

Development of Physics Learning Media Using Powtoon Based on Predict Observe Explain (POE) in Class XI of SMA N 6 Solok Selatan

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ABSTRACT

During the learning process, educators have used teaching materials in the form of textbooks, power points, and LKPD. After analyzing the teaching materials used by educators in the learning process, it was found that the implementation of physics learning did not apply the concept of everyday life. The learning media used by educators in the form of power points with a less attractive appearance, because there were no pictures and learning videos that linked the material being studied, this caused students to be less active during the learning process, so that the learning process that took place was still one-way. Along with the development of technology, the learning process must be able to utilize technology in its activities such as learning media. One of the learning media that can be developed is physics learning media using Powtoon which is interesting and can help students to better understand the learning process. The purpose of this study is to develop physics learning media using Powtoon based on Predict Observe Explain (POE) in class XI SMA N 6 Solok Selatan which is valid and practical. This type of research is research and development (Research and Development) which uses the 4D development model. This research was conducted in class XI IPA 3 SMA N 6 Solok Selatan which consisted of 30 students. The percentage of validity level based on material experts and media experts, obtained an average validation of 90.7% which is categorized as very valid. The level of validity of teaching materials is reviewed from the aspects of content feasibility, language feasibility, presentation feasibility and graphics. In addition, for the percentage of media practicality, an average practicality of 92.32% was obtained which was categorized as very practical.

Keywords : Learning Media; Powtoon; Predict; Observe; Explain.



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I. INTRODUCTION

The development of science and technology today is evidence of the increasing development of human thought in the era of the 4.0 revolution. Technology in the world has developed very rapidly and has an impact on everyday life [1]. The use of technology in education is very important to support the learning process. One of the learning processes that requires technological advancement is physics learning [2]. Physics learning at the high school level is one of the important sciences to learn [3]. Because physics subjects, in addition to providing knowledge to students, can also build critical thinking skills that can be applied to find solutions to problems encountered in everyday life [4]. To organize active, creative, fun and meaningful learning functions, of course, educators need to prepare learning materials that are in accordance with the characteristics of students [5]. Learning media is media that carries messages with instructional purposes or contains teaching purposes (Sakti & Napsawati, 2021). One of them is by using learning media in the form of modules, printed books, power points and LKPD. This learning media aims to be able to attract students' interest in learning physics [6]. Physics as one of the subjects that plays an important role in creating quality human resources, because physics contains various logical concepts and realities that are able to shape human thought patterns in developing science and technology [7].

Based on the results of observations conducted in class XI IPA SMAN 6 Solok Selatan through interviews with educators, information was obtained that during the learning process, educators had used teaching materials

in the form of textbooks, power points, and LKPD. After analyzing the teaching materials used by educators in the learning process, it was discovered that the implementation of physics learning did not apply the concept of everyday life [8].

Based on the results of observations conducted in class XI IPA SMAN 6 Solok Selatan through interviews with educators, information was obtained that during the learning process, educators had used teaching materials in the form of textbooks, power points, and LKPD. After analyzing the teaching materials used by educators in the learning process, it was found that the implementation of physics learning did not apply the concept of everyday life [9].

Based on the results of observations conducted on students, it was found that in the learning process, students had used teaching materials in the form of textbooks and LKPD in printed form. Most students thought that the textbooks used were too dense with writing that did not directly discuss the main material, so that students were less interested in reading the textbooks [10].

Based on the description above, one form of effort that can be made to make students more active and attract interest in learning physics is to develop a more interesting learning media. One of the learning media that can be chosen to be developed is using Powtoon [11].

Powtoon is a web-based application program that works online and functions as an animated video maker for presentations and helps explain difficult-to-understand material, using the help of interesting animations and interesting background sounds that can provide stimulus to teaching and learning activities so that students can understand and follow teaching and learning activities well [12]. Powtoon has interesting animation features, including handwriting animation, cartoon animation, and more lively transition effects as well as more convenient duration settings [13]. Where the way to make it is like powerpoint but the results are better which can be made in flash form, so it is more lively and fun [14]. One of the learning media using Powtoon that is suitable for use is based on Predict Observe Explain (POE). Predict Observe Explain (POE) is a learning model that is centered on students and allows students to actively participate in the learning process [15]. The POE learning model can improve students' understanding of physics concepts compared to conventional learning models [16]. And there are many alternative media that can be used in the learning process [17]. Learning with POE can be used by educators to deepen learning activities and provide appropriate initial learning strategies for students [18]. The POE model provides students with the opportunity to learn concretely, so that students have a correct and strong understanding of the material being studied [19]. Furthermore, the material taken for this development is temperature and heat material.

