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Presenting Materials About Static Electricity with Video Based Demonstration: A Feasibility of Learning Media

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ABSTRAK

Penelitian ini dilatarbelakangi oleh adanya temuan bahwa terdapat kurangnya media pembelajaran didalam proses pembelajaran. Tujuan dari studi ini guna mengembangkan media video pembelajaran berbasis demonstrasi yang valid dan praktis pada topik gaya listrik statis di kelas IV SD. Studi ini menerapkan pemodelan 4D yakni define atau pendefinisian; design atau perancangan; develop atau pengembangan; dan disseminate atau penyebaran. Studi ini mengambil subjek dua ahli materi, dua ahli media, dua praktisi serta lima siswa. Studi ini mempergunakan metode analisis deskriptif kualitatif serta kuantitatif. Metode pengumpulan data yang dipergunakan ialah kuesioner atau angket serta wawancara. Hasil rerata validitas video pembelajaran berbasis demonstrasi dari ahli materi 96,5% predikat sangat baik, nilai 96% dari ahli media predikat sangat baik, nilai 97,5% dari praktisi predikat sangat baik serta nilai 96,8% dari respon siswa predikat sangat baik. Hasil ini sejalan dengan tujuan studi untuk memperoleh media pembelajaran yang lolos uji validitas. Disimpulkan media video pembelajaran berbasis demonstrasi pada topik gaya listrik statis dinyatakan valid serta layak untuk dipergunakan pada aktivitas pembelajaran di kelas IV SD.

ABSTRACT

This study is motivated by the finding that there is a lack of learning media in the learning process. This study aims to develop a valid and practical demonstration-based learning video media on static electricity in the fourth grade of elementary school. This study applies 4D modeling, namely (1) define or define; (2) design or design; (3) develop or development; and (4) disseminate or spread. This study involved two material experts, two media experts, two practitioners, and five students. This study uses qualitative and quantitative descriptive analysis methods. Data collection methods used are questionnaires or questionnaires and interviews. The average result of the validity of demonstration-based learning videos from material experts is 96.5% very good category, 96% of media experts in the very good category, 97.5% of practitioners in are very good category, and 96.8% of student responses are very good category. These results align with the study's aim to obtain learning media that pass the validity test. It was concluded that demonstration-based learning video media on static electricity were valid and suitable for use in learning activities in fourth-grade elementary school.

1. INTRODUCTION

Education is a stage that can connect the knowledge of every human being, not only general knowledge, skills, and social values that will later be applied to life in society. Education has an important role in transforming humans into people with good skills and character by going through the stages of learning based on existing curriculum standards (Indrayani et al., 2019; Nurpratiwi, 2021). Education is a way to humanize humans to bring out all one's potential so that one becomes an ideal or what one aspires to based on the character of the Indonesian people based on Pancasila, followed by an understanding of knowledge that becomes a person's provision both affectively, cognitively and psychomotorically to fulfill life (Nugraha et al., 2020; Pancaningrum, 2021). Learning is an activity by students and teachers to teach students to be more varied and carried out reciprocally. Teaching and learning activities should be creative, innovative, varied, full of challenges, and motivate students to learn (Gading et al., 2018; Komara et al., 2022). Learning activities are the essence of the educational process because by using learning activities, it

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is hoped that the goals of education will be achieved by changing the character and behavior of students, as well as being the hope of all aspects so that students achieve optimal learning outcomes based on the abilities of each individual.

During the current COVID-19 pandemic, learning activities are dominated by distance or online learning activities. Online learning is an example of applying the delivery of conventional learning materials through the internet. During this pandemic, online learning is a solution for delivering learning materials (Hanjar Ikrima Nanda et al., 2020; Imania & Bariah, 2019). This online method is an opportunity and a challenge for the world of education. It takes adaptation of students and teachers during the transition from conventional learning activities to distance learning. Teachers must have strategies and learning methods that attract attention so students can understand the topics discussed, such as learning videos. So that students do not experience boredom when participating in online learning in pandemic conditions, teachers are required to use learning media. Teachers are encouraged to innovate in this regard so that the objectives of learning activities can be achieved properly (Kristina et al., 2021; Zainuddin Atsani, 2020). Submission of material with simple animated videos can increase students' interest in learning, creating feelings of pleasure and making the material easier to understand. It is an advantage of animated video as a learning medium. It also makes the learning atmosphere similar to face-to-face because students can see the teacher in question appearing in the video (Komara et al., 2022; Ningthoujam, 2016).

