

Development of Interactive Powerpoint-Based IPAS Learning Media on the Material of Plant Sources of Life on Earth for Class IV SD Negeri Tugurejo 02 Semarang City

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Abstract: This study was conducted to develop, test the feasibility and effectiveness of interactive powerpoint-based IPAS learning media on the material of Plant Sources of Life on Earth to improve student learning outcomes. This research uses the ADDIE model. The sampling technique used nonprobability sampling technique, namely purposive sampling. Data collection techniques through tests and non-tests. The results of the product validation test by media expert validators obtained a percentage of 93.3% in the "Very Feasible" category and through material expert validators obtained a percentage of 92% in the "Very Feasible" category. This is reinforced by the responses of teachers and students in the product trial obtained a percentage of 100% in the "Very Feasible" category. Through the paired sample t-test test shows a sig value. (2-tailed) 0.000 is smaller than 0.050 so that the learning outcomes on the pretest and posttest are significantly different and the N-Gain Test shows a value of 0.69 and 0.65 which is included in the "Moderate" category. It can be concluded that through this research, an interactive powerpoint-based learning media has been developed which is feasible and effective to improve the learning outcomes of fourth class students of SD Negeri Tugurejo 02 Semarang City.

Keywords: Interactive Powerpoint; IPAS; Learning media; Learning outcomes

Introduction

Education is an important part of human life as a means of growth and preparation for life in the future. In Indonesia, education at the elementary school level currently uses the Merdeka Curriculum. The purpose of Curriculum Merdeka is to create a curriculum that is tailored to the needs of students and provides freedom to professional teachers to develop more interesting and meaningful learning materials (Kurniati et al., 2022). Referring to this, it is important to provide quality and professional learning so that later it will be able to achieve all aspects of the target. Education today is already facing many challenges.

One of the most important challenges is the impact of globalization and technology on learning. Teachers are important to adapt to these changes and shape the character of their students for the future. The use of technology in learning in basic education has a positive impact, such as facilitating the learning process, increasing students' understanding of the material, attracting students' interest, and raising standards in teaching (Bjelobaba et al., 2023; Hsiao et al., 2021; Salhab et al., 2023). One of the important components of the development of science and technology or science and technology in everyday life, especially in the field of education, is being able to develop media in an inspiring

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way and balance it with the development of information and communication technology (Laili et al., 2021).

Based on observation activities that have been carried out at SD Negeri Tugurejo 02 Semarang City through observation, filling out questionnaires and interviews, several obstacles can be found in teaching and learning activities, especially during science learning. One of the obstacles that can be seen when learning science takes place is that it seems that there are still many students who tend to be more difficult in capturing material, lack focus and quickly feel bored, causing learning activities to be less than optimal. The learning outcomes of grade IV students show unsatisfactory results and many students whose scores are still below KKTP, namely based on 29 grade IV students, there are 12 students whose scores are above KKTP with a percentage of completeness (41.38%) and there are 17 students whose scores are still below KKTP with an incomplete percentage (58.62%). In addition, in the implementation of this independent curriculum, teachers still have difficulty in making learning media that are attractive to students. To facilitate students' understanding of the material taught during the teaching and learning process, it is necessary to use the right learning media so that it can support the learning process optimally.

Interactive powerpoint-based learning media is one of the learning media innovations that can be made by teachers. Kudsiyah et al. (2017), Squire (2019), and Angkarini (2022) emphasized that interactive powerpoint can increase student involvement in the learning process and also facilitate the delivery of learning information, because using interactive powerpoint allows two-way communication between students and computers and encourages student participation. According to Nafisah (2021), Alida (2021) and Afni (2019) there are advantages in using powerpoint media, including a combination of colors, text, animation, both can be included to make presentations attractive so that messages or visual information are easy to understand for students; teachers don't really need to explain the material on display; can be rotated and used repeatedly as needed, and can be stored as optical or magnetic data so that it is easy to carry anywhere.

