Development of Interactive PPT Media Based on Audio Visual Using the Problem Based Learning Model to Improve Learning Outcomes of the Forces Around Us Material in Grade IV

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Abstract: The problem in SD Negeri 02 Sidorejo, Pemalang Regency, is that teachers still use learning media that do not utilize technology that affects student learning outcomes. The purpose of this study is to develop interactive PPT media based on audiovisual using the PBL model, to determine its feasibility and effectiveness. Using the ADDIE model which includes the stages of analysis, design, development, implementation, and evaluation. The subjects of the study were students and teachers of grade IV of SD Negeri 02 Sidorejo. Data collection was carried out through test and non-test techniques with data analysis in the form of product analysis. The results of the expert validator's assessment were very feasible to obtain a percentage of 87%, while the media expert gave a percentage of 93%. The data is normally distributed with values The data is normally distributed, with values of 0.54 and 0.98 significance on the small-scale pretest and posttest and for a large scale of 0.31 and 0.10. The results of the t-test with significance (α) below 0.05 are 0.008 and 0.000. In the average increase test, the N-gain value was obtained at 0.67 on a large scale so that the effectiveness value was in the medium category. On a small scale, the mean value was 0.65, which was in the medium category. The conclusion of this study is that it is very feasible and improves learning outcomes. It is recommended that interactive PPT media based on audiovisual with the PBL model can be used by teachers as a learning medium so that learning objectives are achieved.

Keywords: ADDIE model; Interactive PPT; Problem based learning

Introduction

Teaching and learning activities are carried out by students and teachers. As an educator, you must have an understanding and ability related to the use of relevant learning media and learning resources, the aim is to create complete learning as stated in Permendiknas No. 16 of 2007. The importance of learning activities with a pleasant classroom atmosphere, so that students are enthusiastic and more enthusiastic in learning activities and are able to easily understand the material presented by the teacher (Azairok & Fathurohman, 2023).

Digitalization technology has developed in various fields, ranging from banking, retail, urban, energy, transportation, education, publishing, media and health (Bhutani, 2015; Buck et al., 2023; Cai et al., 2021; S. Li et al., 2023; X. Li et al., 2022; Ye et al., 2021). In facing the challenges of education in the era of the industrial revolution 4.0 in Indonesia, it is necessary to improve human resources through education.Digitalization also has a positive impact on education. There is a close relationship between science learning and the development of 21st century digital technology (Hidayat et al., 2023). It is easier for people to get information via the internet and increase their knowledge (Aeni et al., 2022; Ahmed et al., 2021). So technology plays a role in the teaching and learning process as well as evaluation (Abba et al., 2020; Herman et al., 2022). And also the development of science and technology has a positive impact on the world of education, the form of its

application can be by utilizing technology as a learning medium. There are various choices of learning media available to teachers, including books, modules, videos, websites, experimental tools, virtual simulations, and others (Malik et al., 2023). Learning media can motivate students to become more independent in managing their own learning, as well as develop a long-term perspective on their learning process (Ahdar & Nusriani, 2023). Learning media alsofunctions as a communication tool from teachers to students (Dilla, 2023). The use of learning media can produce positive responses from students, because it can improve understanding of the material and learning outcomes (Dzakwan, 2020).

One of the learning media that can convey information and make teaching and learning activities more memorable is using audio visual video media (Nurhidayat et al., 2021). Audio-visual learning media can create Islamic illustrated stories and improve elementary school students' understanding of prayer based on research Satriya & Fahyuni, 2023). Technology-based learning media can help improve learning efficiency and provide a more interactive learning experience for students (Kristanto, 2020; Nurhidayati et al., 2023; Akinoso, 2022; Arciosa, 2022; Shah, 2022; Záhorec et al., 2021). Learning media is an intermediary that contains learning to students carried out by educators to increase student knowledge. Learning media is a source of learning that can help teachers to enrich student perceptions, with various types of learning media by teachers can be used as material to convey knowledge to students. Learning media as an intermediary for delivering learning materials at various levels of education has various types that can be used according to certain learning materials effectively. One of the learning media that is widely used today is visual-based media. The design of audio-visual media that focuses on achieving student understanding of the learning concept that will be created requires teachers to have adequate teaching materials and learning media to facilitate the learning process (Ahdar & Nusriani, 2023).

