



Animaker Animation Video Design as a Digital-Based Learning Media with the Theme of Comparison and Scale in Elementary School

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Abstract: This study aimed to determine the effectiveness of developing digital-based teaching materials in Animaker-assisted animated videos aimed at grade V elementary school students on Comparison and Scale subject matter. This was done because problems often arise regarding the effectiveness of the teaching and learning process. Teachers have also been required to be active and creative in developing learning systems in the classroom that coexist with technological advances. In this study, the learning system developed is on teaching materials. This researcher uses the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). This research is subjected to elementary school students in Langkat Regency. Data collection is done using assessments by material experts, media experts, homeroom teachers, and students. Overall based on media experts reached 81.25%, material experts reached 81.25%, homeroom teachers reached an average of 82%, and the average student response of 87% was classified as high so that it could be stated that Animaker-based animation videos on Comparison and Scale materials were feasible to be used as teaching material facilities in the classroom.

Abstrak: Tujuan dari penelitian ini adalah untuk mengetahui keefektifan dari pengembangan bahan ajar berbasis digital berupa video animasi berbantuan Animaker yang ditujukan kepada siswa kelas V SD pada materi pelajaran Perbandingan dan Skala. Hal ini dilakukan karena seringkali permasalahan muncul mengenai keefektifan dalam proses belajar mengajar dimana guru-guru juga sudah dituntut untuk aktif dan kreatif dalam mengembangkan sistem pembelajaran di kelas yang berdampingan dengan kemajuan teknologi. Dalam penelitian ini, sistem pembelajaran yang dikembangkan yaitu pada bahan ajar. Peneliti ini menggunakan model ADDIE (Analysis, Design, Development, Implementation and Evaluation). Penelitian ini bersubjek siswa sekolah dasar di Kabupaten Langkat. Pengumpulan data dilakukan dengan cara penilaian oleh ahli materi, ahli media, wali kelas dan siswa. Secara keseluruhan berdasarkan ahli media mencapai 81,25%, ahli materi mencapai 81,25%, wali kelas mencapai rata-rata 82%, dan respon siswa rata-rata sebesar 87% tergolong tinggi sehingga dapat dinyatakan bahwa video animasi berbasis animaker pada materi Perbandingan dan Skala sudah layak untuk dapat digunakan sebagai pengembangan bahan ajar di sekolah.

A. Introduction

Education today is one of the most critical challenges for teachers because they are directly involved in educational activities to face the challenges of technological development and students as essential subjects of change. The world of education always develops side by side with technological advances. Therefore, teachers must have the readiness and be prepared to face these challenges, so teachers are required to be able to think critically and creatively to implement digital technology-based learning (Paud et al., 2020). Satriawan et al (2020) Current technological developments have been applied in various disciplines, especially education. The use of technology, apart from being a management tool (administration), is also applied as an alternative to choosing a learning environment or learning system. The latest technology makes it possible to create affordable animations when viewed in terms of cost compared to the previous era's technology. In addition, creating animations does not require special skills to produce an affordable, fun, and exciting learning media (Nasution et al., 2021).

Mathematics is essential in various sciences, especially science and technology. According to Sujono (in Fathani, 2009), mathematics is a science that requires logical and systematic thinking in solving exact problems, especially those related to arithmetic. Mathematics shapes students' thinking (creative, critical, and independent) to be applied in life. Mathematics learning aims to help students conceptualize a mathematical problem using their abilities. Mathematics learning is designed to provide students with various experiences that allow them to develop mathematical concepts. However, as is known, the traditional learning used in learning mathematics in schools is the lecture method carried out without learning aids or materials. As a result, students have low demand for learning because many students need help mastering mathematics subjects.

