

## DEVELOPMENT OF ANIMATED VIDEOS ON SUBSTANCE MATERIALS AND THEIR CHANGES USING PROBLEM BASED LEARNING TO INCREASE LEARNING MOTIVATION

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**Abstract:** The purpose of the research is to find out (1) How to make an animated video; (2) Feasibility analysis of animated videos; (3) Animation video development; (4) Evaluation of increased learning motivation; and (5) Evaluation of improving learning outcomes. The research method is *Research and Development* (R&D) with the ADDIE procedural model. The research was conducted at SMP Negeri 1 Depapre with a total of 25 students. The results of the study showed that: The feasibility analysis of animated videos was obtained based on validator validation (93.69% of the category strongly agreed), peer feasibility test (94.15% of the category strongly agreed), and student trials (97.62% strongly agreed) so that the animated video was suitable for use; The development of animated videos is carried out by making visualizations of abstract concepts on substance materials and their changes so as to help students understand, using examples of solving everyday problems; The evaluation of increased learning motivation was obtained and there was an increase in motivation.

**Keywords:** Animated Videos, substances and their changes, Problem based learning, learning motivation

### 1. INTRODUCTION

Education Education is one of the important aspects in nation building because it plays a role in improving the quality of human resources and advancing the civilization of a country. The purpose of Indonesian national education as stated in Article 3 of the Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System states that national education functions to develop abilities and form the character and civilization of a dignified nation in order to educate the life of the nation, and aims to develop the potential of students to become human beings who have faith, piety, noble character, health, knowledge, and ability, creative, independent, and democratic and responsible citizens.

The achievement of these educational goals is influenced by the implementation of learning that involves effective learning strategies, approaches, models, methods, and

media. The use of learning media is one of the important factors in helping students understand the concept of learning materials. Learning media can take many forms, such as powerpoint presentations, learning audios, charts, and learning videos. Learning videos are one of the media that is considered interesting because they are able to present information in audio and visual, making it easier for students to understand the learning material. One type of learning video that is widely used is animated videos that are able to present information visually and dynamically so that it makes it easier for students to understand abstract concepts.

Science materials, especially matter and its changes, have several abstract concepts such as the form of substances, changes in the form of substances, changes in physics and chemical changes, and density of substances. These concepts are often difficult to understand if they are only conveyed through verbal or textual explanations. Therefore, the use of animated videos can be an alternative learning media that can help students understand concepts more concretely. Research conducted by Febriani et al. (2022) shows that the application of animated video media to liquid pressure materials can increase students' motivation to learn.

In addition to the use of learning media, the selection of appropriate learning models also affects the success of the learning process. One of the student-centered learning models is Problem Based Learning (PBL). The PBL model is a learning model that uses contextual problems as a starting point for learning so that students are actively involved in the problem-solving process. This model provides opportunities for students to analyze problems and find solutions through meaningful learning activities (Sudarmanto et al., 2021).

The integration of animated video media with PBL models has the potential to increase student engagement in learning. Animated videos not only serve as visual media, but can also be used as an initial stimulus in problem-based learning so as to encourage students to think critically, collaborate, and increase learning motivation. Learning motivation is an internal factor that affects the success of students in achieving learning outcomes. Uno (2023) states that motivation is the motivation that moves a person to carry out an activity, including learning activities.

Based on non-cognitive diagnostic assessments in grade VII D students, it was found that students' motivation to learn science is still relatively low. Low motivation to

learn can be influenced by various factors, such as the lack of use of interesting learning media and the lack of student involvement in the learning process.

Based on these problems, it is necessary to develop learning media that can increase students' motivation to learn. Therefore, this study aims to develop an animated video on substance materials and their changes using the Problem Based Learning model to increase students' learning motivation.

## 2. RESEARCH METHODS

This research uses the Research and Development (R&D) method with the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) development model. The ADDIE model is used as a systematic guideline in developing learning media in the form of Problem Based Learning (PBL)-based animation videos on substance materials and their changes (Yuwana & Indarti, 2023). A summary of this ADDIE model can be seen in Figure 1.

