Development of Scientific Based Learning Video Media Using Problem Based Learning (PBL) Model to Improve Student Learning Outcomes in 4Th Grade Students of Elementary School Parmaksian, Kab. Toba Samosir

Launa Yenny Abadi Simanjuntak[1], Reh Bungana Perangin-Angin[2], Daulat Saragi[2]
[1]Postgraduate Students, State University of Medan, Indonesia
[2]Postgraduate Lecturer at State University of Medan, Indonesia
lona_joentax@yahoo.com

Abstract: *Learning media is a learning tool that is very important in the learning process. This study aims to produce scientific-based learning videos with problem-based learning models to improve the learning outcomes of Civic students in 4th grade elementary school in Parm testimonial, Toba Samosir district. This type of research is research and development using the 4D model. Research instruments used in the form of an expert validation questionnaire, teacher and student response questionnaire and learning achievement tests. Then the data analysis in the form of expert validation analysis is carried out by material, language and media experts, practicality analysis is carried out by teacher and student questionnaires and effectiveness analysis is done by pretest and posttest. The stages of this research are define, design, develop and assess. The results of this study indicate that the validation rate of material experts is 80% in the very high category, the validation of linguists is 89% in the very high category and the validation of the media expert is 92% in the very high category while the N gain for student learning outcomes is 0.7 with the category high. Finally, instructional videos are also considered by teachers and students by obtaining 87.5% of teachers and obtaining an average of 79% of students in either category. Thus, scientific-based videos can improve student learning outcomes.*
Keywords: *Learning videos; scientific; civics.*

I. Introduction

Education is one of the very basic things in building a nation. In order to improve the quality of human resources in Indonesia, one of the most important elements that must be done is to improve the quality of education starting from elementary school level to tertiary level. Therefore, education must be able to shape people to think creatively and independently and be able to build themselves for the better.

Zuhrieh (2009) states that to improve the quality of human resources in the world of education, especially civic education can be done by selecting effective learning media and learning models. A teacher who uses media and learning models appropriately, can adjust the basic competencies to be achieved and according to students' conditions. If this is done, then students will quickly respond or understand the material delivered by the teacher. This will affect student learning outcomes both from the cognitive, affective and psychomotor aspects. Conversely, if the teacher uses media and learning models that are less precise and less appropriate to the conditions of students, then students are slow to respond to the material being taught and it is feared that student learning outcomes will also decrease.

From the results of initial observations researchers found students often had difficulty understanding Civics material. This is due to the lack of potential of the teacher to develop media, which allows it to be used in learning so as to be able to add information to students. Aside from the semester exam score data, this can also be seen from the data of daily test

scores (final score of the sub-themes) that illustrate the average value of daily Civics test especially the Beautifulness of Togetherness theme is 70 with 45% completeness. This condition shows that students' understanding in the learning process is still low so that it causes student learning outcomes to tend to be low. Similarly, seeing the conditions of students who have difficulty understanding the material and students need learning media that can help improve student learning outcomes.

Based on the explanation above, the writer is interested in developing learning media in the form of Learning Videos that are adapted to the Learning Theme that takes place on a scientific basis through the problem based learning model, which is expected to improve student learning outcomes.

II. Review of Literature

2.1 Learning

The learning process is creating experience through activities that are interesting enough for the learner so that the learner can be influenced. This is supported by Gagne's opinion (in Purwanto 2002: 54) which says that "learning occurs when a stimulus situation together with the contents of memory affects students so that their actions change from time to time after he experiences a previous situation".

In addition, Jerume Brunner (in Trianto 2010: 15) "that learning is an active process in which students build (construct) new knowledge based on the experience / knowledge they already have".

From this description it can be concluded that learning must go through a process of finding, constructing concepts and principles, the process of understanding, not just transferring knowledge but also experiencing.

2.2 Beautiful Theme of Togetherness

In integrated thematic learning, the themes chosen relate to nature and human life. The theme of the Beauty of Togetherness discusses more about regional culture in terms of traditional houses, traditional clothing, regional specialties, folk songs and regional weapons and religion. The diversity explained in the book, if related to the material of Civics is about the NKRI Motto "Unity in Diversity". Like the culture of North Sumatra, Saragi (2018: 162) states that almost all tribes in Indonesia are familiar with the art of weaving which is the hallmark of their society. North Sumatra is famous for its weaving called Ulos (Toba) and Uis (Simalungun).

