

# Development of Video-Based Learning Media on SPLDV Material to Improve Mathematics Learning Outcomes

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## ABSTRACT

This study aims to determine the impact of using video learning media on improving the learning outcomes of eighth-grade students. Employing a Research and Development (R&D) approach, the study utilizes the ARCS research model, which encompasses student attention to the product (attention), assessment of product relevance (relevance), student confidence in using the product (confidence), and student satisfaction with the product (satisfaction). Data collection techniques include observations and structured questionnaires. The sample consists of eighth-grade students selected through purposive sampling. The research procedure involves needs analysis, design and development of the video learning media using the Renderforest application, implementation in classroom settings, and evaluation through collected data. Descriptive statistics summarize students' responses, while paired sample t-tests compare pretest and posttest scores to assess learning improvements. The study reveals that video learning media significantly enhances student engagement, comprehension of SPLDV material, and overall satisfaction with the learning process. The findings underscore the importance of integrating motivational elements into educational media to foster better academic outcomes. This research contributes to the understanding of digital learning tools in education, offering practical insights for educators to enhance student learning experiences through innovative media.

**Keywords:** learning video, problem-solving ability



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## INTRODUCTION

A developed nation is one that has high-quality human resources with critical, systematic, logical, creative, reasoning, and effective collaboration skills. One way to achieve this goal is through educational reform, particularly in mathematics. According to [kemdikbud.go.id](http://kemdikbud.go.id), on December 3, 2019, the Ministry of Education and Culture released the results of the 2018 Program for International Student Assessment (PISA) study, showing that Indonesian students' math and science scores are below average. Indonesia scored 379 in math, while the average score of other countries was 487. According to educational observers, the low math skills of students are due to the abilities of teachers, curriculum systems, and support from the surrounding environment. Various efforts have been made by teachers to address the low math scores of students. However, students always consider math difficult and hard to understand.

In essence, education is an effort to develop students' potential through a complex process that changes with technological and informational advances.

The learning process will continue, now transferred through the "Learning From Home" program in the form of distance learning (PJJ) or online learning. During this process, parents now play a primary role in ensuring the continuity of their children's learning by directly monitoring their development. Currently, rapid technological and informational advancements have been well utilized in education by several schools, especially during the Covid-19 pandemic, where learning was conducted online from home. Therefore, the author took the initiative to contribute new ideas to make math lessons more interesting and aligned with the times. Teachers also play an important role in achieving learning objectives. In addition to being more creative, teachers are also required to be more innovative in creating various things that support the learning process. One way to achieve this is by developing learning media to make the material taught by teachers more engaging and easier to understand for students. Additionally, teachers must ensure that the learning competencies they aim to achieve are met without forcing curriculum completion. These competencies can be achieved through good interaction and communication between teachers and students in learning media.

Given the problems mentioned above, learning media is a supporting element for the success of the learning process. According to Hamalik (in Arikunto, 1998: 112), in the learning process, media can enhance specific lessons, such as information and communication technology. One of the efforts is developing digital learning media. The current use of technology in learning includes learning trajectory, video animation, and more. The chosen and considered effective learning media to improve students' math learning outcomes is video animation. The use of animated videos, which combine video, audio, text, and animation, aims to provide significant benefits for teachers and students, such as: 1) Achieving effective learning, especially in subjects that are predominantly practical; 2) Maximizing the achievement of learning objectives in a short time; 3) Stimulating students' interest in independent learning; 4) Helping students to concentrate; 5) Focusing and enhancing students' reasoning abilities; 6) Motivating students to actively practice. Thus, it is capable of achieving the learning goal of improving students' learning outcomes.

Based on the above explanation, this research aims to develop video-based learning media on SPLDV material to improve mathematics learning outcomes.

## **METHOD**

According to Sugiyono (2019: 768-769), research and development is a method or process used to validate and develop products. The product in question can be not only tangible items but also teaching methods. The development model applied in this research is the ADDIE development model used by Lee and Owens. According to Tegeh (2014), the ADDIE model consists of five steps: 1) Analysis, 2) Design, 3) Development, 4) Implementation, and 5) Evaluation. The ADDIE learning model is systematically programmed to solve learning problems related to learning media that match students' needs and characteristics.

