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THE DEVELOPMENT DESIGN OF DIGITAL TEACHING MATERIALS ASSISTED BY POWTOON APPLICATION FOR SCIENCE LEARNING IN PRIMARY SCHOOL

Ratna Dewi[1], Ira Asyura[1], Aan Subhan Pamungkas[2]

[1] STKIP Syekh Mansyur

[2]University Of Sultan Ageng Tirtayasa

dewisafarina79@gmail.com

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Abstract

The success of a learning program is marked by the achievement of competence by students. One component that can assist teachers in conveying concepts and helping students achieve these competencies is learning media. Learning media is a channel used by teachers to convey messages so that students are motivated to learn and make it easier to understand certain concepts. Current learning media in accordance with technological developments have changed from printed to digital. One example of a teaching material capable of conveying a picture or sound message is video. Learning videos have the advantage of being able to display real examples. However, conditions in the field indicate that the use of video in schools, especially in elementary schools, has not been widely used. This is due to several factors, including the ability of teachers to produce instructional videos. Based on these findings, the purpose of this study is to develop a digital teaching material design in the form of learning videos using the powtoon application and improve students' understanding. The development model that will be used in this research is the 4D model, namely *Define, Design, Develop, Disseminate*. The subjects of this study were fourth grade students in one of the public elementary schools in Pandeglang Regency. The results of this study are digital teaching materials, namely learning videos designed using the help of the powtoon application on the topic of the properties of light with a very good category and understanding the concepts of students related to the concept of light properties with the quality of achievement in the good category, namely 70.30%. .

Keywords: Teaching Materials; Powtoon; Properties of Light.

A. Introduction

Education is a way that aims to develop the potential, interests, talents and intelligence of individuals. Education that is well organized will be able to achieve these goals. Apart from these goals education can also be expected to form students who are competitive, innovative, creative, collaborative and have character (Nurdiansyah and Fahyuni, 2016). A good education is characterized by process a good learning, such as providing opportunities for students to develop and construct knowledge independently or in groups. In addition to a good learning process, it is certainly supported by the use of technology that is suitable and beneficial for teachers and students.

Current technological developments have changed the paradigm of conventional education into modern education. One example of modern education is the use of technology in the learning process. Such as the use of digital learning media or learning using certain platforms that lead to learning that is not limited by space and time (Darmayanti, Setiani and Oetojo, 2007).

In addition, the use of technology aims to achieve educational goals both at the subject level and at the national level as stated in the national education goals regulated in the National Education System Law. Educational objectives are contained in the national curriculum. The curriculum is an operational guide in implementing learning in schools. Currently in Indonesia, an enhanced 2013 curriculum applies. This is according to the opinion of Khery (2018) which states that this curriculum requires students to be active in acquiring knowledge, information and concepts through a scientific approach and integrating ICT in their learning.

The integration of ICT in learning requires teachers to have innovation and creativity in conveying correct and interesting concepts to students. Teachers must also be able to develop and use ICT integrated learning media in accordance with the indicators of competency achievement. The selected media must have the characteristics of being easy to use, cheap, and attractive. This means that the technology used is not necessarily expensive and wasteful (As'ari, 2017).

Based on the results of preliminary studies, it was found that in the process of learning the concept of the properties of light in elementary schools, teachers only rely on teacher and student books. The interaction process that occurs in the learning process tends to be teacher centered. In this paradigm, the teacher has dominant control in learning, so that students are not given the opportunity to construct their own knowledge (Ramdhani, 2014). In addition, most of the teachers did not take advantage of the existing media in schools. This is because teachers are not proficient in using these facilities such as LCD projectors and laptops. This fact is reinforced by the findings of Iskandar (2018) which states that teachers are less interested in innovating in learning.

Natural science learning in elementary schools has a very good role in developing the thinking skills or scientific attitudes of elementary school students. In addition, scientific literacy or scientific literacy is a basic ability that students must have as provisions in facing current global developments (Yuliati, 2017). When referring to the facts above, the objectives of learning science in elementary schools will not be achieved properly. The development of scientific attitudes and literacy will be achieved when teachers in their learning provide opportunities for students to construct their own knowledge through learning experiences provided by the teacher. Learning experiences designed by the teacher provide opportunities for students to carry out scientific or scientific activities. So that the objectives of learning science in elementary schools can be achieved properly.