Batak has a unique woven cloth, which is always worn at every traditional ceremony. Woven motifs are widely adopted from traditional Batak house ornament motifs. One sheet of woven fabric can reveal thousands of meanings. With this basis, the meaning behind the ornament motifs needs to be revealed.

In this theme, students are invited to get to know their cultural diversity as a sense of pride in the homeland that creates a sense of love for the homeland and is able to maintain the integrity of the Republic of Indonesia.

2.3 Scientific approach

According to Fadillah (2014: 176), a scientific approach is a learning approach that is carried out through the process of observing, questioning, trying (experimenting), reasoning (associating), and communicating (communication).

The 2013 curriculum uses a scientific approach because this approach is considered appropriate to develop students' attitudes, knowledge and skills. According to Daryanto (2014: 51) Learning with a scientific approach is a learning process that is designed so that students actively construct concepts, laws or principles through stages of observing (to identify or find a problem), formulate a problem, propose or formulate a hypothesis, collect data with various techniques, analyzing data, drawing conclusions and communicating concepts, laws or principles that are "discovered".

2.4 Learning Media

The media comes from the Latin "medium" which literally means "intermediary" that is the intermediary between the source of the message and the person receiving the message. According to Heinich in Rusman (2013: 159), said that the media is a means of communication channels. So learning media is an intermediary tool that can help channel learning information or channeling messages to help the learning process so that learning objectives are achieved better and perfect.

The word media comes from the Latin "medium" which literally means middle, intermediary or introduction. In Arabic the media is an intermediary or introduction to the message from the sender to the recipient of the message Arsyad (2011: 3).

Asra (2007: 5) argues that the word media in "learning media" literally means an intermediary or introduction, while the word learning is interpreted as a condition created to make someone do something learning activities. Learning media emphasizes the position of the media as a vehicle for channeling messages or learning information to condition a person learning.

Based on the explanation, it can be concluded that learning media is one of the most important communication components in delivering a material that is delivered by the communicator (teacher) to the communicant (students) to be able to provide the same stimulation, equalize experiences and lead to the same perception in learning activities teaching to achieve learning objectives or it can be said that learning media is a series of processes or learning activities, where students are active in learning the subject matter delivered by the teacher so as to achieve a good learning goal.

Sadiman, et al (2011: 84) revealed that in choosing media, it should pay attention to the following criteria: a) intend to demonstrate it as well as in lectures about media, b) feel familiar with the media, for example a lecturer who is used to using transparency projectors , c) wants to give a more concrete description or explanation, and d) feels that the media can do more than can be done, for example to attract students' interest or enthusiasm for learning.

According to Arsyad (2011: 71), it is revealed that in choosing media, it should pay attention to the following criteria: a) The ability to accommodate the presentation of the right stimulus (visual and / or audio). b) Ability to accommodate students' appropriate responses (written, audio, and / or physical activities). c) Ability to accommodate feedback. d) Selection of primary and secondary media for presenting information or stimuli, and for practice and tests (preferably exercises and tests using the same media. e) Level of enjoyment (preferences of institutions, teachers, and students) and cost effectiveness.

From some of the expert opinions above, the researcher can conclude that the selection of media should be based on learning objectives, subject matter, and certain media characteristics.

2.5 Learning outcomes

According to Hamalik (2010: 23) asserts "that learning outcomes appear as changes in behavior in students, which can be observed and measured in changes in knowledge, attitudes, and skills". So, learning outcomes are the results achieved after someone held a learning activity that is formed in the form of a value of learning outcomes provided by the teacher.

According to Gagne developing the ability of learning outcomes into five types, among others: (1) intellectual learning outcomes are the most important learning outcomes of the lingsikolastik system; (2) cognitive strategies that regulate ways of thinking and thinking in the broadest sense including the ability to solve problems; (3) attitudes and values, related to the direction of emotional intensity possessed as inferred from the tendency to behave towards people and events; (4) verbal information, knowledge in the sense of information and facts; and (5) motor skills, namely skills that function for the environment and achieve concepts and symbols. (Sudjana, 2010)

Based on the above understanding, it can be concluded that learning outcomes are abilities possessed by students after receiving their learning experiences and these results can be used by teachers to be used as a measure or criteria in achieving an educational goal and this can be achieved if students already understand learning accompanied by changes in behavior that is even better as a result of the learning activities carried out.

III. Research Method

3.1. Types of research

This research is a type of Development Research (Development & Research) using the 4D model "define, design, develop and assess" (Thiagarajan, 1974). In this study learning media will be developed using instructional videos. The final product will be evaluated based on the specified product quality aspects. Thus the product of this research is a valid, practical and effective media (Plom and Niveen, 2010).

