

Does Interactive Whiteboard Use in Public Policy Courses Improve Learning Outcomes?

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Abstract—Interactive Whiteboard is a touch screen panel that functions as a computer projector screen that can control images on a computer by touching the panel surface without using a mouse or keyboard. Research using the Interactive Whiteboard aims to shape motivation and a good learning atmosphere. This research includes types of R & D (research and development) and uses the development used by Borg and Gall. Based on expert validators for general aspects of the material got 90.0%, for the presentation of learning obtained 96.7% and for the feasibility of language obtained 96.8%. The average rating for Interactive Whiteboard media was 94.5%. It has received a very good response from students and lecturers at Universitas PGRI Semarang of 85.5% and IKIP Veteran Semarang at 86.0% in the use of Interactive Whiteboard media. The results of the pre-test and post-test scores of the students of Civic at Universitas PGRI Semarang showed that there was a difference between the mean value of the pre-test and the average value of the post-test, namely the average pre-test score of 70,3103 and the average value post test is 72,051. The results of the pre-test and post-test scores of the students of Civic at IKIP Veteran Semarang showed that there was a difference between the average pre-test score and the average post-test score. This is shown through the average pre-test value of 63.6842 and the average post-test value of 68.9474

Keywords—Interactive Whiteboard, R n D, pretest, posttest

I. INTRODUCTION

Motivation and a good learning atmosphere will support learning to be optimal. This is reinforced by [1], which states that there are several indicators of students who have high learning interest, namely feelings of pleasure, attention in learning, interest and participation in learning. According to Darmawan (2010), at the tertiary level, learning happens a lot in the classroom, which brings together lecturers and students who need good interaction [2]. But in fact, monotonous classes are often found, lecturers who are less communicative in delivering the material so as to cause learning passion that is not good [3].

Who stated that 95% of students and teachers observed in the UK stated that interactive whiteboards could add value to learning, although 76% felt that with interactive whiteboard this would increase their preparation time, such as must learn

how to operate it effectively [4]. Johnny Chung Lee (2008) Carnegie Mellon University students in his research have made an Interactive Whiteboard by utilizing applications from a remote wii, which is a control tool in the Nintendo Wii game console [5]. Smith et al. (2005) illustrate how the Interactive Whiteboard's ability to return to reading material helps a primary teacher help groups with lower abilities [6]. Marzano (2009) reports in another study that interactive whiteboards bring students to a 16 percent gain in student achievement [7].

Interactive Whiteboard is one of the media included in the visual presentation media. Visual presentations are a combination or combination of text, audio and video images that can enhance learning interest and can lead to learning motivation. This prototype has been tested and has good value from material experts and media experts. The responses from students also varied, but in a parallel line, a positive response was seen from the results of the questionnaire which was quite high at 89.59%.

This research is expected to produce theoretical and practical as follows: theoretically it is expected to enrich the theory of existing learning models, especially those based on ICT. Practically, the results of this study are expected to provide input, namely:

1. Specifically in the education study program of Civic of Universitas PGRI Semarang and IKIP Veteran Semarang, especially lecturers of Public Policy courses in order to be able to make and use learning media and applied using Interactive Whiteboard that is attractive to students.

2. Generally for lecturers and students of civic to be able to package ICT-based learning media that is more interesting, one of them is by using Interactive Whiteboard media with the Constructivism approach.

The use of Interactive Whiteboard in the Public Policy course is expected to improve learning outcomes, especially students of Civic. The use of Interactive Whiteboard has been adapted to the behavioristic theory, cognitivism and constructivism that was initiated by Gagne. Behavioristic learning theory is a theory about human behavior that varies and is different resulting from learning. Behaviorism sees learning as a change in behavior that can be observed caused by an external stimulus. They see the mind as a "black box", responding to a stimulus. Gagne suggested 5 kinds of learning

outcomes or three capabilities are cognitive, one is affective and one is psychomotor. Gagne divides learning outcomes into five capability categories as follows: (1) verbal information, (2) intellectual skills, (3) cognitive strategies, (4) attitudes, (5) motor skills, therefore interactive whiteboard media is expected to be Information Verbal, Intellectual Skills, Cognitive Strategies, Attitudes, and Motor Skills students can run optimally.