Based on some of the problems above, it is necessary to innovate in science learning in elementary schools. One of the innovations is to develop learning media that is attractive to students and contains the right concepts. The learning media is audio visual or video media. Through this audio-visual media, students are invited to take advantage of all their sense organs. The teacher can try to stimulate students' stimuli with various senses. Thus, students are expected to be able to receive and absorb information or knowledge easily and well (Asyhar, 2013).

Audio visual or video media according

to Ariani and Festiyed (2019) is multimedia that has varied sounds, images, motion and text. Meanwhile, according to Arsyad (2013) audio visual is a depiction or visualization of the text of the learning material and is packaged briefly and clearly. In addition, video is a tool that can present information, explain processes, explain complex concepts, teach

skills, shorten or slow down time and influence attitudes (Arsyad, 2013). This is reinforced by the opinion of Purwanto and Rizki who say that students who learn using learning videos get good understanding or learning outcomes (Purwanto and Rizki, 2015).

Currently, video creation applications are of various types, ranging from paid, unpaid, offline and online applications. The video application chosen is an online application that is free of charge and prioritizes animation elements, so that this type can attract students to see the video shown. The application is a powtoon application. *Powtoon* is an innovation and media that is not difficult to make, namely a presentation in the form of a moving animation equipped with backsounds and transitions that make the subject matter good and interesting for students so that it is easier to understand and understand (Graham, 2015). *Powtoon* is a program used by internet users to convey messages.learning *Powtoon* media includes multimedia learning media because there are audio, visual and motion animation features that can increase students' desire to learn to pay more attention.

The advantage of the powtoon application is that it is easy and practical to use by teachers, teachers only make videos through the website. Besides that, the presentation is more lively with various animations that are already on the Powtoon website. Using the powtoon application, students get to know more deeply about the real properties of light.

Previous research that developed-based learning media was *powtooncarried* out by Asyifa (2018) which stated that learning videos made with *powtoon were* suitable for use and could improve students' understanding of mathematical concepts. The difference between research conducted and previous research, namely 1) the material contained in the learning media is

the properties of light; 2) longer video duration, which is approximately 6 minutes; 3) animations used are more and varied; 4) the learning process uses a *student center* 5) adds supporting voices to clarify the material presented.

B. Research Methodology

Methods The development research method used in this study refers to the 4D model research design developed by Thiagarajan. The 4D model consists of 4 development stages, namely *Define, Design, Develop,* and *Disseminate*. Through these stages a product will be produced in the form of a powtoon-based learning video. The following is a description of the stages of product development.

The first stage is define, the activities carried out in this stage are analysis of existing products and analysis of new product development. In addition, the related activity is to identify teaching materials that are in accordance with the objectives of students, learning objectives and the content of the material contained in the teaching materials. The second stage is design, at this stage the development of designing a storyboard will be used as a guide in designing the initial product according to the analysis in the first stage. The third stage is develop, this stage the activities carried out are divided into two activities, namely: *expert appraisal* and *developmental testing*. In theactivity *expert appraisal* the product design that has been made is validated by an expert to see the feasibility of the product design. The results of this activity are in the form of suggestions which will be used to improve the product designs that have been prepared. The expert test used in this study was the material expert test and the media expert test. Whereas at thestage *developmental testing*, the product design is tested on limited subject targets, this is done to see the responses, reactions and comments of the target product users. The results of this activity are used as material for revisions in improving the product. After the product has been repaired, it is then tested again to obtain effective results. The last stage is disseminate, this

stage of the activities carried out is *validation testing.* In thephase of *validationtesting,*the product which has been revised during the development stage*(develop)*and then implemented on a large scale real target.

The instruments used in this development were questionnaires and tests. The questionnaire was used to assess the powtoon learning video which was divided into validity assessments and user responses. The validity is carried out by material and media experts. The scale used in the validity questionnaire is the Likert scale with four choices, while the user response questionnaire uses the Guttman scale (Sugiyono, 2015).

The validation indicator of the powtoon learning video refers to each material and media expert indicator. Material expert indicators include aspects of content and presentation assessment. Meanwhile, the indicator for media experts includes aspects of appearance, presentation and effects.

Questionnaire data processing was carried out using a Likert scale. The Likert scale is used to measure media ratings for each expert test. Each expert is asked to answer the items in the expert assessment sheet with very good, good, adequate, lacking, and very poor answers. The maximum score on the Likert scale for a unit of analysis is the number of items on the scale multiplied by 5 with the symbol 5k, while the minimum score for the Likert scale for each unit of analysis is the number of items on the attitude scale multiplied by 1 with the symbol k (Djaali and Muljono, 2008). Furthermore, the validation results are analyzed and interpreted according to the following table (Pamungkas, 2017).

