



## Development of animation video assistant teaching science courses in SD Negeri 056 Lamasariang

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### ABSTRACT

This development research focuses on making teaching materials in animated videos for science subjects at SDN 056 Lamasariang. Science subjects at SDN 056 Lamasariang. This research aims to improve learning effectiveness using an exciting visualization approach for students. This research uses technology and animation media to increase the involvement of students in the learning process, especially in learning process science subjects. Besides, it can help learners understand complex concepts that can be easily understood. The research method used is Research and Development with the ADDIE development model, which consists of 5 stages: analysis, design, development, implementation, and evaluation. The results showed that teaching materials based on animated videos are very effective in applying Class V science subjects, as seen from the acquisition of learning outcomes before (pretests) and after (posttest). The conclusion is that the results of developing teaching materials based on animated videos fulfill effective use in the learning process.

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### ABSTRAK

Penelitian ini merupakan penelitian pengembangan yang berfokus pada pembuatan bahan ajar berupa video animasi untuk mata pelajaran IPA di SDN 056 Lamasariang. Penelitian ini bertujuan untuk meningkatkan efektivitas pembelajaran dengan menggunakan pendekatan visualisasi yang menarik bagi peserta didik. Penelitian ini menggunakan teknologi dan media animasi sehingga dapat meningkatkan keterlibatan peserta didik dalam proses pembelajaran, khususnya dalam mata pelajaran IPA selain itu dapat membantu peserta didik dalam memahami konsep-konsep yang kompleks dan dapat dengan mudah memahami pembelajaran. Metode penelitian yang digunakan yaitu Research and Development dengan model pengembangan ADDIE yang terdiri dari 5 tahapan, yakni: analisis, desain, pengembangan, implementasi dan evaluasi. Hasil penelitian menunjukkan bahwa bahan ajar berbasis video animasi sangat efektif di terapkan pada mata pelajaran IPA Kelas V, dilihat dari perolehan nilai hasil belajar sebelum (pretes) dan sesudah (posttes). Kesimpulannya bahwa hasil pengembangan bahan ajar berbasis video animasi memenuhi efektif digunakan dalam proses pembelajaran.

**Kata Kunci:** Bahan ajar; pengembangan produk pembelajaran; video animasi

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## INTRODUCTION

Education is a very complex system and consists of various components that influence each other. Herlambang, according to [Sutarna \(2021\)](#), defines education as a social institution that has a conservative function that focuses on the study of local wisdom, which is a form of revitalization or revival of the spirit of cultural wealth, which in turn will color Indonesian education in carrying out its identity. The nation can be competitive, independent, polite, and assertive through education. Improving the quality of a nation is to improve the quality of its education system, which is the responsibility of all parties involved in education, especially teachers and the government ([Wulansari et al., 2021](#)).

According to Panggabean and Danis in their book titled "*Desain Pengembangan Bahan Ajar Berbasis Sains*," teaching materials can also be interpreted as all forms of information materials, tools, and texts used to assist teachers or instructors in carrying out teaching and learning activities. Teaching materials make students feel satisfied in getting material or information. The development of teaching materials is essential for teachers because developing teaching materials can help students. Students not only have textbooks that are used as teaching materials but can be more than one and can help students develop their insights and make it easier for them to obtain information ([Rahmani et al., 2021](#)). Teachers are challenged to develop the ability to create learning media for use with technology support ([Hasanah et al., 2022](#)), and advances in computing technology in today's digital age have reignited teachers' interest in multimedia forms of communication ([Desyandri et al., 2021](#)). Technology accessibility and stability significantly improve students' performance ([Bradaric & Tresselt, 2022](#)). One of the teaching materials that can be utilized in developing learning is animated video. [Lestari et al. \(2017\)](#) define "animation as a series of images arranged in sequence, and when the series of images is displayed at an adequate speed, the series of images will appear to move."