Based on the explanation of the problems that have been stated previously, it is clear that learning resources in schools have not attracted students' interest in understanding the material. Therefore, it is necessary to develop interesting teaching materials to increase students' interest in understanding the material, namely by developing physics learning media using Powtoon based on Predict Observe Explain (POE) [20].

II. METHOD

The type of research used in this study is research and development or Research and Development (R&D). This research is used to develop new products and improve existing products. Development or Research and Development is a method used to develop learning devices through research using various methods [21]. Development research is a method for developing new products, models, procedures, techniques and tools based on methods and analysis of specific problems [22]. In this study, the procedure used by the researcher is the 4-D model. The 4-D model includes (1) Define; (2) Design; Develop; and (4) Disseminate with a description of the stages as follows [23].

1. Define

In developing learning media in the form of animated videos in this study, in general the definition stage activities include initial-final analysis, student analysis, concept analysis, and objective specification.

a. Early-late analysis

In the initial stage, conduct an analysis to see and get an overview of the basic problems faced by students in learning by distributing questionnaires.

b. Student Analysis

This stage aims to analyze students' learning habits during the physics learning process. This analysis is carried out by distributing questionnaires to students.

c. Concept Analysis

At this stage, the activity identifies the concept of temperature and heat, the concept of temperature and heat is arranged systematically and described according to the learning indicators and in accordance with the applied curriculum.

d. Objective Specification

Activities carried out include formulating learning objectives such as KI and KD, as well as analyzing the syllabus used by educators.

2. Design

At the product design stage, activities were carried out in the form of designing physics learning media using Powtoon based on the results obtained from the initial analysis. Physics learning media using Powtoon are designed based on the physics learning conditions to be achieved and the needs of students during learning. Physics learning media using Powtoon are designed as attractively as possible and use language that is in accordance with the development of students and the presentation of images and videos to motivate students to see and listen, with the existence of physics learning media using Powtoon it is believed to be able to increase the enthusiasm and activeness of students.

3. Develop

At this development stage, it is the stage to realize the design that has been made in the form of a product. The product that has been made is then validated and the practicality of the product is seen. Validation aims to determine whether or not the media is valid before being tested in the research class. Validation of physics learning media using Powtoon was carried out by 3 physics and learning media experts. The components of the validated animated video include content analysis; language aspects; presentation aspects; and graphic aspects. After the product is declared valid by the three validators, the next stage is that the media is tested in the research class during the learning process. Furthermore, a practicality questionnaire is filled out through responses from educators and students. The practicality or impracticality of a media is seen from the media components that are in practicality including ease of use, easy to interpret, the time required during the use of learning media using Powtoon, and having the same equivalence.

Research instruments are tools used to find out the responses of research subjects. For data collection, researchers use several instruments, namely validity questionnaires and practicality questionnaires [24].

The data is analyzed in order to simplify the data into a form that is easier to read and understand. The data obtained from the analysis is the final result of the research which is then used as a conclusion. The data analysis method used is expert validation analysis and practicality analysis by educators and students [25].

1. Validation Analysis

The validity analysis format uses a scale that provides answer scores with criteria based on a modified Likert scale from the validation results of all aspects assessed from the animated video and then analyzed using the following formula.

- a. Calculate the score of each validator using the formula:

$$NA = \frac{S}{SM} \times 100\% \quad (1)$$

With the caption;

NA = Final validation value of each validator

S = Score obtained

SM = Maximum score

- b. Calculate the average score from the final scores of all validators

$$\bar{X}NA = \frac{\sum NA_i}{n} \quad (2)$$

With the caption;

$\bar{X}NA$ = Average value of all validators

NA_i = Final validator assessment score

n = Many validators

c. Provides validity research with modified criteria as in Table 1:

Table 1. Product Validity Criteria

Interval (%)	Criteria
0-20	Totally Invalid
21-40	Less Valid
41-60	Quite Valid
61-80	Valid
81-100	Very Valid

(Source: Riduwan)

From table 1, it can be summarized that learning media using Powtoon is declared to be of high quality and suitable for use in the field if it meets the valid to very valid criteria with a weight percentage range between 61-100.