The type of research used is research and development (R&D), specifically the development of video-based learning media. The material discussed is SPLDV. The subjects in this study are eighth-grade students. The learning objectives include: students understanding the concept of solving SPLDV problems, participating actively in learning activities, and improving learning outcomes. This learning is structured in a concise and clear video format.

The research process involves first determining the competencies or objectives to be achieved and understanding the characteristics of the students, then selecting the media to be used, in this case, animated video learning using the Renderforest application. Activities are then distributed through platforms such as WhatsApp and YouTube. The results of these stages will be analyzed and described.

The instruments used include learning videos with the Renderforest application, measured on a scale from 1 to 4 (1 being strongly disagree and 4 being strongly agree). The aspects measured in the ARCS learning model include student attention to the product, product relevance assessment, student confidence in using the product, and student satisfaction with the product. The subjects of this study are eighth-grade students studying SPLDV material.

Data collection instruments used in this study consist of:

1. Interviews with a mathematics teacher in a Yogyakarta school to obtain information about the problems occurring during the learning process, learning strategies, and learning media.
2. Questionnaires: The instrument used in this study includes validation sheets consisting of material and media expert validation, product attractiveness, and effectiveness questionnaires, and learning outcome tests to measure student learning outcomes before and after using learning media in the form of pretests and posttests.

The data analysis technique used in this study is descriptive quantitative data analysis. Descriptive quantitative analysis is obtained from questionnaires that are then quantified to obtain numerical results.

(1) Product Validity and Attractiveness Analysis: The formula used to calculate the percentage results from the questionnaire is:

$$P = \left( \frac{\sum xi}{\sum x} \right) \times 100\%$$

Where:

-  $P$  = Percentage

-  $\sum xi$  = Total score obtained

-  $\sum x$  = Ideal score

(2) Effectiveness analysis: The researcher uses two indicators, student learning outcome tests and student responses to the learning video. To assess product effectiveness, the researcher uses pretest and posttest scores and calculates the N-gain, which provides an overview of the improvement in learning scores before and after using the media. The N-gain formula is:

$$N\text{-gain} = \frac{\text{posttest score} - \text{pretest score}}{\text{maximum score} - \text{pretest score}}$$

## RESULTS

The development of video-based learning media on SPLDV material using the Renderforest application results in learning videos aimed at improving students' learning outcomes. The video content includes:

- Cover
- Learning objectives
- General form of SPLDV
- Real-life examples

The advantages of learning videos include their ability to attract students' interest, ease of understanding, non-monotony, and enhancement of student participation in learning activities. Based on data obtained from product testing by material experts, the video is considered valid and suitable for use as a mathematics learning medium. The video is deemed valid based on test results with a percentage of 90.67% from material expert I and 85.33% from material expert II, averaging 88% and categorized as highly feasible. Testing by media experts shows a percentage of 92.73% from media expert I and 87.27% from media expert II, averaging

90% and categorized as highly feasible. Thus, the product is considered highly feasible for use in mathematics learning in terms of both material and media quality.

Based on data from product attractiveness testing, the e-module is considered suitable and attractive. The average percentages for each aspect are 85.5% for material, 80.6% for language, 86% for presentation, and 82.9% for appearance, resulting in an overall average of 83.75%, making the product attractive for use as a mathematics learning medium.

## CONCLUSION

The results of material expert I's evaluation (validator I) show a percentage of 90.67% and 82.67% by validator II, averaging to a highly feasible category. Media expert I's evaluation shows a percentage of 89.09% and 85.45% by validator II, averaging to a highly feasible category. Thus, the video is highly feasible and can be developed further. The student response questionnaire shows an average percentage of 83.75%, indicating that the video is good and attractive, enhancing student curiosity and ease of use.

Effectiveness analysis shows that pretest results for 30 eighth-grade students average 41.6%, with 13.33% passing and 86.67% failing. Posttest results average 78.6%, with 63.33% passing and 36.67% failing. Therefore, the developed video media can improve students' mathematics learning outcomes.

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