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Research Article

Development of Interactive PowerPoint Media to Improve Science Learning Outcomes of Grade V Students of SDN 2 Gumulan Academic Year 2024/2025

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Abstract: This study aims to create and evaluate interactive PowerPoint learning media used to help fifth grade students at SDN 2 Gumulan to understand lessons more easily and improve learning outcomes. The problems faced are low learning motivation and monotonous teaching methods for science. As a solution, interactive PowerPoint media is used for fifth grade science material, Chapter 6 "Indonesia is Rich" with the topic "How is My Indonesia?". This study uses the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation. The results of the study showed that this media was very feasible to use, with a feasibility value of 92% from material experts and 88% from media experts. This media has also proven effective because it can increase student learning scores by 65% from pre-test to post-test. In addition, students feel more enthusiastic and interested when learning using this media. However, this study still has shortcomings, such as only being conducted in one school, only covering one topic, and the time is short. For this reason, further research is needed with more participants and a longer time so that the results are stronger and more comprehensive.

Keywords: ADDIE Model; Elementary School; Interactive PowerPoint Media; Learning Outcomes; Natural and Social Sciences (IPAS); R&D.

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1. Introduction

Education is an effort to survive in human civilization to live life in the present or in the future. Education in the view of Ki Hajar Dewantara is defined as an effort to improve children's overall development , including morals, intellectual and physical. According to (Putri, 2023) , Education is an effort to improve humanity, with the aim of creating skills that are in line with the character of the Indonesian state which is guided by Pancasila and equipping society with knowledge, intelligence, attitudes and knowledge about the physical as an activity to meet life's needs. The ultimate goal is for children to be able to live a harmonious life, in harmony with society and keep up with the times. Education in Indonesia currently applies the Merdeka curriculum in learning activities.

The Merdeka Curriculum that we are currently implementing has models, methods and strategies to achieve educational goals more optimally. The transition from the previous curriculum to the Merdeka curriculum certainly presents unique challenges that need to be addressed with the right strategy. by educators and students in adjustments in the classroom. However, it is highly recommended to be open in making changes and taking risks to find out the final results. So that the learning process must have good quality.

This learning process can be done in various ways: reading, listening, observing, discussing, and doing practical actions. Learning often involves reflection, evaluation, and deeper understanding of the topic or skill being learned. Monotonous learning can make it difficult for students to understand the material being taught. Therefore, educators need to present interesting learning media so that students are more motivated and active in the learning process.

Learning media is a means of delivering material so that learning objectives are achieved. According to Miska Risky et al. (2022), this media acts as a liaison between educators and students and is the key to successful learning. Educators need to choose appropriate media so that the learning process is more effective (Indriyani, 2020). In addition to helping deliver material, learning media also makes learning more focused. Therefore, educators are required to be creative and innovative in creating interesting media.

Currently, the education system gives schools and educators freedom to design learning. One example is the Natural Sciences and Social Sciences subjects which are now combined into IPAS.

If science learning only uses textbooks and lecture methods, students tend to be uninterested and less enthusiastic. Passive learning without interaction makes them less critical of the problems discussed. Monotonous activities also reduce their interest in learning. Therefore, educators need to create learning that is packaged in an interesting way that can increase students' enthusiasm in following the learning process, so that their learning outcomes in the cognitive aspect can increase.

Science learning that only relies on textbooks and lectures tends to make students less interested and unenthusiastic. Lack of interaction also hinders their critical thinking skills. Monotonous methods reduce interest in learning. Observation results in class V of SDN 2 Gumulan show that educators have not developed learning media in Science. As a result, many students have difficulty understanding concepts because learning is less interesting, so their learning outcomes are low. In the first daily test, there were 13 students who had not reached the KKTP, while 7 students had graduated.