An animated video is one form of teaching material development that will be used in developing science teaching materials. Animated video is a medium that combines audio and visuals with a format that is more interesting and more colorful than the usual video media. The use of video as teaching material is also based on research carried out previously ([Pattaufi & Arnidah, 2019](#)), which stated that there was an effect of the utilization of audiovisual-based teaching materials on learning outcomes. The process of developing animated video-based teaching materials uses the *Powtoon* application. Learning videos used by teachers must be tailored to the abilities and characteristics so that learning videos can help students understand learning materials. One of the audio-visual media that can attract students' interest in learning is developed into a learning video using the *Powtoon* application ([Barbara & Bayu, 2021](#)). *Powtoon* is an internet-connected application or free *online web app* that can present presentations or exposure to the material. According to the book "*Media Pembelajaran Berbasis Multimedia Interaktif*," written by Lestari, almost all features can be accessed with one screen.

*Powtoon* application is easy to use in the process of making learning media that has *built-in* cartoon characters, animation models, and cartoon objects that make the appearance of learning media more interactive and exciting. In terms of *Powtoon*, it provides tons of animation tools, text options, clip art, and sound. Everyone can create animated videos through this software easily. Visual learning will be created easily by *Powtoon* software. Therefore, this software is easy to use and free. The selection of the *Powtoon* application in the development of animated video teaching materials is based on its appearance in the form of videos containing various animations to be applied both in the world of work and the world of education, which can attract students' attention so that it is not boring for students, the *powtoon* application is also equipped with exciting animation features including handwriting animation, cartoon animation, and livelier transition effects and elementary timeline settings. According to [Hapsari and Hanif \(2019\)](#), interactive motion graphic media can effectively improve student's knowledge. The animated video demonstrates significant gains in vocabulary mastery and learning results ([Ridha et al., 2022](#)).

Referring to the background above, the researcher considers it necessary to make a study titled "Development of Animated Video Teaching Materials in Science Subjects at State Elementary School 056 Lamasariang. It is hoped that this research will assist schools, teachers, and students in implementing learning activities, providing a choice of teaching materials that can be used primarily in science lessons in elementary schools so that learning objectives can be achieved.

## LITERATURE REVIEW

### Teaching Materials

Teaching materials are several pieces of information in various forms and types that are systematically arranged to assist teachers and students in learning. According to Amin in [Muhammad & Novitasari \(2020\)](#), teaching materials are materials or subject matter arranged systematically, which teachers and students use in the learning process. Teaching materials refer to materials or tools used to support the learning process, such as textbooks, presentations, videos, and other learning resources designed to transfer knowledge and skills to learners.

Retrieved from [Syutaridho \(2019\)](#) that teaching materials are materials taught to students that have been selected (selected), or teaching materials are materials (messages) that students must learn and understand. Teaching materials can optimize learning activities and learning outcomes because teaching materials have characteristics that can generate interest and are flexibly designed and arranged according to competencies and learning needs ([Buyung, 2020](#)).

Teaching materials' presentation is essential, so the learning process tends to be monotonous, making students more enthusiastic, engaging, and fun ([Fahmi et al., 2022](#); [Rosa-Castillo, 2022](#)). Teaching materials are systematically arranged, which display the results of the competencies that will be mastered by students and used in the learning process to plan and review the implementation of learning. Teaching materials will reduce the burden on teachers in presenting material so that teachers have more time to guide and assist students in the learning process. Teaching materials are very decisive in the success of a lesson.

### Animated Video

Learning video is one of the media used in developing teaching materials, including the type of audio-visual teaching materials. According to Suryaningsih & Kurniawan in the book "Teknik Pengelolaan Audio Video," video is defined as a multimedia element describing the message conveyed through images. Meanwhile, according to [Nurwahidah et al. \(2021\)](#), video is an electronic media that combines audio and visual technology to produce a dynamic and exciting show. Animated video is a moving image with visual information that allows students to understand better and consolidate factual information and language features of speech, as visual support contributes to a complete and accurate understanding of the meaning, activating attention and memory and contributing to the development and skills of listening and speaking ([Nazarov, 2023](#)). Learning videos are media that present audio and visuals that contain learning messages that contain concepts, principles, procedures, and theories of knowledge applications to help understand learning material, and animations are particularly well-suited for illustrating abstract or hard-to-visualize phenomena relevant ([Pate et al., 2020](#)). Animated videos are used for entertainment, education, and visual communication, conveying messages through characters or objects that move in various styles.

