Development of PowToon Media on Natural Resources Material to Increase Learning Interest and Logical Thinking of Learners in Elementary School

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Abstrak
Penelitian ini bertujuan untuk mengembangkan video animasi yang dapat membantu memproyeksikan gambar berbagai sumber daya alam dengan kemajuan teknologi karena di era society 5.0 pendidik harus dapat menggunakan metode pembelajaran yang lebih menarik. Dengan adanya media audio visual ini akan meningkatkan minat belajar siswa. Selain itu juga untuk mengetahui kelayakan dan efektivitas hasil pengembangan video animasi berbasis Powtoon. Penelitian ini menggunakan metode Research and Development (RnD). Model penelitian ini menggunakan ADDIE yaitu analisis, desain, pengembangan, implementasi, dan evaluasi. Teknik pengumpulan data yang digunakan adalah angket dan tes berupa data deskriptif kuantitatif. Media yang akan digunakan untuk pembelajaran dikatakan valid oleh ketiga ahli dibuktikan dengan hasil (1) ahli materi mempunyai persentase validitas sebesar 81% (2) ahli media sebesar 84% (3) ahli bahasa sebesar 75% . Setelah dinyatakan valid, media tersebut diujicobakan kepada siswa kelas IV SDN Kalanganyar. Berdasarkan hasil analisis uji t pre-test diperoleh nilai rata-rata sebesar 60,0 dan post-test sebesar 78,5. Karena nilai sig. (2-tailed) atau uji 1 sebesar 0,00 yang berarti ≤ 0,05 maka dapat disimpulkan Ho ditolak, Ha diterima. Kesimpulan yang dapat diambil dari hasil penelitian ini menunjukkan bahwa terdapat pengaruh yang signifikan dari video animasi sehingga dapat meningkatkan minat belajar dan berpikir logis siswa kelas IV SDN Kalanganyar.

Kata kunci: media powtoon, animasi, powtoon media, minat belajar, berpikir logis

Abstract
This study aims to develop animated videos that can help project images of various natural resources with technological advances. In the era of society 5.0, educators must be able to use more interesting learning methods. This audio-visual media will increase students' interest in learning. In addition, it is also to find out the feasibility and effectiveness of the results of developing PowToon-based animated videos. This study uses the Research and Development (RnD) method. This research model uses ADDIE, namely analysis, design, development, implementation, and evaluation. Data collection techniques used are

questionnaires and tests in descriptive quantitative data. The media that will be used for learning is said to be valid by the three experts as evidenced by the results: (1) material experts have a validity percentage of 81% (2) media experts are 84%, (3) language experts are 75%. After being declared valid, the media was tested on class IV SDN Kalanganyar students. Based on the pre-test's t-test analysis, the average value is 60.0, and the post-test is 78.5. Because the value of sig. (2-tailed) or test 1 of 0.00, which means ≤ 0.05, it can be concluded that Ho is rejected, and Ha is accepted. The conclusions that can be drawn from the results of this study indicate that there is a significant influence from animated video so that can increase interest in learning and logical thinking of fourth-grade students at SDN Kalanganyar.

Keywords: powtoon media, video animation, interest in learning, logical thinking

INTRODUCTION

Education is a conscious effort to create an atmosphere and process of teaching and learning activities so that students actively develop their potential for religious strength, self-control, personality, intelligence, akhlaqul karimah, and skills that exist in themselves. For themselves, society, the nation and the people of the state (Andhini, 2017). Basically, education encourages humans to develop their potential to face all the changes that come with advances in science and technology (Herliani & Heryati, 2017). There are still various problems in the teaching and learning process, especially in science subjects, where there are some abstract science materials such as natural resources. Hence, it is relatively difficult for students to learn. Therefore, it is not enough for teachers to explain the material alone but there needs to be a learning component that supports the teaching and learning process such as using learning tools or media to make it easier for students to understand the material (Safira et al., 2020).

This research occurs because of the problems faced by educators who are accustomed to using gadgets and laptops. However, these technological facilities have not been used properly to develop learning media that can increase students' interest in learning due to the lack of creativity of educators in developing a computer technology-based learning media (Iskandar, 2019). This has an impact on the provision of learning that is less interesting and also decreases student interest in learning because learning is still conventional. Teachers mostly use the lecture or listening method in learning without students seeing something so that they get bored quickly even though there are many learning styles of students including auditorial, visual, and kinesthetic which makes teachers not only rely on the lecture method alone. This of course affects the logical thinking of students. Based on the results of observations, it was found that students' logical thinking skills were still lacking. The difficulty level of the teacher's questions has been adjusted to the students' ability level, namely difficult, medium, and easy. However, while working on the problem, many students still get minimal scores or are less than the minimum completeness criteria (KKM) (Prasetya, 2012).