Based on the description of the problems above, the researcher concluded that a solution was needed to fix it. The researcher has a solution in the form of developing interactive PowerPoint media so that the learning outcomes of grade V students in the material Chapter 6 "Indonesia is Rich" Topic A "What is the Shape of My Indonesia?" increase.

2. Literature Review

Various previous studies have shown that interactive PowerPoint media has a significant role in improving student learning outcomes at the elementary school level. Putri (2023) found that this media received a very positive response, as seen from the high level of media feasibility and adequate material validation. These findings indicate that interactive PowerPoint-based media is not only easy to use but also able to help students understand learning materials more clearly.

Furthermore, Urbach (2024) revealed that attractive visual displays and interactive features in PowerPoint can foster interest in learning and increase student enthusiasm, which has an impact on significantly improving learning outcomes. Another study by Budianti in 2023 also showed that students who learn using interactive media get better learning outcomes compared to students who learn using conventional methods.

Although they have the same focus, this study has a different approach. The interactive PowerPoint media developed by the researcher is designed by combining visual and audio elements to create a more interesting and easy-to-understand learning atmosphere. This development is focused on the fifth grade science subject, especially Chapter 6 "Indonesia is Rich" Topic A "How is My Indonesia?", which contains quite complex material. Therefore, this media is expected to be an effective learning support tool in helping to improve students' understanding and learning outcomes.

3. Method

The Research and Development (R&D) method aims to create and test the effectiveness of a product (Sugiyono, 2017). This study applies the R&D approach in designing interactive PowerPoint media that aims to improve science learning outcomes in grade V students. The

development model used is ADDIE, which consists of five main stages, namely Analysis, Design, Development, Implementation, and Evaluation (Benny in Nada & Putra, 2023). The following is an explanation of each stage in the ADDIE model:

The first stage of Analysis, aims to find and analyze problems in learning science for grade V and collect data to develop effective learning media. The second stage, Design, includes determining learning objectives, selecting relevant content, and appropriate delivery methods. Media design is made with interactive elements such as quizzes, animations, and videos to make it more interesting. The third stage, Development, is done by creating media using PowerPoint, equipped with attractive visual elements and in accordance with the curriculum. This media is then validated by material experts to ensure its feasibility. The fourth stage, Implementation, is a media trial in grade V of SDN 2 Gumulan in learning science. The last stage, Evaluation, to assess the feasibility of the media through a validation questionnaire from material experts, media experts, and student responses to the use of the media.

The first stage, Analysis, aims to identify problems in learning science for grade V and collect data to develop more effective learning media. The second stage, Design, includes setting learning objectives, selecting appropriate content, and delivery methods that match the characteristics of students. The media design is made interesting with the addition of quizzes, animations, and videos so that students are more involved. The third stage, Development, is carried out by creating media using PowerPoint equipped with attractive visual elements and in accordance with the curriculum. This media is validated by material experts before being used. The fourth stage, Implementation, is a media trial in grade V of SDN 2 Gumulan. The fifth stage, Evaluation, assesses the feasibility of the media through a validation questionnaire from material experts, interactive PowerPoint media experts, and student responses to their experiences using this development media.

This study uses a questionnaire as the main instrument to collect data from respondents. This instrument is designed by applying a Likert scale , this scale is used to evaluate students' responses to the interactive learning media that has been developed. The scale used is between 1 and 5 with the provisions of the applicable Likert scale category.