The research conducted by Noviyanti et al. (2023) with the title "Pengembangan Multimedia Interaktif berbasis *powerpoint* pada muatan pelajaran IPAS kelas V SD Negeri 32 Cakranegara" shows that the existence of powerpoint-based interactive media in IPAS learning gets a percentage of 80% valid by media expert validators and gets a percentage of 90% very valid by material expert validators. Based on the results of the questionnaire, teacher responses obtained 90.76% very practical, individual trials obtained 89.74% very

practical, small group trials obtained 89.23% very practical and large group trials obtained 88.46% very practical. A similar study was conducted by Ryche et al. (2023) with the title "Pengembangan Media Pembelajaran *powerpoint* interaktif pada materi siklus air kelas V SD Negeri 42 Pekanbaru". Based on this study, obtained an interactive powerpoint media product with very valid criteria, namely with an average score by media experts of 98.9%, material experts of 97.9% and linguists of 87.5% with very valid criteria. It can be concluded that interactive powerpoint media can be used as a learning medium for students of the Water Cycle Science material.

It can be concluded from the study that the creation of interactive powerpoint-based learning media is very appropriate for use in classroom teaching. This is reinforced based on the analysis of several experts who say that interactive powerpoint media is practical and valid and is proven by the effectiveness of using interactive powerpoint media in learning. Therefore, to improve science learning outcomes, especially on the material of Plant Sources of Life on Earth, researchers want to develop a learning media, namely interactive powerpoint for Class IV students at SD Negeri Tugurejo 02 Semarang City.

Method

Grade IV students of SD Negeri Tugurejo 02 Semarang City were the subjects of this study. This study used a quantitative approach. This research uses the ADDIE model, which is development research consisting of several stages, namely analysis, design, development, implementation and evaluation. The research scheme is illustrated in Figure 1.

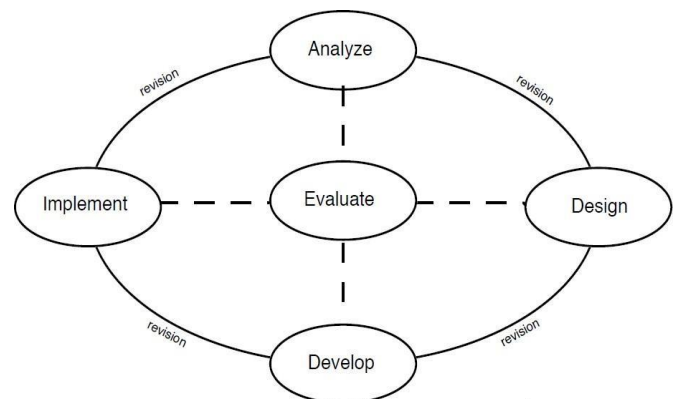


Figure 1. ADDIE model diagram

This research was carried out as a means of developing a product, namely interactive powerpoint-based learning media on science subjects of Plant Source of Life on Earth material for grade IV students at SD

Negeri Tugurejo 02 Semarang City. This research was conducted in grade IV SD Negeri Tugurejo 02 Semarang City with the research subjects including 1 material expert, 1 media expert, 1 teacher as a practitioner, 9 students in small-scale trials and 20 students in large-scale trials. The sampling technique uses a nonprobability sampling technique, namely purposive sampling. Purposive sampling is a sampling technique with certain considerations in Sugiyono (2019a). The reason for using this purposive sampling technique is because it is suitable for quantitative research, or studies that do not generalize according to Sugiyono (2019b).

The data collection techniques carried out in this development research are through tests and non-tests. The test instrument consists of pretest and posttest questions. Meanwhile, through non-test instruments consisting of observation sheets, interview guidelines, questionnaires and documentation. According to Sugiono (2019), test techniques are used to see how the situation and conditions before and after testing new products so that data collection can be done with tests. Observation is carried out through direct observation of the atmosphere in the school along with the process of learning activities and analyzing the use of learning media by teachers in delivering the material taught during the learning process. The observation data obtained from this study was used as a reference for the development of interactive powerpoint media for grade IV students of SD Negeri Tugurejo 02 Semarang City. Interviews were conducted to see what and how the problems were being faced by teachers and asked what were the obstacles when delivering the material. According to Sugiyono (2019), questionnaires are tools to collect data where participants are asked to answer questions or provide answers. There are 3 different types of questionnaires used by researchers, namely questionnaires for students and teachers, assessment questionnaires for media expert validators and material experts, and response questionnaires from students and teachers. The questionnaire of student and teacher needs is related to the things desired from students and teachers in the development of interactive powerpoint media. The assessment questionnaire of material experts and media expert's concerns matters that are used as a benchmark for assessing the feasibility of interactive powerpoint media developed. For questionnaires, the analysis of teacher and student responses is given with the aim of knowing opinions and responses related to interactive powerpoint media that are tested in learning. Furthermore, documentation is used as a means of collecting data in schools, for example on the value of student learning outcomes.

