# Development of Animation-Based Learning Videos for Science and Technology Subjects in Class IV Elementary School

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**Abstract**

*The development of learning video media was motivated by the lack of auxiliary media in education, the lack of educator expertise in improving educational media, thus affecting student learning outcomes. In order to address these problems, animation-based learning media was developed. This research aims to create educational media products that are valid, practical and effective in learning. This type of research adopts a development research design known as Research and Development (R&D). by exploring the ADDIE (Analysis, Design, Development, Implementation and Evaluation) model. The product validity test was carried out by three validators, namely one material expert validator and two media expert validators. The practicality test was tried on 22 class IV students at SD Negeri 26 Air Tawar Timur with the aim of finding out the practicality of the product. After that, the pre-test and post-test scores are used to calculate the effectiveness of the media being developed. The product validity test results from validator I found a value of 4.93 with a very valid group. The product validity test from validator II found a value of 4.83 with a very valid category. Next, validation of the material was attempted by the subject teacher; Science and Technology obtained a score of 4.83 with a very valid category. Next, the results of the product practicality test that were tried by fourth grade elementary school students obtained an average score of 4.65 in the very practical category. After that, an effectiveness test was tried by obtaining a Sig value. p value 0.00 -; 0.05, so the use of this learning media is declared effective because there is a significant comparison between the learning scores before and after using educational media. It can be concluded that educational media uses animation-based educational videos that have been developed to be valid, practical and effective for use in science lessons.*

**Keywords:** *Development, Learning Media, Animation Video*

## INTRODUCTION

Education is basically a need that is meaningful and pressing (urgent) in human life. This is due to the fact that education is a life process that must be developed by each person, so that they can carry out and carry out their lives. Therefore, it is important for humans to be educated and beneficial to the environment around them. The teaching and learning process is not just about delivering teaching materials by teachers to students, but is more in-depth and interpreted as a process. According to Hamalik (2011: 27) "Learning is modifying or strengthening behavior through experience". Learning is a process, an activity and not a result or goal.

Learning media is a teaching tool used in schools to improve the quality of teaching. Presentation media that can present five different types of data, lines, symbols, images, movements and sounds, is a form of learning media. Live images (movies) and TV (video) are examples of media that include five different types of data. Not all TV shows or movies can convey all types of information. The use of learning materials was well received by students. In addition, educational media contributes to improving teaching standards.

Because learning media can explain how information signals are given, it can facilitate the learning process and outcomes, therefore its function in education is very important.important. Therefore, educational media depend on each other, and without adequate educational media the learning process cannot run as it should. Media functions as a channel or transmitter of communication from the sender to the target audience. Elementary school students prefer entertainment to learning, therefore learning media in this atmosphere must of course be interesting and entertaining.

An animated video is a moving image that is specifically composed of various objects and combined with audio and visual media. The goal is to attract students' attention and facilitate the delivery of messages or information. According to Mashuri & Budiyono (2020)Animation is created from a

collection of moving images in the form of objects that are given certain effects to make them more realistic and interesting. Objects included in animation can be living or inanimate objects. Animation looks attractive because it has the right combination of colors and supporting text, and animation becomes more attractive if it contains audio or sound. The use of animated video material as a teaching tool plays an important role because animated video material can represent material that is being taught or is difficult for the teacher to convey.

Natural and Social Sciences (IPAS) is a scientific discipline that studies causes and causesdue to natural events (Wisudawati and Sulistyowati, 2014). Meanwhile, according to Sultoni (2018), science education in general plays a real role in preparing and equipping students to face the future. Because the nature of science and learning has special characteristics, namely science that studies natural phenomena in the form of facts, events based on experiments, and science and learning develops based on theory. Science material includes natural and social knowledge which is closely related to students' lives. The hope is that by studying science, students will be able to recognize and understand the knowledge needed for life and be able to adapt to changes in the environment.

momentObservations were made, researchers found that animated video media was not applied to learning. This is caused by the limited availability of adequate facilities and infrastructure in schools, as well as the skills of educators who are unable to use learning support media. The existence of animated video learning media shows that students' difficulties in understanding the material during the learning process can be overcome and are effectiveincrease student motivation and motivation. This is what causes researchers to want to develop more interesting learning media such as animated video media. learning. Results. Given that these animated films are both visual and aural, they may cater to a variety of learning preferences. Utilizing technology such as computers and cell phones, students can also watch animated videos.