Cognitivism seeing learning is an internal process that sees memory, motivation, thinking reflection, and meta-cognition. In view of the flow, the human mind manipulates symbols such as computers manipulating data. Therefore, learners are considered as information processors. Cognitive psychology includes the process of learning from information processing where information is received in various senses, transferred to short-term and long-term memory. Information undergoes a flow of transformation in the human mind until the information is stored permanently in long-term memory in the form of knowledge packages. It is expected that interactive whiteboard media can improve students' cognitive abilities, especially in learning public policy courses.

Constructivism sees students building their knowledge from their own learning experiences. Learning can be seen as an active process, and knowledge cannot be received from outside or from others. Students should be given the opportunity to build knowledge rather than be given knowledge through teaching. The nature of constructivist learning by Brooks said that knowledge is non-objective, temporary, always changing, and uncertain. Learning is seen as the preparation of knowledge from concrete experiences, collaborative activities, and reflection and interpretation. Teaching means managing the environment so that students are motivated to explore meaning and appreciate uncertainty.

II. METHOD OF RESEARCH

The research method used is R & D (research and development) or type of development research. The development that was carried out was Learning Media Design Course on Interactive Whiteboard-based Public Policy. The procedure for developing learning devices using Modification models developed by Borg and Gall (1983) which includes 10 stages, namely (1) Research and information collecting, (2) Planning, (3) Develop preliminary form of product, (4) Preliminary field testing, (5) Main product revision, (6) Mainfield testing, (7) Operational product revision, (8) Operational field testing, (9) Final product revision, (10) Dissemination and implementation.

This research has been running for two years, and in the second year it uses the last 4 stages. Stage 7: Operational product revision At this stage, integrated research activities are carried out where activities at this stage are a trial of draft 2 involving 2 classes. This trial was conducted to find out if draft 2 had shown a performance as expected. If there are still weaknesses, the next step is carried out. 1. Stage 8: Operational field testing This stage was carried out in the improvement of draft 2 to analyze weaknesses based on the results of the expanded trial. This is done so that the development of media conducted during the research is better. 2. Stage 9: Final product revision This stage resulted in a draft revision 2. The results of the improvement from draft 2 were then called the final draft which was ready to be published. 3. Stage 10: Dissemination and implementation. This stage was taken with the aim that the newly developed media, Interactive Whiteboard, in the Public Policy course could be used by the wider community. The core of the activities in this stage is to disseminate the products developed at the regional and national levels.

The population in this Interactive Whiteboard study was all students in the sixth semester of Civic in Universitas PGRI Semarang and IKIP Veteran Semarang in the 2018/2019 school year. The data collection of this study used purposive sampling technique by taking one class in the sixth semester in the civic of Universitas PGRI Semarang and one class in the sixth semester in Civic at IKIP Veteran Semarang.

Data collected on the development of Interactive Whiteboard media is in the form of quantitative data as basic data and qualitative data in the form of suggestions and input from respondents as additional data. The data gives an overview of the feasibility of the product being developed. Data from material experts in the form of product quality in terms of material content aspects, namely: conformity with the syllabus, relevance to the ability of students, clarity of learning topics, material suitability, material coverage, suitability of evaluation design, relevance of images, videos, and illustrations with material, ease of use, and ease of understanding material [8].

Data from media experts in the form of product quality in terms of media aspects, namely: interaction with users, the use of text format language, color usage, image quality, sound / music quality, video and illustration quality, usage, presentation order, and Interactive Whiteboard display. And student response data in the form of product quality in terms of student attractiveness. This data is used to analyze the attractiveness and accuracy of the material provided by students.