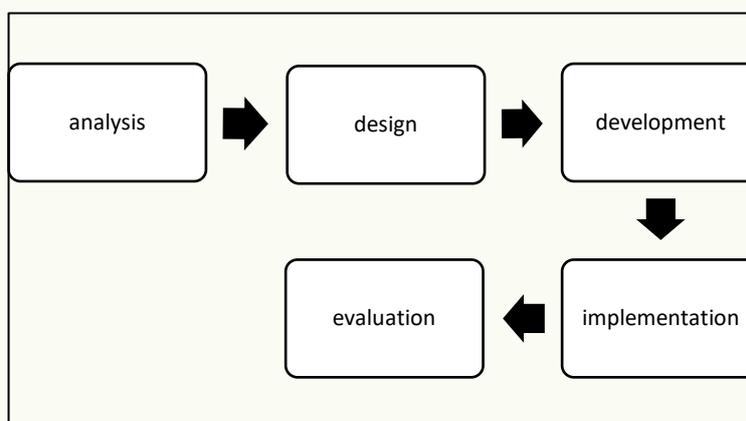


Figure 1. Summary of the R&D model ADDIE

Source : Robert M. Branch

The analysis stage is carried out by identifying student needs, analyzing student characteristics, and examining learning problems and literature related to learning media, PBL models, and substance materials and their changes. The design stage is carried out by compiling learning flows, storyboards, video scenarios, and designing multimedia displays and components. The development phase is done by creating an animated video using the Canva app, then the product is validated by media experts, subject matter experts, and language experts. The implementation stage was carried out through a trial of the use of animated videos in PBL-based learning in students. The evaluation stage is

carried out on an ongoing basis through product revision based on the results of validation and trials.

The research was carried out on grade VII students of SMP Negeri 1 Depapre, Jayapura Regency, in the even semester of the 2024/2025 school year. The subjects of the study were determined using the purposive sampling technique, namely 25 students of class VII D.

The research instruments used include expert validation questionnaires, teacher response questionnaires, student response questionnaires, and learning motivation questionnaires. The questionnaire was used to assess the feasibility of the product, the practicality of the media, and the level of student motivation to learn.

To find out the increase in students' motivation for the use of animated video media, the answers from the questionnaire instrument with the Likert scale were given the following categories: highly motivated (score 4), motivated (score 3), unmotivated (score 2), very unmotivated (score 1).

The results of the student learning motivation questionnaire score will be calculated using the formula:

$$\text{Motivational questionnaire score} = \frac{\text{total skor responden}}{\text{keseluruhan skor angket}} \times 100\%$$

The criteria for the motivation category according to Arifin & Latifah, (2009) can be seen in Table 1.

Table 1. Criteria for motivational categories

Questionnaire score	Categories
80 % ≥ score ≤ 100 %	Highly motivated
60 % ≥ score ≤ 79 %	Motivated
40% ≥ score ≤ 59%	Unmotivated
0% ≥ score ≤ 39 %	Sangat Unmotivated

Source : Arifin & Latifah, (2009)

### 3. RESULTS AND DISCUSSIONS

#### Animated video feasibility test

The feasibility test of the animated video was carried out by collecting validator validation data carried out by a lecturer of master of science education at Cenderawasih University. The results obtained can be seen in Figure 2.