According to [Saputra et al. \(2021\)](#), Animation videos contain a series of images that form a movement that comes from a collection of various objects such as images, writings, sounds, and so on that are arranged

systematically and can later move according to the plot set at each count of time. Video animation is part of a type of multimedia because it can present complete elements of media, such as sound, graphics, and text so that it can describe an object that can move along with natural and artificial sounds and can present information without any limits and can explain a concept (Efendi et al., 2020) and effective as alternative learning materials (Shiu et al., 2019).

## METHODS

This research is a Research and Development (R&D) study. Research and Development (R&D) is one type of research that can bridge or break the gap between research that can bridge or break the gap between basic research and applied research. The product is not always in the form of objects or hardware, such as books, stationery, and other learning tools. However, it can also be in the form of *software*. The steps of this R & D circulation consist of studying the findings of previous research related to the product to be developed, developing the product, conducting tests and settings where the product will be used, and conducting a revision process to improve product deficiencies found during the testing stage. The data analysis techniques used in this research are qualitative descriptive analysis techniques and descriptive statistical analysis. The qualitative descriptive analysis technique is used to process data on the results of validity, accessibility, and effectiveness tests of animated video teaching material products. Descriptive statistical analysis is used to process questionnaire data into a descriptive percentage. The following formula is used to calculate the percentage:

$$Idealization\ Presentation = \frac{Skor\ yang\ diperoleh}{Skor\ maksimal\ ideal} \times 100\%$$

Decision-making for determining the validity level of animated video teaching material products, see **Table 1**:

**Table 1.** Validity Assessment Criteria

Interval	Criteria
81% - 100%	Very Valid
61% - 80%	Valid
41% - 60%	Fairly Valid
21% - 40%	Less Valid
0% - 20%	Invalid

Source: Wijaya (2021)

Decision-making for determining the practicality level of animated video teaching material products (see **Table 2**):

**Table 2.** Practicality Assessment Criteria

Interval	Criteria
81% - 100%	Very Practical
61% - 80%	Practical
41% - 60%	Practical Enough
21% - 40%	Less Practical
0% - 20%	Not Practical

Source: Wijaya (2021)

Decision-making for determining the effectiveness level of animated video teaching material products, see **Table 3**:

**Table 3.** Effective Assessment Criteria

Interval	Kriteria
81% - 100%	Highly Effective
61% - 80%	Effective
41% - 60%	Effective Enough
21% - 40%	Less Effective
0% - 20%	Ineffective

Sumber: [Wijaya \(2021\)](#)

## RESULTS AND DISCUSSION

Developing animated video-based teaching materials begins with identifying needs, formulating learning objectives, and determining content. The next stage is designing by compiling a thesis or script (material) and making a storyboard. The animation video planning process uses a laptop device utilizing several *Powtoon* and *Canva* web applications. Learning media presented with animated videos can involve students in thinking and doing learning activities more effectively, faster, and more deeply, rather than just providing material ([An-Nawaf et al., 2021](#)). In the world of education, the attractive packaging of animated video media will increase students' enthusiasm for learning that is easy to understand. Besides that, animated videos can be used in learning at the primary, secondary, and tertiary levels ([Susilo & Widiya, 2021](#)).

Animated videos can be accessed by both teachers and students freely by using the YouTube platform to publish their videos. The use of the YouTube platform aims to educate the general public. In addition, learning activities utilizing this animated video are shown directly using the help of an *LCD* and projector so that both students can listen well. Using animated videos is very helpful for teachers in the learning process as a supporting medium ([Ikasari & Satriyani, 2022](#)). Multimedia-based learning has many advantages and is also utilized in the world of education, one of which is the use of animated videos that combine text, images, sound, and audio as one of the efforts to develop interactive teaching materials ([Arifin et al., 2021](#)).



