

# A Whiteboard Animation Multimedia to Improve Teachers' Ability in Understanding Classroom Action Research

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**Abstract**—This study aims to test the effectiveness of multimedia whiteboard animation about classroom action research and conduct the process of disseminating the product to teachers in Yogyakarta. The research subjects consisted of teachers from kindergarten to senior high school education, with a sample of as many as 30 people. The test instrument to assess the level of effectiveness of multimedia meets the validity and reliability of the instrument. The results showed that multimedia whiteboard animation about classroom action research proven effective in increasing the ability of teachers in Yogyakarta. The value of the gain score obtained in the effectiveness test of this study is 0.71, which is included in the high category. The mechanism of product dissemination is carried out by packaging multimedia in two storage media, namely using a CD (Compact Disk) and flash disk, which are then distributed to user partners in 5 schools in Yogyakarta and workshops in collaboration with Balai Teknologi dan Komunikasi Pendidikan Yogyakarta.

**Keywords:** *multimedia, whiteboard animation, classroom action research*

## I. INTRODUCTION

Classroom Action Research (CAR) is one way to improve the quality of learning starting from the classroom where the learning process carried out at the smallest level of the education unit. Naturally, every teacher who teaches in these classes can implement CAR well at all levels of education. Moreover, this has been regulated in UU No. 14 Year 2005 concerning teachers and lecturers who explain the professional competencies that must be mastered by teachers. It explains that professional teachers must be able to master teaching materials, compile and implement learning programs, and conduct assessments in the learning process, where the development of these competencies balanced with the ability to research. In conjunction with teacher professionalism, the teacher's efforts in managing the class are inseparable from research activities, both general and the results of generalization, or those that are specific to CAR. [1].

Teachers need to have an awareness of the proper understanding and application of CAR because CAR enables teachers: 1) to be more sensitive and responsive to the dynamics of learning in their classrooms, 2) to be more critical and reflective of what has been done with their students, 3) improve their performance, because teachers are not just practitioners who are satisfied with their actions in teaching but also as researchers in their fields, 4) can improve the learning process through an in-depth study of what happens in their class systematically based on actual and factual problems, 5) makes teachers more creative because they are always required to make efforts innovation as the implementation and adaptation of various theories and learning techniques as well as the teaching materials [2]. The ability of teachers in developing CAR shows their professionalism, because one of the benchmarks of professional teachers is those who have expertise in accordance with the quality standards of education set by the government [3]. Therefore, the ability to understand and implement CAR is necessary to master by teachers who are useful for improving the quality of learning as well as professional competence.

Preliminary research conducted on a sample of teachers in the DIY region stated that, less than 50% of these teachers had conducted CAR. As for teachers who have done CAR, 61% did not understand the steps and the correct rules of implementing CAR. The main obstacle is the low interest in reading books related CAR, while the material and technical guidelines for the implementation of CAR are mostly available in the form of textbooks [4]. Therefore, it can be concluded that the main obstacle of teachers is difficult to understand CAR, derived from the reluctance to learn independently because the learning resources are not practical. On the other hand, what stands out from the characteristics of these teachers is that "see" culture, such as watching television or video shows, is easier and more dominant than reading.

Based on the problems and characteristics of the teacher above, researchers develop multimedia whiteboard animation about CAR. The main feature of the multimedia material delivered in the form of an animated whiteboard video with a duration of about 1.7 minutes per video. In addition to the illustrations that make it easier for teachers to understand the material, the narration in the video delivered in a story-telling format. Some assessments has been done through the validation by material experts and media experts as well as the three stages of media feasibility testing, the multimedia was declared suitable for use by teachers in Yogyakarta as digital teaching materials that are stand-alone in learning about CAR [5]. The next step after the multimedia product declared feasible, it is significant to assess on how to effectively use and disseminate the product's mechanism. Therefore, the discussion in this article focused more on discussing the effectiveness test and the mechanism of product dissemination on the teachers in Yogyakarta so that the research results are useful and has a meaningful impact.