Audio visual media makes the learning process effective, students become enthusiastic and happy (Yulihani et al., 2020). This audio visual media is designed to motivate students in the learning process, especially if the material taught is relevant to real life and can be applied concretely (Ahdar & Nusriani, 2023). In addition, this media is also designed to present various learning methods, ranging from audio, images, animations, to moving videos, especially in the context of learning English (Ahdar & Nusriani, 2023).

There are various applications that teachers can use to create learning content, one of which is Canva (Wumu et al., 2023). Having interesting content in learning is a necessity for students so that they can more easily understand the material being taught (Cahya et al., 2023). One of the applications that offers the creation of attractive visual-based learning media is Canva. Canva is an online design program that provides various templates (Salim et al., 2021). Canva as a tool such as presentations, resumes, posters, pamphlets, infographics, and making learning interesting (Churiyah et al., 2022; Prawijaya et al., 2022; Ramlah et al., 2023; Serevina & Hamidah, 2022). Making learning interactive and its effectiveness in evaluating improvements in learning outcomes (Burrack & Thompson, 2021; Yu-Fong Chang et al., 2021). Canva is an application that can be accessed and designed online using a smartphone or laptop, providing various types of designs such as presentations, posters, brochures, templates, infographics, pamphlets, resumes, and YouTube thumbnails (Rustiman et al., 2021; Tanjung & Faiza, 2019).

In the 21st century, a Problem Based Learning (PBL) learning model was implemented (Yunianto et al., 2020). Through the PBL learning model, students can be trained in critical thinking in solving a problem (Sada et al., 2016). One of the materials that can be developed with the problem-based learning (PBL) model is the material on building identity in diversity in grade IV of Elementary School. The problem-based learning model is a learning model that discusses problems related to children's daily lives. So that children can solve these problems according to educational topics. To stimulate interesting learning, tasks are set and students are asked to complete or solve problems (Mangangantung et al., 2023; Nasar & Kurniati, 2020; Widura et al., 2021). Many previous studies related to problem-based learning have been able to improve student learning outcomes and have been successful (Arofiq, 2019; Asdar et al., 2020; Nurazmi & Bancong, 2021; Veli, 2014). The core of this learning to build identity in diversity is so that students can master and apply the concept of cultural diversity found in the surrounding environment. It is expected to improve learning outcomes.

This research is relevant to the research Syavira (2021) that interactive PowerPoint-based learning media is very suitable for use based on the average assessment results from media expert, material expert, and language expert tests, which are included in the Very Good (SB) category with a value of 90.97%. This research is also relevant to previous research by Anggraini et al. (2024) which states that Canva is categorized as very suitable for supporting the Pancasila learning profile with a score of 89.53% by media experts and 80% by material experts. Then research by Hidayat et al. (2023) stated that Canva was able to test the effectiveness of E-LKPD. Research by Marwah, (2020) it is stated that PowerPoint improves students' numeracy skills. There is also research by Hapsari et al. (2021) obtained the results of validation by material experts and teachers with the category "Very Valid" for results of 86% and 85.57% respectively. Other relevant research is by Montessori et al. (2024), with the development of interactive multimedia teaching materials based on the PBL model using Powerpoint and

Canva for elementary schools with an overall average of 96.96. With the help of PBL, it can improve the learning outcomes of students in Class IV A SDN 1 Cirendang, Kuningan District, Kuningan Regency in the study (Fatah et al., 2023). This multimedia meets the characteristics of interesting multimedia learning, easy to operate, and very suitable to meet the needs of students. Research conducted by Purnaningsih (2017), It can be concluded that Canva-based Digital Flipbook can improve learning outcomes and scientific literacy in the subject of science about the respiratory system for fifth-grade students at SDN 1 Sendangharjo. This is evidenced by the average score of 86.4% in the "very feasible" category. with an n-gain of 0.61 which is categorized as moderate. This proves that Canva-based Digital Flipbook is feasible, practical, and effective in improving the learning outcomes of fifth-grade students in the subject of science about the respiratory system.

