

## NEED ANALYSIS OF VIDEO MEDIA DEVELOPMENT PHYSICS LEARNING BASED ON SCIENCE PROCESS SKILLS ON HEAT MATERIAL

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### ABSTRACT

*This study has the objectives of (1) knowing the constraints on students' understanding in learning physics, especially heat material since the Covid-19 pandemic; (2) see the science process skills in students; (3) describe things that need to be developed in learning media in physics learning; and (4) describes the analysis of the needs for developing learning media based on science process skills on the heat material in high school. This type of research uses quantitative and qualitative research methods, by collecting information and data from written test results distributed online to class X students at SMAN 3 Murung. The analysis technique used is descriptive qualitative analysis technique, from data collection conclusions can be obtained (1) There are obstacles experienced by students in understanding the material because the learning system is carried out online. (2) Students have the ability to apply science process skills. (3) Instructional video media need to be developed in physics learning, especially on heat material in order to encourage students to understand the material. (4) A total of 69.20% of students in understanding physics material find it difficult, 92.31% of students have known learning video media, and 92.31% of students stated that science process skills-based learning video media is needed in learning physics, especially heat material, so the media in the form of this learning video needs to be developed.*

## 1. Introduction

Education is something between educators and students in which an interaction process occurs in order to help plant potentials within themselves (Mutia, 2017) by having various kinds of knowledge, one of which is physics which is a science in the

form of a collection of knowledge about events. nature (Kurrotul, 2018). Physics has three scopes of essence, namely as a process, attitude, and product (Sujarwanto, 2019).

In general, physics material seems abstract to students, and can trigger a sense of laziness in students because many formulas are applied, so that in understanding and accepting this physics material, many students find it difficult (Astuti, 2017). Moreover, as it is now known that the learning process is carried out using an online system due to the Covid-19 which raises new obstacles such as unsupportive learning conditions, educators and students experience obstacles in the knowledge transfer process (Napsawati, 2020), and students express experienced that they find it difficult to understand the subject matter, especially physics on heat material.

When directing learning, educators must of course be able to take advantage of appropriate learning resources or media (Novisya, 2020). In the field of life, it is heavily influenced by the development of Information Technology (ICT), including in the field of education (Zulherman, 2019). Technology as an exploration medium has an important role in the scope of education, because technology can really help so that the goals of education can be achieved (Rante, 2013).

Learning media are everything in the form of intermediary media that can be used in teaching and learning activities to transfer messages and information (Nuzuliana, 2015). Learning media can affect the quality of the learning process. In order to hone the thoughts, concerns and feelings of students, it is necessary to have learning media during the teaching and learning process (Hamdanillah, 2017). Based on the previous explanation, it can be seen that the learning process by utilizing media can attract students' interest to take part in learning, especially if it is applied to physics subjects. So this has the aim of making it easier to understand physics material for students (Diani, 2018). In order to improve this, you can use one of the learning media, namely learning videos. Video is a medium in which there is sound, images, and illustrations with several animations that can display events related to the material being studied, so that the expectation is that the product (video media development) can provide a real view of the related material to be studied by students (Hamdanillah, 2017). Video becomes effective as a learning medium because it can be heard and seen in the form of explanations related to the material being studied (Panggabean, 2021).

The development is aimed at a goal, namely being able to improve abilities (Ichsan, 2018), students' knowledge (Iqbal, 2019), and can assist in the explanation of physics concepts that seem difficult and abstract (Hafizah, 2020). So it is hoped that the learning videos that have been developed can overcome the problems that exist in education (Priyadi, 2018). In developing a learning media, it is necessary to have supporting indicators, in developing this learning video media it is made based on Science Process Skills (KPS) in the form of skills that are usually used in order to be able to overcome a problem within the scope of science (Karamustafaoğlu, 2011).

Learning videos have advantages and disadvantages. The advantages of videos include that videos can be repeated if necessary to add clarity, develop students' thoughts and opinions, and can generate motivation and interest in students to learn physics, especially in heat material whose material can be described with learning videos, for example as in the material part of the conduction, convection, and radiation processes (Tamba, 2020).

Therefore, researchers are interested in conducting this research by analyzing the needs of developing physics learning media based on science process skills on heat



**Figure 1** The stage chart of the development of science process skills-based physics learning video

material. The purpose of the research is to find out the obstacles and needs in learning physics, especially heat material during the Covid-19, see science process skills in students, describe things that need to be developed in learning media in physics learning, and explain the needs analysis for developing video-based learning media. science process skills on heat material in high school.