Based on researchers' observations at SD Negeri Lorong Ibadah School, problems were found in the learning environment, namely the everyday use of learning media. This can be seen from the need for more variety in learning media. In this case, the researcher highlighted teaching on scale and comparison materials. The teacher still used traditional methods as a learning medium using books, lecture methods, and explaining examples through the blackboard. During the lesson, it was seen that the students' expressions began to get bored, and the student's enthusiasm for learning decreased. As a result, students become unfocused and need more understanding of the lesson. In contrast, scale and comparison lessons require high imagination and critical and logical thinking. They are varied because it is a mathematics lesson whose application is direct to everyday life, so it requires special attention by providing suitable learning media. Scale is the comparison of the distance on the map with the actual distance in the field (Marhadi, 2014). . A meaningful comparison of two sets or quantities, written as follows: b or a/b , read $a-b$ (Purnomo, 2015). Research conducted by Siyamtini et al (2019) based on the analysis of the National Exam (UN) tryout results shows that there are still many students who make mistakes when answering scale and comparison questions. Based on data analysis for the last three years, it can be seen that many students still have difficulty solving comparison and scale problems. This is because students forget how to solve problems that use the scale formula.

This is under the research of Adma & Ahmad (2020). It is known that the student who reached the grade V SDN 19 math scale Koto Tuo Selatan Kec IV Koto Agam lesson year 2019/2020 has not reached the Minimum Completion Criteria (KKM) of 75. Of all Class V students, only nine reached the KKM, with the average math learning score still low, 67.69. The minimum average has not reached the KKM that it should be. From this, it can be concluded that there is still a weak understanding of students to solve math problems. Another research conducted by Miyastutik (2021) in the fifth grade of SDN Wonomlat, Krembung Subdistrict, Sidoarjo Regency, shows that the ability to learn mathematics is not good. From the data based on learning outcomes, learning basic skills to know the concepts of comparison and scale reached an average total score of 66.67, and 61.91% of students were evaluated, so only 12 out of 21 students were declared perfect. Minimum 75.

According to Surwani (2017), the factor that affects math learning outcomes when learning comparison and scale material is needing to understand how to calculate comparison and scale based on existing formulas. This is the basis for assessing student learning outcomes because the level of understanding of questions is higher than the level of knowledge. The main thing that needs to be done is to make students understand the content of the question first because when students are trained to interpret the content of the question, it will be easy for them to interpret the entry of the question. According to psychology, students can easily understand complex and abstract concepts if accompanied by clear and concrete examples of the situations and circumstances they face by practicing them themselves. Based on the factors described, learning is not optimal, so there is a need for renewal as an alternative media tailored to the material and needs of students in the classroom that can inspire, one of which is the renewal of learning media. One learning media that has proven helpful is technology-based, namely animated videos. The learning environment created can be an audio, video, image, or multimedia environment, which can be tailored to the needs of students. Animation video is a tool used to change the learning atmosphere to be calm, engaging, and fun so that students become more enthusiastic about learning and can understand and master lessons quickly.

Using animated videos as a solution to learning mathematics is a unique idea in introducing concepts to students who can translate something abstract and complex (Sundayana, 2015). Using digital technology to create this animated video as a learning resource changes the perception of mathematics as dull and fun. Moving images display complex material so teachers can easily explain it visually.

From this explanation came the idea to develop an animation video learning resource with the help of Animaker. The purpose of developing this learning media is to determine how feasible, effective, and practical the use of animated video learning media is based on validation scores and student responses. Animaker is a free and easy-to-use animation video creation site. As a website, Animaker is able to make subjects taught by teachers more exciting and fun during learning activities. The task animation explains cases related to problems related to the topic to be explained.

B. Method

The method used in this research is the R&D Research and Development Method. The R&D method is intended to see the effectiveness of new products produced for education, namely in developing previous teaching materials. In this case, we are developing teaching materials in animated videos based on Animaker. The framework used is ADDIE with the following stages Analysis, Design, Development, Implementation, and Evaluation.