To ensure the validity and reliability as well as the quality of the questions in the research, it is necessary to test the questions which are then analyzed through the

Validity Test, Reliability Test, Difference Power Test and Level of Difficulty. The procedure on the test instrument is that before using interactive powerpoint media, grade IV students of SD Negeri Tugurejo 02 Semarang City take the pretest given by the researcher. Furthermore, after using interactive powerpoint media, grade IV students of SD Negeri Tugurejo 02 Semarang City took the posttest. Next, the results of the pretest and posttest will be compared. The results of the comparison were used to determine how successful the use of interactive powerpoint media was in the science subject of Plant Source of Life on Earth material for grade IV students at SD Negeri Tugurejo 02 Semarang City.

Media effectiveness tests and product feasibility tests became the basis for the data analysis techniques used in this study. Two teams of validators, consisting of media experts and material experts, conduct product due diligence. Analyzing the initial data (normality test) and final data analysis (paired sample test and N-Gain test) are the ways to test effectiveness. Based on the test results, results will be obtained regarding the feasibility and effectiveness of developing interactive powerpoint-based learning media for Plant Source of Life on Earth material for grade IV students at SD Negeri Tugurejo 02 Semarang City.

Results and Discussion

The result of this development research is a product in the form of interactive powerpoint-based learning media that is able to improve the learning outcomes of Plant Source of Life on Earth material in grade IV students at SD Negeri Tugurejo 02 Semarang City. The model used in this study is the ADDIE model. The implementation of the ADDIE model according to Moradmand in Lestari et al. (2018) aims to build and develop learning media methodically and produce efficient and effective designs. The stages carried out by researchers to describe and produce interactive powerpoint-based learning media in this study include the following:

Analysis

The analysis stage is the first stage. The analysis conducted in this research is related to the situation in learning activities, learning materials and the use of learning media. First, analyze the situation in learning activities. Researchers analyzed the situation in learning through classroom observation. There are several obstacles in learning activities in the classroom. It can be seen that there are some students who tend to be more difficult in capturing the material, less focused and quickly feel bored so that learning activities become less optimal.

Second, analyze the learning material. The learning materials analyzed and developed are in the Science subject Chapter on Plants as a Source of Life on Earth. This is based on data on the value of the material tends to be low compared to other materials. With unsatisfactory results and many still below the KKM, namely out of 29 students in class IV, there are 12 students whose scores are above the KKM with a percentage of completeness (41.38%) and there are 17 students whose scores are still below the KKM with a percentage of unsuccessfulness (58.62%).

Third, analyze the use of media during the learning process. Learning activities at SD Negeri Tugurejo 02 Semarang City, especially in class IV, still seem difficult and have not used optimal learning media. Teachers have implemented learning with the lecture method or using IT media such as videos taken from YouTube. However, this still makes students feel bored because of the lack of media variations used by the teacher. The impact of this is that students tend to have more difficulty in capturing the material taught, lack of focus and get bored quickly so that student learning outcomes tend to be low. This happens in the science subject of Plant Sources of Life on Earth. Thus, the lack of optimal science learning activities in class IV SD Negeri Tugurejo 02 Semarang City is caused by the limited use of interesting learning media.

Design

The next stage is design. At this stage, it is also known as designing. The purpose of developing this interactive powerpoint media is to increase students' understanding of learning material to improve their learning outcomes. In this study, design planning was based on the results of data collection using filling out questionnaires for teacher and student needs conducted in grade IV SD Negeri Tugurejo 02 Semarang City. The results of the recapitulation of data on filling out the needs questionnaire provide support for the development of this interactive powerpoint-based learning media.

