



Development of Science Learning Videos Force Material for Elementary School Students

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Received: June 10, 2025	Revised: June 10, 2025	Accepted: June 10, 2025	Online: June 10, 2025
ABSTRACT This study aims to create a learning media in the form of a video that discusses the material of Force in the subject of science for elementary school students. The video was developed through a validation process to meet the eligibility as a teaching media. The development model used refers to Sadiman, which includes the following stages: identification of needs, setting goals, developing content, compiling evaluation instruments, writing scripts, production processes, trials, and product revisions. The main users of this video are fourth grade students of SD Rumah Sekolah Cendekia. Data were collected in quantitative (test results) and qualitative (questionnaires from experts and students) forms. The results of the study indicate that this video has met the eligibility criteria and is able to improve students' understanding of the concept of force. Keywords: <i>Elementary School Students, Learning Videos, Science</i>			

Journal Homepage <https://ejournal.iainbatanghari.ac.id/index.php/attasyrih/index>

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How to cite: Abdullah, N, M & Latifa, Latifa. (2025). Pengembangan Video Pembelajaran Ipa Materi Gaya untuk Siswa Sekolah Dasar. *At-Tasyrih: Jurnal Pendidikan dan Hukum Islam*, 11(1), 232-397. <https://doi.org/10.55849/attasyrih.v11i1.297>

Published by: Pusat Penelitian dan Pengabdian Masyarakat, Institut Agama Islam Nusantara Batang Hari

INTRODUCTION

Indonesia is one of the countries that has progressively integrated the principles of globalization into the national education system, especially in the context of implementing curriculum and learning methodology in formal school environments. This phenomenon is clearly seen through the increasing number of educational institutions that adopt a bilingual education system. In addition, the use of educational technology and various forms of learning media innovation have become common practices in supporting the instructional process in the classroom.

The role of learning media in the context of modern education is very significant, especially in increasing the efficiency and effectiveness of achieving student learning outcomes. However, although various types of media are available, undirected or excessive use has the potential to cause confusion among students. Therefore, educators are required to have adequate pedagogical competence in recognizing the characteristics of each media and the capability in choosing media that is relevant and in line with the

instructional objectives that have been set.

Based on the definition of the National Education Association (in Arsyad), learning media includes all forms of communication channels involving printed and audiovisual components, along with the tools used in the delivery process. In this context, media is interpreted as an object or system that can be manipulated, observed, heard, or read by students. Furthermore, Briggs (1972), Briggs and Wager (1981) explain that media is a physical means used to convey messages and at the same time stimulate cognitive, affective, and psychomotor activities of students. In subsequent developments, media is also understood as software that contains learning content and is presented through certain hardware to increase participation and interest in learning. Concrete examples of learning media include printed materials such as books, audio devices such as cassettes, to audio-visual media such as videos.

According to Sadiman, video is an audio-visual based media that presents a series of moving images and can represent real events such as news documentation or fictional content such as drama. This media has a dual role, namely as a means of conveying information as well as an educational instrument. In the world of education, video is not only used as a learning aid, but also plays a role as an important instructional tool. This view is in line with the opinions of Riyana (2007), Hernawan, Zaman, Riyana (2007), Susilana, Si and Riyana (2008), and Praherdhiono & Adi (2008), who stated that learning video media is a form of media that combines visual and audio elements to convey teaching materials. The material displayed in the video can be concepts, basic principles, procedural steps, theories, to the application of knowledge in real life. The main purpose of using this video is to help students understand the subject matter thoroughly.

Allen (1975) emphasized that video media has high effectiveness in delivering conceptual, principle, and normative materials. However, the effectiveness of video tends to be limited when used to train practical skills, sensory perception, and motor activities. However, for the purposes of delivering factual, procedural information, visual recognition, to the formation of attitudes and learning motivation, video is still able to function optimally at a medium level of effectiveness. In the context of elementary school children's learning, especially in Natural Sciences (IPA) and Mathematics subjects, learning difficulties often arise as a result of the high level of material complexity. In science subjects, students are often faced with material that explains natural phenomena that are abstract and broad in scope. Unfortunately, the instructional approach used by educators/teachers is generally still traditional and less contextual, so it is less able to accommodate the learning needs of students/students optimally. In this regard, a number of previous studies have confirmed the benefits of using video media in science learning. One of the relevant studies conducted by Priyambodo (2015) entitled: Development of Natural Science Learning Videos for Class VIII at SMP Muhammadiyah 4 Singosari, Malang. The findings of this study indicate that the use of video as a teaching tool can improve students' understanding through visualization of various force concepts that are often encountered in everyday life. The