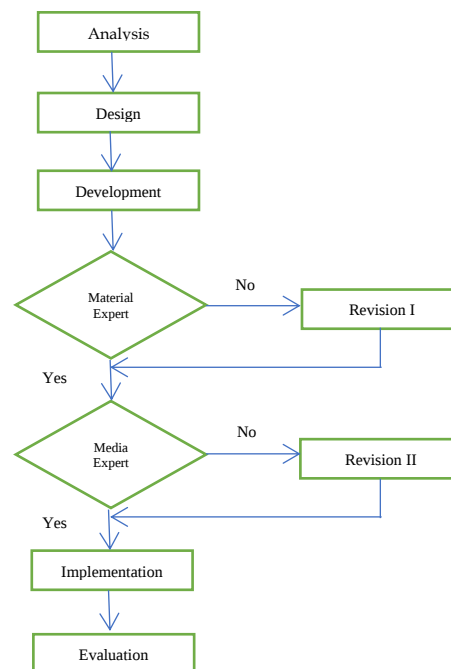


Figure 1. ADDIE Stages in Making Digital-Based Animated Videos

This research was conducted at SD Negeri Lorong Ibadah in Langkat. Data collection techniques were carried out using two methods: observation and questionnaires. Observation is done to find out the problems of learning conditions in the classroom and the needs of students. At the same time, the questionnaire is used to assess the validation (feasibility) of the development of animated Animaker video learning media. In this study, the product was tested first to determine its validity of the product (whether or not the product was developed) before being implemented by students. The trial was given to a media expert, a material expert, and a homeroom teacher. After it is declared valid, the product will be implemented for students. Implementation to students is carried out to determine student responses to the products developed. The student sample was 25 class V students.

The data obtained in this study are quantitative data from instrument validation and trials in the form of scores calculated by questionnaires obtained to determine the feasibility of the products developed. At the same time, qualitative data is obtained through the results of reviews from experts in the form of comments, suggestions, and input. The calculation of the questionnaire uses a rating scale of 1-5. Furthermore, the validity of the acquisition of

expert assessments and student trials is calculated using the following formula (Jannah & Julianto, 2018).

$$P\% = \frac{\text{Score obtained}}{\text{maximum score}} \times 100\%$$

Description:

The score obtained measures the validity of the results of the acquisition of expert assessments and student trials with a rating scale of 1-5 from the question the maximum score is 5

The percentage obtained is used as a reference in stating the feasibility of animated video learning media with the following conversion: (Optiona & Muchlas, 2019)

Table 1: Achievement level of Feasibility of Animated Video Learning Media

Achievement Level	Categories	Description
85%-100%	Excellent	No Revision
75%-84%	Good	No Revision
65%-74%	Simply	Revision
55%-64%	Less	Revision
0%-54%	Very Less	Revision

C. Result and Discussion

Result

Learning media in the form of animated videos developed with the help of Animakers on comparison and scale material with the development model used in the study is guided by the ADDIE model with the steps of implementing the development stages including:

1. Analysis

This stage is the first step in analyzing educators, material analysis, student characters, and facilities obtained through information based on observations obtained. This stage aims to find problems that occur so that solutions can be found. Based on the results of the analysis of educators, it was found that the fundamental problem related to mathematics learning techniques is that the teacher or teacher still uses the lecture method in teaching, where students listen to the material delivered by the teacher. Especially comparison and scale material which is a complicated and quickly dull lesson. Surwani (2017) revealed that one factor that often arises could affect math learning outcomes, especially in scale and comparison material, namely in understanding how to calculate and interpret what is in the problem. Student analysis is also seen from the way students think who do not like theoretical material. In research conducted by Surwani (2017), students still need to understand how to apply story problems that are changed in comparison and scale formulas to find the solution results. In addition, students still need clarification about changing arithmetic operations because they are related to fraction material, and they need help understanding the concept of fractions. Based on the analysis of the material presented, it refers to the core competencies, essential competencies, and learning objectives. Researchers also pay attention to the character of students in the classroom when the lesson

is in progress, where students look sleepy and lackluster with the material presented, which is only in the form of theory and formula concepts. As the last analysis, namely from learning facilities, the use of learning tools still uses the blackboard as a learning medium. In this case, it has yet to be seen to utilize technology as a learning medium. In addition, the provision of learning media is only in the handbooks of students and teachers. So it is clear that the learning media used has not supported learning in the classroom, so there needs to be illustrations or animations that can attract attention.