Based on the problems educators and students face through observations and interviews at school, a learning media is needed to increase students' interest in learning. An interactive and new media that is easy to make, inexpensive, and takes a short time but provides effective and efficient results in the learning process applications that can answer

these problems are Powtoon applications with media support components, namely Photoshop and Adobe Premiere application programs (Nurseto, 2012).

According to Faris "Animation is a medium. Media to change something, from an imagination, idea, concept, visual, until finally influencing the world is not only a barrier in animation. An animated video itself is a moving image that comes from a collection of various objects each of which is defined (Nurrita, 2018). The relevant objects are images of people, text, animal images, plant images, buildings, and others that are specially arranged so that they move according to their flow. Therefore, this digital technology can be used in the world of teaching and learning, especially in the field of education on natural resources material. This material is very suitable to be developed using digital media because in it there are many explanations of the types of natural resources and their benefits so that it will be easier to attract student interest in learning. Powtoon media is an application program through Google on the Internet that functions as an application for making animated videos for presentations in the teaching and learning environment (Ponza et al., 2018). Interest in learning is a person's internal drive to engage in learning activities to improve knowledge, skills, and experience. This interest grows from the desire to know and understand something that stimulates and guides students' interest in learning so that they are more serious in their learning. and also the ability to think logically is an important role in understanding to solve science problems. According to Syafmen Marbun, understanding concepts that are not supported by logical thinking causes students to have good intuition about the concept but cannot solve problems. This is in accordance with several research findings that show that reasoning skills play an important role in academic achievement and student concept formation (Septiati, 2018).

This study refers to previous research conducted by Purnamasari (2019) with the results of the trial, namely the product after being tested by media experts resulted in a percentage value of 90% with very feasible qualifications and a percentage value of 93% from material experts with very achievable qualifications. In the small group test, a percentage of 92% was obtained with very good capabilities and in the significant group test with a rate of 90% with excellent qualifications (Purnamasari, 2019). The shortcomings of the previous research are the lack of interaction between educators and learners which slows down the creation of value in the learning process, the displacement of academic and social aspects by business/commercial aspects, the obstruction of learning activities due to problems in the distribution of teaching materials, the lack of motivation of learners which has the potential to cause failure in learning, the element of novelty from the previous research is that this research and development uses the ADDIE method which includes small and large group feasibility testing stages from among students. The results of the test produced facts about the feasibility of using animation-based visual media among adult.

The urgency of this research is that learning is more fun to make students not quickly bored in learning and can be used as a basis for educators to obtain information about student misconceptions in natural science subjects to construct science. Then, when this happens, educators can guide students to correct the misunderstanding so that the misunderstanding does not recur. Therefore, it is essential to know and train students' in logical thinking and problem solving processes. Thus, the researchers developed learning media using the latest Powtoon application with the help of an application program that is able to support the running of this media. The use of this media is done in order to create a new and more exciting learning atmosphere (Hartina, 2020). This research aims to develop animated videos to help project a picture of various natural resources with technological advances because in the era of society 5.0 educators must be able to use more exciting learning methods. With this audio

visual media, it will increase students' interest in learning. In addition, it is also to determine the feasibility, and effectiveness of the results of the development of Powtoon-based animation videos.

