

## **DEVELOPMENT OF AUDIO VISUAL MEDIA TO IMPROVE SCIENCE LEARNING OUTCOMES OF GRADE V ELEMENTARY SCHOOL STUDENTS**

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### **ABSTRACT**

*Students in science learning activities still get low results. Student motivation is relatively low because the presentation of material in learning activities is very monotonous because teachers do not make enough use of supportive learning media. This research aims to develop audio-visual media in improving the science learning outcomes of grade V elementary school students. This type of research uses development research with a 4D model which includes 4 stages, namely define, design, develop, and disseminate. The research sample was 67 elementary school students in class V. After development, the audio-visual media was tested for feasibility by three experts, namely linguists, materials and media experts, then the media would be disseminated or implemented to obtain data on student learning outcomes by collecting data using pre-test and post-test. The data analysis technique uses SPSS to test normality, n-gain and the T-Test pired sample test to find out how effective and how much difference student learning outcomes are in science learning. The results showed that the audio-visual media obtained an N-Gain value of 82.43 with the effective category and the T test result of <.001 which means that there is a significant difference between before and after treatment.*

*Keywords: Audio Visual Media, Elementary School, Science*

### **ABSTRAK**

Peserta didik dalam kegiatan pembelajaran IPA masih mendapatkan hasil yang masih rendah. Motivasi peserta didik tergolong rendah dikarenakan penyajian materi dalam kegiatan pembelajaran sangat monoton karena guru kurang memanfaatkan media pembelajaran yang mendukung. Penelitian ini bertujuan untuk mengembangkan media audio visual dalam meningkatkan hasil belajar IPA siswa kelas V Sekolah Dasar. Jenis penelitian ini menggunakan penelitian pengembangan dengan model 4D yang mencakup 4 tahap yakni define, design, develop, dan disseminate. Sampel penelitian sebanyak 67 siswa sekolah dasar kelas V. Setelah dilakukan pengembangan, media audio visual diuji kelayakannya oleh tiga ahli yakni ahli bahasa, materi dan media kemudian media akan di sebarakan atau diimplementasikan untuk memperoleh data hasil belajar siswa dengan pengumpulan data menggunakan pre-test dan post-test. Teknik analisis data menggunakan SPSS untuk diuji normalitas, n-gain dan uji pired sample T-Test

untuk mengetahui seberapa efektif dan seberapa besar perbedaan hasil belajar siswa dalam pembelajaran IPA. Hasil penelitian menunjukkan bahwa media audio visual memperoleh nilai N-Gain 82,43 dengan kategori efektif dan hasil uji T sebesar  $<,001$  yang diartikan bahwa terdapat perbedaan yang signifikan antara sebelum dan sesudah perlakuan.

Kata Kunci: Media Audio Visual, Sekolah Dasar, IPA

### **A. Introduction**

Education in the digital era requires innovation in the learning process, especially in the use of learning media that is able to facilitate the understanding of concepts more effectively. The development of information and communication technology has brought significant changes in the world of education, including in the learning of Natural Sciences (IPA) in elementary schools (Ichsan et al., 2021). Science learning requires an approach that not only emphasizes the transfer of theoretical knowledge, but also provides concrete experiences that allow students to understand science concepts in depth and meaning. Natural Sciences is one of the subjects that has an important role in shaping students' understanding of natural phenomena and developing scientific thinking skills (Susanto, 2013). Science learning in grade V of elementary school covers a wide range of abstract and complex subjects, such as the human

respiratory system, light and its properties, simple forces and planes, and heat and displacement. These materials require visualization and concrete experience so that they can be well understood by students who are at the concrete operational stage in their cognitive development (Sinaga et al., 2024).

Learning outcomes are the main indicators of the success of the learning process which includes changes in student behavior in cognitive, affective, and psychomotor aspects after participating in the learning process (Slameto, 2010; Susanto, 2013). In the context of science learning, learning outcomes are not only measured by students' ability to remember facts and concepts, but also the ability to understand, apply, analyze, evaluate, and create according to Bloom's taxonomy that has been revised by Anderson and Krathwohl (Anderson & Krathwohl, 2001). The achievement of optimal learning outcomes is greatly

influenced by various factors, one of which is the use of appropriate and effective learning media.