**Figure 1.** Initial View of Animated Learning Video  
Source: *Research 2022*

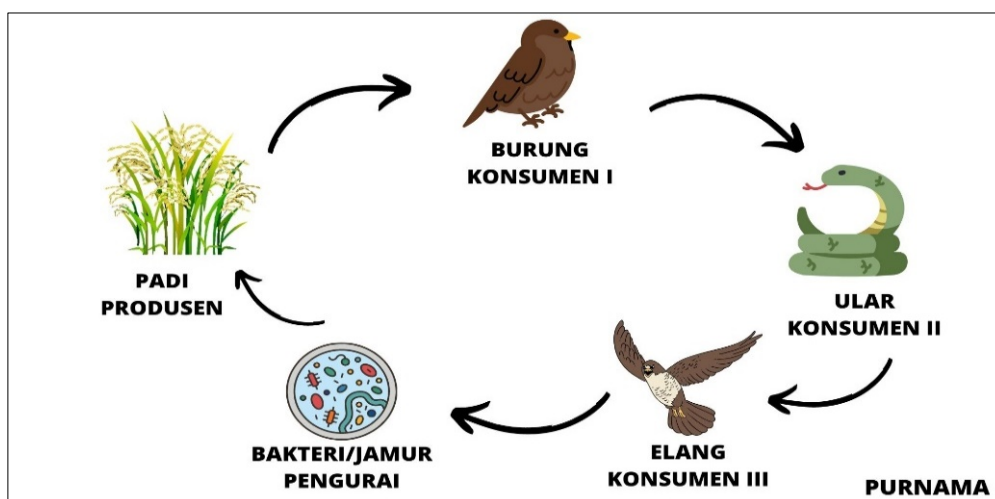
Designing an animated video begins with determining the content and then creating a storyboard according **Figure 1**. Storyboard. The storyboard is an initial design or sketch designed as a picture or guide in making an animated video, as an illustration, or as a guide in making an animated video. After this stage, the video is ready to be developed using the help of applications, namely Canva and Powtoon.

The image above is the initial display of the learning animation video. The initial display begins by providing information about the subject matter that will be presented. This research uses three sub-discussions of science material, namely the food chain, temperature and heat, and the effect of heat on changes in temperature and form of objects. Each animated video teaching material begins by displaying information about the sub-discussion and education level.



**Figure 2.** sLearning Objectives Display  
Source: Research 2022

After the initial display of the animated video, the next frame displays the learning objectives according **Figure 2**. Learning objectives are an essential part of the learning video. Each frame or slide has a different duration according to the needs.



**Figure 3.** Display of Learning Materials  
Source: Research 2022

Animated videos are equipped with moving characters or images that can help illustrate concepts clearly and well to make learning more effective and interesting according **Figure 3**. Each frame has a different animation audio as a back sound and is equipped with a voice or dubbing to read the material script and explain the details of the subject matter presented in the animated video.

### Validity Level

The development stage cannot be separated from the validation stage. In this case, validation of the media developed, namely animated videos and materials used later in the study. At this stage, the aim to produce animated video-based teaching materials that attract interest and provide input on lesson plans regarding learning objectives, evaluation, and student learning tasks in the learning process for the results of product validation can be seen below (see **Table 4**):

**Table 4.** Results of Product Validation by Media and Design Experts

No.	Rating Points	Validator (Value)
<b>Media Aspect</b>		
1	Suitability of media with teaching materials	5
2	Appropriateness of media use with student characteristics	5
3	Appropriateness of font selection	5
4	Appropriateness of font size selection	5
5	Clarity of color contrast between text and <i>background</i>	4
6	Clarity of button navigation used	5
<b>Average Percentage</b>		<b>96,7%</b>
<b>Design Aspects</b>		
7	Clarity of program identity	5
8	Clarity of use	4
9	Appropriate use of color proportion	4
10	Clarity of image display	4
<b>Average Percentage</b>		<b>85%</b>
<b>Usage Aspect</b>		
11	Ease of media creation	4
12	Easy-to-understand application	5
13	Accuracy of button and navigation functions	5
14	Ease of accessing the product menu	5
15	Applications can serve as support for the Learning Process	5
<b>Average Percentage</b>		<b>96%</b>
<b>Utilization Aspect</b>		
16	Appropriateness of program components	5
17	It has visual appeal, which includes colors, images, illustrations, font shape, and size	5
18	Media can overcome time constraints	5
19	The media used is interesting	4
20	Media can minimize misperceptions in students	4
<b>Average Percentage</b>		<b>92%</b>