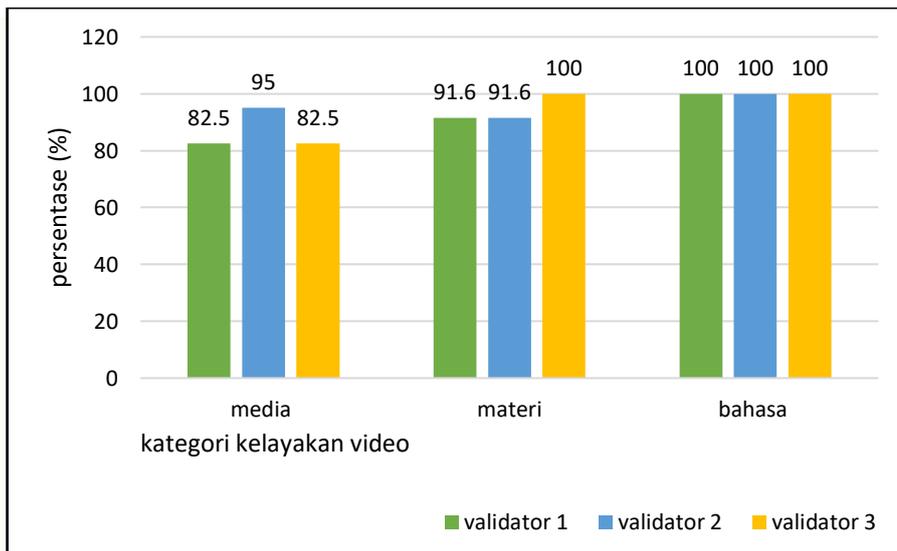


Figure 2. Validator Validation Chart

Figure 2 shows the percentage (%) of validator validation of learning videos made by researchers. It can be seen that in the aspect of media validation, everything has not been validated 100% because there are revisions related to the animation that the researcher shows in the video, as well as *the background*, and the suitability of the narrative with the narrator, so the researcher must make revisions before continuing the research. The validation of the material has also not been fully validated 100% because it is necessary for the researcher to add several examples related to the concept of the material that is closer to the daily life of the students, while for language validation has been validated 100% from the three validators.

The researcher also conducted an animation video feasibility test on the responses of peers related to aspects of teaching materials, presentation, language, and display that obtained the results that can be seen in Figure 3.

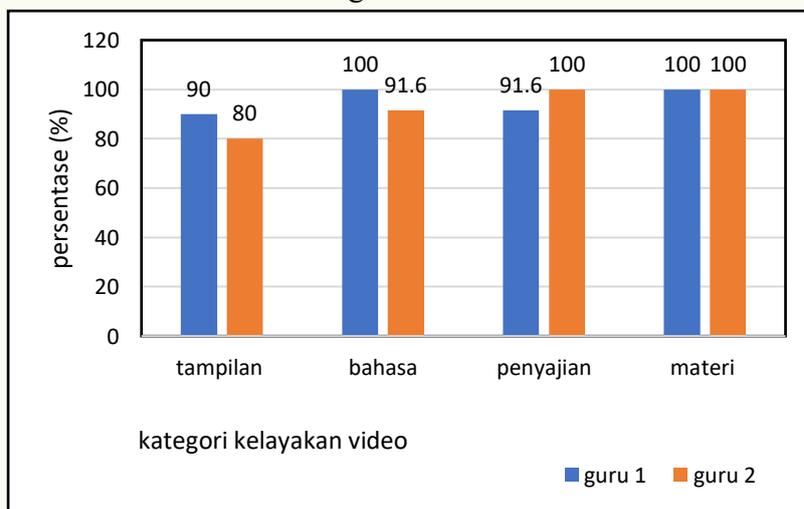


Figure 3. Peer response graph

Based on the graph in Figure 3, it can be seen that the researcher needs to make improvements to the video display, this is related to the animation shown because the researcher has not received 100% responses from peers, while for the language category used, it has been appropriate for the age of the students and for the presentation has also been appropriate and for the narrated material, it has received 100% responses from peers, in this case the teacher.

The feasibility test of the animation video was then carried out on students where in this study the target of the animation video users later, in this case the trial was carried out on students who were not a data collection class or a class that was used as a research sample. The data from the trial results can be seen in Figure 4.