The validation questionnaire was used to assess the feasibility of interactive PowerPoint media before being implemented in elementary schools. The Material Expert Validation Questionnaire covers two main aspects. The material aspect assesses the suitability of the material for Science Chapter 6 Indonesia Kaya Raya Topic A How is My Indonesia? with basic competencies, indicators, and learning objectives. In addition, this aspect also looks at the clarity and sequence of material presentation, the ability of the media to increase interest in learning, and the suitability of images, colors, and writing with the content of the material. The ease of students in understanding the material is also a concern. The language aspect assesses the suitability of the language with the level of thinking of students, the straightforwardness, and the accuracy of grammar, terms, and spelling. The Interactive PowerPoint Media Expert Validation Questionnaire focuses on three aspects. The media aspect assesses the suitability and clarity of the material, and the attractiveness of the media in learning. The utilization aspect includes the extent to which this media is easily accessible and its effectiveness in increasing students' learning motivation. The illustration aspect assesses the clarity and suitability of images, colors, and writing with the content of the material in interactive PowerPoint media. The Student Response Questionnaire measures the extent to which this media attracts their interest in learning. The material aspect assesses the ease of understanding the content of the lesson, the delivery of the material, and the clarity of the language used. With these aspects, the validation questionnaire of material experts, PowerPoint media experts, and student responses can provide conclusions that are in accordance with research needs. Then to test the feasibility of this interactive PowerPoint media, a test consisting of a pre-test and post-test was used. The form of questions given was 10 multiple-choice questions, 10 short answers and 5 descriptions.

This research uses descriptive quantitative data analysis. A quantitative approach is applied to manage data obtained from expert validation of materials and evaluation of learning media, then analyzed in percentage form to determine the level of feasibility of this development media. In the process of analyzing this research data, a Likert scale was used with the calculation of the average score of each question contained in the questionnaire. Determining the percentage, the score obtained through the assessment of the questionnaire by experts is then calculated using the percentage method according to (Priagung, 2021) with the formula:

$$P = \frac{F}{N} \text{x } 100\ \%$$

Where:
P = Percentage Value
F = Number of Responses
N = Total Maximum Score

The percentage of validation results carried out by the validator can be calculated using the formula. Furthermore, the results will be adjusted to the feasibility and validation level table. Here is the Likert scale assessment table:

Table 1. Validation Level Criteria

No	Percentage (%)	Levels	Information
1.	8.1 – 10.0	Very suitable	Fully meets the criteria
2.	6.1 – 8.0	Quite appropriate	Meet the criteria
3.	4.1 – 6.0	Less appropriate	Does not meet the criteria
4.	2.1 – 4.0	It is not in accordance with	Does not meet the criteria
5.	< 2.0	Totally inappropriate	Totally does not meet the criteria

The data from the questionnaire responses of students that have been distributed to students will be validated and tested for reliability using SPSS27 for Windows. After that, the pre-test and post-test are said to be successful if there is an increase in the results of both tests after implementing learning using interactive PowerPoint media. Furthermore, qualitative analysis using data from criticism and suggestions from validators and interview results from educators can be used as reinforcement in quantitative data.

4. Results and Discussion

This learning media was developed systematically and evaluated by material experts and media experts to ensure its quality. The material expert validator, Mrs. Sri Suwartini, S.Pd., M.Pd., is a lecturer in the Elementary School Teacher Education Study Program at Widya Dharma University, Klaten. She is tasked with validating learning media to improve its quality, focusing on two main aspects: material and language.

Table 2. Results of Percentage and Criteria of Material Experts

No	No Statement	Evaluation	Maximum value	No	No Statement	Evaluation	Maximum value
1.	Point 1	5	5	6.	Point 6	5	5
2.	Point 2	5	5	7.	Point 7	5	5
3.	Point 3	4	5	8.	Point 8	5	5
4.	Point 4	5	5	9.	Point 9	4	5
5.	Point 5	4	5	10.	Point 10	4	5
Total Score:				46			
Maximum Score:				50			

The table shows the results of expert validation of interactive PowerPoint media that have been carried out by the validator. From these results, the total maximum score (N) was obtained as 35 and the number of respondents (F) was 31. Furthermore, the researcher will calculate the percentage of media feasibility using the following formula to determine the level of feasibility in the form of a percentage:

$$P = \frac{F}{N} \text{x } 100\ \%$$
$$P = \frac{5+5+4+5+4+5+5+5+4+4}{50} \text{x } 100\ \%$$
$$P = \frac{46}{50} \text{x } 100\ \%$$
$$P = 0.92 \text{ x } 100\ \%$$
$$P = 92\ \%$$

After calculating the percentage of the material expert validation sheet, the figure obtained was 92%, which is included in the qualification of being very feasible to be implemented. However, even though it has been declared feasible, researchers still need to make revisions. The revisions made include adjusting the design or theme in the material to be in line with the learning used in Chapter 6 Indonesia Kaya Raya Topic A "What is the Shape of My Indonesia?".