Source: Research result, 2022

Based on **Table 4** the assessment of media expert validators on the media aspect, a percentage of 96.7 is obtained, which, if referred to the category of validity level, shows that this aspect is very valid. In the design aspect, a percentage of 85% is obtained, which means that the design of teaching materials is in a very valid category. In the aspect of use, 96% was obtained, indicating that the use of teaching materials is very valid. In the utilization aspect, a percentage of 92% was obtained, which indicates that this aspect

is in a very valid category. So, it can be concluded that the development of teaching materials based on animated videos obtained a very valid value category. This aligns with research conducted by Fauziah and Ninawati (2022). The animated video makes it easier for students to master the subject matter quickly and precisely because it combines several media, be it text, visual, audio, sound, or graphics, to make it more exciting and motivate student learning. Animated video is part of a type of multimedia-based media, so the presentation of material can reach various student learning styles (see **Table 5**):

**Table 5.** Results of Product Validation by Material Experts

No	Aspects of assessment	Validator (Value)
<b>Learning Aspects</b>		
1	Suitability of the material presented in the Curriculum	5
2	Encourage students' learning independence	5
3	Easy-to-understand app instructions	3
4	Applications can serve as support for the Learning Process	4
5	Clarity of language used	4
6	Suitability of material and learner characteristics	4
7	The attractiveness of the material content	4
8	Readability of material arrangement	5
<b>Average Percentage</b>		<b>85%</b>
<b>Content Completeness Aspect</b>		
9	The material is presented clearly and concisely	5
10	Coverage (breadth and depth) of material content	4
11	The material presented in the application is a systematic According to the indicators	5
12	Up-to-date or contextual material	5
<b>Average Percentage</b>		<b>95%</b>
<b>Aspects of Completeness, Accuracy, and Meaningfulness</b>		
13	The media presented covers the competencies of	4
14	The application presented stimulates students in understanding the material presented	5
15	The media used can make it easier to achieve learning Objectives	5
<b>Average Percentage</b>		<b>93%</b>

Source: Research result, 2022

Based on **Table 5** the assessment of material expert validators on the learning aspect, an average percentage of 85% was obtained, indicating that this aspect was very valid. The completeness of content is at an average percentage of 95%, which indicates that the aspect of material content is at a very valid level. Regarding completeness, accuracy, and meaningfulness are at an average percentage of 93%, which is very valid. So, it can be concluded that developing animated video-based teaching materials in science subjects is very valid. The clarity and interrelationship between learning indicators, such as essential competencies, learning objectives, material, and the suitability of the evaluation with the learning objectives contained in the learning media will be able to facilitate students in understanding learning materials so that learning objectives will be achieved optimally (Semara & Agung, 2021).

### Practicality Stage

To determine the level of practicality of teaching materials can be seen from the results of the assessment/validation of teacher response instruments and student responses. Teacher response questionnaires are given to get information from teachers about animated video-based teaching materials. Student response data is collected to assess the practicality of teaching materials in terms of content feasibility, material presentation, and language—the practicality of teaching materials based on animated videos by giving teacher response questionnaires and student responses (see **Table 6**):



**Table 6.** Teacher's Assessment of the Product

No.	Question	Response
1	Media can overcome the limited experience that students have	5
2	Media can overcome classroom boundaries	4
3	The overall appearance of the media can be understood	5
4	The language used in the media can be understood	5
5	The presentation of teaching materials used in the media is arranged systematically	5
6	Teaching materials in the media are easy to understand	5
7	The use of language in the media is straightforward	4
8	Types of learning media in videos vary	4
9	Videos are different from the usual teaching materials	5
10	Video can control the speed of student learning	4
11	Videos train students to enrich their knowledge	5
12	Video will make it easier for students to express their opinions orally or in writing	5
13	Videos make it easier for students to acquire material	5
14	The video in the media is interesting	4
15	Videos make it easier for students to understand learning Materials	5
16	The use of video makes it easier for students	5
<b>Average Percentage</b>		<b>93,75</b>

Source: Research result, 2022

Based on **Table 6** shows that science subject teachers at SDN 056 Lamasariang, after conducting learning activities using animated video-based teaching materials, obtained an average score of 93.75%, which means that the teacher's response is in the convenient category, meaning that the use of animated video-based teaching materials can support learning activities. A good and exciting presentation of the material will be able to make the construction of the students' frame of mind clear and easy to follow and imitate some of the scenes in the teaching animation video so that the material presented will make students more enthusiastic in learning (Saputra et al., 2022). The level of practicality of animated videos has significant implications for communication effectiveness. High-quality animations, with attractive visuals and clear messages, can improve students' understanding of the content delivered. This has the potential to increase engagement and recall of information. Therefore, the right animation design is crucial to achieving the desired communication goals.