use of learning videos on the topic of force aims to accelerate students' understanding while also being a supporting tool for educators in delivering material in a more coherent and interesting way. Presenting material through videos that are packaged creatively can produce a learning situation that is not boring, which in turn can increase students' motivation and participation in the learning process. The main objectives of creating learning video media for force material in this science lesson are: (1) Producing valid learning videos that are in accordance with educational media standards; and (2) Assessing the extent to which the video is effective in helping fourth grade elementary school students understand the concept of force in depth.

RESEARCH METHOD

This study adopts a development model as a conceptual framework in the process of designing media products. The model used refers to the media development framework proposed by Sadiman (2010). The selection of this model is based on its advantages, including: its ability to identify learning needs through observation and interview techniques, as well as the preparation of systematic work procedures, so that its implementation can be carried out in a structured and directed manner. In addition, the evaluative stage through product testing is also an integral part of this model. Sadiman's model also emphasizes the use of storyboards or visual scripts as the main guide in the media creation process. The development of learning videos in this study was carried out with various main stages, including: needs analysis, setting learning objectives, developing material content, compiling evaluation instruments, designing scripts, media production, compiling usage guidelines, validation through guided trials, and revisions based on the results of the test.

Needs Analysis

Based on observations conducted on December 20, 2024, on 27 fourth grade students in a 10 x 15 meter classroom, it was found that students experienced difficulties in understanding the topic of force in Natural Science learning. The causal factors are; learning methods that still focus on the lecture approach and the characteristics of force material that is abstract and requires visualization assistance to improve understanding. Based on these problems, it is concluded that students need interactive learning media that provide concrete examples, are flexible in access, and can support independent learning, namely learning video media.

Goal Setting

The learning objectives of the Natural Sciences subject, especially the material on force, are focused on students' ability to understand how force is used in everyday life. The basic competencies to be achieved include:

1. Ability to recognize various types of forces, such as; muscle force, spring force, magnetic force, gravitational force, and frictional force,
2. Ability to directly demonstrate the benefits of each type of style in daily activities.

Material Development

The content developed is focused on the material of force in science subjects. The scope of the material includes two main discussions, namely; the definition of force and its characteristics. Force is defined as an interaction in the form of a push or pull that can cause changes in the position or shape of an object. The characteristics of force include its ability to; a. change the shape of an object, b. change the direction of motion, and c. cause the movement of objects.

Preparation of Evaluation Instruments

Evaluation in this study is intended to measure the level of learning achievement by students. Evaluation tools are designed based on suitability with the material and learning objectives, in the form of a written test. This test is used in two stages, namely before (pretest) and after (posttest) the use of media, to determine the level of improvement in student understanding.

Manuscript Preparation

This stage aims to compile visual guidelines in the media production process. The preparation of the script is carried out through the steps of compiling ideas and program titles, determining the targets to be achieved, analyzing the profile or characteristics of target users, designing a content structure that includes a summary of the story, delivery approach, storyboard, and determining the type of presentation to be used, and writing the final script in full.

Video Production Stage

Video production is carried out in three phases, including:

1. Pre-production: includes planning, equipment provision, location selection, and talent selection,
2. Production: namely taking pictures according to the prepared scenario, and
3. Post-production: the editing process to perfect the recording into a final product.

Preparation of the User Guide

The user manual is designed to ensure that the media is utilized to its full potential by the user. Elements of the manual include: program identification, purpose statement, usage procedures, and a closing section that provides additional direction.

Validation and Testing

Researchers compiled an observation sheet to measure the effectiveness of learning video media. The validation process was carried out through assessment by media and material experts, and continued with trials on an individual, small group, and large group scale. The results of the pretest and posttest were analyzed to determine the impact of the media on improving student learning outcomes.

Revision Process

If weaknesses are found in the media based on validation and trial results, a revision stage is carried out. The goal is to perfect the product to meet the eligibility standards for learning media and provide a positive impact on classroom learning.

Data Types and Instruments

The data used in this study include quantitative and qualitative data. Quantitative data were obtained from expert and student assessments through questionnaires, in contrast to qualitative data collected through posttest results and oral evaluations. Data collection instruments consisted of; media validation questionnaires, learning outcome tests, and observation sheets for psychomotor aspects.