Expert validation of interactive PowerPoint media covers three main aspects, namely feasibility, utilization, and illustration, where each aspect has its own assessment indicator. The validator provides an assessment based on criteria that are in accordance with the actual standards. The following are the results of expert validation of interactive PowerPoint media Chapter 6 Indonesia Kaya Raya Topic A "How is My Indonesia?" which has been carried out by Mrs. Putri Zudhah Ferryka, S.Pd., M.Pd.

Table 3. Results of Percentage and Criteria of Material Experts

No	No Statement	Evaluation	Maximum value	No	No Statement	Evaluation	Maximum value
1.	Point 1	4	5	5.	Point 5	5	5
2.	Point 2	5	5	6.	Point 6	4	5
3.	Point 3	4	5	7.	Point 7	5	5
4.	Point 4	4	5				
Total Score:				31			
Maximum Score:				35			

This table shows the results of expert validation of interactive PowerPoint media. From the assessment, a maximum score of 35 was obtained with 31 respondents. Furthermore, the percentage of media eligibility will be calculated using a predetermined formula:

$$P = \frac{F}{N} \text{x } 100\ \%$$

$$P = \frac{4+5+4+4+5+4+5}{35} \text{x } 100\ \%$$

$$P = \frac{31}{35} \text{x } 100\ \%$$

$$P = 0.88 \text{ x } 100\ \%$$

$$P = 88\ \%$$

After calculating the percentage of expert validation sheets on interactive PowerPoint media, a value of 88% was obtained, indicating that the media is qualified as very feasible to be implemented. However, before being implemented, researchers need to make revisions. The revisions made include adjusting the design to align with the science learning material in Chapter 6 Indonesia Kaya Raya Topic A "How is My Indonesia?" focused on the material on maps and geographical conditions of Indonesia. After the revision, this interactive PowerPoint media can be applied in research that will be conducted in class V of SDN 2 Gumulan.

The material expert and media expert validators provided some input for improvement so that the developed product is more appropriate and effective in supporting the learning process. So the researcher needs to make revisions according to the recommendations given before this media is used in Chapter 6 Indonesia Kaya Raya Topic A "What is the Shape of My Indonesia?" in class V SDN 2 Gumulan. The following are the results of the revision based on input from the validator:

Figure 1. Interactive PowerPoint Media Cover Design Before Revision

The initial cover design in the interactive PowerPoint media for grade V still needs revision. The design created is not fully in accordance with the material that focuses on maps and geographical conditions of Indonesia. In the initial design, the display still displays the map in the form of illustrations, not in real form. Then there is no indication that this media is used in Chapter 6 Indonesia Kaya Raya Topic A "What is the Shape of My Indonesia?". Therefore, based on input from validation experts, it is recommended that the design be adjusted to the material raised, such as by adding visual elements in the form of a real map of Indonesia, illustrations of landscapes, and representations of various geographical conditions. With these improvements, the learning media is expected to be more interesting, relevant, and effective in improving students' understanding.

Figure 2. Interactive PowerPoint Media Cover Design

The design above is a design image of the interactive PowerPoint media cover that has been revised by the researcher. Suggestions and input from the validator given to the researcher, then the researcher revised the design that was adjusted to the theme of the material used, namely getting to know maps and geographical conditions in Indonesia. After being revised, the cover design has differences. Previously, there was no writing of Chapter 6 Topic A "What is the Shape of My Indonesia?", it will be understood that this media is specifically for that chapter. Then the map image that was only an illustration was revised to include the original map so that students can see its real form. So after this revision, it is certainly more interesting and makes students enthusiastic to learn.