Table 1. Criteria for Interpretation of Score Questionnaire

Criteria (%)	Classification	Information
$90 < p \leq 100$	Very Good	No ned for revision
$75 < p \leq 90$	Good	Slight revision
$65 < p \leq 75$	Sufficient	Revised
$55 < p \leq 65$	Less	Many things revised
$0 < p \leq 55$	Very Less	Repeatable making products

The next questionnaire is a user response questionnaire, users of this product are grade V elementary school students. The scale used is the Guttman

scale, this is adjusted to the target assessor of the questionnaire, namely elementary school students. Student response questionnaire indicators refer to indicators, namely student attitudes towards the material presented, student interest in the media and student attitudes towards learning. Furthermore, the results of the student response questionnaire were analyzed and interpreted according to the following table (Riduwan, 2009).

Table 2. Criteria for the interpretation of the student response questionnaire

Criteria (%)	Clasification
$80 < P \leq 100$	Very Good
$60 < P \leq 80$	Good
$40 < P \leq 60$	Sufficient
$20 < P \leq 40$	Less
$0 < P \leq 20$	Very Less

The test used is to measure students' understanding of related material after seeing the video. The test indicator refers to an indicator, namely names the objects that produce light, lists the properties of light, lists the objects that can be penetrated by light, and mentions the benefits of light. Comprehension test in the form of multiple choice questions designed using google form.

C. Results And Discussion

This section describes the stages of developing a powtoon-based learning video which refers to the development stages, namely Define, Design, Develop and Disseminate.

The first stage is define, this stage is obtained from a preliminary study in the form of observation and direct interviews with teachers at the target school. Based on the results of the preliminary study, it was found that in science learning in elementary schools the teachers were not optimal in the use of instructional media, while schools had been facilitated by supporting media such as LCD with sufficient and good numbers. Teachers rely more on text books, namely teacher and student books. In addition, students tend to be passive because in their learning they do not involve students both cognitively and

physically. Students sit neatly listening to the teacher's explanation and the teacher occasionally asks questions.

The design and develop stage, namely the making of a product design, includes making a *story board*, determining the theme, template and video script. The video is developed according to the previously developed script and storyboard. The process of making videos is carried out in the powtoon application, starting from selecting a theme according to student characteristics, selecting templates, colors, characters, animation, text and audio that are tailored to the learning objectives. The sound given is an instrument for background sound and is *dubbed* for an explanation of the material contained in the media. This powtoon-based learning media uses the .mp4 format which is compatible to be played using either PC or other media.

The powtoon video is equipped with core competencies, basic competencies, indicators, material and sample questions. The learning flow and learning scenarios in the powtoon video refer to the scientific approach which is the direction of the 2013 curriculum. These activities are observing, asking questions, gathering information, discussing and associating. After carrying out these activities the students worked on the practice questions contained in the video. The following is a snippet of the powtoon learning video from the initial display to the final (closing) display.

Figure 1. Powtoon Video Footage

After the video is developed, the next step is to assess the feasibility of the video or this is called the validation stage. This stage is carried out before the video is tested on respondents. This is so that the video developed meets the feasibility according to material and media experts. Expert validation was carried out by elementary school teacher education lecturers and elementary school teachers. The following is the recapitulation of the results of the validation of the material and media experts:

Table 3. Data on the Validation of the Content and Media

Validation	Validator	Skor	Kriteria
Content	I	90	Good
	II	79	Good
	III	95	Very Good
	Average	88	Good
Media	I	71	Good
	II	77	Good
	III	92	Very Good
	Average	80	Good

Based on the results of the material and media expert's assessment above, the average validator's assessment shows good and very good results. This shows that the quality of the developed powtoon learning videos has met the pedagogical and multimedia elements that are good and in accordance with the target users. Here are some inputs and revisions from several validators, namely adding *power* to the *backsound* to make it more vibrant and *powerful*, adding videos / images to the context so that it is closer to daily activities. Meanwhile, improvements from material experts are improvements in the context of explanation on the nature of light being reflected and refracted as well as changes in the understanding of light and the addition of questions. Based on the feasibility score, powtoon-based learning media is very feasible and can be used as a learning medium in grade IV elementary schools on the concept of the properties of light.