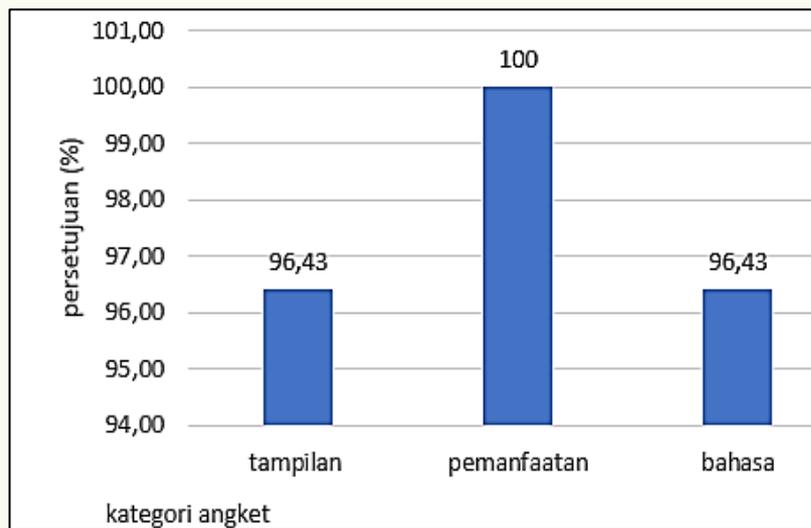


Figure 4. Student response graph

As seen in Figure 4, students have different responses related to the questionnaire category such as for appearance and language, students have a percentage of 96.43% and for the use of animated videos, student responses are 100%.

**Analysis of the feasibility of animated videos on substance materials and their changes using the PBL learning model**

The results of the percentage of validation of the use of animated videos for the validator test with the percentage of validation carried out on three validators who analyzed the feasibility of animated videos related to media, materials, and language with the results seen in Figure 5.

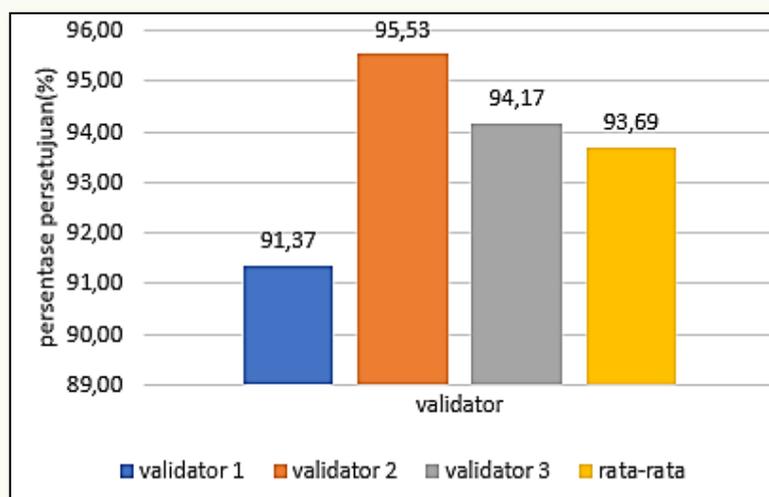


Figure 5. Validator validation graph

Based on the graph in Figure 5, it is obtained that the average questionnaire validation for validator 1 is 91.37%, validator 2 is 95.53%, and validator 3 is 94.17% with an average questionnaire score of 93.69%, the percentage value of this validator questionnaire is not yet 100% because there are still revisions that need to be made before this animated video is used.

The trial of the use of this animated video was also carried out on responses from colleagues, where in this case colleagues will use this animated video as one of the alternative learning media to be used later. The results of the peer responses were obtained that the questionnaire score was in the category of strongly agree, which can be seen from the percentage of responses of teacher 1 was 95.40%, and teacher 2 was 92.90% with an average percentage of 94.15%, the results can be seen in Figure 6.

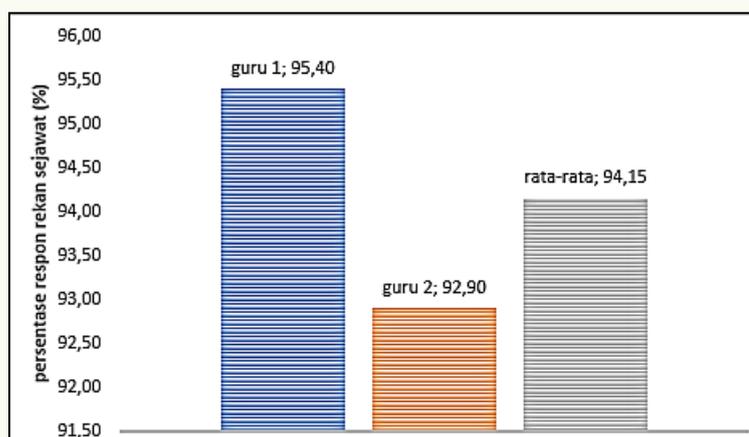


Figure 6. Peer response graph

The feasibility of the next animation video is to test the students. The results of the percentage of student responses have results that show that students generally agree

with the animated video used, with an average data acquisition percentage of 97.62% which can be seen in the graph in Figure 7.

