Development of 3-Dimensional Cartoon Animation Videos to Improve Higher Order Thinking Skills of Elementary School Students

by Febrina Dafit

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Zaka Hadikusuma Ramadan[1*], Mitha Dwi Anggriani[1], Febrina Dafit[1]

[1] Universitas Islam Riau, Pekanbaru, Riau, Indonesia

Abstract: This research aims to develop 3-dimensional cartoon animation video media to improve the Higher Order Thinking Skills (HOTS) of fourth grade elementary school students. This research uses an R&D method that adopts the ADDIE model with five stages, namely (Analysis, Design, Development, Implementation and Evaluation). The data collection instruments used were questionnaires given to design validators, material validators, language validators for feasibility, teacher and student responses to test practicality and tests to test the effect of 3-dimensional cartoon animation video media on students' Higher Order Thinking Skills (HOTS). The results of this research produced a 3-dimensional cartoon animated video media product that can be used at the elementary school level as a learning medium that meets the very appropriate criteria with an average score of 92.65% from the design validator, 92.19% for the material and 88 for the language validator. 75%. The response given by educators was 92.5% in the very interesting category and small-scale trials carried out by students received a score of 93.33% in the very interesting category. Video media is also able to increase the Higher Order Thinking Skills (HOTS) of fourth grade elementary school students based on product effectiveness test results by obtaining a significance value of 0.00 < 0.05.

Keywords: Cartoon Animation; Higher Order Thinking Skills (HOTS); Media Videos

Introduction

Along with the times, science and technology are also experiencing developments that are increasingly sophisticated (Dafit, 2019). One aspect of life that has been influenced by the development of science and technology is the educational aspect (Akbar & Anggraeni, 2017), where with learning almost all schools use quite sophisticated technology. To improve the learning process, educators make learning media more innovative that encourage students to learn optimally. With the development of technology and digital, it makes it easier for teachers to create attractive learning media at an economical cost.

The role of the teacher is not only responsible for educating and teaching, but the teacher also plays a role in preparing learning tools, one of which is learning media (Tobamba et al., 2019). The role of learning media in the learning and teaching process is an inseparable unit from the world of education (Tafonao, 2018). The creativity of teachers in designing learning tools is very influential on the success or failure of the learning process to be carried out. Learning using media is very useful for clarifying the material, stimulating students' thoughts, feelings, and abilities so that it can encourage an effective and efficient learning process (Agustira & Rahmi, 2022; Sapriyah, 2019; Zaki & Yusri, 2016). This is in line with his opinion (Wahid, 2018) that educational media have positive forces and synergies that are able to change their attitudes and behaviors towards creative and dynamic change. Media has an absolute value that must exist or must be utilized in every learning (Magdalena et al., 2021). It is said that because if one of the components does not exist, the results obtained will not be optimal.

Based on the researcher's professional experience with one of the grade IV elementary school teachers, information was obtained that the school is equipped with various adequate facilities and infrastructure, one of which is infocus and related to the electrical power in the school is strong enough to support the learning process, but there is still a lack of teachers in utilizing these facilities and infrastructure for the use of learning media in the classroom, and the learning carried out by the teacher in delivering the subject matter only explains the material through conventional media such as the blackboard, resulting in students appearing less interested, and quickly getting bored with learning. Students are sometimes unable to imagine the material presented by the teacher. This is because students have not been able to fully understand the material being taught, so the learning outcomes are still low. Furthermore, based on a statement from one of the class IV teachers, information was obtained that on theme 6 sub-theme 2, especially in learning 1 which contains subjects Indonesian with material on poetry my ideals and subjects of Natural Sciences (IPA) with animal life cycle material is considered quite difficult for students, this is evidenced by an average score of around 57% of the learning outcomes of IVA elementary school class students have not reached the Maximum Completion Criteria (KKM) that have been set teacher i.e. 76.