2. Practicality Analysis

The results of the assessment of all aspects based on the questionnaire responses to the use of animated videos by students and educators were then analyzed using a formula. Practicality data analysis was carried out with the following steps:

- Recapitulate the results of the questionnaire distribution
- Calculating the practicality value

$$\text{Practical Value} = \frac{\text{Total scores obtained}}{\text{Total scores obtained}} \times 100\% \quad (3)$$

c. Find the average of all respondents

$$\bar{X}NA = \frac{\sum NA_i}{n} \quad (4)$$

With the caption;

$\bar{X}NA$ = Average value of all validators

NA_i = Final validator assessment score

n = Many validators

d. Interpret the results obtained using the modified criteria in Table 2:

Table 2. Product Practicality Criteria

Interval (%)	Criteria
0-20	Very Impractical
21-40	Less practical
41-60	Quite practical
61-80	practical
81-100	Very practical

(Source: Riduwan)

Based on Table 2, it can be concluded that the learning media using Powtoon that has been tried is feasible to be applied and developed more widely if it meets the criteria of practical to very practical with a practicality score in the weight percentage range of 61-100.

III. RESULTS AND DISCUSSION

The results of the study at the design stage for physics learning media using Powtoon based on Predict Observe Explain (POE) on temperature and heat material. In physics learning media using Powtoon based on Predict Observe Explain (POE), the product design uses the Powtoon web, where each page displayed in the animated video displays a page designed according to the Predict Observe Explain (POE) learning model so that the animated video is neatly arranged. The following are the stages of designing learning media.

- 1) In the development stage, the intro section was created using Powtoon so that the animated display can move, showing an educator speaking in front of the class, making it more interesting. The following is a display of the intro that was created.

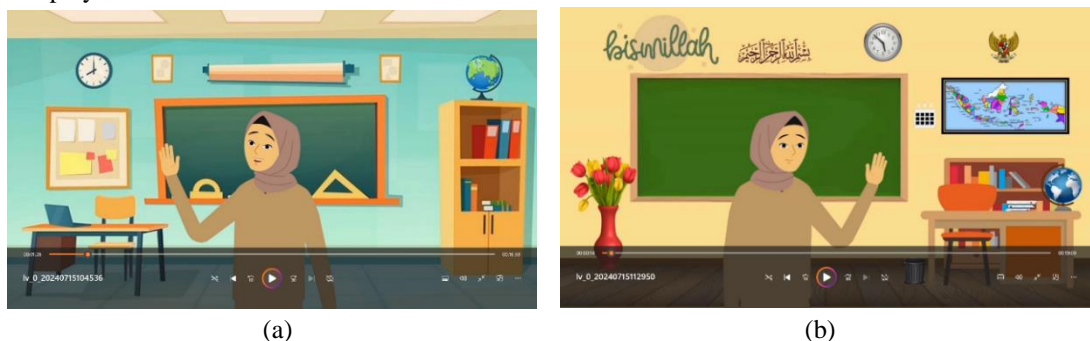


Fig 1. (a) Intro view of the animated video on temperature and expansion and (b) Intro view of the animated video temperature and expansion

- 2) In the indicators and learning objectives section, the design form in this section is as shown in the following image.



Fig 2. (a) Display of indicators and learning objectives in the animated video on temperature and expansion material and (b) Display of indicators and learning objectives in the animated video on heat material

- 3) Development of content design in animated videos created based on the syntax of the Predict Observe Explain (POE) learning model which has several steps as follows.
 - a) Predict, in this section there are trigger questions or problems that students want to solve. The trigger questions in the animated video are in the form of general questions taken from illustrations of everyday life that can make students think and answer the questions in the Google form that has been provided at the predict stage. The following is a display of the predict syntax.



