Development of a Learning Multimedia Based on Balanced Literacy Approach to Improve Critical Thinking Ability of Fifth Grade Elementary School Students

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Abstract- The low level of school literacy culture and the lack of learning activities that hone critical thinking skills are problems that must be overcome. Therefore, relevant learning facilities are needed according to the challenges of the 21st century. This study aims to develop and test the feasibility, practicality, and effectiveness of multimedia learning based on a balanced literacy approach to improve the critical thinking skills of fifth-grade students of elementary school. This study adapted the Thiagarajan research and development (R & D) model known as 4D (define, design, develop, & disseminate). The feasibility of multimedia learning is based on the results of expert validation. The practicality of multimedia learning is based on the results of observations of the implementation of learning, student activities, and student responses. The effectiveness of multimedia learning was tested by tests using pretest-posttest control group design. The results show that learning multimedia based on balanced literacy is feasible, practical, and effective in influencing students' critical thinking skills. Therefore, multimedia learning based on balanced literacy is recommended to be applied as a relevant learning media in the fifth grade of elementary school

Index Terms - balanced literacy, critical thinking, multimedia learning, elementary school.

I. INTRODUCTION

The development of information flows, communication media, science, and technology are rapidly supporting human civilization in the 21st century. For this reason, we need skills in mastering technology, information media, and innovation skills in learning. In the face of the 21st-century era, professional human resources who have the ability to innovate, compete, collaborate, and cooperate in various ways are needed [1]. This is in line with the 21st Century Partnership Learning Framework where education is expected to produce 21st-century human competence and expertise, namely: skills in problem-solving, critical thinking, and knowledge of information and media literacy [2].

Facing the changing times, especially the challenges of globalization, advances in technology and information, environmental problems, and the development of international education. The government has designed policy in the form of a set of plans and rules about objectives, content, and learning materials as a reference in the implementation of education in the 2013 curriculum. Learning in the 2013 curriculum must be well designed so as to grow and provide meaningful experiences for students, one of them through literacy. Literacy is a skill in identifying, finding out, and applying all things carefully using various language skills, including reading, writing, seeing, listening and/or speaking skills [3], [4].

To achieve these targets a comprehensive and planned strategy is needed through a balanced literacy approach. Balanced literacy is defined as an integrated approach that refers to the balance of reading and writing skills through various components of hard reading, guided reading, independent reading, joint writing, interactive writing, and independent writing [5] - [7]. Learning by using a balanced literacy approach is expected to foster a culture of literacy while giving an impact on students' critical thinking skills.

Critical thinking is the ability to think in a reflective and logical way of analyzing and making decisions on a problem based on the consideration of existing facts [8] - [11]. High-level thinking skills are the skills needed to prepare students to be able to compete and adapt to the challenges of the 21st century. For this reason, students need to be accustomed to critical thinking to be used in investigating and uncovering problems that will be faced in daily life, one of them through the use of learning media that can improve students' critical thinking skills.

Based on the reality in the field of observations and preliminary interviews with students and teachers in fifth grade at Ujung Elementary School XIII/38, it was encountered several obstacles in 2013 curriculum learning, namely: (1) low literacy abilities of students, teachers, and school culture; (2) learning that is done is not enough to explore and develop students' critical thinking skills; (3) lack of integration of Information Technology (IT) in learning; and (4) the difficulties of the teacher in preparing relevant learning media in developing students' critical thinking skills. Some of these problems have a negative impact on students in learning such as saturation, boredom, and lack of motivation in learning. These problems are in line with the results of the analysis conducted by The Program for International Student Assessment (PISA) on the ability of mathematics, science and reading literacy of Indonesian students which is still a concern. In addition to the Indonesian National Assessment Program

(INAP) study which described nationally 46.8% of Indonesian students were less skilled in literacy competencies and critical thinking skills [12].

To help overcome these problems, relevant learning facilities are needed to be tailored to technological developments in the 21st century, one of which is the use of literacy-based multimedia learning. Multimedia learning based on a balanced literacy approach is a medium or means used in generating understanding, guiding knowledge, skills, and performance tools through the use of ICTs to understand students in learning subject matter based on the balance of literacy components. Multimedia-based on a balanced literacy approach is useful for students in developing students' concrete understanding, acquiring new information, and a means of creating proactive and creative learning [13] - [15].