The media that is often used by teachers in the classroom only utilizes surrounding objects and uses media in the form of images only so that the learning carried out is not optimal, for example, the use of small images can make it difficult for students sitting in the back to see them. This is in line with the opinion (Septianova & Rusiyanto, 2017) says the medium of images cannot help students to make a summary of the material. In addition, the small image media makes it difficult for the child sitting in the back to see the picture.

One way that teachers can use in making the learning atmosphere more effective and efficient is to use various learning media, one of which is animated video media. Animated video media is a type of media that uses the ability of the ear or sense of hearing and the senses of the eyes or vision (Pamungkas & Koeswanti, 2021; Nurwahidah et al., 2021; Ardhianti, 2022). In line with it is expressed also by (Fatonah, 2019; Budiarsini, Divayana, & Sindu, 2020) that animated video is a medium or intermediate tool used in helping the learning process by displaying moving images in the form of cartoons so that it can attract the interest in learning and attention of students in the learning process. The media can stimulate the mind, attention so that it can encourage a controlled and interesting learning process (Putra & Prijowuntato, 2021) and can help understanding a learning material (Fatmawati et al., 2018). (Febrianto et al., 2020) argue that using video media has higher learning outcomes than not using video media. Video media has the potential to be preferred by students, this is because through video media students can watch and imagine what is presented at the time of the video screening (Sih & Martini, 2019).

Previous research findings state that video media can be used in the learning process. Therefore, researchers are trying to create innovative learning following technological developments, thereby improving students' Higher Order Thinking Skills (HOTS) by developing 3-dimensional cartoon animation videos to improve the Higher Order Thinking Skills (HOTS) of grade IV elementary school students.

Method

The type of research used is research and development, namely the development of 3-dimensional cartoon animation video-based learning media for grade IV elementary school students. In developing this video media, researchers used the ADDIE model. According to (Qondias et al., 2016) a learning design model that is more generic in nature is the ADDIE model with 5 stages, namely Analysis, Design, Delevopment, Implementation & Evaluate. This model is one of the systematic learning design models (Tegeh & Kirna, 2013).

The creation of this cartoon animated video media uses the help of application programs such as plotagon story, kinemaster, automatic speech recognition (ASR) and factory format. The types of data that will be obtained from this study are in the form of primary data and secondary data. Furthermore, the instruments used are validation sheets, questionnaires, tests and documentation and the data obtained will be analyzed qualitatively and quantitatively. There are three data collection techniques, namely:

The questionnaire of needs in the development of this product will be analyzed using descriptive qualitative by presenting data through several questions according to the circumstances and needs that exist at the time of research without any calculations in it are all described in a descriptive form.

The validation questionnaire that will be given to material, language, and design experts and teachers, in this research and development using the Likert scale and measurements that refer to the book essay (Riduwan, 2016). Quantitative analysis is the provision of questions that will be generated scores in this case can be seen in the formula 1.

$$P = \frac{\Sigma X}{\Sigma X i} \times 100\ \% \qquad (1)$$

Information:

P　　　　　: Percentage
∑x　　　　: The total number of respondents' answers in the whole item
∑xi　　　　: Ideal overall score count

To determine the criteria in determining the result of validation, as follows:

Table.1 Product Validity and Revision Levels

Percentage (%)	Valid Criteria
76-100	Valid (without revision)
56-75	Quite valid (without revision)
40-55	Less valid (revision)
0-39	Invalid (revision)

Source: (Listiawan, 2016)

"Response questionnaires are used to collect data on learners' responses to video media developed using the Guttman Scale. According to (Riduwan, 2016) the guttman scale is a scale used for clear (firm) and consistent answers. For example: Sure-Unsure; Yes-No; True-False; Positive-Negative; Penah-Never Ever; Agree-Disagree; and so on. To find out the position of the percentage of "yes" answers obtained from the questionnaire, it is calculated first and then placed in the percentage scale range as follows:

Answer Value "yes" = 1
Answer Value "No" = 0
Converted in percentage terms :
Answer "Yes" : 1 X 100% = 100%
Answer "No" : 0 X 100% = 0%

Analysis of the effectiveness of 3-dimensional cartoon animated video media using paired sample t test and independent sample t test data analysis techniques. 1) The paired sample t-test is used to see the influence of free variables on bound variables. The level of significance used is 5%. The data was processed with the help of a computer using SPSS release 24 with criteria if the significance < 0.05 means Ho was rejected, Hi was accepted and 2) The independent sample t-test was used to determine the difference in bound variables between groups of students who were treated. The significance level uses 5%. The data was processed with the help of a computer using SPSS release 24 with criteria if the significance of < 0.05 means Ho is rejected, Hi is accepted. Before conducting the hypothesis test, prerequisite tests will be carried out such as normality tests and homogeneity tests.