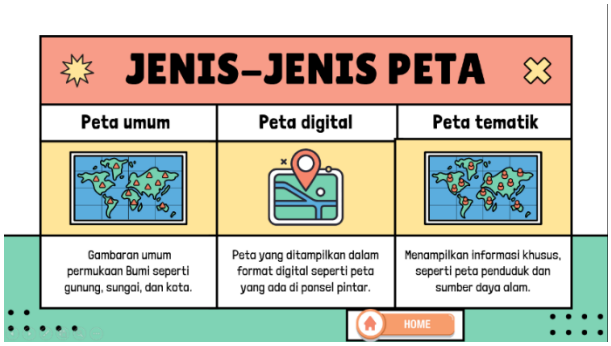


Figure 3. Design of the Content Section of Map Types Before Revision

The image above shows the initial design in an interactive PowerPoint media slide before being revised by the validator. At the initial design stage, the learning media still used general illustrations and did not display more relevant real images. The use of these illustrations was initially intended to provide a simpler visualization of the concept. However, based on the evaluation results from the validator, the use of illustrations was considered less effective in helping students understand the material concretely. Therefore, the validator recommended a revision by replacing the illustrations with real images to better suit the learning objectives.

This change aims to improve the quality of the media with the aim of making it easier for students to understand the concepts being taught. The use of real images is expected to help them relate the material to objects in everyday life.

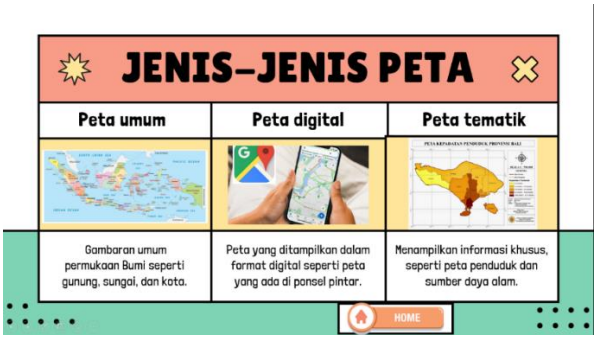


Figure 4. Design of the Content Section of the Map Types Material After Revision

After being revised by the validator expert, the design of the map types slides was given real images or real forms. There is a visible difference before and after the revision. The PowerPoint media slides become easier to understand and look very efficient for students to understand. Other slides that have not used real images have been revised according to the validator's recommendations.

In the implementation stage, interactive PowerPoint media was tested in science learning in class V of SDN 2 Gumulan. This media, which discusses Chapter 6 Indonesia Kaya Raya in Topic A "How is My Indonesia", has been validated. After being revised based on input from the validator, this media is ready to be used in learning.

Implementation was carried out in one meeting on Thursday, January 23, 2025, to assess the feasibility of interactive PowerPoint media in science learning. The student response questionnaire was used to measure their learning interest, which affects learning outcomes. Meanwhile, the pretest and posttest were used to see if there were significant changes in student learning outcomes. The following are the results of the student response questionnaire after going through a validity test, where 10 questions were declared accurate and met the criteria:

Table 4. Results of Validation Test Questionnaire Calculation

No	Minimum limit correlation	Correlation test value	Note	No	Minimum correlation limit	Correlation test value	Note
1.	(0.456)	0.855	Accurate	6.	(0.456)	0.519	Accurate
2.	(0.456)	0.519	Accurate	7.	(0.456)	0.855	Accurate
3.	(0.456)	0.866	Just in case	8.	(0.456)	0.519	Just in case
4.	(0.456)	0.462	Just in case	9.	(0.456)	0.866	Just in case
5.	(0.456)	0.855	Just in case	10.	(0.456)	0.462	Just in case