From the results of initial observations during learning at SD Negeri 02 Sidorejo on Saturday, October 28, 2023, it was found that learning had used the PBL (Problem Based Learning) model, but the learning carried out was still very conventional and did not utilize the school facilities available. What also often happens is that teachers only use lectures and the help of LKS books which cause students to have low interest in the material being taught so that students have not been able to achieve good grades in their learning outcomes. This problem is also supported by documentation data on student learning outcomes in the subject of science, the material of the force around us, there are several students who have not completed it so that a solution is needed to solve the problem of the material. Students who have not yet achieved completeness in learning science, the material of the force around me is 67% or 20 students out of a total of 30 students, while 33% or 10 students have met the KKM. So the researcher chose Canva-based PowerPoint media to meet student needs. Novelty from previous research is that researchers use audio visuals using a problem-based learning model that is arranged according to the syntax of problem-based learning. The videos used in interactive power points also contain 90% personal videos made by the author himself without taking them from the internet. In addition, the use of Canva which can be accessed anywhere and anytime can facilitate the learning process. And other novelties lie in the material presented in the form of the influence of muscle force and friction on objects.

Based on this background, the researcher will discuss three problem formulations, including: design, feasibility and effectiveness of interactive audio-visual-based PowerPoint learning media using the problem-based learning model.

Method

Research and Development or research and development is the method applied in this study. Through this method, it can also design, produce, investigate and test validity and this is the result of the application of a scientific approach according to Sugiyono (2016). This study applies quantitative methods as a type of research R&D research is research that produces products and tests them by measuring the effectiveness of a product Sugiyono (2016).

The location of this research is in class IV SDN 02 Sidorejo, Comal District, Pemalang Regency. This research uses 2 data, namely qualitative data and quantitative data. Teachers, students, expert teams, and researchers are the sources of data in this study. The subjects of the study were students of class IV SDN 02 Sidorejo, Comal District, Pemalang, with a total of 30 students.

Two techniques are applied in this study, namely test techniques and non-test techniques. Data collection techniques that have more specific characteristics than other techniques are the techniques applied in this study by collecting data through observation.
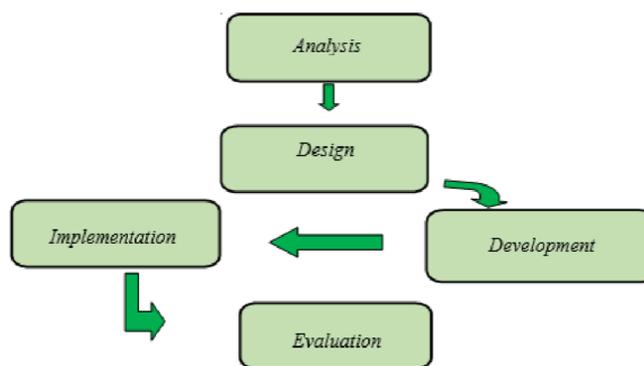

Figure 1. Research procedure

The following is an explanation of the ADDIE design steps, there are 5 stages. The steps that researchers must take in developing Audio Visual-based learning media are as follows:

Analysis

The first step that researchers must take is to collect information on the potential and problems that exist in SD Negeri 02 Sidorejo, Demak Regency. Information collection is carried out by observation, interviews, distributing questionnaires, and documentation. Based on the information obtained, there are several problems including, namely, Student learning outcomes are not in accordance with the Minimum Completion Criteria (KM) standard, namely 70, Learning media has not utilized technology and has not been varied, so students lack material to develop ideas and thoughts, Teachers teach using conventional learning models, learning is still centered on the teacher.

Product Design

Product design is done based on the results of the media needs questionnaire analysis for teachers and students. At this stage, the researcher designs a learning media product that contains a combination of Interactive PPT with attractive audio visuals. The combination of suitable colors is equipped with a display menu that can be selected by users in the form of understanding and examples in everyday life, there is also So that the appearance of this Interactive PPT learning media based on audio visuals becomes an attraction in itself for students.

Development

At this stage, the researcher tested the audio-visual-based interactive PPT learning media prototype that had been created with media experts and material experts. Based on assessments from media experts and material experts, several product weaknesses and strengths were found.

Implementation

After the assessment and validation by the experts, the advantages and disadvantages of the product to be developed were obtained. The weaknesses of the product were corrected so that it produced a product that was suitable for use. After the prototype of the product being developed was finished, a small-scale trial would be conducted on several fourth-grade students of SD Negeri 02 Sidorejo, Pemalang Regency to prove the effectiveness of the product to be developed. The product effectiveness test was carried out using a testing instrument so that complete data was obtained related to the application of the product.