2. Design

The next stage is designing the learning media needed after knowing the existing problems based on information from the field. In accordance with the results of the previous analysis, the researchers designed learning media in the form of animated videos on comparison and scale lessons. Before designing an animated video, the researcher determines the appropriate application with complete features so that it can be used on comparison and scale material. In this research, the application used is Animaker. Furthermore, researchers create designs, flowcharts, and storyboards and collect and determine images, animation characters, and backgrounds by paying attention to the suitability of the theme that has been determined.

3. Development

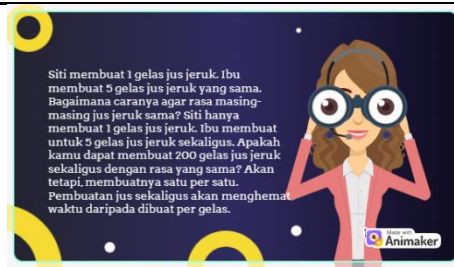
At this stage, the researcher then realizes the media that has been designed by the predetermined design. Animated video media began to be developed with Animaker applications obtained online from the website, so designing animated videos requires a laptop and a stable internet network. The results of Animaker-based animated videos can be seen in table 2 below:

Table 2. Animaker-based Animation Video Results

Media View	Information
	Initial/opening display with greetings and animated movements of waving hands as a form of acquaintance
	Displays the material to be studied, namely scale and comparison

Media View

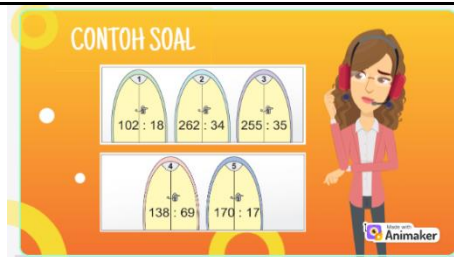
Information



Display the introduction of material by providing questions encountered in everyday life so that students can find out the direction of the lesson.



The display is in the form of comparative material



Display discussion to invite students to answer together



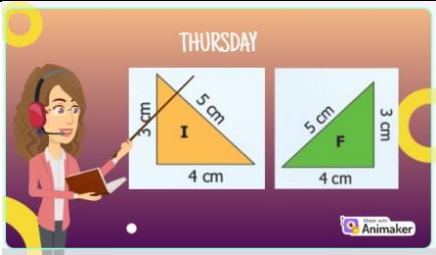
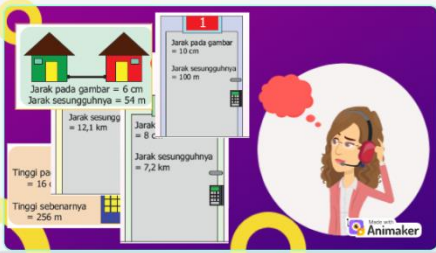
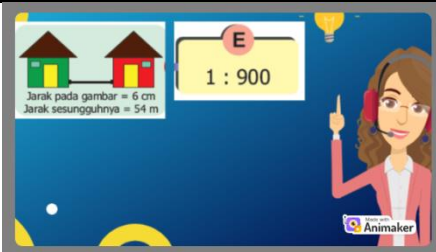
Display of discussion answers, so that after students are asked to guess the answers then slides of answers from all the questions displayed are displayed



Displays a basic understanding of congruence



Congruency material display

Media View	Information
	Display examples of congruence material in the form of images
	The material view looks for Scale
	Display discussion that invites students to also answer questions about the scale
	Display the answers after students are given time to answer the questions that were displayed beforehand
	End with cover

After the process of developing animated learning videos is complete, it is continued with an assessment by material experts, media experts, and fifth-grade teachers to assess the feasibility of animated videos that have been previously designed so that they can be implemented in students as learning media in the classroom. The results of the material expert validation consist of 10 indicators of the overall items from various aspects assessed according to the diagram below. Overall the validation results reached 81.25%, which included the category "very feasible".