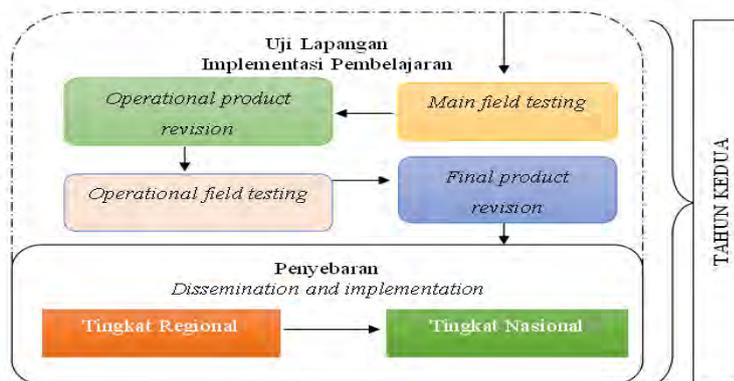


Fig.1. Interactive Whiteboard Research Scheme

III. RESULT

In the learning process using Interactive Whiteboard media at the Universitas PGRI Semarang and IKIP Veteran Semarang has been carried out simultaneously with the following steps:

- a. Selecting the experimental class by random sampling, namely semester 6 at the Universitas PGRI Semarang and IKIP Veteran Semarang
- b. The material of the Public Policy course covers 7 chapters that have been revised by the team based on expert input, student and lecturer respondents in the first year include material on Public Policy, Relations of State Administration and Public Policy, Process of State Policy Formulation, Model of Public Policy Formulation, Policy Analysis Countries, Community Participation in Public Policy, and Value Systems in public policy
- c. The subject matter of Public Policy is carried out with a constructivist approach by characterizing that learning means forming meaning, constructing means something that is happening in a continuous process, learning is not an activity of gathering facts, but more than that is developing thinking by making new understandings, the actual learning process occurs at the time of one's scheme in doubt that stimulates further thinking to spur learning, and results are influenced by the experience of students with their environment that influences the interaction with the material being studied
- d. Students use interactive whiteboard media in classroom learning
- e. Then the questionnaire was completed by students and lecturers on the learning process using interactive whiteboard media
- f. In learning in Civic program at Universitas PGRI Semarang and IKIP Veteran Semarang, has received a very good response, because there is no lecturer in Civic Education who uses it in learning Public Policy courses.



Fig. 2. Use of Interactive Whiteboard in public policy courses at Universitas PGRI Semarang



Fig. 3. Use of Interactive Whiteboard in public policy courses at IKIP Veteran Semarang

A. Expert Validation

Based on the learning process that took place at IKIP Veteran Semarang, a good response was obtained from Drs. Agustinus Sutriyanto Hadi, M.Si as a lecturer who teaches Public Policy courses.

Table 1. Results of expert assessment Material Through Validation Sheet Instruments

No	Aspect Of Assesment	Appropriatness
1	General aspects	90,0%
2	Presentation of learning	96,7%
3	Feasibility of language	96,8%
	average	94,5%

From the table above can be seen for the general aspects of the material got 90.0%, for the presentation of learning obtained 96.7% and for the feasibility of language obtained 96.8%. The average rating for Interactive Whiteboard media was 94.5%.



Fig. 4. Media Implemented Using Interactive Whiteboard

Based on the results of filling out the questionnaire by students as a response from the students of the Civic Education Program of Unversitas PGRI Semarang and IKIP Veteran Semarang, good results were obtained, namely the response of students of Unversitas PGRI Semarang by 85.5%

and the response of IKIP Veteran Semarang students by 86.0%. From the results of these percentages it can be concluded that the response of students from both universities is very good.