Based on the results of observations with the homeroom teacher of SDN 26 Air Tawar Timur, it is known that the main difficulty in learning science subjects lies in the students' lack of ability to understand the subject, as well as the teacher's teaching style. Apart from that, there is no mediateachingdigital used in science learning. The learning process takes place using worksheets or power points displayed on the projector. The school already has a computer laboratory, but it has never been used for science classes. Thus, researchers are interested in developing learning video media because they are aware of several of the problems mentioned above. Therefore, science and science education requires animated multimedia video material that allows students to better understand the material. so the presence of animated video material allows you to visualize the topics that appear during the exam. This allows students to recognize the style of the subject and repeat the learning material at home.

Based ondescription above, the researcher is interested in conducting research related to learning media entitled "DEVELOPMENT OF ANIMATION-BASED LEARNING VIDEOS IN CLASS IV SCIENCE SUBJECTS."

## RESEARCH METHOD

### Research Design

Research and development is the research style used. According to Sanjaya (2013:130), research and development research is research that produces a productfulfilfield demands and several items that are considered reliable because they have undergone continuous assessment. The product development process is carried out scientifically by reviewing data empirically, starting from the creation of original products and ending with verified goods.

According to Nana Syaodih (2011:164), research and development is a process or activity that can be carried out to develop new things or improve existing things.

### Data collection technique

The development research model is the basis for creating the items that will be created, claims Yahya (2014:2015). ADDIE model (Analysis, Design, Development or Production,Implementationor Delivery, and

Evaluations) created by Dick and Carry is the development model used in this research. This paradigm is used to create a learning system, and has five stages, namely as follows:

**Analysis Stage**

At this stage, various initial data are collected and used to design learning aids. At this stage the researcher collects data through user needs analysis, learning material needs analysis, user hardware analysis, and software analysis.

a. Needs analysis

The aim of this phase is to ascertain the needs of teachers and students. Do schools utilize animated video learning resources or do they create them? Has the teacher used other media or animated videos to teach science?

b. Curriculum Analysis

The stage of examining learning objectives and their development in elementary school courses serves as the starting point for curriculum analysis. After developing competency analysis indicators, learning objectives are created (Hidayati, 2019).

**Design Stage**

This stage is the stage of designing the description for the next learning video. Flowcharts are created at the beginning of the design process to serve as an overview of the finished product. Next, storyboard the story for any straightforward written or spoken language. Flowcharts and Storyboards can then be designed, and researchers can produce learning video content.

**Development Stage**

The product design results at this stage are then developed to become actual products, after which their validity is checked before being implemented. Based on the design developed and the validation stage, development is carried out. Some of the steps that will be taken include:

a. Validity test

According to Trianto (2010), the validity of an instrument can be determined by looking at the degree of validity. Expert evaluation of the product occurs at this stage, followed by changes. Based on the information in the validator questionnaire, revisions were made. Practical exams utilize the latest learning materials.

b. Practicality Test

After the validation stage, the teaching materials are modified and tested externally. Product trials are carried out, according to Emzir (2010), to ensure the feasibility of the proposed product. Field trials were carried out to obtain direct feedback in the form of reactions to student and observer comments regarding the planned learning video media.

c. Effectiveness

Students take a pretest and posttest as part of the effectiveness test.

d. Revision

Product changes are made in response to feedback, criticism, and recommendations from media professionals and materials specialists. Before the product testing stage, revisions are still carried out. Original products that have been validated are updated results. In order for the first product to be considered genuine when it enters the application (trial) stage with students, this must be done.

**Implementation Stage**

Learning media trials on students are currently being carried out. This experiment intends to evaluate the application and reaction of students' assessments to the resulting learning materials. At SD Negeri 26 Air Tawar Timur Padang, the trial involved 22 grade IV students who were the subjects of this development.

**Evaluation Stage**

At this evaluation stage, it will be determined whether this animated video learning media product can improve students' understanding of the material and motivate them to learn. If there are problems with trial use, modifications to this product are made. Researchers assess the performance of animated video learning media items during trials of use to identify any deficiencies so that new items can be improved or developed.