METHOD

This research uses the research and development (R&D) method. According to Sugiyono (2011: 333), the R&D research method is a research method used to create specific products and test the effectiveness of these products. R&D research is the process of developing and determining the validity of a product. The development research conducted by researchers is the development of products in the form of videos using POWTOON as a learning resource and then product validation. Data collection for this development research is observation, questionnaire, pre test, post test and documentation. For media feasibility through validation tests and effectiveness tests carried out by giving or distributing questionnaires to all respondents. In the expert validation analysis technique using descriptive quantitative analysis techniques to process data obtained from questionnaire assessment scores that have been filled in by validators and if there are deficiencies or suggestions from experts, the media must be revised according to input from experts and using comparative analysis techniques using SPSS 25 for the results of the effectiveness test or T test on students (paired sample test). The research design of this media development uses the ADDIE development study developed by Dick and Carry which is carried out in five stages, namely analysis, planning, development, implementation and evaluation (Andhini, 2017). ADDIE is a generic learning design model that serves as a guide for building efficient, dynamic and educational programming tools and infrastructure(Hidayat & Nizar, 2021) and can be presented on the ADDIE model design chart as shown at Figure 1.
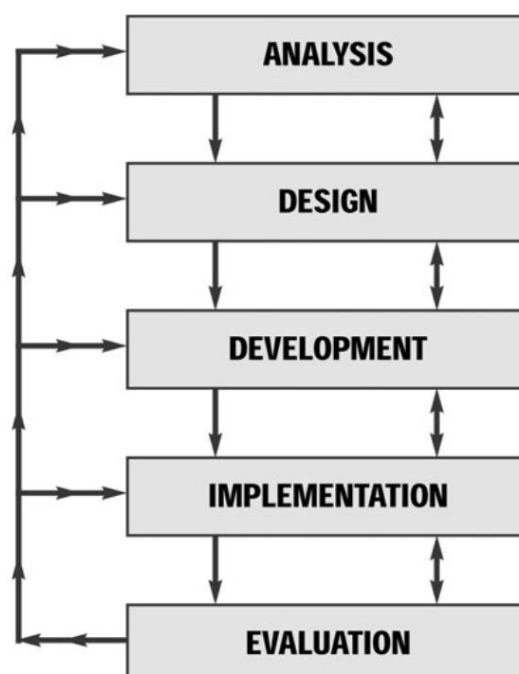

Figure 1. Development of the ADDIE model
Source : (Molenda, 2015)

The reason the researcher chose to use the ADDIE development method is because this development model has an advantage in the systematic completion of work. Each phase

is evaluated and revised from the stages passed, so that the resulting product becomes a valid product.

1. Analyze (needs analysis); at this stage the researcher analyzes problems based on field studies which include fundamental competency analysis, needs analysis and characteristic analysis.
2. Design; researchers began to design assessment instrument sheets or student and teacher response questionnaires to develop animated video media, make pre-test and post-test questions and compile materials to be prepared.
3. Development; at this stage includes validation, revision, individual, small group and large group tests. Products that have been validated by experts will be revised by researchers according to input from experts, media that have been made and revised will be tested on individuals, small groups and large groups so that the final product results are feasible.
4. Implementation: At this stage the product is tested on grade IV students of SDN Kalanganyar then provide questionnaires for students and teachers to get response data on the product being tested.
5. Evaluation.
6. The evaluation stage is giving pretest and post test questions to get data on whether the animation video is effective for increasing student interest in learning and improving the learning video according to student input.

Results of expert validation of powtoon animation video products

From the three experts, namely media/design experts, material experts and language experts who will assess the product which contains several questions using a Likert scale. (Jebb, A. T., Ng, V., & Tay, L., 2021). The results of the percentage calculation obtained from the information in the questionnaire are then interpreted with the size of the assessment criteria. Then the size of the assessment criteria obtained, the size of the assessment criteria as presented in the Table 1.

Table 1: Validity assessment categories

Intervention score	Assessment category	Description
3,6 ≤ P < 4	Very good	Without revision
2,6≤ P < 3,5	Feasible	Minor revision
1,6≤ P < 2,5	Less feasible	Major revision
1 ≤ P < 1,5	Not feasible	Cannot be used

The score can be calculated using the formula:

$$Percentage = \frac{\sum Score \; x \; component \; weight}{n \; x \; score \; highest} \; x \; 100\%$$
(Formula 1)

After getting the score value, the product is categorized as feasible if it meets the following feasibility categories, as shown in Table 2. The product is declared feasible if it has a value> 61 with good or very good qualifications from the results of expert or student validation.

Table 2. Expert validation eligibility categories

Achievement level	Qualification	Description
81% - 100%	Very good	No revision
61%-80%	Good	No revision
41%-60%	Simply	Revised
21%-40%	Less	Revised
0%-20%	Not at all	Revised

Student questionnaire results

After making revisions, the learning video media was tested on students. The research subjects were 25 fourth grade students at SDN Kalanganyar. The following is an analysis of the questionnaire assessment from students as shown in Table 3.

Table 3. Guttman scale scoring

Score	Description
Score 1	Yes
Score 0	No

Source : (Sugiyono, 2015)

The questionnaire results can be calculated using the following formula:

$$NP = \frac{n}{N} \ x \ 100\% \qquad \text{(Formula 2)}$$

(Riduwan, 2009)

The data that will be obtained from the results of the pretest and post test questions will be tested to find the average results of the test to determine the effectiveness and magnitude of the influence of animated videos in learning.