## 2. Method

This research is a development research using physics learning videos based on science process skills on heat material, using 3D research research methods (*define, design, develop*) (Agustien, Umamah, & Sumarno, 2018). The following is a chart related to the stages carried out in this research (figure 1)

*Define* is the stage of analyzing the need for development of learning media in learning objectives (Cahyadi, 2019), *Design* (planning) in learning is the stage for preparing the device, and *Development* (development) in learning that has been revised from expert input is the stage for produce learning tools (Hafizah, 2020), this research is only up to the *Design*, to explore initial data for development (development) (Helsa, 2020).

This type of research is descriptive using a quantitative approach. Descriptive research is to describe, describe and systematically describe an event (Rujakat, 2018). The data collection process uses research instruments that are packaged in the form of tests and distributed *online* using *the Google Form platform* to class X students at SMAN 3 Murung. The stage in this research is through observation by finding out the events or problems that are happening, collecting information, and then looking for solutions that can overcome these problems (Nugroho, 2018).

The data obtained in this study were qualitative data types, namely collecting in the form of texts that had been obtained from the results of filling out tests (Sari, 2014), the results of data acquisition could be analyzed by the following equation (Sugiyono, 2017).

$$\text{Percentage of results} = \frac{\text{The number of students who answered}}{\text{The total number of students}} \times 100\% \quad (1)$$

The results of the study obtained an overview of the learning media that can be used or not, namely in the form of learning videos in the learning process.

### 3. Result and Discussion

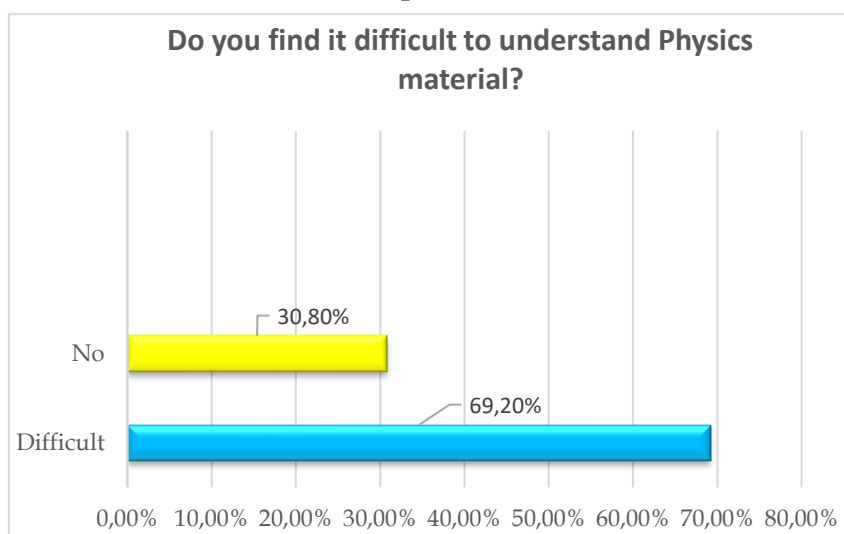
The research at the analysis stage went through several stages, namely the analysis was carried out through initial observations with written tests distributed online with the google form platform assisted by social media via WhatsApp (WA) at SMAN 3 Murung to 26 students of class X IPA. The results obtained from the analysis are in the form of data on the needs of students for the use of physics learning videos based on science process skills on heat material. During the Covid-19 pandemic, schools use an online using the help of learning applications such as Google Classroom and Zoom. However, in online , students experience several obstacles such as quotas, networks, and even in understanding the material (Andani, Mawaddah, & Yuliani, 2020).

Science process skills were developed in this study in order to improve students' skills in learning. For example, such as observing, classifying, predicting, calculating, inferring, and discussing. Meanwhile, learning is carried out using an online learning system assisted by applications such as WhatsApp, Classroom, and Zoom. But in fact, the learning process that is applied to the online learning system, makes students experience obstacles. Regarding the obstacles experienced by students, it can be presented in the form of a diagram with the percentage results that have been obtained from the test results.