Learning media used in learning activities during the COVID-19 pandemic tend to be monotonous. Teachers tend to use only textbooks during the learning process. The use of packaged book media or learning videos taken through the YouTube platform is still carried out by teachers (Hastuti et al., 2019; Krisna Bayu & Citra Wibawa, 2021). Initial observations with the fourth-grade teacher at SD Negeri 2 Pemaron found that during this pandemic, teachers only looked for learning videos on the internet and did not make them themselves. There is no direct demonstration and only a material presentation. It can lead to less effective learning and students not understanding the material. Based on these findings, efforts are made to develop learning videos based on demonstrations to improve the quality of education to overcome this problem. The solution that can be done to overcome this problem is by using learning media. Learning media can have the meaning of media used in activities or processes and the objectives of learning activities. The use of learning media in the educational process is expected to foster motivation and interest in students (Susiyanti, 2017; Tegeh et al., 2019). In addition, learning media is also expected to help improve student understanding and present material interestingly. Learning media is an intermediary, means, and media liaison to carry and disseminate or convey ideas and messages to trigger students' feelings, thoughts, behavior, interests, and attention so that learning activities are carried out well (Cahyadi, 2019; Komara et al., 2022). Therefore, the quality of teaching, learning, and learning achievement can be improved by determining suitable learning media (Kusumayani et al., 2019; Tegeh et al., 2019). The application of information technology in educational activities can affect the effectiveness of the learning process itself. The application of information technology in learning activities is in the form of audiovisual communication. Audiovisual is a combination of sound and visualization combined with audio cassettes with sound content that can be listened to and seen as image elements, for example, sound slides, video recordings, and others (Jusmeri, 2021; Purwono et al., 2014; Suprapti, 2019).

An example of media that can be modified or created during this pandemic is learning video media. Media in the form of audiovisual that can display a model with movement and sound so that it can display data, explain a stage, propose a concept, demonstrate a procedure, explain skills, and influence behavior (Indra Cahya et al., 2019; Melinda et al., 2017). A way that can be used to make it easier for teachers to deliver material online is by making learning videos (Hanjar Ikrima Nanda et al., 2020; Pancaningrum, 2021). The study found that it is still not evenly distributed despite the lack of availability of learning media in schools. It makes teaching and learning activities ineffective in schools which causes students' low understanding of the material presented (Cahyadi, 2019; Purwono et al., 2014). This demonstration-based learning video media will make it easier for students to understand learning topics, increase learning effectiveness, and increase students' interest and motivation to learn (Dapiha, 2019; Kristina et al., 2021; Pancaningrum, 2021). The advantages of video media developed in this study compared to similar media, namely combining video, demonstration methods, and concrete objects into a single whole, clear picture and sound quality, and helping students to learn more independently and confidently (Hidayati et al., 2019; Krisna Bayu & Citra Wibawa, 2021; Muqoddas et al., 2017).

Previous findings state that demonstration-based learning video products are valid for learning activities (Hidayati et al., 2019; Krisna Bayu & Citra Wibawa, 2021). Video media can attract students' interest in learning so that it is effectively used in learning (Kamelia, 2019; Mustofa et al., 2018). The learning video is feasible and valid to be used in the learning process (Supriyani et al., 2021; Wardani & Syofyan, 2018). There have been no studies related to demonstration-based learning videos on the topic of electric forces. Students can easily understand demonstration-based learning videos because students will see

and listen directly to the material presented. In science subjects, this method has the advantage that it can visualize objects for students, make models, and in practical activities that make students highly motivated and interested in learning (Komara et al., 2022; Kurmala, 2016). This study aimed to develop a valid and practical demonstration-based learning video media on static electricity in the fourth grade of elementary school. Through the development of demonstration-based learning video media on the topic of Static Electricity for Fourth Grade Students at SD Negeri 2 Pemaron, it is hoped that students will be able to understand the learning delivered so that the objectives of the learning activities can be achieved.