### Effectiveness level

Effectiveness testing is an evaluation process to assess the extent to which the animated video-based teaching materials used successfully achieve the learning objectives that have been set. The purpose of this test is to ensure that the animated video-based teaching materials designed and used can help students better understand the learning material. The effectiveness stage is carried out by comparing learning outcomes through pretest and post-test scores. The following table shows the results of comparing the pretest and post-test scores (see **Table 7**):

**Table 7.** Comparison of Pretest and Posttest Mean Values

Average value	Pretest Score	Posttest Score
Average	40,35	86,60

Source: Research result, 2022

Based on the comparison of pretest and post-test scores analyzed, the average score of student pretests or before using animated video-based teaching materials is 40.35, and the average score of posttests or after using animated video-based teaching materials is 86.60. This shows an increase in learning outcomes between the pretest and post-test scores of 46.25. The conclusion is that using animated video-based teaching materials in science subjects has been proven effective at SDN 056 Lamasariang. The effectiveness of animated videos has a significant impact on their communication. Well-designed animations that combine interesting visual elements with clear narration can increase audience understanding and engagement. Using animation to explain complex concepts can make information easier to digest.

## **Discussion**

The use of teaching materials in the form of animated videos in the learning process at State Elementary School (SDN) 056 Lamasaring significantly impacts the quality of learning. One of the main impacts of using animated videos is more precise visualization so that students can understand the concepts of complex learning materials more efficiently. This is in line with research conducted by [Fauziah & Ninawati \(2022\)](#), stating that animated videos make it easier for students to master subject matter quickly and precisely because the visualization displayed can make it easier for students to understand and remember the concepts contained in the Learning video.

The visualization presented can help students to understand the material better. This can be seen from the high involvement of students in learning. In addition, using visuals and audio in animation videos can improve students' memory because the information presented in the form of visuals and engaging narratives tends to be easier to remember than just reading text. In addition, animation can stimulate students' creativity and imagination and encourage them to connect concepts with their daily lives. Research conducted previously by [Pattaufi and Arnidah \(2019\)](#) using videos as teaching materials provides utilization of learning outcomes because animated videos are media that combine audio and visuals with a format that is more interesting and more colorful than the usual video media. Animated video is part of multimedia-based media that combines several media, including text, visual, audio, sound, and graphics. It is more exciting and can motivate student learning so that the presentation of material can reach a variety of diverse student learning styles.

This research is different from previous studies. The development of learning animation videos is carried out with appropriate and general principles. The correct principle means that the material used in this learning video media is appropriate and suitable for students. The general principle is that this media can be used anywhere and by anyone without being hampered by media availability and usage skills. This animated video-based teaching material requires teacher skills in using IT and other devices that can support the learning process. This research improves learning quality, bridges the gap between learning theory and more effective practice, and paves the way to a more interactive and immersive learning experience.

Remembering that the video content should be relevant to the curriculum and learning objectives is essential. The duration of the video should also be adjusted so that students do not lose concentration. The selection of interactive videos is also recommended so students can actively participate in learning. Although animated videos can be accessed outside the classroom, it is still necessary to supervise them so that their use remains valuable and productive. By considering these aspects, animated videos can positively enhance learning.

## CONCLUSION

Teaching materials have a significant role in the learning process, and the development of teaching materials is a concern for teachers to improve learning effectiveness. Animated video-based teaching materials are an effective solution for teaching with an attractive visual approach. It overcomes the limitations of traditional learning and improves students' understanding. Complex visualizations are simplified, motivate students, and reduce boredom. The validation results by media, design, and material experts show that this teaching material is highly valid and practical. In addition, effectiveness testing shows increased student learning outcomes after using animated video teaching materials. Thus, this teaching material effectively improves students' understanding of science learning materials.

## AUTHOR'S NOTE

The author hopes this article can be helpful for readers and emphasizes that this writing is original and does not contain plagiarism.

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