Result and Discussion

This media development uses the ADDIE development model with five stages, namely Analysis, Design, Delevopment, Implementation, Evaluation. The description of the data of the results of the study is described as follows:

Analysis

The results of the needs analysis which is a reference in the development of 3-dimensional cartoon animation video-based learning media are obtained based on student needs analysis, teacher needs analysis, learning environment analysis and curriculum analysis. Analysis is carried out to obtain information in developing cartoon animation video media according to student needs in the learning process, including:

a) Analysis of the educator (teacher)

This research was developed from problems that arise during the learning process, teachers in delivering lesson materials in class only explain the material through conventional media, so that the learning carried is not optimal and Teachers have not used varied learning media, teachers should be able to present a creative learning media and attract students' attention to learning. Therefore, researchers are trying to present alternatives to overcome these problems, solutions that are considered effective, namely developing learning video media. In developing this video media, researchers present interesting displays and present 3-dimensional cartoon animations in it.

b) Analysis of student needs

At this stage of the analysis, researchers conduct interviews with teachers to obtain information related to student characteristics and learning outcomes obtained by students. In addition, researchers also conduct interviews with students to obtain illustrative information in making 3-dimensional cartoon animation-based learning video media that matches what students want.

Based on the results of an interview conducted with one of the teachers of grade IV elementary school, researchers obtained information that the characteristics of grade IV elementary school students are in a concrete operational stage, namely the period when children's activities are focused on real objects or on various events that have been experienced. This is in line with Piaget's opinion (dalam Juwantara, 2019) states that this stage the child has understood logical operations with the help of concrete objects, without real objects children at the concrete operational stage still have great difficulty in solving logic tasks. Furthermore, based on the results of the interview, it can also be concluded that the theme y ang is considered quite difficult for students to lie in theme 6, especially in sub-theme 2 of learning 1 which includes subjects Indonesian about poetry and natural science (IPA) subjects regarding the life cycle of animals. For this reason, the media is very influential on the learning process for students. Therefore, researchers try to provide alternative solutions by developing 3-dimensional cartoon animation video-based learning media on the theme of 6 sub-themes 2 for learning 1.

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Furthermore, based on the results of interviews conducted with three grade IV elementary school students, researchers get information about the video media description they want, as for the picture is that they want a learning video media that is different from the learning videos they often see such as there are interesting and color-rich images, not too much writing, there are evaluations / assignments at the end of the video and combined with moving animations such as like a character in a cartoon movie. Therefore, researchers try to provide alternative solutions to students' opinions by developing interesting and fun cartoon animation video media.

c)　Learning Environment Analysis

Based on the results of an interview conducted with one of the grade IV elementary school teachers, the researcher obtained information that the elementary school was equipped with various adequate facilities and infrastructure such as infocus and related to electrical power was strong enough to support the teaching and learning process. Thereis still a lack of teachers in utilizing these facilities and infrastructure for the use of learning media in the classroom. Therefore, researchers are trying to provide solutions to present alternatives to take advantage of existing facilities and infrastructure by developing learning video media.

d)　Curriculum Analysis

The analysis carried out is an analysis related to core competencies, basic competencies (KD) and indicators of competency achievement referring to the 2013 curriculum. This analysis will be the basis of the material in the development of cartoon animation video media. This includes:

Table 2. Core Competencies (Knowledge and Skills Competencies)

Core Competencies 3 (Knowledge)	Core Competencies 4 (Skills)
Understanding factual knowledge by observing, hearing, seeing, reading and questioning it based on curiosity about himself, God's creatures and their activities, and the objects he encounters at home and school	Presenting factual knowledge in clear, logical and systematic language in aesthetic work in movements that reflect healthy children, and in actions that reflect the behavior of children of faith and noble character.