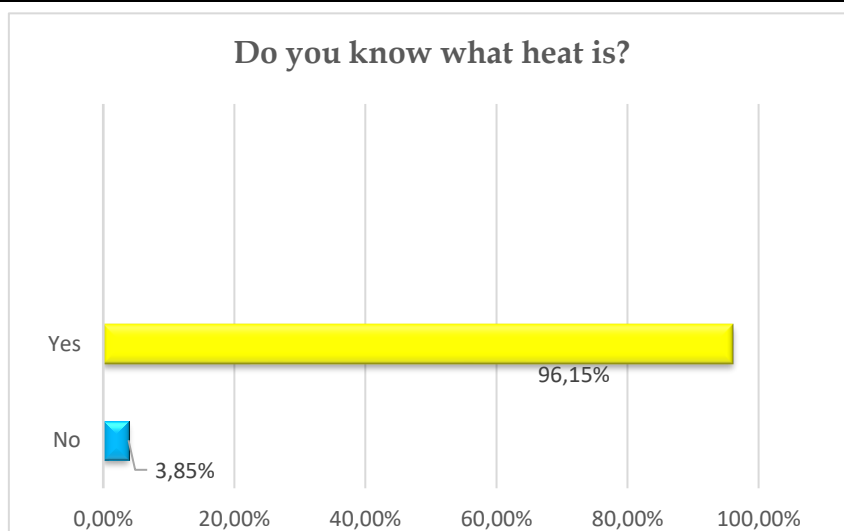
In the first question on the test, the survey aims to find out about the obstacles to students' understanding in learning physics. The percentage results from student statements regarding difficulties in physics material can be presented as shown in Figure 2.

Based on the diagram in Figure 2, almost most of the students are faced with obstacles in the learning process to understand the material in Physics lessons. The difficulties experienced by students are caused by several factors. As many as 69.20% of the responses from students said that they had difficulty in understanding physics material on the grounds that the material seemed abstract and 30.80% of the students said that in understanding physics material they did not find it difficult.

The obstacles faced by students on physics material are related to understanding physics material, that the difficulties experienced are due to not understanding the



**Figure 2.** Diagram of the results of student



**Figure 3.** Diagram of Student Responses to Heat Material

concepts of the material provided and mathematical abilities that have not been maximized. The purpose of the questions on the test is to find out the learning media used by educators during the Covid-19. This is in line with research from Vitrianingsih, Aulianingsih, and Yuliani (2021) which stated that the difficulties felt by students were caused by sometimes having problems with the internet network and having difficulty understanding the explanations of online (Vitrianingsih, Aulianingsih, & Yuliani, 2021).

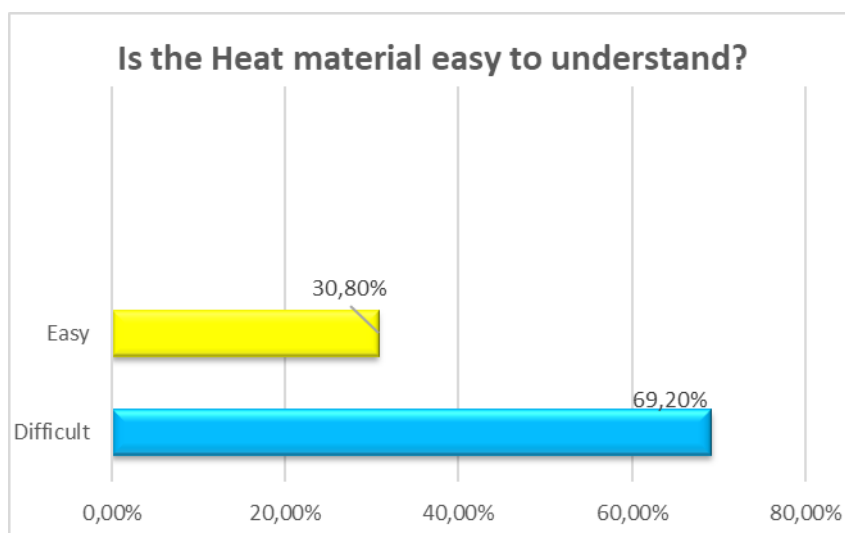
In the second question of the test, the survey aims to find out the response to the heat material from the students. The percentage of student responses can be presented as shown in Figure 3.

Based on the diagram in Figure 3, it is known that as many as 96.15% of students already know about heat material and only 3.85% do not know about heat material. This is in line with Astuti's research that physics material seems difficult, but even though it is difficult, not a few students already know physics material (Astuti, 2017).