**Data analysis**

According to Setyosari (2010), the formula used to determine the validity and practicality test results is as follows:

$\bar{x} = \sum x$
$n$

Data from the effectiveness test will be calculated using the Wilcoxon signed rank test using SPSS.

## RESEARCH RESULTS AND DISCUSSION

With information in the form of text, audio, images and videos that are tailored to learning objectives and attract students' attention, this learning media is used in class IV science learning. This allows students to actively participate in their education. Researchers tested the validity of the media and material validators as well as questionnaires for students using a Likert scale in order to create reliable and useful learning materials. After evaluation, the validator offers improvement proposals which become standards for improving educational media.

### Learning Video Media Validation Results

Table 2. Validation Results of Learning Video Media 1 (Validator 1)

| Assessed Aspects | Average |
|---|---|
| Text type | 4.67 |
| Video Aspect | 5.0 |
| Animation Aspect | 5.0 |
| Audio Aspect | 5.0 |
| Image Aspect | 5.0 |
| Amount | **4.93** |

Aspects of text type, video aspects, animation aspects, audio aspects and image aspects all received a "Very Valid" score in the media validation test of the first validator.

Table 3. Validation Results of Learning Video Media 2 (Validator 2)

| Rated aspect | Average |
|---|---|
| Text Type | 4.67 |
| Video Aspect | 5.0 |
| Animation Aspect | 5.0 |
| Audio Aspect | 4.5 |
| Image Aspect | 5.0 |
| Amount | **4.83** |

The initial validator media validation test produced a score of "Very Valid" in the text type aspect, video aspect, animation aspect, audio aspect and image aspect.

### Results of Validation of Learning Video Media Materials

Table 4. Validation Results of Learning Video Materials

| Assessed Aspects | Average |
|---|---|
| Contents and Objectives | 5.0 |
| Presentation of material | 4.5 |
| Efficiency | 5.0 |
| Amount | **4.83** |

This media is categorized as "Very Valid" based on validation tests carried out by material validators in the areas of content and purpose, material presentation and efficiency

### Results of Practicality Test

Table 5. Recapitulation of Product Trial Results Data

| Aspects are assessed | Average |
|---|---|
| Appearance | 4.59 |
| Presentation of Material | 4.65 |
| Usefulness | 4.71 |
| Average | **4.65** |

The results of the media practicality test were assessed by 22 class IV students at SD Negeri 26 Air Tawar Timur who were included in the "Very Practical" category. The learning media that researchers create is said to be useful for students.

### Effectiveness Test Results

Students complete pre- and post-test questions before and after studying content with learning media as part of the effectiveness test. The paired t test was used to evaluate how the final pre-test and post-test scores were calculated (Widiyanto, 2013). To find out whether there is a difference in averages between two paired data from the same sample, do a paired t test. The normality test

uses the Wilcoxon Sign Rank test because it is known that the data is not regularly distributed. There is no real difference between the pre-test and post-test data, so the assessment is carried out if the Sig value (p value) is less than 0.05. The effectiveness test media was calculated using the SPSS statistical program. The image below shows the results of the effectiveness test.

**RANKS**

| | | N | Mean Rank | Sum of Ranks |
|---|---|---|---|---|
| Posttest - Pretest | Negative Ranks | 0a | .00 | .00 |
| | Positive Ranks | 22b | 11.50 | 253.00 |
| | Ties | 0c | | |
| | Total | 22 | | |

**Test Statistics**

| | Posttest - Pretest |
|---|---|
| Z | -4.126a |
| Asymp. Sig. (2-tailed) | **,000** |

*a. Wilcoxon Signed Ranks Test*
*b. Based on negative ranks.*

## CONCLUSION

Data obtained from the results of the study and development of animated video-based science learning materials and science-related topics for class IV elementary schools are as follows:

1. Research and development of learning video media uses the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model. The resulting product is an animated video consisting of text, animation, images and audio content.
2. Validation tests by material validators and media validators show that the animated video is declared Very Valid.
3. The practicality test by users (students) at SD Negeri 26 Air Tawar Timur shows that this learning media is practical and suitable for use in science and science subjects in class IV elementary school.

   The Wilcoxon sign rank test shows that there is a significant difference in student learning outcomes between before (pre-test) and after (post-test) the use of media in learning, in accordance with the results of the effectiveness test carried out by users at SD Negeri 26 Air Tawar Timur. Therefore, this learning media is declared effective.

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