Table 2. Results of Student Response Assessment Universitas PGRI Semarang

Responden	Result
Responden 1	90,0 %
Responden 2	85,0 %
Responden 3	77,9%
Responden 4	95,0%
Responden 5	86,2%
Responden 6	92,5%
Responden 7	80,0%
Responden 8	77,5%
Responden 9	86,2%
Responden 10	77,9%
Responden 11	82,5%
Responden 12	91,3%
Responden 13	92,5%
Responden 14	85,0%
Responden 15	78,5%
Responden 16	79,3%
Responden 17	93,0%
Responden 18	93,8%
Responden 19	77,5%
Responden 20	87,5%
Score	85,5%

Table 3. Results of Student Response Assessment IKIP Veteran Semarang

Responden	Result
Responden 1	86.2 %
Responden 2	77.9 %
Responden 3	85,0%
Responden 4	95,0%
Responden 5	97,5%
Responden 6	92,5%
Responden 7	80,0%
Responden 8	77,5%
Responden 9	86,2%
Responden 10	75,0%
Responden 11	82,5%
Responden 12	91,3%
Responden 13	71,3%
Responden 14	85,0%
Responden 15	78,5%
Responden 16	79,3%
Responden 17	95,0%
Responden 18	93,8%
Responden 19	69,5%
Responden 20	87,5%
Score	86,0%

B. Pre-test and post-test scores of students at Universitas PGRI Semarang and IKIP Veteran Semarang



Fig. 5. Value retrieval at Universitas PGRI Semarang

The results of the pre-test and post-test scores of the students of the Civic Education program at Universitas PGRI Semarang showed that there was a difference between the average pre-test score and the average post-test score. This is shown through the average value of the pre-test of 70.3103 and the average post-test value of 72.0517.

Table 4. Paired Samples Statistics students of Universitas PGRI Semarang

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre test	70,3103	17,92010	2,35302
	post test	72,0517	18,07433	2,37328

While the results of the pre-test and post-test scores of the students of Civic Education program at IKIP Veteran Semarang showed that there was a difference between the average pre-test score and the average post-test score. This is shown through the average pre-test value of 63.6842 and the average post-test value of 68.9474.

Table 5. Paired Samples Statistics Semarang IKIP Veterans students

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre test	63.6842	12.83572	1.70013
	post test	68.9474	14.00691	1.85526



Fig. 6. Value retrieval at IKIP Veteran Semarang

Table 6 shows that the test results using Paired Samples Test obtained that the Sig. (2-tailed) value is 0.142. This means that H0 is accepted because the value of H0 is greater than 0.05, which is $0.142 > 0.05$. The test results state that there is a difference between the average value of the pre-test and the average post-test value. And because the t value found is negative, it shows that the post test value is better than the pre test value

Table 6. Paired Samples Test table

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
pre test	Pair 1 - post test	-1,74138	8,90212	1,16891	-4,08207	,59931	-1,490	,142	

Interactive Whiteboard's has some weakness, those are:

- 1) The dimensions of the Interactive whiteboard are large enough that they need a suitable place
 - 2) Hardware such as LCD Projectors have different features that need adjustments. This process is carried out several times to produce good display quality
 - 3) Sometimes the output display from the media appears but on the computer it does not, so it needs to calibrate
 - 4) Every time you start learning you need to do calibration
- Interactive Whiteboard's has strengths are:
- 1) Can be used multi-user / multi-touch up to 4 users or more writing simultaneously
 - 2) Can be written / touched using your fingers
 - 3) Prices are very competitive
 - 4) Impact resistance (because optical component parts are well protected)

IV. CONCLUSION

Has received a very good response from students and lecturers at Universitas PGRI Semarang of 85.5% and IKIP Veteran Semarang at 86.0% in the use of Interactive Whiteboard media.

The results of the pre-test and post-test scores of the students of the Pancasila and Citizenship Education study program at Universitas PGRI Semarang showed that there was a difference between the mean value of the pre-test and the average value of the post-test, namely the average pre-test score of 70,3103 and the average value post test is 72,051. The results of the pre-test and post-test scores of the students of the Pancasila and Citizenship Education study program at IKIP Veteran Semarang showed that there was a difference between the average pre-test score and the average post-test score. This is shown through the average pre-test value of 63.6842 and the average post-test value of 68.9474

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