RESULTS
Needs Analysis

The first stage in this step is to conduct a needs analysis which includes problem identification. In conducting a needs analysis the author first identifies the problems that exist in learning, especially in natural resource material analyzing the learning media used. The problem that exists in this material is that students do not understand the benefits and types of natural resources because the way the teacher delivers mostly uses the lecture method during the learning process and directlay works on the worksheet. So that at this stage the researcher can determine the media to be developed as shown in Table 4.

Table 4. basic competencies and core competency

Basic competencies	Competency indicator
Explain the relationship between natural resources and the environment	• Mention the types of natural resources in the environment • Explain the benefits of natural resources • Explain the relationship between natural resources and the environment

In addition to analyzing student needs, an important thing that needs to be done is an analysis of student characteristics. This analysis includes the actual abilities of students and

one of the efforts made to gain an understanding of the demands, talents, interests, needs and interests of students, related to a particular learning program and student learning styles as well as adjusting to kinesthetic, visual, auditory and audiovisual learning styles.

Design

At this stage the researcher begins to collect data which includes material collection, material collection, research instruments and programming of learning media that use animated videos and will be developed according to the results of the analysis conducted previously. The making of this animated video media is divided into three parts, namely the initial part, the content part, and the final part. The initial part of PowToon search at www.google.com then the login page uses a google account if you have created an account and sign up for those who have not created an account, create animation templates including animated explainer, white board video, presentation, marketing video, branded character, screen & cam recording, infographics, video from powerpoint. Create animated explainer template then choose template. Use the appropriate template then click edit in studio.

The media content section consists of several slides in the template, edit studio view and several menus for editing, namely backgound, text, characters, props, shades, images, videos, audio and contains explanations of the contents of the material coherently and supporting animations. The final part consists of a save menu or called saving to the device, export or also called sharing on social media sites such as YouTube, other supporting applications such as Adobe Premiere Pro, Filmora, After Effect and others. As well as profiles and reference materials used in the media. At this stage the researcher determines the learning objectives and develops test items or questions to measure student progress and achievement of the objectives set and the development of learning strategies. to increase learning effectiveness. Images on the media are obtained by downloading them from several websites. www.google.com, www.freepik.com.

Table 5. Learning video design

NO	Before revision	After revision	Description
1.			From the media expert's input, the background should be changed because usually the most dominant color is the one that first focuses on students, namely yellow and also added a greeting to the opener.
2.			In the grouping of natural resources, there should be text and pictures of each group to make it easier for students. For example, from plants given a relevant picture.

Table 5. (continued) Learning video design

NO	Before revision	After revision	Description
3.			Pictures of fruits and vegetables should be enlarged to appear alternately and the name of the fruit or vegetable should be written below the picture.
4.			The explanation of the coffee plant should be replaced with natural resources derived from animals because there is no narration from animals in the video.

Development

Material expert test

The first stage of data obtained from content experts (class IV teacher SDN Kalanganyar) the data was obtained through observations and questionnaires with material experts. The following data is in the form of a summary of the material, suitability for indicators, input and suggestions from material experts to improve powtoon media development products as shown in Table 6.

Table 6. Material expert test instrument

NO	Material expert validity test	percentage
1.	Stage I	54%
2.	Stage II	81%

Based on Table 6, it can be seen the results of consultation with material experts in the first and second stages, animated video media using powtoon on natural resource material to increase students' interest in learning and logical thinking, as listed in table 6. In the first stage, the percentage of material experts was 54% while the second stage got 81%. the percentage results are obtained from the number of scores multiplied by the weight of the highest component divided by the number of statements multiplied by the weight of the highest component multiplied by 100%:

$$\text{Percentage} = \frac{\sum Score \; x \; componen \; weight}{n \; x \; score \; highest} \; x \; 100\%$$

$$\text{Percentage} = \frac{9x4}{11x4} x100\% = 81\%$$

Because the highest weight of each choice is 4 and the researcher gets a validation weight of 9 on each item, the percentage of material test choices is 81% after being converted to the conversion table. The percentage of the level reaching 81% is in the best qualification according to the learning media on natural resource material so that the effectiveness test can be carried out.