3.2. Research instrument

Data obtained from two ways, namely qualitative and quantitative data. Qualitative data were obtained using expert validation questionnaires and teacher and student response questionnaires while quantitative data were obtained from the pretest and posttest tests in the form of multiple choices. The completeness indicator that was used was based on the students' completeness criteria in the school where the study was conducted.

3.3. Data analysis technique

Expert validation questionnaire data was analyzed using the percentage of learning media scores developed. The formula used to calculate the percentage of expert validation questionnaires (Sugiyono, 2013: 141), namely:

$$P = \frac{f}{N} \, x100\%$$

After the validation results are obtained, then the data is entered into the category table as follows:

Table 1. Classification of Learning Media Validity

Achievement Level	Validity Classification
$81,26\% < P \leq 100\%$	Very valid
$62,26\% < P \leq 81,25\%$	Valid

43,76% < P ≤ 62,25%	Not valid
25% < P ≤ 43,75%	Invalid

Source: Sudjana (2007: 91)

The value of completeness of students' knowledge and skills competency as a result of student learning is poured in the form of numbers and letters, namely 4.00 - 1.00 for numbers equivalent to letters A to D. Individual learning completeness is determined by an average score of 2.67. The value of students' knowledge and skills is determined by the following formula.

$$\text{Student Score} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 4$$

IV. Result and Discussion

This research is a research development (development research), and the product of this research is a scientific-based learning video. This video development stage uses the 4-D development model (Four D Model). This model consists of four stages. The first stage starts from the definition stage (define), the second stage of design (design), the third stage of development (develop) and the last stage of deployment (disseminate).

At the defining stage, the results of the initial analysis, student analysis, concept analysis, task analysis and learning objective specifications are obtained. The results of each activity at the defining stage are described as follows:

a. Analysis of preliminary, in this activity the researchers spread the questionnaire teacher needs to 10 teachers. From the results of the analysis of teacher needs by 80% teachers really need a valid, effective and practical scientific-based video.

b. Analysis of students, this activity is carried out to determine the characteristics of students, in the initial observation the researchers conducted interviews with the homeroom teacher of students. Based on observations and interviews from the homeroom teacher, it can be seen that the civics knowledge of 4th grade students varies. There are less, medium and high ability. When viewed from the socio-economic background obtained through interviews with teachers, the work of the students' parents includes a variety, including Civil Servants (PNS), traders, laborers and others. However, the overall socioeconomic background of the students' parents is in the middle and lower middle categories. This condition certainly affects student learning because most of their parents are busy working to meet their daily needs and do not have enough time to accompany children to learn at home. Evidenced by the homework (homework) given by the teacher, there are a number of students who have not finished working on the grounds of not understanding and there is no accompanying when studying at home.

c. Concept analysis, concept analysis is intended to identify, detail, and systematically arrange the concepts students will learn on the theme of the beauty of togetherness. Based on the analysis of teaching materials commonly used by teachers, then the video developed includes a concept map that represents the contents of the basic competencies to be achieved and remains centered on the sub-themes that will be delivered. All are easily understood by students.

d. Task analysis, the results of the task analysis obtained refer to the concept analysis. Assignments given to students are divided into independent assignments (individual) and group assignments. The independent assignment given is in the form of questions in class discussions. For group assignments, students are given a scientific-based video that contains questions and each student in the group discusses the question by first gathering information from the material presented in the video that has been developed.

e. Formulation of Learning Objectives, indicators of achievement of learning outcomes are translated into more specific indicators of learning objectives. Learning objectives are adjusted to the Core Competencies (KI) and Basic Competencies (KD) in the 2013 curriculum.

At the design stage, researchers design scientific-based videos. The results of this stage are videos that have been designed in accordance with the design format, so that a prototype is obtained for the beautiful theme of togetherness with a scientific approach. The activity at this stage is the preparation of tests, media selection, format selection and initial video design in accordance with IC and BC that have been determined in the previous chapter.

a. Compiling a test, questions consisting of 20 multiple choices were then trialled to find the level of validity, reliability and level of difficulty. Of the 20 questions obtained 18 multiple choice questions that are categorized as valid and reliable so that they can be used to measure student learning outcomes.

b. Researchers determine and choose the software used to create learning media, including movie maker and several other supporting software. Movie maker software was chosen because the panel tools contained in the software are very supportive for making animations, making buttons and can integrate text, images, animations, sounds, videos into a learning medium well

c. Selection of formats, pictures and activities are also made to help students learn easily. The choice of format is done to design a video layout with an interesting, material and approach that is used easily understood by students. The final product of the research is a scientific-based video with a test and answer key.