2. METHOD

This study is classified as a development study by developing a demonstration-based video learning media on static electricity in the fourth grade of elementary school. The model used is a 4D model (Define, Design, Development, and Disseminate) because the learning design is explained clearly. The Define Phase is done through needs, curriculum, characteristics, and learning video analysis. The Design stage is carried out through the design of several concepts, namely design concepts, media concepts, and script concepts. The development stage involves the production, implementation, and evaluation stages. The Disseminate stage is carried out by publishing demonstration-based learning videos that have proven validity on YouTube (Prabawa & Restami, 2020; Tegeh et al., 2019). The trial subjects in this study were two material experts, two media experts, two practitioners, and five student subjects to determine the validity of demonstration-based learning video media on the topic of static electricity for fourth-grade elementary school students.

Descriptive quantitative and qualitative analysis are the methods used in this study. The use of qualitative descriptive for processing information from criticism, suggestions, responses, and comments following the expert test of the media that has been developed using a questionnaire or questionnaire. This analysis is used to describe the distribution of data based on the score of the expert assessment sheet. The quantitative descriptive analysis describes the data distribution in the form of values obtained from expert assessment sheets (Hastuti et al., 2019; Indra Cahya et al., 2019; Tegeh et al., 2019). Several steps must be taken to produce a good instrument to meet the validity testing requirements: 1) Making a table-shaped instrument grid, 2) Conducting guidance with supervisors related to the grid, and 3) compiling instruments. Modified demonstration-based learning video validation instrument (Krisna Bayu & Citra Wibawa, 2021; Yuniarni et al., 2019). The instrument used in this study uses a rating scale so that it can be easier to find out the opinions of respondents. The research instrument grid is presented in Table 1, Table 2, Table 3, and Table 4.

Table 1. Material Expert Instruments

No	Aspect	Indicator	Item number	Total Item
1	Learning	Learning objectives	1, 2, 3	3
		Submission of materials	4, 5, 6, 7	4
		Motivating quality	8, 9, 10, 11	4
2	Material	Material relevance	12, 13, 14	3
		Material selection	15, 16, 17, 18	4
		Total Item		18

(Andriawan, 2015)

Table 2. Media Expert Instruments

No	Aspect	Indicator	Item Number	Total Item
1	Media quality	Video output quality	1, 2, 3, 4	4
		Simplicity of operation	5, 6	2
		Clarity of voice and clarity of text/readability	7, 8, 9, 10	4
2	Language use	Quality of language use	11, 12, 13	3
		Matching sentence placement	14, 15	2
3	Media display	Video presentation	16, 17	2
		Layout	18, 19, 20	3
		Total Item		20

(Andriawan, 2015)

Table 3. Practitioner Test Instruments

No	Aspect	Indicator	Item Number	Total Item
1	Learning	Learning objectives	1, 2, 3	3
		Submission of materials	4, 5, 6, 7	4
		Motivating ability	8, 9, 10, 11	4
2	Material	Material relevance	12, 13, 14	3
		Material determination	15, 16, 17, 18	4
3	Media quality	Video output quality	19, 20, 21, 22	4
		Ease of operation	23, 24	2
		Text and voice clarity	25, 26, 27, 28	4
4	Language use	Quality of language use	29, 30, 31	3
		Appropriateness of sentence placement	32, 33	2
5	Media display	Video presentation	34, 35	2
		Layout	36, 37, 38	3
		Total Item		38

(Andriawan, 2015)

Table 4. Student Response Instruments

No	Aspect	Indicator	Item Number	Total Item
1	Learning	Submission of materials	1, 2	2
		Motivating quality	3, 4	2
2	Material	Material selection	5, 6	2
3	Media quality	Video output quality	7, 8	2
		Voice and text clarity	9, 10	2
4	Language use	Quality of language use	11, 12	2
		Matching sentence placement	13, 14	2
5	Media display	Video presentation	15, 16	2
		Total Item		**16**

(Andriawan, 2015)

Qualitative descriptive analysis in this development study is used to manage information from comments, suggestions, criticisms, and responses according to tests from media experts optimized using a questionnaire. At the same time, the quantitative analysis method is used to process data sourced from questionnaires in the form of assessments and process the results of the assessment for student work through observation sheets (Hastuti et al., 2019; Indra Cahya et al., 2019). The data analysis used in this study calculates the percentage of each subject and the percentage of the whole subject. The provisions listed in Table 5 can be used to follow up in decision-making and give meaning.