**II. WHITEBOARD ANIMATION MULTIMEDIA**

*A. The Characteristic of Multimedia Whiteboard Animation*

Whiteboard animation or known by other terms such as video scribing, sketch videos, explainer videos, and doodle videos is a technique for making multimedia through symbols that are on the whiteboard. This technique done by pouring symbols in the form of text and images on white boards or media. The interesting thing about this whiteboard animation is that the highlighted animation is a recording of the process or flow on how concepts, principles, even procedures will be formed. The characteristics of multimedia whiteboard animation are very relevant to the current learning needs of humans. Through this technique, solid content presented using simple and easy to understand illustration flow. The main requirement for developing multimedia with this technique is the flow of illustrations and stories that delivered based on prior knowledge that students already have, so that students can link between old knowledge and the new one.

The results show that the aspect of media practicality is high in terms of content, ease of use, efficiency of learning time, and the benefits of teaching materials. Practicality test according to the users also shows that teaching materials developed in the form of whiteboard animation are practically used by teachers and students in learning. Practicality brings ease of use, efficiency of learning time, and great benefits in the implementation of learning [6]. Research on the feasibility of using whiteboard animation-based media shows that the use of the media is appropriate for students to use and can be used as an alternative learning media that can be

applied on a broader scale. In general, these media in addition to functioning as a messenger or information, also serves to foster student interest in learning [7].

*B. Product Description of Multimedia Whiteboard Animation about Classroom Action Research*

The whiteboard animation multimedia produced in this research is in the form of interactive multimedia, which involves many user roles to be able to use it. A set of multimedia CAR whiteboard animation, containing a printed A5-sized manual along with multimedia application software files that are stored on a CD or flash drive. The features available in multimedia include study instructions, instructions for use, material that contains whiteboard animation video, developer profile, evaluation in the form of objective questions, and user worksheets where users can practice compiling a PTK framework by directly typing ideas in multimedia applications through text input facility. Display page of multimedia whiteboard animation menu can be seen in Figure 1 below.



Fig. 1. The Display of Multimedia Menu

The significant feature that differentiates this multimedia with other type of multimedia is the material presented through whiteboard animation videos. The use of these features has a synergistic role because it activates dual sense channels in humans, namely vision and hearing. The video presented does not provide a lot of text, so it does not make the user's eyes become tired. Audio that is utilize to explain the material developed in communicative language with storytelling style. The material compiled in this multimedia consists of the concept of CAR, the stages of CAR, and find problems in CAR. Display snippets of material in multimedia can be seen in Figure 2 as follows:

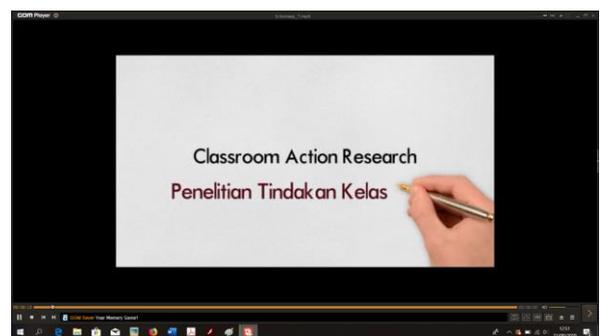




Fig. 2. Snapshots of Multimedia Content

The multimedia exercise or practice menu not only displays evaluations in the form of objective questions but also provides user worksheet facilities that can be used by teachers to practice developing the CAR framework. The exercise done by inputting text or typing text directly into a running application, which can then be saved. Examples of users' worksheet menu display can be seen in Figure 3 below:

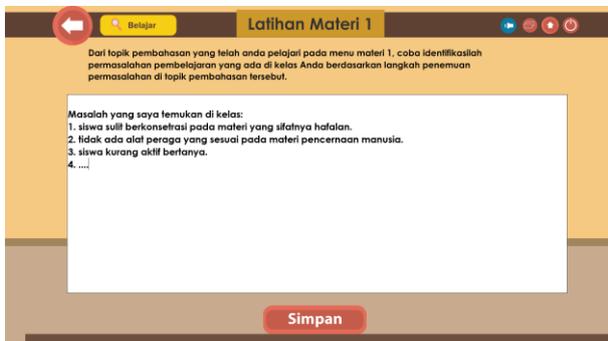


Fig. 3. Users' Worksheet

### III. METHODOLOGY

#### A. Research Design

In order to examine the effectiveness of the CAR multimedia whiteboard animation, the research design used was a one-group pretest-posttest design. In this design, the comparison of teacher learning outcomes between before and after using multimedia calculated using the normalized-gain (N-gain) formula [8]. N-gain is determined based on the average gain (g) obtained from the results of the pre-test and post-test values, which calculated using the following formula:

$$g = \frac{S_{post} - S_{pre}}{S_{maks} - S_{pre}}$$

Explanation:

- S post = Post-test score average
- S pre = Pre-test score average
- S maks = Maximum score
- g = Gain Value

The results of the values that obtained then interpreted into the gain value classification in the table as follows:

TABLE I. CLASSIFICATION OF SCORE GAIN VALUE INTERPRETATION

No.	Gain Value	Category
1.	$g \geq 0,70$	High
2.	$0,70 > g$	Medium
3.	$g < 0,30$	Low

The product dissemination carried out by directly distributing multimedia that has been examined for effectiveness to the research partner schools and in collaboration with the Balai Tekkomdik Yogyakarta. The form of cooperation carried out was by giving workshops on the use of CAR multimedia whiteboards and providing material on the urgency of CAR to improve the quality of learning.

The research instrument used to examine the effectiveness of multimedia whiteboard animation is in the form of a comprehension test regarding the application of CAR. There are two types of examinations used, namely pre-test (initial test) and post-test (final test). Pre-test used to measure teachers' comprehension before using multimedia, while post-test is used to measure teachers' comprehension after learning CAR material using multimedia. The instruments used in the pre-test and post-test are the same, except that the item randomized. The test instrument has met the validity and reliability of the instrument. Before being used the test questions tested on 30 teachers in Yogyakarta as respondents who already had an understanding of the previous CAR. Then the results calculated using the help of the MS Excel application to determine the level of validity and reliability. Validity test done through an application using the biserial point formula, while the reliability test uses the KR-20 test. As for the results, of the 20 items that have been compiled there are 14 questions declared valid, while the reliability of the test is declared high with  $r = 0.775$  [9].

#### B. Subjects

The subjects of this study were teachers in the Yogyakarta range from kindergarten to high schools' teachers. In order to collect the data, 30 people taken as samples with cluster random sampling techniques.

The technique was chosen because the study population included all teachers from 5 districts in Yogyakarta, including Sleman, Bantul, Gunung Kidul, and Kulon Progo. Therefore, teachers chosen to represent the whole district. In addition to representing regions, samples also taken with consideration of representing each level of education such as the proportion of kindergarten teachers (kindergarten), elementary school (elementary school), junior high school (junior high school), and senior high school (high school). Randomly the number of samples representing the kindergarten level totaled 9 people, 6 people from elementary school, 5 people from junior high school, and 10 people from high school. The percentage of the number of samples used in this study are as follows:

TABLE II. THE PERCENTAGE OF SAMPLE

No.	Education Level	Number of Sample	Percentage
1.	Kindergarten	9 teachers	30%
2.	Elementary School	6 teachers	20%
3.	Junior High School	5 teachers	17%
4.	High School	10 teachers	33%