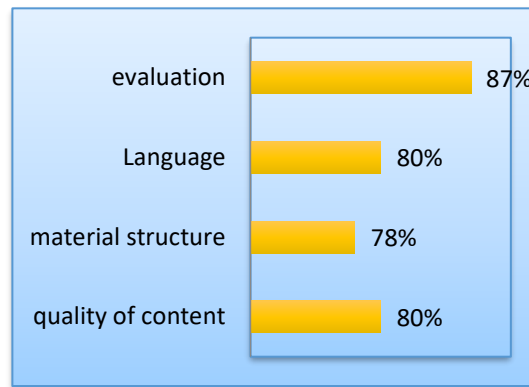


Figure 2. Diagram of material expert validation results

Furthermore, the results of media expert validation consist of 10 indicators of the overall items from various aspects assessed according to the diagram below. Overall the validation results reached 81.25%, which included the "very feasible" category.

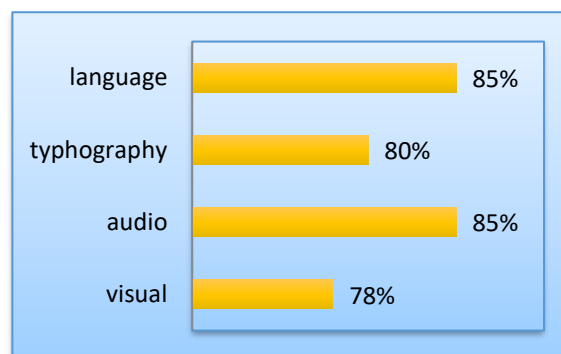


Figure 3. Media expert validation result diagram

The third validation result was carried out by the fifth-grade teacher of an Elementary School (SD) in Langkat consisting of 10 indicators of the overall items from various aspects assessed according to the diagram below. Overall the validation results reached 82%, which included the category "very feasible".

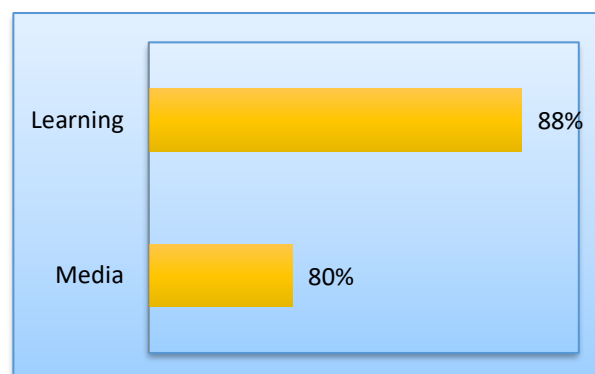


Figure 4. Diagram of homeroom validation results

4. Implementasi

After validation from material experts, media experts, and homeroom teachers on animated media products titled comparison and scale, the next stage is implementing the product to grade V students. The test is carried out during the learning process in the classroom, namely during math lessons and on the material of comparison and scale. Before showing the learning video, the school provides the need to display videos such as projectors and laptops. Video playback is carried out on the blackboard so that all students can adequately pay attention to the video. After completing the video playback, students are given a questionnaire to know the response of students about the learning video developed. The indicators of assessment are aspects of the reaction to the use of media, language aspects, and aspects of benefits with an average percentage in the diagram below.