Validity test shows that all statement items (P1–P10) have a higher correlation test value than the minimum correlation limit at a significance level of 5% (0.456). This indicates that each statement in the research instrument is declared valid because it has a significant relationship with the total score. After conducting the validity test, the researcher continued with the reliability test. Here are the results:

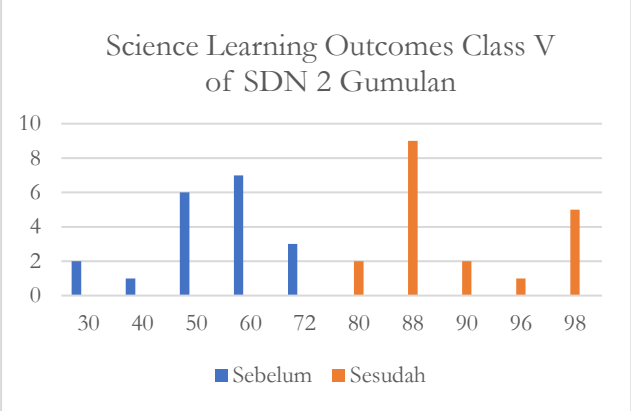
Table 5. Reliability Results

Reliability Analysis	
Cronbach's Alpha	N of Item
.885	10

To understand the table above, pay attention to the Cronbach's Alpha value. The score obtained exceeds 0.6, then the questionnaire instrument is stated to have a good level of reliability, while if it is below 0.6 then it is considered less reliable. Based on the data in the table, the student response questionnaire is proven to be reliable with a Cronbach's Alpha

value of 0.885 (> 0.6). After the questionnaire was used, the study was continued by conducting two stages of testing, namely pre-test and post-test. Thus, this study can show the extent to which interactive PowerPoint media contributes to improving the quality of learning. The following are the learning outcomes in class V of SDN 2 Gumulan.

Table 6. Comparison of student learning outcomes before and after using development media.



The results of the pre-test of students before the implementation of interactive PowerPoint media showed that the highest score obtained was 72, while the lowest score was 30. Then a post-test was conducted after the implementation of interactive PowerPoint media, the highest score increased to 98 and the lowest score to 80.

After implementing interactive PowerPoint media, a post-test was conducted to assess the extent of students' understanding after participating in the learning process. The results showed an increase of 65%, proving that this media is effective in improving understanding of the material. The average pre-test score increased from 54 to 90 in the post-test. The highest and lowest scores also increased, indicating improvements in the results of learning science in class V SDN 2 Gumulan. These findings prove that interactive media can improve the quality of learning. Therefore, its use can be an innovative solution in improving learning outcomes in elementary schools.

This research focuses on developing interactive PowerPoint media as a means of learning science for students at SDN 2 Gumulan class V by implementing the ADDIE model. Assessments from material experts and media experts indicate that the developed media has a feasibility level of 92% and 88%, respectively. So this media is declared very feasible with only a few improvements needed. The effectiveness of the media was tested through a test, where the results showed an increase of 65%. The average pre-test score which was originally 54 increased to 90 in the post-test.

5. Conclusion

The results of this study indicate that the use of interactive PowerPoint media in science learning can create a more enjoyable and meaningful learning experience for students. The media has gone through a feasibility test process by experts with assessment results of 92% and 88%, which indicates that this media is very ready to use without the need for significant improvements. After being implemented in the learning process, there was an increase in student learning outcomes of 65%. This finding proves that the use of digital-based interactive media can encourage understanding of the material and increase student interest in participating in learning. On the other hand, the use of technology in teaching and learning activities can be an effective new approach to improving the quality of education. Along with that, the development of similar learning media needs to be continued by paying attention to the elements of interactivity and the suitability of the material so that it is more interesting and relevant to the learning needs of today's students.

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