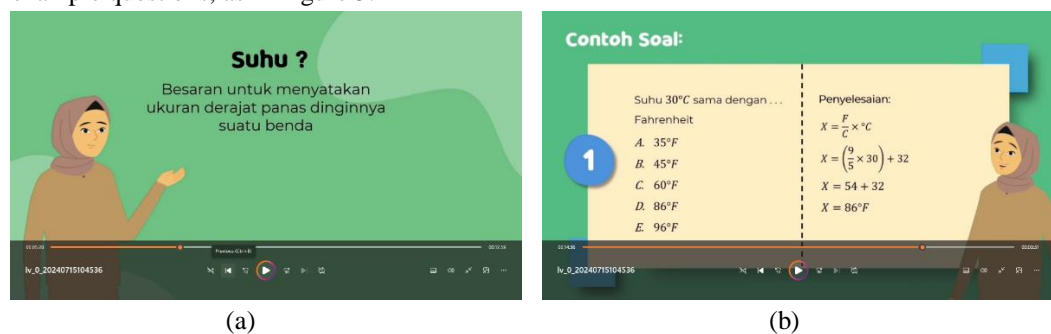
Fig 3. Predict syntax in the POE learning model

- b) The second syntax in this learning model is Observe. In this syntax, there are experimental activities. In this animated video, there are steps for implementing experiments that are designed as a guide for students in carrying out experiments consisting of tools and materials, working methods, and a Google form link is provided to enter reports on the results of experiments carried out in the learning process, such as Figure 4.



Fig 4. Observe syntax in the POE learning model

- c) In the Explain section, there is an explanation of material regarding temperature and heat where the material developed contains real phenomena and applications in everyday life and there are example questions, as in Figure 5.



(a) Explain syntax in the temperature and expansion material section and (b) Explain syntax in the heat material section.

The results of the research at the development stage (Develop) aim to produce valid and practical Powtoon learning media based on Predict Observe Explain (POE). The results obtained at the development stage are: 1) The results of the validation of the learning media products that have been designed are validated by 3 experts, namely 2 material experts and 1 media expert. The results of the validation by the experts can be seen in Table 3.

Table 3. Validation Sheet Analysis Results

Assessment Aspects	Validation By Experts			Average	Validation Category
	AR	HS	RN		
Content Eligibility	93,3	93,3	-	93,3	Very Valid
Language Eligibility	96	96	-	96,6	Very Valid
Presentation Eligibility	90	90	-	90	Very Valid
Graphics	-	-	88,3	88,3	Very Valid
Amount				90,7	

Based on Table 3, it can be concluded that the developed learning media can be categorized as very valid with an overall percentage of 90.7%. The results show that the physics learning media using Powtoon based on Predict Observe Explain (POE) that was developed is feasible to be tested in the physics learning process in the research class.

2) Practicality Results of the learning media product after being declared valid and feasible to be tested in the research class, practicality sheets were distributed to educators and students, to determine the level of practicality of the learning media developed. The results of the analysis of the practicality sheets filled in by educators and students are presented in Table 4.

Table 4. Results of Practicality Sheet Analysis

Assessment Aspects	Practical Value		Average	Practicality Category
	Educator	Learners		
User convenience	92	90,78	91,39	Very Practical
Time	90	87,78	88,89	Very practical
Easy to interpret	93,33	91,11	92,22	Very practical
Have equivalence	100	93,56	96,78	Very practical
Amount			92,32	Very practical

Based on Table 4, it can be concluded that the results obtained from the distribution of practicality sheets for the use of the developed teaching materials are categorized as very practical with an overall percentage of 92.32%.

Physics learning media using Powtoon based on Predict Observe Explain (POE), developed using a 4D research model with stages, first an analysis was carried out by looking at the needs of students for the research conducted, information was obtained that during the learning process, educators had used teaching materials in the form of textbooks, power points, and LKPD. Existing teaching materials have not been able to attract students' interest in the learning process, in addition, students have not been able to understand the material based on existing teaching materials, so a learning medium is needed so that students can better understand the lesson. In addition, learning media are needed that can involve students to be able to solve problems related to everyday life. Based on the results of the analysis, the learning models applied by educators have not varied, the learning models used by educators tend to be one-way, so a variation of learning models is needed, one of which uses the Predict Observe Explain (POE) learning model. Therefore, it is necessary to develop interesting teaching materials to increase students' interest in understanding the material, namely by developing physics learning media using Powtoon based on Predict Observe Explain (POE).