The design planning on this interactive powerpoint media uses Microsoft Powerpoint applications and is presented with an attractive display. In addition, the display on the media contains animations, images, text and interesting learning videos so as to make students more enthusiastic in learning. For product design, this interactive powerpoint-based learning media consists of several menus, namely (1) Cover; (2) Developer Profile; (3) Main Menu consisting of instructions for media use, learning outcomes, learning objectives, materials, exercises and conclusions; (4) Bibliography. The display in this interactive powerpoint contains various features that can be accessed by clicking buttons according to the wishes of students.

Development

Activities at this stage are by realizing interactive powerpoint design designs into a complete product or learning media and can be implemented in students, especially in grade IV SD Negeri Tugurejo 02 Semarang City. At this stage, there is a media development process from learning materials, displays, animations, texts and instruments used to create a complete and quality media. The display on the results of the development of interactive powerpoint media includes the following:



Figure 2. Cover



Figure 3. Developer profile



Figure 4. Main menu



Figure 5. Display instructions for use



Figure 6. Learning objectives

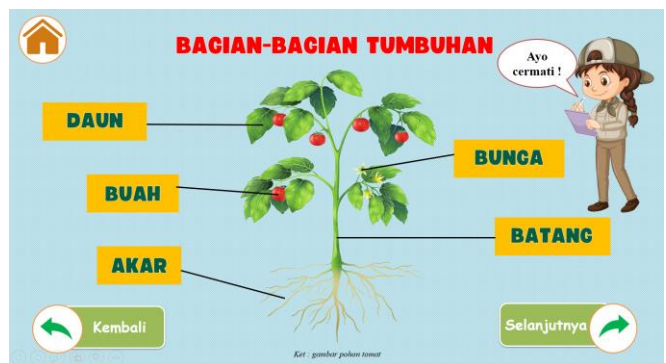


Figure 7. Material display



Figure 8. Quiz view

Implementation

The actual stage in using learning media products that have been made, is the implementation stage. At this stage, interactive powerpoint-based learning media

products were developed in class IV science subjects with material on Plant Sources of Life on Earth. At this stage of implementation, actions related to product validation are carried out, such as usage trials and validation by media experts and material experts. The results of the interactive powerpoint media implementation stage in more detail are First, Product Validation. According to Sugiyono (2019), product validation can be done by presenting several subject matter experts or experts who have sufficient expertise to evaluate the products made. This product validation is one of the requirements in ensuring a product is feasible or not feasible to be tested. Product validation carried out on this interactive powerpoint-based learning media is by validating material experts and media experts.

Table 1. Material and Media Validation Test Results by Expert Validators

Validators	Percentage (%)	Criterion
Material Validator	92%	Very Worth It
Media Validator	93.3%	Very Worth It

Based on the results of the product validation test, a percentage of 92% was obtained with the category "Very Feasible" for material expert validation, and a percentage of 93.3% was obtained with the category "Very Feasible" for media expert validation. This also shows that in terms of quality, there are excellent qualifications obtained through expert validators related to the development of this interactive powerpoint media. Based on the results of validation by material expert validators, there are several aspects of assessment that get a very good assessment including the suitability of IPAS material with learning outcomes, there is already a suitability of IPAS material with interactive powerpoint-based learning media developed, making learning evaluations is in accordance with the material and quality, the quizzes displayed are interesting, the language used is clear and in accordance with the characteristics Learners. As for based on media expert validators, there are several aspects of assessment that get a very good assessment, namely the learning media that researchers develop is relevant to the subjects learned by students, the appearance and layout of this interactive powerpoint media already looks interesting, learning media can be used and learned with flexible time, media is easy to use by students and teachers, The instructions for using the media are clear and easy to use. This is in accordance with the statement of Setyaningsih et al. (2019) that the ease of accessing or using media will be able to make students reopen the material delivered outside class hours more often. As for the Validity Test and Reliability Test, 25 "Valid"

questions were obtained for research, especially on the pretest and posttest.