Data Analysis Techniques

Data analysis was conducted by converting questionnaire scores into qualitative descriptions. These scores were obtained from direct data collection by media experts, material experts, and students as users. The data were analyzed systematically and the final results were presented in descriptive form.

Assessment criteria

The assessment of the feasibility of learning videos refers to the classification of Arikunto (2009) and Suharsimi (2006) which divides the level of media validity into four categories, namely: very valid, quite valid, less valid, and invalid.

RESULT AND DISCUSSION

The results of the analysis of feedback from media experts showed that the learning video scored 91%. Based on the evaluation criteria applied, these results place the science learning video with the material "Style" for grade IV elementary school students in category A, with the qualification that it can and is feasible to be applied in the learning process. On the other hand, the analysis of feedback from material experts produced a percentage of 88%. Using the same criteria, these results also place the video in category A, which means that the media is valid and feasible to use.

Individual trials yielded an average percentage of 84.8%. This result shows that students responded positively to the learning video, indicating that the media was interesting and well received by the audience. When conducting trials with small groups, an average percentage of 89.7% was found. This result shows that the learning video successfully attracted the attention of students, and received a positive response from users.

Furthermore, the large group trial showed an average percentage of 91.55%. Based on this data, it can be concluded that the learning video on style material for class IV semester 2 received a very good response from students, both in terms of content and presentation of the material. Of the 27 students who took the posttest, 23 students (85%) managed to achieve a score above the Learning Objective Achievement Criteria (KKTP) and were said to be complete, while 4 students (15%) had not achieved KKTP. These results indicate that the use of learning video media on style material has a positive impact on improving student learning outcomes.

Revisions were made based on input from a material expert after receiving feedback. From the results of the questionnaire filled out, it was concluded that the language and terms used in the learning video were in accordance with the level of understanding of the students. The material presented was quite dense and complete, but

there were recommendations to improve the sound quality in the video. Revisions from the media expert, which were also obtained from one expert, suggested increasing the number of images in the video to increase visual appeal and improve the narrator's delivery style to be more communicative and engaging.

Meanwhile, revisions based on student input were obtained from trial data on 27 students. This data was analyzed to improve the video learning media to be more effective and in accordance with the needs of the audience. Overall, it can be said that the video learning media on the subject of style has shown adequate quality. The use of this media is able to attract the interest of students, so that they become more enthusiastic and enjoy the learning process with the help of the learning video.

DISCUSSION

Media plays an important role as a liaison in delivering information. In the world of education, media functions as a bridge between learning resources and students (Susilana et al., 2008). When media is developed properly, it can help improve the quality of learning achievement more efficiently and effectively (Fuady & Mutalib, 2018; Saprudin et al., 2018). One form of media that greatly supports the learning process is video, because it combines visual and audio elements simultaneously (Woottipong, 2014; Potdevin et al., 2018). The combination of sound and images in videos can accelerate the delivery of material to students. The use of animation can also foster interest in learning, which leads to increased curiosity and involvement of students during learning. The interesting characteristics of this video are an advantage compared to other media such as printed teaching materials (Pramudito, 2013; Melinda et al., 2018; Agustiningsih, 2015).

In today's digital era, learning videos can be integrated with online-based learning strategies and models (Surahman, 2019; Dönmez et al., 2010). The designed video media can be accessed through online platforms, allowing students to learn the material anytime and anywhere (Hrastinski, 2009; Moore & Kearsley, 2011). This method not only facilitates the dissemination of information but also supports students in learning independently (Gunawardena & Duphorne, 2001; Hirumi, 2006). In its application, the design of video content needs to be adjusted to the variations in learning styles possessed by each student. This is in line with the theory that states that each student has different learning preferences (R. Mayer, 2005; RE Mayer & Moreno, 1998; Surahman & Surjono, 2017). Although video media is not completely effective for students with a kinesthetic learning style, this media is very suitable for use by students who are predominantly visual or auditory learning styles.

CONCLUSION

The learning video media designed in this study is based on digital technology and is specifically designed to support students' learning activities. In its application in science learning with a focus on force material at SD Rumah Sekolah Cendekia, this video has proven to be very relevant and needed. The content of the material delivered through the

video is easy to understand and accept by students. The students' responses are also very positive, shown through enthusiasm and happiness during the learning process. Overall, this learning video about the concept of force has proven to be valid and effective, and can be used as one of the appropriate learning media options to be applied in the classroom.

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