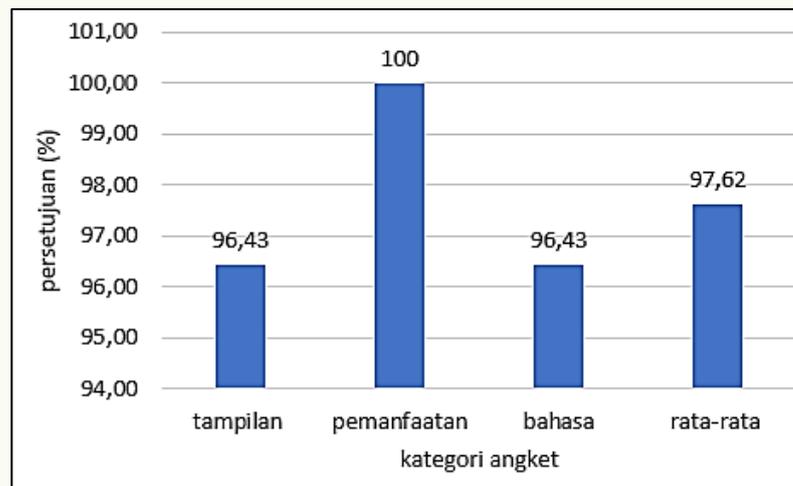


Figure 7. Student approval graph

The results of the analysis (Figure 7) obtained from this study show that the average validator obtained a score of 93.69%, peers 94.15%, and students 97.62% so that animated videos are suitable for use in learning substance materials and their changes in grade VII of SMP Negeri 1 Depapre. This is in line with the research of Aini et al., (2023) that animation-drawing-based videoscribe media is declared suitable for use in learning, Siregar et al., (2024) who developed contextual-based chemistry modules using the ADDIE model which was stated to be very feasible for use in learning. Another research is also by Siregar (2021) research which develops a literacy culture-based chemistry module on elemental periodic system material. The results of the study show that the modules developed are declared suitable for use as teaching materials. This shows that the development of learning media through the Research and Development approach can produce learning products that are effective in the learning process.

**Measurement of learning motivation**

Data obtained from the results of measuring student learning motivation from module 1 meeting 1 to module 4 meeting 4 as well as the average motivated and highly motivated students can be seen in Figure 8.

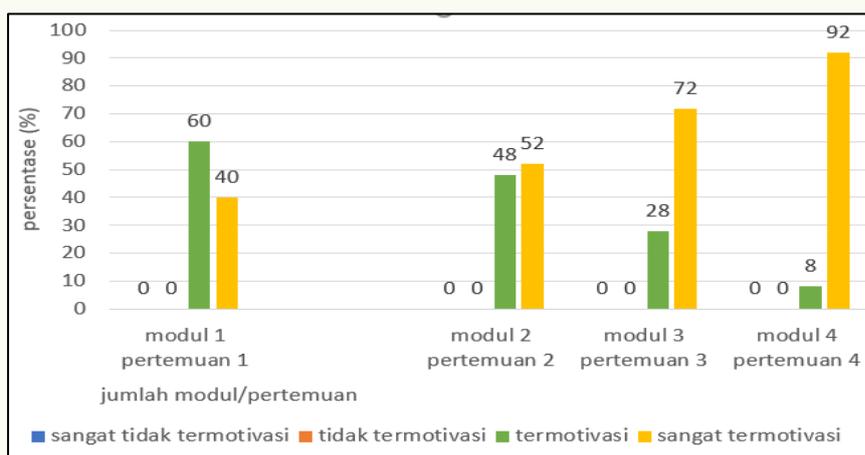


Figure 8. Motivation measurement graph

Based on Figure 8, the category of highly motivated students shows a graph in the form of an increase, this is in line with the state of the motivated graph which has decreased because students who were previously only motivated become highly motivated, thus showing a measurable increase in motivation from module 1 to module 4. This learning uses 4 modules, each module for each meeting. The results obtained that the use of animated videos on substance materials and their changes using PBL showed an increase in learning motivation of grade VIID students at SMP Negeri 1 Depapre in accordance with the results of motivation measurement which showed an increase in the percentage up to the module.