Table 3. Basic Competencies and Indicators

No	Competence	Indicators
3.6	Exploring the content and mandate of poems presented orally and in writing with the aim of pleasure	3.6. Knowing how to make a good and correct poem
4.6	Presenting poems made by personal works with proper pronunciation, intonation, and expression as a form of self-expression	4.6.1. Presenting poetry independently well as a form of self-expression
IPA		
3.2	Comparing the life cycles of several types of living things as well as attributing to their preservation efforts.	3.2. Knowing the life cycle of two living things
4.2	Create a life cycle scheme of several types of living beings that exist in the surrounding environment, and slogans of their preservation efforts. in floor gymnastics activities.	4.2.1 Comparing the life cycles of living things and reporting them.

Desain

This stage is planning and making learning videos. Based on the data set that has been obtained from the analysis stage, the learning video design activity process is then carried out. The learning video made is in the form of a 3-dimensional cartoon animation video. In developing video media, there are stages to produce cartoon animation video media, including: (1) Collecting Sources; (2) Develop an Outline of Media Content; (3) Compiling Material Maps; (4) Manuscript Preparation; (5) Production

At this stage, production begins to be carried out based on the finished video media script. Here are the stages in developing video media:

1. Making it starts with creating cartoon animated characters according to the character characters in the story, the researcher creates 3 characters / characters who play the role of mother, child and anchor. The creation of this character uses the plotagon story application.
2. The setting of the scene is adjusted to the story idea to support the achievement of the story. It selects and arranges the scene or venue of a scene (living room scene, news studio, classroom and forest), . Living room and studio news scenes are created using the plotagon story application and classroom and forest scenes are created using the kinemaster application.

3. After the characters and scenes have been selected, the next step is to create conversations between the characters along with the expressions of the characters following the storyline in the script. This creation is done using the plotagon story application.

4. Make edits to the character/character so that the character/character appears to be speaking. These edits were made using the plotagon story app.

5. The next stage is that researchers are still using the plotagon story application to create and arrange 3 characters / characters to play a story in each scene complete with dialogue and expression so that it becomes 3 videos in the form of a 3D film . The 3 videos consist of videos in the living room, videos in news studios and videos with greenscreen backgrounds with high video quality. After the video is finished, then the researcher saves it into the gallery.

6. The next stage is to voice each character following the script using the automatic speech recognition (ASR) application. . ASR makes it easier to fill in the sound becauseit produces clear recording results and can eliminate noise or noise. The voice used in this video consists of 4 types of voices, namely small children's voices, mother's voices, teacher's voices and anchor's voices. Once the sound is all collected, the researcher rendersit to be an mp3 file. The finished file will be uploaded to the kinemaster application and adjusted to the dialog performed.

7. Then create a view of the researcher's biodata which will be displayed at the end of the video. The creation of this biodata uses the kinemaster application.

8. The next stage of the researcher uses the kinemaster application to create intros, initial and closing views of videos, create material that will be discussed in the video such as texts and images about my ideal poems in Indonesian subjects and reading texts and images about the life cycle of animals in Natural Science (IPA) subjects. In addition, researchers also use the kinemaster application to combine video results from the plotagon story application and video pieces from kinemaster, create questions / exercises related to the material, create subtitle text, insert sounds from the ASR application and add backsound and effects on video.

9. Furthermore, all scenes in the video are checked again and aligned with the script to become a complete cartoon animation video.