The next stage is to conduct trials on users, namely students of grade IV SD in one of the Pandeglang districts. The trial implementation was carried out in a one-time setting. In the initial activity the teacher performs apperception, namely by conveying learning objectives, linking with material that has been studied and relating to real life. After students feel ready to take part in learning, then the teacher enters the core stage, which is to provide powtoon learning videos for material on the properties of light in class using an LCD projector. The teacher guides students to understand the video and students are asked to make notes of each video that is shown. Furthermore, the teacher provides reinforcement of student understanding by

asking several questions that contain elements of scaffolding.

At the end of the implementation of learning, the teacher provides an understanding test in the form of multiple choice questions. In addition to giving tests, the teacher also provides questionnaires to students related to the learning process that has been implemented. Students answer the questionnaire according to how they feel.

Based on the results of the test data analysis, it was found that the average student got a score of 70.30 with a score in the good category. This shows that the powtoon learning video makes a good contribution to student understanding. This is reinforced by research (Awalia et al, 2019) which states that the powtoon animation learning media provides good understanding to students.

As for the results of the student response questionnaire, based on the results of the answers from 32 elementary school students. Obtained a mean score of 82,%, this score shows that students give good responses in the use of powtoon learning videos on the topic of the properties of light. The following is a table of recapitulation of student responses to the powtoon learning video.

Table 4. Recapitulation of Student Responses

No	Statement	Response (%)	
		Yes	No
1	I am passionate about learning to use the video powtoon	93,80	6,20
2	Video powtoon made it easier for me to learn	93,80	6,20
3	Learning with powtoon videos adds to the new experience	96,90	3,10
4	I am tired of learning to use video powtoon	78,10	21,90
5	I find it easier to understand the properties of light with video powtoon	90,60	9,40
6	I find it difficult to understand the sentences in the video powtoon	56,30	43,70
7	Learning with powtoon videos is interesting and fun	90,60	9,40
8	Colors and images on the powtoon video are attractive	96,90	3,10
9	Letters in powtoon videos easy to read and clear	96.90	3,10
Average		87,12	11,78

Obviously a good attitude will affect academic achievement, because students feel happy and interested in learning with media that can stimulate student stimulation. This is in line with the findings (Pamungkas, 2018) which states that instructional videos can explain concepts and trigger discussions between students. so that when learning to use video there is interaction between students and students, students and teachers as well as students and learning resources.

In addition, according to Edgar Dale in (Asyhar, 2013) learning using multiple senses, namely audio and visuals will make a good contribution to students. This opinion is reinforced by Sukiman's opinion that video is a tool used to display images as well as sound at the same time so that the teaching and learning process will take place properly and optimally (Sukiman, 2012).

The development of this powtoon-based learning video is designed and made with an attractive appearance for students. The choice of color and background design is adjusted to the development of students. Not only the design color, the choice of typeface and color to be used is also considered. This learning media also has student activities or activities such as observing, asking questions, gathering information, discussing and re-conveying what is obtained from the results of discussions with group friends. This learning process is based on the curriculum used by the school, namely the 2013 Curriculum which activates students in the learning process.

This powtoon-based learning video uses language appropriate to the level of student development. The sentences used in the learning videos are simple, communicative, structured and interactive (Sanjaya, 2012). Language is the main point in conveying messages, so that messages or information can be conveyed properly.

The learning process presented includes observing activities, which according to (Hamzah and Nurdin, 2013) with the method of observing students will feel more challenged to explore their curiosity about the phenomena presented in the learning media. After students observe, they are directed to do question and answer

and gather information. After students do the question and answer and collect information, students are given time to discuss with their friends to find additional information which the results of collecting this information students will share with their friends, namely by presenting their findings to the class.

The achievement or feasibility of-based learning media *powtoon* thisis proven through validation from media experts and material experts by looking at several aspects such as appearance aspects, video content design, uses and uses contained in media experts and criteria for content presentation, presentation and language contained in the expert. Theory. Based on the results of expert validation, all aspects of-based learning media are *powtoon* stated to be very suitable for use. This is also supported by the results of research conducted by Meinanti (2018) which obtained data that is very feasible and valid for use in the learning process.

D. Conclusions

Based on the results of the research and discussion, it can be concluded that the PowToon-based learning video using the 4-D model has been developed based on the results of criticism and suggestions from experts so that it can be tested in grade IV SD. The test results conducted by grade IV SD students obtained an average score of 70.30 which is included in the good category. Thus, PowToon-based learning videos can provide students with a good understanding of the topic of the properties of light in elementary schools.

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