Second, at this stage, designing products according to the needs of students, which were encountered in the previous stage. The design is made in the form of animated videos that are arranged starting from the intro or opening of the animated video, which is designed in relation to the material entered, where in the intro there is an opening of learning such as greeting students, delivering learning materials, displaying indicators and learning objectives. Based on the previous analysis, the learning process still tends to only use the lecture method, so that in the learning media that is developed using the Predict Observe Explain (POE) learning model. In this Predict

Observe Explain (POE) model, students can predict a problem called Predict, after that conduct an experiment called Observe, and then students can distinguish the results of Predict and Observe, which is called Explain. In addition, the product consists of three syntaxes contained in the Predict Observe Explain (POE) learning model where the product made must be adjusted to its syntax, namely Predict. At this stage, the educator is given a trigger question in the video so that to answer the question, a Google form link has been provided. Next, in the Observe stage, students can conduct experiments. For the procedure for working on the experiment, the experimental steps are made through the video and finally, at the Explain stage, the material is presented and examples of questions are given, after which the conclusion is in the form of a conclusion of the material.

Third, at this stage, further development of the previous design into a product is carried out. The product created is a physics learning media using Powtoon based on Predict Observe Explain (POE). Furthermore, in order for the resulting learning media to be more interesting, Powtoon premium is used so that the video quality is good and the necessary elements are completely available. The product that has been completed before being tested on educators and students, first goes through a validation stage by experts, namely material experts and media experts.

Based on expert input, there are several suggestions for improvements to the products made, such as in the untidy writing, writing points, and video of the experimental steps that are easier to understand. Before the validation process, there were several parts of the video that were not filled with sound or explanation so that it looked monotonous, but after revisions were made based on expert advice, the parts that did not have sound were filled with sound or explanations in those parts, so that later they could be easier for students to understand.

After revisions based on expert suggestions, the developed learning media was validated by experts by filling in the validity instrument, and obtained a very valid value of 90.7%. With a content feasibility of 93.32%, it means that the learning media using Powtoon Based on Predict Observe Explain (POE) that was made is in accordance with the indicators and learning objectives, the material included is appropriate and can encourage students' curiosity. Then for the language aspect, 96% was obtained, meaning that the learning media created already uses good language and is in accordance with the applicable EYD. For the presentation feasibility aspect of 90%, which means that the teaching materials have been presented well where the material presented is easy to understand, the discussion of examples is clear and contextual, and in the learning media using Powtoon Based on Predict Observe Explain (POE) is also equipped with example questions and learning conclusions. Meanwhile, the media expert validation consisting of graphic aspects obtained a value of 88.3% which is categorized as very valid, which means that the learning media created has clear visuals, good design, existing links can be accessed properly, and the audio displayed is clear.

Then after the teaching materials were declared valid and worthy of being tested in the research class, the research process was carried out. The trial of this teaching material was carried out on one physics subject educator and 30 students in class XI IPA 3 SMA N 6 Solok Selatan. This trial was carried out to see the practicality of the learning media using Powtoon Based on Predict Observe Explain (POE) that was created. Based on the analysis, the practicality value of the product was 92.32%, which is very practical. This means that the learning media developed is easy to use, effective in terms of time, easy to interpret and can be used as accompanying teaching materials in learning.

Educators and students also mentioned that the developed learning media is very interesting and easy to understand so that it can attract students' interest in learning, because by watching the learning video the material taught is quickly understood, besides that the physics learning media using Powtoon can be used anytime and anywhere. In line with the study entitled Development of Learning Media with Powtoon Animation Videos. Powtoon animation video learning media is declared feasible because it meets the aspects of media validity for powtoon animation videos, the average percentage of validation assessment is $\geq 61\%$ - 100% with good to very good quality, and the response to powtoon animation video learning media is said to be good because respondents show interest in the media with an average percentage of response results assessment $\geq 61\%$ - 100% with good to very good quality [26].

Based on the results of relevant research entitled "Development of Powtoon-Based Animation Videos for the Flipped Classroom Learning Model on Thermodynamics Material", it was concluded that based on the assessment results from the validator, the average score was 83.50%, so it can be said that the teaching material with this Powtoon video is suitable for use by students as teaching materials and the assessment results of 30 students as a whole are 85.35% [27]. Based on this explanation, it can be concluded that the physics learning media using

Powtoon based on Predict Observe Explain (POE) is very valid and very practical to use by class XI students of SMA N 6 Solok Selatan.

IV. CONCLUSION

Based on the data analysis that has been carried out on the development of physics learning media using Powtoon based on Predict Observe Explain (POE) in class XI of SMA N 6 Solok Selatan, it was concluded that the physics learning media using Powtoon that was developed was categorized as very valid with a percentage of 90.7%. Furthermore, based on the processing of practicality data, the percentage of the practicality level of physics learning media using Powtoon was 92.32% which was categorized as very practical.

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