The following are some visualizations of the results of making 3-dimensional cartoon animation video media on the theme 6 subtheme 2 learning 1:
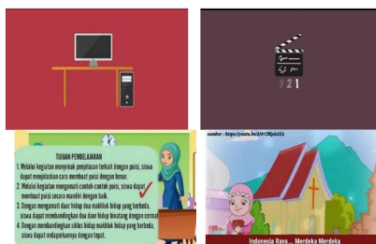

Figure 1. Learning Video Start Page

The initial page of cartoon animation video media on thematic learning consists of an intro / introductory display of the opening of the video, a display of greetings and news to students, a display of competencies to be achieved, the delivery of subjects to be studied such as Indonesian subjects related to poetry and Natural Science subjects related to animal life , then presented a display delivery of learning objectives, , video display of the song Indonesia Raya and ended with the delivery of introductory information before entering the core / content of learning videos such as "Children, mothers there is a very good story. Do children all want to see it? Well, now let's both watch the following story"

Figure 2. Learning Video Content Display

The video content page discusses the learning materials in Indonesian and Natural Knowledge. The content of the material is as follows: 1) the meaning of poetry; 2) the steps of making a good and correct poem; 3) examples of poems about my ideals and the meaning of the poem; 4) the notion of the life cycle of animals; 5) discussion of metamorphosis and its types and; 6) examples of animal life cycles. The content page of the learning video is packaged more attractively by using cartoon animations in its appearance
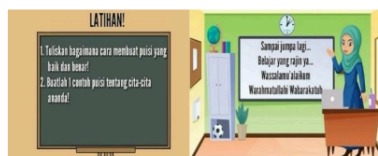
Figure 3. Final View of the Learning Video

The final page of the learning video consists of the final display of the mother and Rara's story, the delivery of learning conclusions, then the provision of final assessments / practice questions for students and ends with the provision of motivation, closing greetings and a display of the, researcher's biodata.

Development

The data obtained in this study includes the validation results of cartoon animation video-based learning media by experts such as media experts, material experts and linguists. The validation results of this video media can be described as follows:

Media Expert Validation

Media experts assess learning media from the media side which includes indicators of technical quality, composition, balance and integration. The results of the assessment of media aspects can be seen in Table 2.

Table 4. Media Expert Validation Results

Validators	Percentage	
	Validation 1	Validation 2
Validator 1	54.41	88.24
Validator 2	91.18	97.06
Combined Value	72.80	92.65

Table 4 above is the result of the assessment of media aspects by media experts on thematic learning video products on validation 1 and validation. Based on data obtained from validation 1, it can be seen that the average percentage of score results achieved from validator 1 and validator 2 is 72.80%. If converted into qualitative data, the cartoon animation video media aspect of this thematic learning is included in the "Quite Valid" category. After the video media is revised based on suggestions and comments obtained from the results of the first validation, then validation will be carried out for the second. The suggestions and comments from validator 1 in validation 1 include: 1) the opening intro is suggested non-copyright; 2) add sources to images and videos quoted from online media such as google and youtube; 3) pay attention to the use of capital letters and punctuation marks on subtitles; 4) an explanation of the life cycle of the animal, preferably the appearance of

the small child figure should be replaced with the mother figure; 5) before getting into the next discussion of the life cycle of animals, it is best to provide information as an introduction first; 6) learning objectives should be reduced so that the teacher's character is not covered; 7) for the news reading display, we recommend incorporating cartoon animations; 8) poetry readings should be corrected again; and 9) before the appearance of the mother and Rara's video story, the teacher should say that there is a story to be shown. And the suggestions and inputs provided by validator 2 include: 1) font selection in conversations between mother and child should be selected with a more informal font style; and 2) the opening animation display is less attractive because it impresses the formal situation. After the video media is revised based on suggestions and comments obtained from the results of the first validation, the second validation will then be carried out. Based on the data obtained from validation 2, it can be known that the validation results of the video media design display in the second validation obtained from a combination of two validators are included in the valid criteria without revision with an average percentage of 92.65%

Material Expert Validation

Material experts assess learning media from the material side, whether the material has achieved the desired learning goals. Material experts assess learning media based on indicators of purpose, appropriateness, technical quality, student ability level and benefits. The results of the assessment of content/material aspects can be seen in Table 5.