This study aims to (1) describe the feasibility of developing multimedia learning based on a balanced literacy approach to improve the critical thinking skills of fifth grade students of elementary school; (2) describe the practicality of the application of multimedia learning based on the balanced literacy approach to improve the critical thinking skills of fifth grade students of elementary school; and (3) describe the effectiveness of the application of multimedia learning based on the balanced literacy approach to improve the critical thinking skills of fifth grade students of elementary school.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

This research is a research development (R & D), which aims to develop products and test the effectiveness of the product (validity). The development model used is the 4D model developed by Thiagarajan [16] which consists of define, design, develop, and disseminate. To test the effectiveness of multimedia learning, the experimental design chosen was one group pretest-posttest design. This research was conducted in fifth grade Ujung Elementary School XIII / 38 Surabaya in the 2018/2019 school year. The subjects of this study were VA class students with 32 students as the experimental class and VB class with 33 students as the control class.

Data collection techniques used in measuring the feasibility, practicality, and effectiveness of learning multimedia based on balanced literacy in the form of questionnaires, observations, and tests. Then, analyzing the feasibility of multimedia learning based on a balanced literacy approach was done by converting the average results of observations into validation criteria. Analysis of the practicality of multimedia learning was obtained from the results of the average implementation of learning, activities, and student responses then converted into predetermined criteria. Moreover, the effectiveness of multimedia learning based on the balanced literacy approach can be measured based on student test results. The previously determined tests have been tested for validity, reliability, normality, and homogeneity before it was applied to the experimental class and the control class.

III. RESULTS AND DISCUSSION

The results of the feasibility test of learning multimedia based on balanced literacy were obtained from the validation sheet from media experts and material experts. Based on the results of the validation sheet, the media expert shows a very valid interpretation (feasible to be applied without improvement). The media expert suggested that the balanced literacy multimedia learning should use more complete and easy-to-understand instructions for students, improve the animation, and add explanatory images in several parts.

Furthermore, the development of learning multimedia based on balanced literacy was carried out by validating material experts. The results of the material expert validation show that the interpretation is very valid, so it is feasible to apply without improvement. The results of the validation sheet of media experts and material experts can be described in the following table.

Table 1. Results of Expert Validation

Validation	Media Expert	Categories
Media Expert (1)	83, 32%	Quite valid (with minor improvements)
Media Expert (2)	89,30%	Very valid (feasible to apply without improvement)
Material Expert	90,54%	Very valid (feasible to apply without improvement)

Source: processed secondary data of researchers, 2018

The practicality of learning multimedia based on balanced literacy can be seen from the results of observation sheets of learning implementation, student activities, and student responses. The results of the implementation of the learning obtained from the observation sheet conducted by two teachers showed very good implementation. Furthermore, the activities of students during the implementation of learning using multimedia learning based on balanced literacy based on the results of observations obtained excellent interpretation results. In addition, the student responses obtained from the practicality questionnaire of learning multimedia based on balanced literacy on product trials are included in the high criteria. The results of learning implementation observation sheet, student activities, and student responses can be explained more detail in the following table.

Table 2. Practicality of Learning Multimedia

Validation	Media Expert	Categories
Implementation in learning	88, 60%	Very good
Student activities	89,30%	Very well
Student response	90,54%	High

Source: processed secondary data of researchers, 2018

The effectiveness of multimedia learning based on balanced literacy on critical thinking skills is obtained from the results of learning outcomes tests. Before being used in research, test questions were validated to experts and then tested on 12 students using the product moment correlation formula. The results of the validity test obtained valid criteria with $r_{count} > r_{table}$,

which is 0.612. The results of the validity test show that of the 40 questions only 21 questions are valid, 20 valid items are set as 20 questions as learning outcomes test instruments. Furthermore, the reliability test using the Alpha Cronbach formula, from the results of these calculations obtained the reliability of the problem of 0, 912 so that the question was said to have high reliability.