Evaluation

After the product trial was successful, it was continued with a large-scale trial on all fourth-grade students of SD Negeri 02 Sidorejo, Pemalang Regency to test the feasibility and effectiveness of the Audio Visual-based learning media product that had been created. After all the processes were carried out, the researcher compiled a report from the results of the research that had been carried out so that it could become a complete scientific work. By using teachers using audio visual-based learning media, it is expected to be able to improve student learning outcomes in the subject of Science. The framework of this research is described in the following chart.

Results and Discussion

This research obtained results that include: Development of Interactive PPT Media Based on Audio Visual Using the PBL Model; Feasibility of Developing Interactive PPT Media Based on Audio Visual Using the PBL Model; Effectiveness of Developing Interactive PPT Media Based on Audio Visual Using the PBL Model.

Product Design
Analysis

At this stage, data collection becomes an analysis step. By searching for information related to supporting facilities such as projectors and portable audio that can be used.usedto support audio-visual learning, it cannot be separated from the interview process and the provision of teacher needs questionnaires and student needs questionnaires.

The recapitulation analysis resulted in students still having difficulty in understanding the science learning material about the forces around us. Therefore, an interesting learning process is needed using powerpoint with a combination of colors and supporting illustrations.

Design

The preparation of the interactive PPT product design based on audio visuals using the PBL model includes discussion of materials according to learning outcomes, learning objectives, concept maps of force materials, understanding of force, understanding of friction, benefits of friction, understanding of muscle force, benefits of muscle force and daily assessments and LKPD. This design was made using the Canva application for the presentation section. The researcher also made a video as the authenticity of the researcher's product. The design making process related to the title is as follows: The first page contains information about the class, title, author and supervisor as an appreciation.

Figure 2. First page

Figure 3. Creation on the canva application

Figure 4. Application of media in the classroom

Product Results (Development)
Media Validation

To test the feasibility of interactive PPT learning media based on audio visual with PBL model can be known through media validation and expert validation. Validation is done with the aim of assessing whether or not the learning media that is run is feasible with the needs of students and teachers.Data analysis technique with descriptive method. The feasibility of flipbook-based digital magazine learning media is analyzed according to the results of validation tests from media experts and material experts. The formula used is as follows:

$$NP = \frac{R}{SM} \times 100\% \qquad (1)$$

Information : NP = percentage value sought or expected; R : raw score obtained by students; SM : Ideal maximum score of the test in question (Wardani & Syofyan, 2018). Based on the formula 1, the following results are obtained:

Table 1. Recapitulation of Feasibility Assessment Results

Assessor	Total score	Presentation	Criteria
Media expert	75	93%	Very Worth It
Subject matter expert	47	87%	Very Worth It

The result obtained was 75 scores with a percentage of 93% which can be said to be very decent. With several aspects that can be evaluated, such as neatness and clarity of media, appropriate learning materials, good media quality, relevant target audience, student orientation, easy use of learning media. And the results of the validation calculation were obtained with a score of 47 with a percentage of 87%, which can be said to be

in accordance with the criteria of very feasible. Thus it can be said that the media applied in the trial use.

Product Trial Results (Implementation)

The trial phase of usage was carried out by pretest students to understand the material of earth changes caused by humans before using interactive audio-visual based powerpoint media using the problem-based learning model. The next step is to carry out learning using interactive audio-visual based powerpoint media using the problem-based learning model, then students are given posttest questions to work on.

Data Analysis Results (Evaluation)
Normality Test Results

The Normality Test was used in the pretest and posttest using the Shapiro-Wilk test so that the data used in sampling was normally distributed.

In decision making there are basic criteria based on significance values. The basic criteria are if the value If the significance value is > 0.05 then the residual value is normally distributed. The following are the results of the normality test on a small scale and a large scale.

Table 2. Results of Small-Scale Normality Tests

	Kolmogorov-Smirnova			Shapiro Wilk		
	Statistics	Df	Sig.	Statistics	Df	Sig.
Pre_Test	.20	5	.20	.92	5	.54
Post_Test	.14	5	.20	.99	5	.98

*. This is a lower bound of the true significance.