Table 5. Material Expert Validation Results

Validators	Percentage	
	Validation 1	Validation 2
Validator 3	75	90.63
Validator 4	87.5	93.75
Combined Value	81.25	92.19

Table 5 above is the result of the assessment of content / material aspects by material experts on thematic learning video products in validation 1 and validation 2. Based on the data obtained from validation 1, it can be known that the average percentage of score results achieved from validator 3 and validator 4 is 81.25%. When converted into qualitative data, the content / material aspects of cartoon animation videos in this thematic learning are included in the "Valid" category. After the video media is revised based on suggestions and comments obtained from the results of the first validation, then validation will be carried out for the second. The suggestions and comments from validator 3 on validation 1 include: 1) apperceptions are

not connected to the material; 2) unexplained examples of living beings undergoing perfect metamorphosis and imperfect metamorphosis; 3) it is not explained how to make a good and correct poem and the meaning of the poem; 4) the subject matter of the language is not very much displayed. And the suggestions and inputs provided by validators 4 include: 1) add sample material of animals undergoing perfect and imperfect metamorphosis; 2) add sources/references to images taken from internet sites; and 3) provide an introduction before getting into the material. After the video media is revised based on suggestions and comments obtained from the results of the first validation, the second validation will then be carried out. Based on the data obtained from validation 2, it can be known the results of validation of content / material on video media in the second validation obtained from a combination of two validators including to the valid criteria without revision with an average percentage of 92.19%

Linguist Validation

Linguists assess learning media in terms of language use which includes communitarian indicators, good and correct use of language according to linguistic rules and conformity with student development. The results of the assessment of language aspects can be seen in Table 6.

Table 6. Linguist Validation Results

Validators	Percentage	
	Validation 1	Validation 2
Validator 5	62.5	85
Validator 6	72.5	92.5
Combined Value	67.5	88.75

Table 6 above is the result of the assessment of language aspects by linguists of thematic learning video products in validation 1 and validation 2. Based on the data obtained from validation 1, it can be seen that the average percentage of score results achieved from validator 5 and validator 6 is 67.5%. When converted into qualitative data, the language aspect in cartoon animation videos in thematic learning is included in the "Quite Valid" category. After the video media is revised based on suggestions and comments obtained from the results of the first validation, then validation will be carried out for the second. The suggestions and comments from validator 5 in validation 1 include: 1) the word umah should use Indonesian only; 2) people's names are capitalized; 3) the content is less relevant to the learning objectives; 4) preferably the child character wears a headscarf; 5) be consistent in vocation to the child and mother; and 6) practice questions should be tailored to the learning objectives. And the suggestions and inputs given by validators 6 include: 1) pay

attention to the use of capital letters; 2) include the source on images and videos taken from google sites such as Indonesia Raya videos; 3) improve poetry readings on Rara's character; and 4) adjust the final assessment (practice questions) to the learning objectives. After the video media is revised based on suggestions and comments obtained from the results of the first validation, the second validation will then be carried out. Based on the data obtained from validation 2, it can be seen that the results of validating language aspects on video media in the second validation obtained from a combination of two validators are included in the valid criteria with an average percentage of 88.75%

The results of the assessment of all aspects of the video by design experts, material experts and linguists on the first validation and the second validation can be presented in the form of Figure 4.
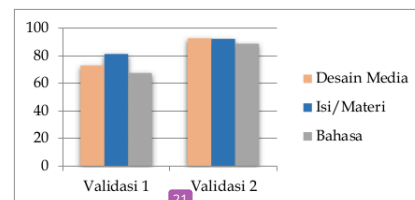
Figure 4. Diagram of the Results of the Assessment of All Aspects of Media 3-Dimensional Cartoon Animation Video

Furthermore, a comparison of the results of the assessment of video media in the first validation and the second validation can be presented in the form of the Figure 5.
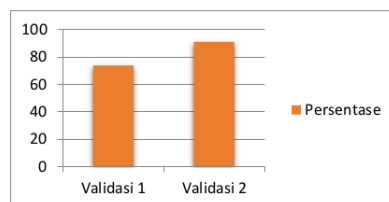
Figure 5. Comparison Diagram of Media Assessment Results 3-Dimensional Cartoon Animation Video

Based on Figure 5, it can be seen that the average value in the first validation was 73.85% with a fairly valid category and in the second validation obtained an average value of 91.20% with a valid category. Furthermore, it can be seen that there was a significant

increase from the first validation to the second validation by 17.34%.