Table 5. Conversion of PAP Achievement Level with Five Scale

Achievement Level (%)	Criteria
v90 – 100	Very good
75 – 89	Good
65 – 74	Enough
55 – 64	Not good
0 - 54	Bad

Source : (Prabawa & Restami, 2020)(Tegeh dan Kirna, 2010:101).

3. RESULT AND DISCUSSION

Result

This research is classified as a development study by developing a demonstration-based video learning media on static electricity in the fourth grade of elementary school. The model used is a 4D model (Define, Design, Development, and Disseminate) because the learning design is explained clearly. Defining Stage (Define). The definition involves four analysis stages: needs, curriculum, student characteristics, and learning videos. The needs analysis stage was carried out by an initial study process in the form of interviews and observations with fourth-grade teachers at SD Negeri 2 Pemaron. Based on the results of the analysis that has been carried out, fourth-grade teachers at SD Negeri 2 Pemaron need a learning

video media that can reduce teacher performance when conveying information or messages to students during online learning. Curriculum analysis is carried out by analyzing basic competencies, indicators of competency achievement, the purpose of learning activities, and topics as references in developing demonstration-based learning videos. According to the theory of cognitive development, analysis of student characteristics explains that elementary schools are in a concrete operational stage, so when the learning process needs an object with concrete properties (Hidayati et al., 2019; Rahmaniar et al., 2022). Learning video analysis was conducted to determine the type and quality of existing learning videos. It is used as a consideration in developing learning videos to produce quality learning videos. There are several criteria in developing this learning video: aspects of the media display, media quality, and language use.

Stage of Design (Design). At this stage, three concepts must be formed: design, media, and script. The design concept in this demonstration-based learning video comprises three parts: the opening, the core, and the closing. The media concept at this stage is done by selecting elements that can make videos more effective, interesting, and efficient. The constituent elements of the video include music, sound, images, text, effects, transitions, animations, and video backgrounds. The concept of the script was made so that the demonstration-based learning video production process is more structured—the development Phase. There are three development stages: production, implementation, and evaluation. (1) The production stage has three parts in the learning video media process: opening, core, and closing. The opening consists of an intro with animation containing text in the form of the greeting "Om Swastyastu," logo and identity, title, and learning objectives. Greeting students is made with the narrator in front of the classroom background with a medium shot type with the help of a green screen so that the background of the classroom can be seen clearly. Connecting the topics discussed with the environment around students is the same as the section greeting students in Figure 1. The core part of the video consists of giving problems to students as well as the section greeting students and connecting the topic with the surrounding environment; the presentation of the material is made the same as the part to greet students; prepare tools and materials made with pictures of tools and materials with Extreme Close Up shots; static electricity practicum is made with the narrator demonstrating each practicum and the type of shot used is Close Up which can be seen in Figure 2. The closing section consists of concluding the practicum and answering the problems given at the beginning; giving an assignment as a follow-up; giving games made with the narrator in front of the classroom background with medium shots can be seen in Figure 3; closing the video by greeting and saying thank you made with the narrator in front of the classroom background with a medium shot; The outro is made with animation containing the text "Hopefully Useful," closing greetings "Om Santih Santih Santih Om," saying "Thank you." Credit Video in the form of thanking the parties involved in video production, the display of the video outro can be seen in Figure 4.

Figure 1. The Part of Greeting Students

Figure 2. Static electric force practicum section

Figure 3. Part of giving games

Figure 4. Closing Display

In the implementation phase, demonstration-based learning videos are limited to 2 media

experts, two material experts, two teachers, and five students to test the validity of the learning videos that have been produced. The results of the validity test can be seen in Table 6.

Table 6. Results of Data Analysis

No	Description	Percentage	Category
1	First and second material expert calculations	96,5 %	Very good
2	First and second media expert calculations	96 %	Very good
3	The calculation of the first and second practitioners	97,5 %	Very good
4	Calculation of student responses first, second, third, fourth, and fifth	96,8 %	Very good

After testing with experts, the evaluation stage aims to improve demonstration-based learning video media. Comments, suggestions, and input submitted by teachers as practitioners and lecturers as material and media experts can be seen in Table 7.