Media expert test

The second stage is the media expert test in the form of an animated video which is carried out to test whether the media to be used is appropriate and can be tested in the field. The following are descriptive results of validation results from media experts on development products.

Table 7. Media expert test instrument

NO	Media expert validity test	percentage
1.	Stage I	53%
2.	Stage II	84%

Based on Table 7, it can be seen that there are differences in the results of consultation with media experts and researchers to media experts in the first and second stages. In the first stage, the percentage of media experts of 53% had to make revisions, because the validity did not reach good criteria. Revisions are made so that the learning media is suitable for use. Comments and suggestions by media experts "From the input of media experts, the background should be changed because usually the most dominant color is the one that first focuses on students, namely yellow and also added greetings to the opener. In the font section, one color should be enough and the font type should be replaced with a clearer one. In the picture below, add natural resources derived from animals and abiotic ". While the second stage gets 84%. the percentage results are obtained from the number of scores multiplied by the weight of the highest component divided by the number of statements multiplied by the weight of the highest component multiplied by 100%:

$$\text{Percentage} = \frac{\sum Score \; x \; component \; weight}{n \; x \; score \; highest} \; x \; 100\%$$
$$\text{Percentage} = \frac{11x4}{13x4} x 100\% = 84\%$$

Due to the highest weight of each choice of 4 each item and the number of statements 13, the media test percentage is 84% after being converted to the confection table. The percentage reached 84% is in the best qualification so that it can continue the field test.

Linguist test

The third stage is the linguist test in the form of an animated video which is carried out to test whether the media to be used is appropriate and can be tested in the field. The following are descriptive results of validation results from media experts on development products.

Table 8. Language expert test instrument

NO	Language expert validity test	percentage
1.	Stage I	75%
2.	Stage II	75%

Based on Table 8, it can be seen that there are differences in the results of consultations with linguists and researchers to language experts. In the first stage, the percentage of media experts is 75%, so the learning media is suitable for use according to the qualification level and does not make revisions. The percentage result is obtained from the number of scores multiplied by the weight of the highest component divided by the number of statements multiplied by the weight of the highest component multiplied by 100% as formulated below :

$$\text{Percentage} = \frac{\sum Score \ x \ component \ weight}{n \ x \ score \ highest} \ x \ 100\%$$

$$\text{Percentage} = \frac{3x4}{4x4} x100\% = 75\%$$

Because the highest weight of each choice is 4 each item and the number of statements is only 4, the media test percentage is 75% after being converted to the confection table. The percentage of 75% is in the best qualification so that the field test can be continued.

Implementation
Individual test

Based on the results of the individual trial (1 person) on the animation video, the percentage level of achievement of the individual test can be calculated:

Table 9. Individual test questionnaire data

Number of learners	The number of students' scores for each indicator	Total of all questions
1	10	10

$$NP = \frac{n}{N} \ x \ 100\%$$

$$NP = \frac{10}{10} \ x \ 100\% = 100\%$$

Based on the individual test questionnaire there is a positive response, in the field test students are very interested in this learning media but students have not explored but in the questionnaire provide a good assessment. After conversion with the conversion table there is a 100% success rate with qualifications that are feasible and appropriate, so that the learning media can continue in small group tests.

Small group test

Based on the results of the individual trial (7 people) on the animated video, the percentage level of achievement of the small group test can be calculated:

Table 10. Small group test questionnaire data

Number of learners	The number of students' scores for each indicator	Total of all questions
7	70	70

$$NP = \frac{n}{N} \ x \ 100\%$$

$$NP = \frac{70}{70} \ x \ 100\% = 100\%$$

In the field test there were some students who did not understand about the grouping of natural resources and how to preserve them and so on, but the educator explained verbally to stimulate the images presented. After conversion with the conversion table there is a 100% success rate with qualifications that are feasible and appropriate, so that the learning media can continue in the large group test.

Large group test: Based on the results of the large group test (25 people) against the animated video, it can be calculated the percentage level of achievement of the large group test:

Table 11. Large group test questionnaire data

Number of learners	The number of students' scores for each indicator	Total of all questions
25	250	250

$$NP = \frac{n}{N} \ x \ 100\%$$

$$NP = \frac{250}{250} \ x \ 100\% = 100\%$$

In the field test there were some students who did not understand about the grouping of natural resources and how to preserve them and so on, but the educator explained verbally to stimulate the images presented. After conversion with the conversion table there is a 100% success rate with qualifications that are feasible and appropriate, so that learning media can continue at the evaluation stage.