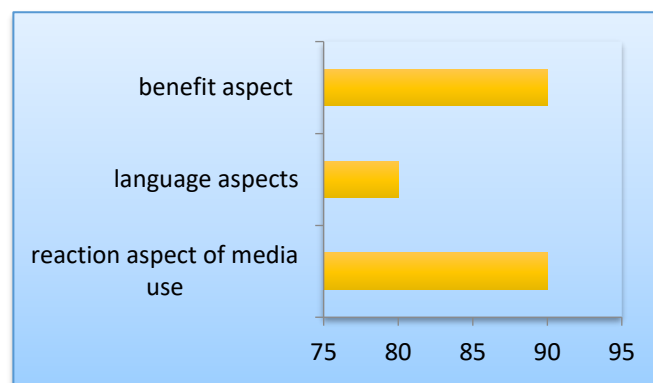


Figure 5. Diagram of Class V Student Response

The diagram above shows the average percentage of students in the animation video. The trial results by students include aspects determined with a total of 10 items. In the reaction aspect of using the media, the average result reached 88%, the language aspect reached 82.40%, and the benefit aspect reached 86.00%. So that the overall average percentage of student responses to Animaker-assisted animated video learning media was obtained at 87%, which was declared 'very positive' and 'very feasible'. With this media, the material can be well received by students to support the emergence of interest, enthusiasm, and enthusiasm for learning. The following details of student response results are presented with an average diagram in Figure 5.

5. Evaluation

The evaluation stage is the stage for making final improvements to the developed media application. Evaluation is based on comments, suggestions, and input from the previous stage. If there are deficiencies, it is necessary to make improvements so that the media developed gets better results in the future.

Discussion

The research entitled Animaker Animated Video Design as Digital-Based Learning Media with Comparison and Scale Materials in Elementary Schools aims to produce a learning media that can assist teachers in delivering material. The learning video is made by utilizing a web-based application called Animaker. The model used to develop this

Animaker-based learning media is the ADDIE model, which consists of several stages, namely analysis, design, development, implementation, and evaluation.

The changes in the teaching materials made can be seen from the students' presentation in responding, which reached an average of 87% to the teaching materials presented in attracting their attention and enthusiasm for learning. Based on this, the use of Animaker as a digital-based learning media influences the learning system at school. This is in line with the development and advancement of technology in the 4.0 era, where education can coexist with the times. In addition, the development of a teaching system using digital-based technology, namely Animaker, shows that teachers can more easily operate because the way of working is relatively easy and only requires equipment such as laptops and projectors. Making teaching materials in the form of animated videos with the help of Animakers is easier to understand and learn and practical in its use. In addition, Animaker videos can help teachers adapt to the times in applying teaching methods and models, including teaching materials that are more creative and innovative.

This is in line with research on the subject matter in PAUD education conducted by [Paud et al](#) (2020) found that the results of a survey conducted at the evaluation stage showed a success rate of 85.2% which can be classified as very high. Digital teaching materials using Animaker are considered adequate for use by PAUD teachers. Research on the material "clean and healthy living behavior" conducted by [Pranata et al](#) (2022) on Class IV students at SDN Pinang Ranti 02 Pag shows that the use of Animaker-based animated videos as learning media is very effective in helping students learn. This is based on the results of the Pearson correlation coefficient at a significance level of 5% or 0.05, which is 0.538. In accordance with the guidelines for interpreting the correlation coefficient, which ranges from 0.40 to 0.599, it means that it is correlated or has a moderate effect. (animaker 8) In line with research conducted by [Sidabutar et al](#) (2022) the research was conducted on SMA Negeri 13 Medan class X MIA 2 students in vector material mathematics using learning media with Animaker video assistance. The results showed that learning media made with Animaker applications are practical and can be used. Teacher and student responses showed positive responses based on the percentage of values achieved. Based on the teacher response questionnaire of 80% and student response questionnaire of 78%.

Similar research has been conducted by several previous researchers, such as the development of Animaker-based animated videos on the theme of the area where I live in class IV sdn banjarsari two serang city conducted by [Ningtyas et al](#) (2021). The learning media developed in the form of interactive learning media with the quality of the products that have been developed get a very feasible category with a percentage of 86.9% from two media experts. Students' responses to Animaker-based animated videos received a percentage of 92.72%.

D. Conclusion

Based on the research results, the use of animated teaching materials made with Animaker is practical for teachers to deliver teaching materials on scale material. Based on the evaluation of the effectiveness of using animation, a high level of utility signifies success. In order to obtain this category, the researcher has improved and developed, and although

the results obtained do not need to be improved, the researcher has the impression that some content needs to be improved, so the researcher makes improvements. The final result of the evaluation of the effectiveness of the use of animated materials in Animaker is strongly supported by the educators' findings that the animated content is appropriate and easy to use with the materials presented.

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