Test questions that had been tested for validity and reliability were firstly tested for normality using the chi square formula. The results of the pretest and posttest normality test obtained $x^2_{count} \leq x^2_{table}$,, so that data was normally distributed according to the following table.

Table 3. Normality Test Results

Normality Test	X count	X table	Interpretations
Pretest experimental class	1,945	9,49	Data is normally distributed
Pretest control class	2,626	9,49	Data is normally distributed
Posttest experimental class	2,075	9,49	Data is normally distributed
Posttest control class	2,742	9,49	Data is normally distributed

Source: processed secondary data of researchers, 2018

Furthermore, the homogeneity test using variant formula was conducted. If the value of $F_{count} < F_{table}$, it can be said that the question has normal and homogeneous data according to the following table.

Table 4. Homogeneity Test

Homogeneity Test	F count	F table	Interpretations
Pretest	2,03	2,15	Homogeneous
Postest	2,13	2,15	Homogeneous

Source: processed secondary data of researchers, 2018

After testing for normality and homogeneity, t-test sample relates were tested to test the effectiveness of learning multimedia based on balanced literacy in the pretest and posttest in the experimental class and the control class. Based on the results of the calculation of the t-test, the learning outcomes of students' critical thinking skills after learning activities are 2.45, where t_{count} is greater than t_{table} ($2.45 \geq 2.093$). Therefore, it can be concluded that there are significant differences between the results of learning critical thinking skills of students in the experimental class and the control class.

The application of learning multimedia based on balanced literacy in learning proved to be effective in improving the critical thinking skills of fifth grade students of elementary school. Multimedia learning based on balanced literacy is useful to improve the quality of learning and students' abilities in a more interesting, more interactive way, and can be used at any time [14]. Based on the results of the validation of media experts and material experts, the development of learning multimedia based on balanced literacy is included in a very valid category. After going through the validation stage and declared feasible to use, the learning multimedia based on balanced literacy can be continued at the small group trial stage. Based on the results of the feasibility analysis, the learning multimedia based on balanced literacy is feasible to be used to increase the critical thinking skills of students in fifth grade elementary school with material events in life.

The practicality of multimedia learning based on balanced literacy is known from the results of observations of the implementation of learning, student activities, and practicality questionnaires. Based on the results of observations and questionnaires, it was found that learning multimedia based on balanced literacy was very practical to be used to improve student learning outcomes in social studies subjects in fifth grade elementary school with material "events in life". On the other hand, the effectiveness of multimedia learning based on balanced literacy is based on student test results. Before the learning outcome test questions are given to the research subject, expert validation tests are first carried out. The results of the trials were tested for validity, reliability, normality, and homogeneity. Furthermore, to find out the effectiveness of learning multimedia based on balanced literacy, a t-test was conducted that H_o was rejected and H_a was accepted. Thus it can be said that there is a significant difference between the learning outcomes of the experimental class students and the control class. Therefore, it can be said that learning multimedia based on balanced literacy is effective to improve students' critical thinking skills, this is evidenced by the differences in the results of learning critical thinking skills that are significant between the experimental class and the control class.

IV. CONCLUSION AND SUGGESTION

Based on the results of the research and discussion the results of the study, it can be concluded, namely: (1) Multimedia based literacy based on literacy is suitable to be used in fifth grade elementary school based on the results of media expert validation of 89, 30% and material experts at 90.54% with very valid criteria . (2) Multimedia learning based on balanced literacy is practically used based on the calculation of the results of observation of learning implementation of 88.60% with very good categories, student activities at 89.30% with excellent categories, and student response questionnaires at 90.54% with high categories. (3) Multimedia learning based on balanced literacy is effectively used based on the results of the t-test, where the value of $t_{count} > t_{table}$, which is 2.45> 2.093. Based on this, H_o is rejected and H_a is accepted. Therefore, it can be concluded that learning multimedia based on balanced literacy is effective in improving students' critical thinking skills, because there are significant differences in learning outcomes between the experimental and the control class.

Based on these conclusions it can be suggested that multimedia learning based on balanced literacy can be used and disseminated in learning the "events in life" theme in the fifth grade of elementary school, especially in training students' critical thinking skills.

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