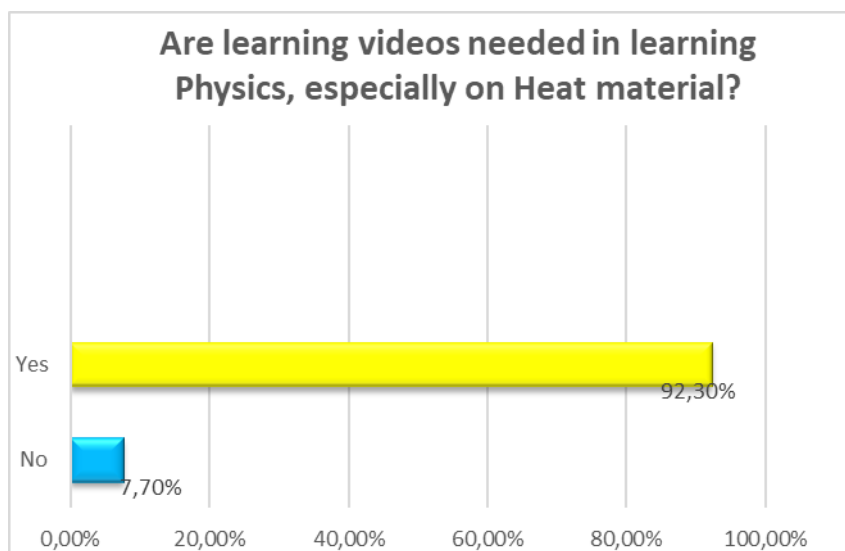
In the third question of the test, the survey aims to find out the understanding of the heat material of the students. The percentage of student responses can be presented as shown in Figure 4.

Based on the diagram in Figure 4, it is known that 69.20% of the statements from students experienced and felt difficulties in the heat material and 30.80% of the students considered the heat material to be easy. Students tend to first assume that the heat material which is included in the physics material is difficult. The difficulties experienced by students from physics material are related to understanding the material with mathematical concepts. This is in line with research from Napsawati (2020), which states that the current learning situation is not conducive to carrying out the learning process so that educators find it difficult to transfer knowledge, and students experience difficulties in capturing subject matter including heat material (Napsawati, 2020).

In the fourth question on the test, the survey aims to find out the student's response to the learning video. The percentage of student responses is presented in Figure 5.



**Figure 5.** Student Response Diagram Regarding Difficulty in Caloric Materials

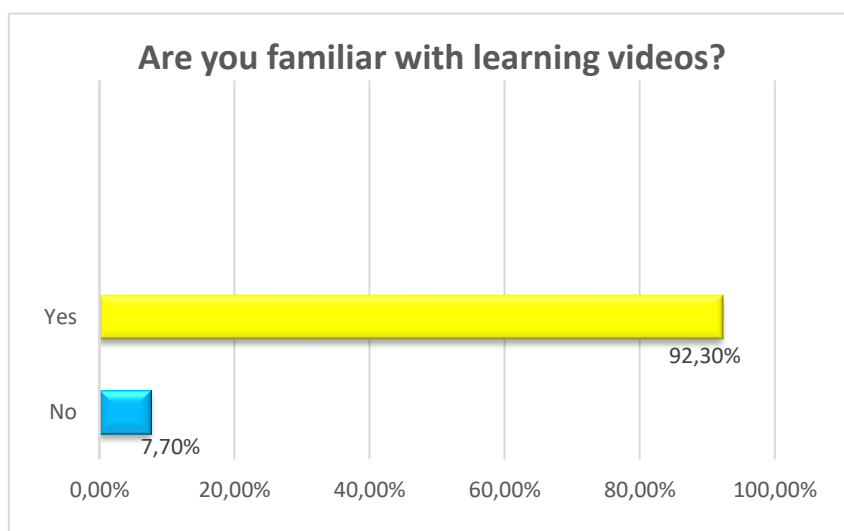


**Figure 4.** Diagram of Student Responses to Learning Videos

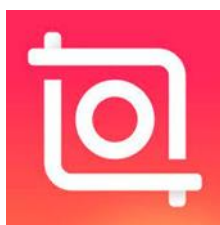
Based on the diagram in Figure 5, it is known that as many as 92.30% of students are familiar with learning videos and only 7.70% do not know it. This is in line with the results of research from Busyaeri, Udin, and Zaenuddin (2016) which stated that students were familiar with learning videos and this media was in great demand by students (Busyaeri, Udin, & Zaenuddin, 2016).