Implementation

After validation by design experts, material experts, and linguists, the responses of teachers and students consisting of two teachers and six class IV students were then carried out. The responses given by teachers and students can be seen in Tables 7 and 8.

Table 7. Teacher Response Class IV

Assessment Aspects	Teacher I	Teacher II
Material Organization	96%	93%
Evaluation and Exercise	95%	91%
Video Media Products	100%	92,4%
Effects on Users	83,4%	94,3%
Average	92,7%	93,15%
Criterion		Very Interesting

From Table 7, the average given by class IV teachers was 93.15% so that they obtained the "Very Interesting" category. In line with the opinion of the teacher who said that this media attracts the attention of students to learn and the level of desire of students to learn increases. Researchers also conducted an assessment to get students' responses to this video media. The results of the responses given by students are found in Table 8.

Table 8. Response of Class IV Learners

Name	Sum	Max Score	Presentatiton	Criterion
SAP	8	10	80%	Interesting
IS	9	10	90%	Very Interesting
PDA	10	10	100%	Very Interesting
MT	9	10	90%	Very Interesting
AS	10	10	100%	Very Interesting
IKS	10	10	100%	Very Interesting
Number of Scores	56	60	93.33%	Very Interesting

Based on table 8 the results of a limited-scale field trial involving 6 learners showed that the total score of 56 out of the maximum score of the statement was 60. Furthermore, it is known that student responses from this limited-scale trial obtained an average assessment prentase of 93.33% with the "Very Interesting" criterion. This is in line with the opinions of students when participating in small-scale trials, according to them, this 3-dimensional cartoon animation video media is interesting if applied in the learning process.

Evaluation

The data in this study were grouped into (1) Higher Order Thinking Skills (HOTS)taught using 3-dimensional cartoon animation video media and (2) Higher Order Thinking Skills (HOTS)taught using image media. After all the data is obtained, the next stage is to analyze the data. The first step is to conduct a data normality test that aims to measure whether the analyzed data is normally distributed so that it can be used in parametric statistics. The normality test was carried out using Kolmogorov-Smirnov, by looking at the values of Kolmogorov-Smirnov and his Asymp.Sig. The criterion for accepting normality is that if the significance value of the calculation result is greater than $\alpha = 0.05$ then the distribution is normal, on the contrary if it is smaller than $\alpha = 0.05$ then distribution is declared abnormal. A summary of the results of the normality test of pretest and posttest data in the control and experimental classes can be seen in Table 9.

Table 9. Normality Test Results

GRUP		Kolmogorov-Smirnov^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
PRE	Eksperimen	.136	25	.200*	.965	25	.531
	Kontrol	.137	25	.200*	.964	25	.495
POST	Eksperimen	.116	25	.200*	.942	25	.162
	Kontrol	.116	25	.200*	.980	25	.886

From table 9 it is obtained that the significance value of this normality test is greater than $\alpha = 0.05$. Thus, it can be concluded that the students' pretest and posttest scores in the control group and the experimental group are normally distributed.

In this study, a homogeneity variance test was carried out on the variance between the experimental group and the control group. The test used is a homogeneity test with criteria if the significance value (sig) on the Based on Mean > 0.05, then the data is homogeneous. Meanwhile, if the significance value (sig) on the Based on Mean < 0.05, then the research data is not homogeneous. The calculation of the homogeneity test of the complete distribution of data is presented in Table 10.