The next step is Product testing. Product trials are a series of research processes which are carried out to determine the effectiveness of a product developed. The effectiveness test is obtained based on data on student learning outcomes which is a reference in determining the effectiveness or not of using this interactive powerpoint media. Student learning outcomes include the results of pretest and posttest scores conducted in small-scale product trials and large-scale product trials. The data analysis stage is carried out using 3 stages, namely the Normality Test, paired sample test and N-Gain Test. The initial data analysis used was the pretest and posttest normality test. The normality test is carried

out to test the results of pretest learning, namely before using interactive powerpoint-based learning media and posttest, namely after using interactive powerpoint-based learning media. The normality test is carried out to see whether the learning outcomes of students are normally distributed or not. The normality test of pretest and posttest value data in this study was analyzed using SPSS. The hypothesis in this normality test is as follows:
 Ho = Normal distributed
 Ha = Not normally distributed

Decision Making Criteria, namely Data is said to be normally distributed if Ho is received, namely if sig. > 0.05. In this study $\alpha = 0.05$ and obtained the results of the pretest and posttest normality tests as follows:

Table 2. Normality Test

Class	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	Df	Sig.	Statistics	Df	Sig.
Small Scale Test Pretest	.267	9	.068	.844	9	.064
Small Scale Test Posttest	.236	9	.157	.865	9	.110
Pretest Large Scale Test	.215	20	.016	.931	20	.159
Large Scale Test Posttest	.158	20	.200*	.967	20	.688

Table 2 shows that for pretest and posttest data, the sig. value in the Shapiro-Wilk column is more than 0.050. The sig values. 0.064 and 0.159 correspond to the pretest values. On the other hand, the posttest values have sig. values of 0.688 and 0.110. This means that Ho is accepted so that the researcher can conclude that the pretest and posttest data are "normally distributed".

Furthermore, by using interactive powerpoint-based learning media, a paired sample t-test was conducted to see whether the learning outcomes on the pretest and posttest were statistically significant. The hypothesis in this paired sample test is as follows:

Ho: There is no significant difference between the learning outcomes on the pretest and posttest on the use of interactive powerpoint-based learning media.

Ha: There is a significant difference between the learning outcomes on the pretest and posttest on the use of interactive powerpoint media.

The Decision Making Criteria are: If the value of Sig. (2-tailed) > 0.050 then Ho is accepted or Ha is rejected (the difference in performance is not

significant). If the value of Sig. (2-tailed) < 0.050 then Ho is rejected or Ha is accepted (significant performance difference). Using the SPSS program, the calculation of $\alpha = 0.05$ in this study produced the following findings for paired sample tests on pretest and posttest.

Table 3. Paired Sample Test

Class	Sig. (2-tailed)	Criterion
Small Scale Test Pretest - Small Scale Test Posttest	.000	effective
Large Scale Test Pretest - Large Scale Test Posttest	.000	effective

Table 3 of the Paired sample test above shows that the value of sig. (2-tailed) less than 0.050. As for 0.000 is the sig. value (2-tailed). These data show that learning outcomes on the pretest and posttest differ from each other. Thus, it can be said that the creation of interactive powerpoint-based learning media proves to be "effective" when used.

Table 4. N-Gain Test

Class	Test	N	Mean	Std. Deviation
Small Scale Pretest - Small Scale Posttest	NGain Score	9	.69	.14
	NGain Persen	9	69.03	14.33
	Valid N (listwise)	9		
Large Scale Pretest - Large Scale Posttest	NGain Score	20	.65	.15
	NGain Persen	20	65.62	15.45
	Valid N (listwise)	20		

Next, researchers conducted an N-Gain test. This N-Gain test aims to determine the average increase in learning outcomes of students in grade IV SD Negeri Tugurejo 02 Semarang City. N-Gain test pretest and posttest value data are analyzed using SPSS as shown in the table 4.

Based on the calculations in table 4, it is known that N-gain in small and large scale tests is 0.69 and 0.65 and is included in the "Medium" category. These results mean that there is an increase in student learning outcomes between before and after learning. Thus it can be concluded that interactive powerpoint media can improve student learning outcomes.