Table 7. Comments, Suggestions, and Feedback

No	Expert	Comments, Suggestions, and Feedback
1	First Material Expert	1) Impressions of learning objectives are too fast. 2) The quiz at the end of the lesson should be adjusted to the learning objectives.
2	Second Material Expert	Impressions on the learning objectives are too short and need to be read out, or there is sound.
3	First Media Expert	Sound quality changes in some video segments.
4	Second Media Expert	Already well. Pay attention to the writing.
5	First practitioner	It's good. The learning objectives can be broadcast longer.
6	Second practitioner	(There are no input, suggestions, or comments)

The fourth stage is the Dissemination Stage. This section is carried out by uploading videos produced, revised, and tested for validity through the YouTube platform. Demonstration-based learning video media on the topic of static electricity forces that have been disseminated are expected to make it easier for teachers to find media in the form of demonstration videos to support the learning process and, in particular, make it easier for students to understand the material on static electricity.

Discussion

This research is classified as a development study by developing a demonstration-based video learning media on static electricity in the fourth grade of elementary school. The model used is a 4D model (Define, Design, Development, and Disseminate) because the learning design is explained clearly. The demonstration-based learning video media that have been made can be said to be good and have the advantages of the learning videos produced. It refers to the material and learning aspects. The material presented on the learning video media is presented in a clear, interesting way, follows the characteristics of students, and demonstrates activities. The objectives conveyed in the learning video have been based on basic competencies, namely the demonstration of the benefits of force in everyday life, such as friction, gravity, magnetism, electricity, and muscles. Then rather than that, the material presented has been presented interestingly and clearly to align with the teaching and learning objectives. Presentation of topics presented well can help students understand the concepts being taught. Therefore learning activities will be more meaningful (Melinda et al., 2017; Sudiarta & Sadra, 2016). It is based on the characteristics of elementary school students in the age range of 7-11 years or at the concrete operational stage so that students' thinking has begun to be stable and logical (Dantes, 2014; Hidayati et al., 2019).

Second, the developed media is valid with the overall percentage of subjects in the very good category. The very good category was obtained because the criteria for the aspect of the media display, language use, and media quality had been met well. The clarity of text and sound in video media is presented well and accompanied by the musical accompaniment to raise enthusiasm but without losing

the voice of talent so that the learning video can focus the students' attention so that they are enthusiastic about hearing and listening to the material being explained. The clarity of text and sound is also a vital component in learning video media because a clear sound and display can focus the mind and attract the attention of students to the material being taught (Kristina et al., 2021; Prabawa & Restami, 2020). Then, the quality of the display and video images developed have been very good, so the practical activities carried out can be seen properly. This study's results align with studies (Hidayati et al., 2019; Tegeh et al., 2019) with the findings of appropriate and effective learning video media applied to support teaching and learning activities based on testing material experts and media experts. Third, the developed media validates the subject's overall percentage, including the very good category. This category is obtained because the material and learning aspects have been presented in the learning video media to be achieved. In addition, the criteria for display, use of language, and the quality of the developed media have been met well, in which the sound, images, and text shown are clear and well received. The addition of background, as well as a pleasant voiceover on video products, will add to the attractiveness of students so that their attention is focused on the media being shown (Kristina et al., 2021; Prabawa & Restami, 2020). The results of this study support the study (Hidayati et al., 2019; Tegeh et al., 2019) with the acquisition of the results of expert reviews, individual testing, and group testing, the learning video media is effective and valid and can significantly affect the learning outcomes of Hinduism.

Based on the discussion of the learning, video media was described and tested by experts. So, the learning video media made have very good validity, so it can be said that it is feasible to distribute to social media. This finding is strengthened by previous research, which states that using demonstration-based learning video media is in line with cognitive learning theory, which emphasizes the process rather than learning outcomes (Nurhadi, 2020; Yuberti, 2014). Video media can attract students' interest in learning so that it is effectively used in learning (Kamelia, 2019; Mustofa et al., 2018). The learning video is feasible and valid to be used in the learning process (Supriyani et al., 2021; Wardani & Syofyan, 2018). This research implies that through demonstration-based learning videos, students can observe and try directly the simple experiments contained in the learning videos. It can make it easier for students to understand the material because they see or are directly involved in teaching and learning activities. Demonstration-based learning videos on static electricity can support learning because students can see, hear, and observe the material being studied. The limitations of this study are limited to the material of static electric force. It is recommended for further research to develop demonstration video media on other styles of material.

4. CONCLUSION

The demonstration-based learning video media on static electricity passed the validity test. They were suitable for use in sixth-grade elementary school learning activities, with a very good category seen from the assessments of material experts, media experts, and practitioners.

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