However, various studies show that the learning outcomes of science students in elementary school, especially class V, are still not optimal. Research conducted by Sinaga et al. (2024) shows that the thematic learning outcomes of grade V students still do not reach the Minimum Completeness Criteria (KKM) that have been set, with an average pretest score of only 42.33. A similar condition was also reported in another study that identified that most students had difficulty understanding abstract science concepts (Wachidah & Sidoarjo, 2024). In line with this, the researcher has carried out a preliminary study on elementary school students in grade V elementary school in science learning where the average score of students from one group still gets low results with an average of 65. This low learning outcome indicates that there are problems in the learning process that need to be addressed immediately.

One of the factors causing the low learning outcomes of science is the use of learning methods that are still conventional and lack of use of

varied learning media. Learning that is still teacher-centered with a dominant lecture method tends to make students passive and less motivated in learning (Sela, 2024). The limitations of the use of varied and technology-based learning media in the learning process, especially the content of science learning, are one of the obstacles faced by teachers in delivering learning materials (Wulandari & Suniasih, 2022). In fact, the characteristics of science material that tend to be abstract require media that can concretize the concept so that it is easy for students to understand. Learning media has a very important role in the science learning process. Effective learning media can help teachers in conveying abstract material to be more concrete, facilitate the understanding of complex concepts, increase student learning motivation, and ultimately improve student learning outcomes (Rohani, 2020; Susanti, 2021).

One type of learning media that is considered very effective for science learning is audio-visual media. Audio-visual media is a learning medium that combines audio (sound) and visual (image) elements in a unit, so that it can stimulate

students' sense of hearing and vision at the same time (Djamarah et al., 2020). Audio-visual media has the advantage of presenting abstract learning materials to be more concrete and easy to understand because students can see and hear explanations simultaneously. In addition, audio-visual media is also capable of displaying animations, simulations, or demonstrations of processes that are difficult or dangerous to carry out directly in the classroom (Ichsan et al., 2021).

Audio-visual media can be one of the means to realize these principles because they can be adjusted to students' learning speeds, different learning styles, and can be used for independent and collaborative learning (Atmijaya et al., 2024). Based on the description above, it can be concluded that the development of audio-visual media for science learning in grade V elementary school is an urgent need to overcome the problem of low student learning outcomes and the limitations of existing learning media. Although various studies have shown the effectiveness of audio-visual media, there is still a need for development research that produces quality audio-

visual media products, in accordance with the characteristics of grade V elementary school students, and can be implemented effectively in science learning. Therefore, this research aims to develop audio visual media to improve the science learning outcomes of grade V elementary school students. The media developed is expected to meet valid, practical, and effective criteria so that it can be a solution to existing science learning problems and contribute to improving the quality of education, especially science learning in elementary schools.

## **B. Research Methods**

This research uses the Research and Development (R&D) method. This research method is a method that aims to test the level of effectiveness of a product developed (Sugiyono, 2016). The design used in this study is 4D development design (define, design, develop, and disseminate).

The research was conducted in two elementary schools in the Waru Cluster, Parung District, Bogor Regency. The development of audio-visual media is focused on Magnet, Electricity and Technology for Life material in grade V elementary school

students. The first step is to analyze the needs of educators and students (Define) then the next stage is to make a design (Design) or audio-visual media storyboard on the predetermined material. After the storyboard is created, the next step is to develop the audio-visual media on Magnet, Electricity and Technology materials with the help of the Canva application.

After development, the audio-visual media is validated by language and media subject matter experts to be tested for feasibility. The next step is at the Disseminate stage, where the dissemination or application of audio-visual media to elementary school students in grade V at SDN Waru 1 and SDN Waru 5 is carried out. The data of this study was obtained through tests and non-tests. The test consists of a pretest and posttest consisting of 14 questions regarding magnetic matter, electricity and technology for life. While non-tests are obtained to find the needs used for the basis of development, documentation of the validation results of material experts and media. All of this data was then tested with normality tests, T-tests, and n-gain tests.

## **C. Research and Discussion Results**

### **Research Results**

The development of audio-visual media with the help of the Canva application in learning science content of Magnet, Electricity and Technology for Life at SDN Waru 1 and SDN Waru 5 has been carried out through several stages in accordance with the 4D research model. The stages carried out are in the form of define, design, develop and disseminate.

The first stage is in the form of define. The initial stage carried out is to define to find out the initial analysis, gaps, characteristics of students, identify potential infrastructure facilities, determine potential and problems, estimate product deployment, and prepare product designs using data collection techniques in the form of interviews with teachers, providing potential questionnaires and problems to students, observation during the learning process, and literature review.