In the fifth question on the test, the survey aims to find out the responses of students for the purposes of learning video media. The percentage of responses from students is presented as shown in Figure 6.

Based on the diagram in Figure 6, it is known that 92.30% of students stated that learning videos are needed in learning physics, especially on the heat material. Learning videos can be used as an alternative to learning media, with learning videos it is hoped that they can encourage students to understand the subject matter, especially in physics lessons that are made and arranged in such a way that the learning videos are easy to understand and attract learning interest for students.



**Figure 6.** Diagram of Learners' Responses to the Needs of Learning Videos



**Figure 7.** Inshot Application Logo

(Sumber: <https://play.google.com/store/apps/details?id=com.camerasideas.instashot&hl=in&gl=US>)

However, besides that, students need to prepare in advance devices such as LCD, computers, laptops, cellphones, or other devices for learning using media in the form of videos. This is in line with research from P. Rante, Sudarto, and N. Ihsan (2013) which states that the development of physics learning media, one of which is in the form of learning videos, can be used as a solution in the learning process (Rante, Sudarto, & Ihsan, 2013).

Design, namely the stage of designing media in the form of learning videos. Learning videos are designed using the Inshot application, the logo of the application can be seen in Figure 7. Inshot is an application that can be used to edit videos equipped with quite complete features. Videos edited with the Inshot application have good quality, because the quality of the video before and after editing does not change much.

The description given in the development of learning video media for students can be illustrated with pictures 8, 9, and 10.

Figure 8 is part of a learning video that presents conduction material in the form of heat transfer that is not accompanied by particle transfer by passing an intermediate substance (Pertiwi, Ristiana, Isnaini, & Prajitno, 2015).

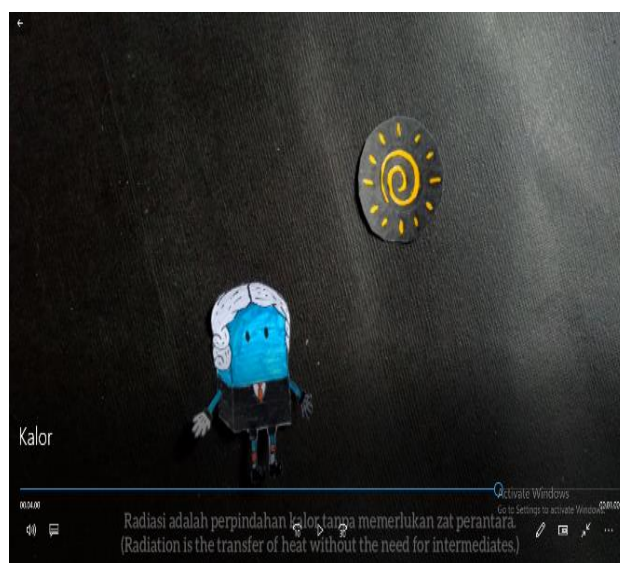
Figure 9 is part of a learning video that presents convection material in the form of heat transfer accompanied by the transfer of heated particles in a substance (Yohana & Novariawan, 2013).



**Figure 8.** Convection Material Learning Video



**Figure 9.** Video of Conducting Material Learning



**Figure 10.** Radiation Material Learning Video

Figure 10 is a part of a learning video that presents radiation material in the form of heat transfer without going through an intermediate substance from one object to another (Nurhayati, Saputra, Asmara, & Malahayati, 2021).

The results of the needs analysis obtained for the development of physics learning media based on science process skills on heat material, it is hoped that the learning videos developed can help overcome obstacles in the learning process, improve students' abilities in applying science process skills, make it easier for students to understand the material. in physics lessons that seem abstract, and help in realizing the goals in learning.



#### 4. Conclusion

So from the research that has been developed, it can be concluded that pandemic *Covid-19* students experienced problems including networks and difficulty understanding material when studying with the online system, students had the ability to apply science process skills, the results of the test needs analysis can be stated that one of the media that needs to be developed is a learning video.

Based on the needs analysis, it is known that as many as 69% of students find it difficult to understand physics material, 92.31% of students have never known learning video media, and 92.31% of students stated that science process skills-based learning video media is needed in learning physics, especially heat material.

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