The results of the study showed an increase in learning motivation by using PBL-based animation videos as presented in the graph in Figure 9.

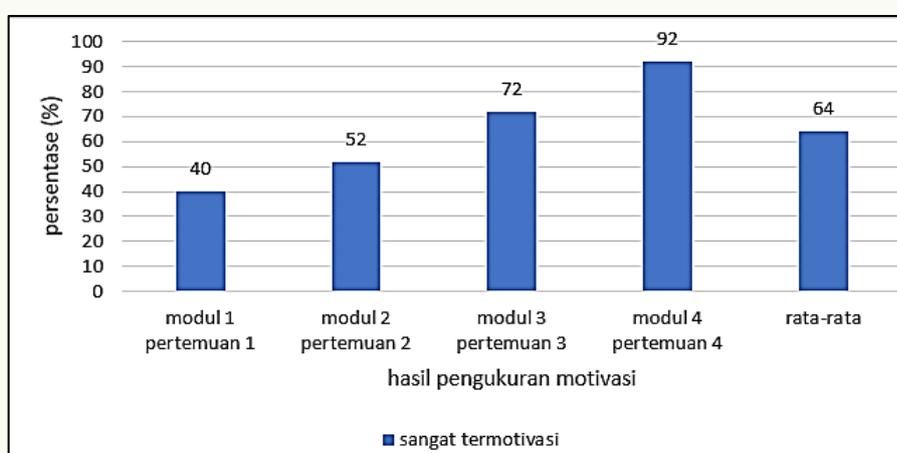


Figure 9. Motivation increase graph

Based on the graph in Figure 9, it can be seen that students experienced an increase in motivation from the meeting in module 1 to module 4 where the percentage of students who were highly motivated increased from meeting 1 to 40%, meeting 2 to 52%, meeting

3 to 72% and meeting 4 to 92% with an average increase in motivation of 64%, which is in the motivated category so that the use of animation videos for grade VII SMP Negeri 1 Depapre on substance materials and their changes using the PBL learning model can increase students' motivation to learn.

This increase occurs because animated videos are able to present abstract material to be more concrete and interesting through visualization. The PBL approach integrated in the video also encourages students to be actively involved in problem solving, thereby increasing their intrinsic curiosity and motivation. This is in line with the theory put forward by Uno (2021) which states that animated videos are an effective and efficient tool for students in understanding the material.

The findings of this study are also supported by previous research conducted by Febriani et al., (2022) with the title *The Application of Animation Video Media to Improve Students' Motivation and Learning Outcomes of Liquid Pressure Materials*. The results of the study show that the application of animated video media to liquid pressure materials can increase student motivation and learning outcomes. which applies animated video media to improve student motivation and learning outcomes.

Another study has also been conducted by Teplá et al., (2022) the title *Influence of 3D models and animations on students in natural subjects*. The results show that the use of 3D models and animations in the teaching process significantly increases students' intrinsic motivation in learning natural sciences. Based on these findings, it is concluded that 3D models and animations have a positive effect on students and teachers should incorporate these visual aids into lessons.

## 4. CONCLUSIONS AND SUGGESTIONS

### CONCLUSIONS

Based on validator validation, the peer feasibility test and the animation video student response test were declared feasible to use. The average score for validator validation was 93.69%, the average peer response was 94.15%, and the average student response was 97.62%. The use of animated videos on substance materials and their changes using the PBL learning model for grade VII students of SMP Negeri 1 Depapre can increase learning motivation by 64%.

## SUGGESTIONS

Animated videos on substance materials and their changes using the PBL learning model can be used by teachers as a learning medium for students.

## 5. ACKNOWLEDGMENTS

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