Figure 2. Animation video implementation

Evaluation

In this last stage, researchers gave pretests and postests to fourth grade students of SDN Kalanganyar to determine the effectiveness of a learning media before and after it was applied. At this stage, students can increase their interest in learning and logical thinking through posttest and pretest results.

Table 12. Paired sample

		Mean	N	Std. deviation	Std. Error Mean
Pair 1	pre test	66.40	25	14.686	2.937
	post test	85.60	25	10.832	2.166

This first SPSS output explains the statistical data from paired samples, namely samples before and after the test. The data before the test shows the average test value of 66.40 out of 25 data used. Has a standard deviation of 14.686 and standard error mean data of 2.937.

the data obtained after the test shows an average value of 85.60 with a total of 25 data. Has a standard deviation of 10.832 and a standard error mean of 2.166.

Table 13. Paired sample correlations

	N	Correlation	Sig.
Pair 1 pretest & post test	25	.787	.000

Through the second output result, it is known that the correlation value is 0.787 with a significance of 0.000, because the significance result of 0.000 <0.05, it can be concluded that there is a significant relationship between the test scores before and after the test. If the correlation value obtained is closer to 1, it is stated to have a stronger relationship. If the correlation value obtained is close to 0, the correlation relationship is weaker. Through the data above, it is known that the correlation value is 0.787 (close to 1), so it can be concluded that the relationship is strong.

Table 14. Paired sample test

	Mean	Std. Deviation	Std. Error mean	Lower	Upper	t	df	Sig. 2 (tailed
Pair 1 pretest-post test	-19.200	9.092	1.818	-22.953	-15.447	-10.559	24	.000

Through the third output result, the mean or average value in the table above can be seen the difference between pretest and posttest learning outcomes, namely the pretest results show an average value of 66.40 and the posttest results show an average value of 85.60. Therefore, the p-value or sig. (2-tailed) of 0.000 which means (<0.05), it can be interpreted that Ho is rejected and Ha is accepted. This has a significant effect on the average pretest and posttest scores. The developed media can achieve feasibility, practicality and effectiveness because the media is validated in advance by three experts namely material experts, media experts, and linguists. Validation was carried out twice to get very valid results so that they could be tested in schools. After that, the media was tried out to determine the level of effectiveness, namely by giving pretest and posttest to students. Before the learning animation video is applied, students are given pretest questions to do first. After that the researcher showed a learning animation video so that it could be seen by students. After that the students returned to work on the post test questions. This is where researchers can compare the level of effectiveness of implementing PowToon-based video animation media. PowToon media can increase students' interest in learning and logical thinking skills because it has an important role, especially in lower grades, because students are not yet able to think abstractly, so the material taught by the teacher needs to be visualized in a more concrete or concrete form. Therefore the researcher uses PowToon media as a fun and effective learning media and does not require a long time to make. This data shows a significant increase in the average learning outcomes of students after receiving different treatments, namely before using animated video media and after using animated video media. Because one of the criteria for learning outcomes is called effective if the value or learning outcomes of students are above the KKM. This of course affects the level of logical thinking of students. From the explanation above, learning media using video animation is effectively used in learning,

because if the learning media is used, students easily understand the lessons conveyed by educators using video animation of natural resource material to increase students' interest in learning and logical thinking.

CONCLUSIONS

The feasibility level of learning media using animated video media is said to be feasible to use, because it can be proven by the results of product trials to experts. The following results are obtained to test the feasibility of learning media using animated videos: (a) The results of the material expert validation have a validity score of 81 , which means that the animated video in natural resource material is valid or can be tested in the field; (b) The results of media expert validation have a validity score of 84 , which means that learning media using animated videos can be tested; (c) The results of linguist validation have a validity score 75, which means that the animated video learning media in natural resource material is valid. The effectiveness of learning media using this animated video is obtained from the learning outcomes of students using a field test with a comparative analysis or T test using SPSS 25. The results of the t test analysis of the pre-test average value of 66.4 and post-test 85.6. Because the sig. value (2- tailed) or p-value of test 1 of 0.00 which means <0.05, it can be interpreted that Ho is rejected and Ha is accepted. This shows that there is a significant influence on learning media. Thus learning media that use this animated video can be said to be feasible to use and have good quality. Due to the application of learning media using animated videos, it can make it easier for students to project a picture of the grouping of natural resources and their benefits so that it can increase the interest in learning and logical thinking of students in class IV SDN Kalanganyar.

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