was a significant difference between the pre-test and post-test scores, as well as an N-Gain value of 0.72 with a high category. Thus, the Project Based Learning-based Smart Box media is feasible and effective for use in improving student learning outcomes in the subject of various landscapes.

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