**IV. RESULTS AND DISCUSSION**

The results of the effectiveness examination that have been carried out on 30 respondents produce the average data of the results of the pre-test respondents were scored at 7.83. The lowest score obtained by the respondent in the pre-test was 5, while the highest score gained by the respondent was 11. While the mean data of the respondents' post-test results was at a score of 12.20. The lowest post-test score obtained by respondents was 9 and the highest score was 14. The score distribution of the pre-test and post-test as seen in the following figure:

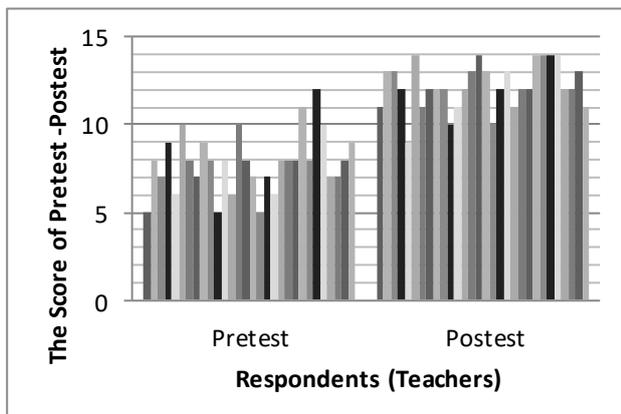


Fig. 4. Score of Pre-test dan Post-test

Based on the data above, the calculation of increasing scores using the N-Gain formula is as follows:

$$g = \frac{S_{post} - S_{pre}}{S_{maks} - S_{pre}}$$

$$g = \frac{12,20 - 7,83}{14 - 7,83}$$

$$g = \frac{4,37}{6,17}$$

$$g = 0,71$$

Based on the above calculation, a gain value is 0.71 which is included in the high classification where  $0.70 > g > 0.3$ . By observing at these results, it can be concluded that the CAR multimedia whiteboard animation is effective in improving the ability of teachers in Yogyakarta. In addition, it was found that the trend in the various acquisition of the gain value indicates that the higher the school level the narrower or smaller the difference between the pre-test and post-test gain values obtained. That is because it turns out that teachers at the higher education level have greater access to carry out more CAR. The access itself comes from the government, universities, or state and private institutions that provide literacy or opportunities for teachers to conduct CAR.

The mechanism of product dissemination carried out by distributing it directly to schools. There are 5 schools targeted for dissemination, namely KB / Anak Bintang Sleman, SD Plemburan 1 Gunung Kidul, MI Al Ihsan Sleman, SMP Negeri 2 Wates, and SMK Negeri 5 Yogyakarta. The dissemination procedure carried out by packaging multimedia applications in the form of CDs and flash drives, which are then handed over directly to these schools. In addition, dissemination also carried out in collaboration with the Yogyakarta Provincial Education and Communication Technology Center in the form of a workshop on the use of multimedia whiteboard animation and the provision of material about the urgency of CAR to improve the learning process. The material was given not only to support the widespread use of multimedia, but also as an effort to provide reinforcement for teachers to be motivated to implement CAR with appropriate goals and procedures. Participants who attended the workshop totaled 40 high school/vocational school teachers in Yogyakarta.

**V. CONCLUSIONS**

The conclusion of this research is the multimedia whiteboard animation that has been developed has a high effectiveness in improving the ability of teachers to comprehend CAR with an N-gain obtained of 0.71. Furthermore, product dissemination carried out through a collaborative mechanism with partner schools and the Yogyakarta Provincial

Communication and Education Technology Center (Balai Tekkomdik). The 5 schools' partners, namely KB / Anak Bintang Sleman, SD Plemburan 1 Gunung Kidul, MI Al Ihsan Sleman, SMP Negeri 2 Wates, and SMK Negeri 5 Yogyakarta. Additionally, the form of collaboration with the Yogyakarta Provincial Education and Balai Tekkomdik done through workshops to as many as 40 high schools/vocational school teachers on the use of multimedia CAR whiteboard animation and the provision of material about the urgency of CAR to improve the learning process.

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