At the development stage, the researcher validates the products that have been produced to material, language and media experts. Following are the results of expert validation analysis.

Table 2. Expert Validation Analysis Results

No	Aspect	Score	Information
1	Material	80%	Well
2	Language	89%	Very good
3	Media	92%	Excellent

Based on the above table, the score of material validation results obtained by 80% in the good category, language validation by 89% in the excellent category and media validation by 92% in the excellent category so that the resulting product can be tested in the next step.

In the small group trial phase the researchers conducted this limited group trial to find out whether there were deficiencies in the product that were developed to be repaired after being well discussed based on expert review (validator). This limited group trial was conducted on 9 students.

Based on the results of small group trials shows the average percentage of assessment results in group trials of scientific-based videos of 83%, including very good category.

In the final stage is a field trial on research subjects. In this field trial the researcher gives a pretest to the subject of the study then the subject of the study is given treatment and the final step of the research subject is given a posttest. The following are the results of field trials:

Table 3. Field Trial Results

Activity	Public Elementary School 173652 Tanjung Pasir	Public Elementary School 173642 Hasahatan	Public Elementary School 173643 Pangombusan
Pretest	38	45	30
Posttest	83	85	75
N-Gain	0.725	0.727	0.642

To see the students 'pretest and posttest results more clearly, the following is presented a diagram of the recapitulation results of students' pretest and posttest
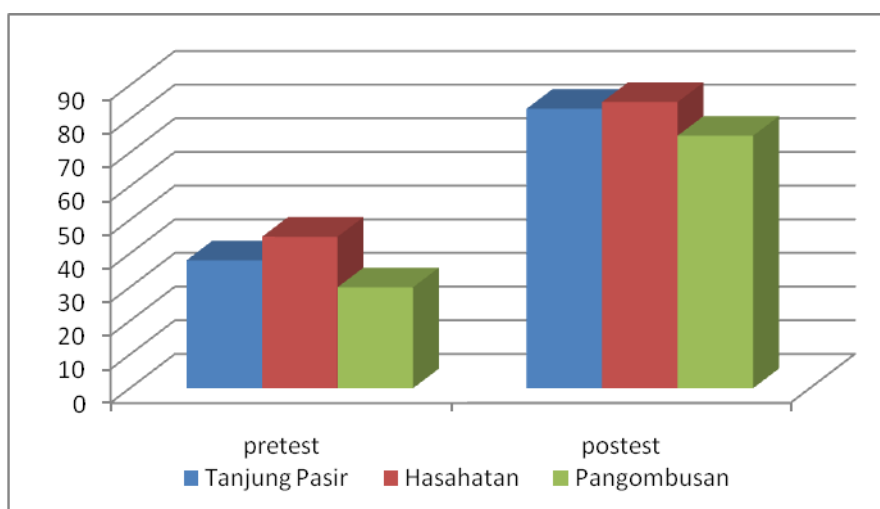

Table 5. Results of Analysis of Student Response Questionnaire

Public Elementary School 173652 Tanjung Pasir	Public Elementary School 173642 Hasahatan	Public Elementary School 173643 Pangombusan
79%	79%	80%
Practical	Practical	Practical

Based on the table above, it appears that the responses given by students through student questionnaires are in the practical category.

V. Conclusion and Suggestion

5.1 Conclusion

Based on the results of previous studies and discussions, it can be concluded that:

1. The process of developing a scientific-based learning video is developed through 4 stages namely; (1) Preparation of Tests (2) Media Selection (3) Format Selection (4) Initial design results

2. Practitioners' results from teachers state that teachers need scientific-based videos in the learning process while students prefer to learn and make it easier for students to learn to use scientific-based videos. The influence of the use of scientific-based videos on student learning outcomes is higher compared to using teaching materials used daily. Thus it can be concluded that learning using scientific-based videos can improve student learning outcomes.

5.2. Suggestion

Based on the findings that have been outlined at the conclusion of the research results, the following suggestions are proposed, namely:

1. For teachers, it is hoped that the video is scientific based but does not make the video scientific based as the main learning medium used in learning.
2. For schools, providing facilities in the form of scientific-based videos to improve teaching and learning.
3. For other researchers, it can be used as a reference and input for further research with different material.

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