Evaluation

This stage is the last stage in the ADDIE development model. At this evaluation stage, whether or not the interactive powerpoint-based learning media that has been created will be measured. At this evaluation stage, students and teachers are given questionnaire responses containing questions and assessed according to what is seen and felt. Questionnaires analyzing teacher and student responses are given with the aim of knowing opinions and responses related to interactive powerpoint media that are tested in learning.

Table 5. Response Questionnaire Recapitulation

Respondents	Percentage	Category
Teacher response questionnaire	100%	Very decent
Student response questionnaire	100%	Very decent

Based on table 5 above, it can be seen that the results of teacher and student responses obtained a percentage of 100% with the category "Very Decent".

Thus, referring to the research data, it can be seen that based on expert validation tests of material, media and recapitulation of teacher and student responses get an average percentage of 95% with the category "Very feasible" so that it can be concluded that the development of interactive powerpoint-based learning media is suitable for use in learning in grade IV SD Negeri Tugurejo 02 Semarang City. This is because in the development of media carried out, researchers consider aspects of variations in material content which in the opinion of researchers variations in material content are very important to note.

As for product trials through paired sample tests and N-Gain tests, it can be seen that interactive powerpoint-based learning media has proven effective to be applied to learning in grade IV SD Negeri Tugurejo 02 Semarang City. In the paired sample test, it shows that the value of sig. (2-tailed) 0.000 is less than 0.050 thus indicating that learning outcomes on the pretest and posttest differ significantly from each other. In the

N-Gain test, it is known that the calculation of small and large scale tests is 0.69 and 0.65 and is included in the "Medium" category which means that there is an increase in learning outcomes in students between before and after learning. The results of the effectiveness of this media are in accordance with the results of research conducted by Wahyuni et al. (2021) entitled "Pengembangan Media Pembelajaran *powerpoint* interaktif berbasis *Information and Communication Technologies* pada Pembelajaran Tematik". The results of the research are interactive powerpoint media able to improve student learning outcomes. This is proven by the N-Gain result of 0.57 with the medium category.

Thus it can be concluded that interactive powerpoint media can improve student learning outcomes (Alfi et al., 2022; Mardianto et al., 2020; Sophia, 2022). As for the results of validation tests and product trials in this study, it can be concluded that the development of interactive powerpoint-based learning media is effective and feasible to be applied to grade IV students at SD Negeri Tugurejo 02 Semarang City, this is also in line with the implementation of research where during product trials, students are seen who are focused and active in following learning so that when the teacher gives some questions, Many students are enthusiastic to respond and answer questions. Some students also seem to actively discuss and are able to present the results of the discussion well, although there are indeed some students who are still shy or lack confidence during the presentation. As for working on quizzes in this interactive powerpoint media, many students have answered correctly. However, because there is limited time in answering the quiz, there are some students who are not optimal in doing the questions.

Conclusion

The development of interactive powerpoint-based IPAS learning media on the material of Plant Sources of Life on Earth is carried out using the ADDIE development model which consists of several stages, namely analysis, design, development, implementation, and evaluation (evaluation). The percentage that meets the "Very Feasible" criteria based on the validation results by material expert validators is 92%, while the percentage that meets the criteria based on the validation results by media expert validators is 93.3%. Based on the results of teacher and student responses, the percentage who meet the "Very Feasible" criteria is 100%. The results of product trials through the T test, namely the paired sample test, show that the value of sig. (2-tailed) of 0.000 which is less than 0.050 thus indicating that the learning outcomes on the pretest and posttest differ significantly and the N-Gain Test shows values of 0.69 and 0.65 which are included in the

"Medium" category and mean that there is an increase in student learning outcomes between before and after learning. Thus, it can be concluded that through this research, an interactive powerpoint-based learning media for Plant Source of Life on Earth has been developed that is feasible and effective to improve the learning outcomes of Class IV students at SD Negeri Tugurejo 02 Semarang City.

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Author Contributions

Marsya Fatkhia Nurani contributed in conducting research activities, developing a product, analyzing data, and writing articles. Dewi Nilam Tyas, acted as a supervisor in research activities and writing articles.

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Conflict of Interest

The authors declare no conflict of interest.

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