Based on the definition stage that has been carried out, it is found that there is still a low score in science learning because the scope of the

material is too broad and too large so that students find it difficult to understand the material. This also happens because learning activities still use simple or conventional teaching materials in the form of package books without the support of other learning media.

These problems are in line with the results of the student needs questionnaire and educators also support this which shows that students often have difficulty understanding the material, especially broad material and require them to understand a concept in science learning. The results of the analysis also show that educators need learning media as a tool to concretize a theory in science learning as well as media that can increase student motivation in science learning activities. So based on this stage of analysis, Canva-assisted audio visual media was developed.

The second stage is the design stage. The activities carried out in the design stage are the preparation of instrument tests, making an outline of the content of the media to be developed, namely the description of the learning material, compiling a synopsis of the learning video, compiling a storyboard, compiling an

assessment instrument for expert validation tests and determining the initial design and components to be presented in the audio-visual media.

The third step in this research is development. The application used in the development of this audio-visual media design is the Canva application. This is because the Canva application is very easy to use so that it can provide information to educators in creating audio-visual media using the Canva application. The material chosen in this study is in class V material. At this stage, the researcher pays attention to the needs of students in the form of audiovisual media needs. The design stage begins with making an initial appearance of the audio-visual media presented in figure 1.

**Figure 1 Initial View of the Video**



Next, the researcher created the concept of audio visual media that he wanted to develop. The concepts used include material content, layout selection, illustrations, selection, spark videos, quizzes, and other

innovations. All the condiments used are made in the Canva app. The development carried out is by creating media that is attractive both in appearance and presentation in the learning material, equipped with the display of contextual supporting images or videos to improve students' understanding in elementary science learning and equipped with interactive quizzes and starting with a starter question at the beginning of learning.

**Figure 2 Material Opening Display**



At the beginning of the material, an animated video is used that is colored and in accordance with the concept of the learning material to be studied. The use of colors and animations aims to attract students' motivation to learn. Furthermore, in figure 3, a view will be presented on the material part of the developed audio visual media.

**Figure 3 Display of Audio Visual Media Materials**



The presentation of the material is complemented by contextual supporting images and videos. This aims to provide additional understanding to students of the material studied.

**Figure 4 Quiz View**



Audio-visual media is equipped with formative evaluations that are presented interactively using the quiz application. This aims to measure student understanding and increase student involvement in learning activities.

After the development stage is completed, audio-visual media is tested for feasibility by material, media and language experts. The results of expert validation on media, material

and language aspects are presented in table 1.

**Table 1 Results of Expert Validation Test**

Yes	Validation Categories	Value
1	Material	95
2	Media	86
3	Language	62
	Average	81%
	Criterion	Highly Worth It

Based on the feasibility test by experts, the results were obtained in the material validation of 95 with the very feasible category, the media validation of 62 with the feasible category and the language validation of 86 with the very feasible category. The overall average of the validation results of audio visual media was obtained 81% with the category of very feasible to be tested and implemented in grade V students at SDN Waru 1 and SDN Waru 5.

Furthermore, the last step of this development is Disseminate. The final product that has been revised at the development stage is then distributed or implemented to grade V students of SDN Waru 1 and SDN Waru 5 with a total sample of 67 students. Audio-visual media is distributed in a limited way to research samples through the youtube platform. The products that

have been disseminated will be implemented as learning media in the Science subject of Science content Magnetism, Electricity and Technology for Life.

After implementation, at this stage, the achievement of learning objectives is also measured to measure the effectiveness of the developed learning video media. The measurement results can then be used as material for evaluation and development carried out in future research.

The data obtained from the implementation of audio-visual media in the classroom will then be processed using SPSS. First, the data will be tested descriptive statistics first to find out an overview of the research results in the pre-test and post test. The descriptive statistical test is presented in table 2.

**Table 2 Statistical Descriptive Test Results**

	N	Min	Max	Mean
Pre-test	67	40	74	53.30
Post-test	67	87	98	91.75

Based on table 2, it is presented that there is an increase in the pre-test and post test scores where the average score in the pre-test is 53.30

and there is an average increase in the post test of 91.75.

Furthermore, the data is tested for normality to determine the normality of the distribution of pre-test and post-test data. The normality test is presented in table 3.