Table 3. Results of Large-Scale Normality Tests

	Kolmogorov-Smirnova			Shapiro Wilk		
	Statistics	Df	Sig.	Statistics	Df	Sig.
Pre_Test	.17	24	.06	.95	24	.31
Post_Test	.17	24	.06	.93	24	.10

*. This is a lower bound of the true significance.

In the table above, it can be seen that the values 0.54 and 0.98 are significant in the small-scale pretest and posttest and for the large scale 0.31 and 0.10. Overall, the value is above 0.05 so that the data is said to be normally distributed.

Independent T Test Results

The t-test is conducted to test for significant influence between independent variables on their dependent variables. This study used pre-test and post-test data of one group design with multiple-choice test instruments. The following are the results of the t-test for both small and large scales.

Table 4. Results of Small and Large Scale t-Tests

		Paired Samples Test							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	Df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	pretest-posttest	-8,000,000	3.7081	1.658312	-12.604213	-3.395787	-4.82418	4	0.008
Pair 1	pretest-posttest	-15.75	9.359952	1.910592	-19.702361	-11.79764	-8.244	23	0

In the table, the sig. value (2-tailed) is 0.000 < 0.05, so it can be concluded that there is a significant difference between the pretest and posttest results on a small and large scale. In other words, the average of the two groups is not significantly different.

N-Gain Test Results

The average increase in science learning outcomes can be calculated using the N-gain test. Testing using the N-Gain Test (normalized gain) is used to find the increase in students' cognitive learning outcomes before and after learning. The purpose of analyzing pre-test and post-test data is to determine changes in the increase in students' abilities in the experimental and control classes. The N-Gain formula for seeing the increase in students' abilities is as follows:

$$\text{N-Gain Value} = \frac{Skor\ posttest - Skor\ pretest}{Skor\ maksimum - skor\ pretest} \quad (2)$$

Table 5. N-Gain Score Categories

N-Gain Value	Category
g>0.7	Tall
0.3≤ g ≤ 0.7	Currently
g < 0.3	Low

The following are the results of small-scale and large-scale tests on the N-Gain Test:

Table 6. Results of Small and Large Scale N-gain Tests

	N	Min	Max	Mean	Std. Deviation
NGain Valid N (listwise)	5 5	.13	.80	.6593	.07747
NGain Valid N (listwise)	25 25	.06	1.00	.6755	.29296

Table 6 shows that the use of interactive power point media based on Canva has increased the average value of students from both small and large scale trial implementations. In the small scale trial, it obtained the "moderate" category and in the large scale trial, it obtained the "moderate" category. The results of the teacher response questionnaire reached 100% without revision.

Conclusion

The results of the research and discussion on interactive powerpoint learning media based on canva on the material of the influence of muscle force and friction force on objects in class IV of SD N 02 Sidorejo, Pemalang obtained effective, valid and practical results. With the help of the PBL (Problem Based Learning) model, a score of 47 was obtained with a percentage of 87% from material experts and a score of 75 with a percentage of 93% from media experts. A score of 68 was obtained as the average pretest score, and 78 as the average posttest score. The number of students who achieved learning completeness in the pretest was 8 students (26%), while in the posttest it increased to 28 students (93%). The data is normally distributed, with values of 0.54 and 0.98 significance in the small-scale pretest and posttest and for a large scale of 0.31 and 0.10. The results of the t-test with significance (α) below 0.05 were 0.008 and 0.000. In the average increase test, the N-gain value was obtained at 0.67 on a large scale so that the effectiveness value was in the medium category. On a small scale, the mean value was 0.65, which was in the medium category. For further researchers, it is expected to conduct research by examining the shortcomings in this study related to the application of the PBL (Problem Based Learning) model. So it is expected to be able to study the PBL learning model so that it can be used as an alternative in improving student learning outcomes.

Author Contributions
Yunisa Ifvaranindra (Author 1) is involved in going to elementary school institutions to conduct observations and research. Conducting data processing and writing scientific articles. Mr. Isa Ansori (Author 2) is a supervisor and directs the author in compiling scientific articles. In addition, he plays a role in providing criticism and suggestions in the process of writing scientific articles.

Conflict of Interest
The author declares that he has no conflict of interest regarding the publication of this scientific article.

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