Table 10. Variance Homogeneity Test Results between Experimental and Control Groups

		Levene Statistic	df1	df2	Sig.
PRE	Based on Mean	2.559	1	48	.116
	Based on Median	2.048	1	48	.159
	Based on Median and with adjusted df	2.048	1	43.357	.160
	Based on trimmed mean	2.666	1	48	.109
POST	Based on Mean	.040	1	48	.842
	Based on Median	.028	1	48	.868
	Based on Median and with adjusted df	.028	1	45.804	.868
	Based on trimmed mean	.048	1	48	.827

Based on table 10, it is known that the significance value (sig) on the Based on Mean pretest value is 0.116, where the value of 0.116 > 0.05, so it can be concluded that the data is homogeneous. Furthermore, for the significance value (sig) on the Based on Mean the posttest value is 0.842, where the value of 0.842 > 0.05, so it can be concluded that the data is also homogeneous.

After the data were confirmed to be normally distributed and homogeneous, a paired t-test parametric statistical test was then carried out to see whether the media used in the control class and experimental class was effective or not in improving students' Higher Order Thinking Skills (HOTS). The basis for making paired sample t test decisions is if the Sig. (2-tailed) value < alpha (0.05), then the video media used can improve students' Higher Order Thinking Skills (HOTS). The results of the paired t test can be seen in Table 11.

Table 11. Paired T Test Results

		Paired Differences		t	df	Sig. (2-tailed)
		Mean	Std. Devia-tion			
Eksperimen	PRE - POST	-28.68000	11.20536	-12.797	24	.000
Kontrol	PRE - POST	-9.96000	5.61605	-8.867	24	.000

Based on the last two columns of the Paired Sample Test table, namely the Sig. (2-tailed) column, it can be seen that Sig. (2-tailed) < alpha (0.000 < 0.05). So it can be decided that both media used are effective in improving students' Higher Order Thinking Skills (HOTS) both in control classes and experimental classes.

Then the next stage is hypothesis testing using an independent sample t-test to find out if there is an average difference between the two classes and prove which class is more effective between the control or experimental classes. The independent sample t-test analysis is presented in Table 12.

Table 12. Hypothesis Test Results Independent Sample Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
DIF	Equal variances assumed	18.017	.000	7.468	48	.000
	Equal variances not assumed			7.468	35.342	.000

In decision making, in addition to comparing count and t-table, we can also do so by comparing the value of Sig. (2-tailed) with a α value used. The criteria are: H 0 is accepted when the value of Sig. (2-tailed) is more than α, while H0 is rejected when the opposite applies. From table 8 above, it is obtained that the value of Sig. (2-tailed) is less than α (0.05) which shows that there are differences in Higher Order Thinking Skills (HOTS) between the two groups, where the experimental group is more effective than the control

group so it can be concluded that the 3-dimension cartoon animation video media has an influence on students' Higher Order Thinking Skills (HOTS).

Conclusion

Based on the formulation of the problem and the analysis of research and discussion data, the researcher made the following conclusions, the development of 3-dimensional cartoon animation video media in thematic learning, especially on theme 6 subtheme 2 learning 1 which includes subjects Indonesian about poetry my ideals and natural science (IPA) subjects regarding the life cycle of this animal developed by paying attention to learning materials, basic competencies (KD) and learning objectives that are in accordance with the material for grade IV elementary school students. Based on the results of the analysis of the validity assessment of 3-dimensional cartoon animated video media, it obtained a valid category without revision reviewed based on validation results by design experts, material experts, and linguists. In the design aspect, it obtained a percentage of 92.65% with valid categories, 92.19% material aspects with valid categories and 88.75% language aspects with valid categories. Overall, the validity of cartoon animation video learning media in thematic learning obtained an average score of 91.20%. Meanwhile, the results of the analysis from the questionnaire of class IV teachers' responses to video media received a positive response which obtained an average of 93.15% which showed the "Very Interesting" category. Meanwhile, the analysis of the student response questionnaire to video media received a positive response which obtained an average of 93.33% which showed the "Very Interesting" category. Furthermore, based on the results of the product effectiveness test, it obtained a significance value of 0.00 < 0.05 which means that 3-dimension cartoon animation video media is able to influence the Higher Order Thinking Skills (HOTS) of grade IV elementary school students

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