**Table 3 Normality Test Results  
(Shapiro-Wilk)**

Class	Statistic	Df	Itself
Pre-test	0.960	67	0.503
Post-Test	0.974	67	0.116

Based on the Shapiro-Wilk output table, the significance value is 0.503 for the pre-test and 0.116 for the posttest. The data shows that  $0.503 > 0.05$  and  $0.116 > 0.05$ , so that the data is normally distributed and the requirements of the T-test and N-gain are met.

Furthermore, the data was tested by N-Gain to find out the extent of the effectiveness of improving learning outcomes with the implementation of audio-visual media presented in table 4.

**Table 4 N-Gain Test Results**

Class	Mean	Category
NGain_Score	.82	Tall
NGain_Persen	82.43	Effective

Based on the N-Gain value in table 3, it is known that the N-Gain Score obtained an average of 0.82 which is in the high category. Then at

the N-Gain percent, a mean of 82.43 was obtained which obtained the effective category. It can be concluded that the application of audio-visual media is effectively able to improve student learning outcomes in elementary school science learning class V.

Furthermore, the data was carried out by the T-Test to find out the difference in the average increase in pre-test and post-test. The T-Test used is the T-Test sample presented in table 5.

**Tabel 5 Pired Sample T-Test**

	Upper	t	df	Itself. (2-tailed)
Pair 1 Pre-Post	-36.779	-45.990	67	<,001

Based on table 5, it is presented that the average pired sample t-test obtained a sig value.  $2\text{-tailed } 0.001 < 0.05$ . So it can be concluded that there is a significant difference between before and after treatment. This means that the influence of the use of audio-visual media on improving science learning outcomes of grade V elementary school students was found.

## **Discussion**

The results of the paired sample t-test proved that there was a significant difference between student learning outcomes before and after using audio-visual media. These findings show that audio-visual media makes a real contribution to improving students' cognitive abilities in mastering science material. According to Mayer (2021), multimedia learning that integrates visual and auditory elements coherently can reduce students' cognitive load and improve information retention through the dual coding process, which is the simultaneous processing of information through verbal and visual pathways. This process allows students to build stronger connections between new information and knowledge they already have (Sweller et al., 2019).

This significant influence is also strengthened by the results of research by Wulandari et al. (2020) which show that students who learn using audio-visual media have a better level of conceptual understanding compared to students who learn using conventional methods. This difference occurs because audio-visual media is able to present material in a more

dynamic and contextual way, so that students can see the application of science concepts in daily life directly (Pratama & Haryanto, 2020).

In addition, audio-visual media also facilitates self-paced learning, where students can repeat ununderstood parts without feeling embarrassed or rushed, thus encouraging deeper mastery of the material (Astuti & Mustadi, 2021).

One of the positive impacts of the use of audio-visual media is the increase in student motivation to learn. Audio-visual media packed with interesting animations, bright colors, and interactive narratives are able to attract students' attention and make learning more enjoyable (Dewi & Agustika, 2020). This is in accordance with the motivation theory put forward by Keller (2010) in the ARCS (Attention, Relevance, Confidence, Satisfaction) model which states that learning that attracts attention and is relevant to students' lives will increase intrinsic motivation to learn. This high motivation in turn has a positive impact on students' efforts and persistence in mastering the learning material (Schunk & DiBenedetto, 2020).

Research conducted by Putri and Dewi (2021) also showed similar results that students who learned using audio-visual media showed higher enthusiasm, were more active in asking questions, and were more focused on participating in learning compared to conventional learning. This active involvement of students is very important because meaningful learning occurs when students actively construct their own knowledge through mental processes that involve attention, understanding, and reflection (Wijayanti et al., 2019).

Audio-visual media serves as a stimulus that encourages students to think critically, ask questions, and connect science concepts with their daily experiences (Yulianti & Wulandari, 2021). In addition, the use of audio-visual media also creates a more interactive and collaborative learning environment, where students can discuss what they see and hear with their peers (Suryani et al., 2020).

### **E. Conclusion**

Thus, it can be concluded that the development of audio-visual media using the 4D model is an effective solution to overcome the problem of science learning in

elementary schools, especially in improving the learning outcomes of science students in grade V. This media can be an alternative learning media that is innovative and in accordance with the demands of the independent curriculum that mandates the integration of technology in learning). The implementation of audio-visual media in science learning is expected to continue to be developed and disseminated to improve the quality of science education in Indonesia, with the support of adequate infrastructure facilities and the improvement of teachers' competence in utilizing learning technology (Budiman, 2019; Wibowo & Marzuki, 2021).

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