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Interactive Learning Model in Vocational Education with Smart Board Technology

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Abstract: ***Increasing the competence of graduates to work according to the demands of the development of the Industrial Revolution 4.0 is determined by the role of educators. The role of educators in terms of choosing to apply technological innovations into their learning with appropriate models / strategies, is considered to be a solution to increasing competence. The long-term goal of this research is to develop an innovative and flexible learning model based on Smart Classroom through the study of the development of an interactive learning model on technology education and vocational-based Smart Board Technology at Padang State University. This type of research is Research and Development, with development procedures using the 4D Development Model [4] consisting of: Define, Design, Develop and Disseminate. The model design was validated by 3 media experts with very high validity values; 87,35, through practicality testing on 36 students in the Department of Electronics Engineering, the Faculty of Engineering shows that learning through the use of IWB is more fun and interesting, and they claiming that it makes learning more fun and helps them understand difficult subjects. The developed model can be a solution to increase the competency of vocational education graduates through the application of technology innovation strategies into the offered learning***

Keywords: Industrial Revolution 4.0,TVET, Interactive Learning Model,Smart Board Technology,Smart Classroom.

I. INTRODUCTION

Learning in the Industrial Revolution 4.0 supports the achievement of learning in the realization of 21st century competencies. One of the six elements of 21st century learning (Partnership for 21st centuryskills, 2002) is information and technology literacy and communication literacy. For these skills to develop, the integration of information and communication technology in learning must be applied. The integration of information and communication technologies, such as the Internet, can help improve the skills of information literacy and literacy of information and communication technologies for students effectively [1]. Greater technological and communicative literacy can be carried out synchronizing with IWB technology. This synchronization allows greater collaboration, profitability and greater pedagogy [2]. Broad technology and communicative literacy in an intelligent learning environment is generally known as an intelligent classroom, and this environment is seen as an intelligent solution. The integration of the IWB smart board and e-learning software as an information system has become part of the smart learning environment.

The Smart Classroom as a modern method of education provides quality education to students. This education can help them in the formation of better concepts, elaboration of concepts, greater reading skills and academic achievements. Electronic learning software as an information system has been widely used by institutions of higher education, including Padang State University. The teaching strategies covered in e-learning include the use of application software, projectors and whiteboards, and this has become an IWB smartboard that combines whiteboard, computer, projector operations and has applications to manage learning content .The teacher must apply the technology in their learning with the correct model / strategy, considered as a solution to improve proficiency. The discovery of new models, methods and strategies in learning through the integration of information technology and communication in learning has become a serious study lately. Several efforts have been made, but there is no effective model / strategy to integrate the use of communication / literacy technology and equipment, specifically the integration of the IWB smart board in teaching and learning. Teaching and learning support through the integration of technology and communication and Internet equipment is increasingly being developed and it has been shown that it can improve students' competencies [1], then the integration of the use of IWB smartboard in learning with certain models / strategies.

The main objective of this research is to study and formulate interactive learning models or strategies that can be used in learning. The IWB Smartboard-based interactive learning model or strategy will also be tested for its practicality in determining the use of the developed model.

II. METHODOLOGY

Efforts to harmonize the performance of vocational education in preparing graduates for work are increasing according to the demands of the development of the Industrial Revolution 4.0 or the fourth world industrial revolution .

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The role of educators in the application of technology in their learning with appropriate models / strategies is considered a solution to increase competition. The discovery of new models, methods and strategies in learning through the integration of information technology and communication in learning has become a serious study lately.

Technology and communication can give students direct access to information and resources, allowing them to create meaningful learning experiences, exclusive to traditional classical learning [3].

The use of technologies such as interactive whiteboards (IWB) that are part of information and communication technology is considered one of the most revolutionary learning for various levels of education [8]. This learning process helps develop cognitive skills and is appropriate for the 21st century [4] IWB improves teaching and learning ([5],[6],[7]) for example, allowing interactive learning[[8],[7]).

Research on the relationship between the use of IWB and student achievement has revealed mixed results. IWB positively influences students' ability to understand complex concepts. Other findings reveal that multidirectional technology helps students develop complicated concepts in their imagination ([5],[4]). Much research related to the use of IWB, there is no one who formulates the best model or strategy in the use of IWB as an effective / efficient model / strategy to produce better learning.

The Faculty of Engineering of Universitas Negeri Padang as a Technology and Vocational Education Institute, in order to become a competitive institution in responding to the Industrial Revolution 4.0 by making the lecture classes at FT UNP integrated ICT programmed and structured so that it is implemented into a Smart Classroom. Some classes / laboratories at FT UNP already have facilities to support the integration of technology to support the creation of Smart Classroom. In order to obtain optimal results in developing cognitive and learning skills during the Industrial Revolution 4.0 era, the availability of several IWB SmartBoards in the Electronic Engineering Department, is deemed necessary to have a learning model / strategy using an effective and integrated SmartBoard IWB with www.elearning.unp.ac.idis being tested in this year's research.

This type of research is R & D (Research and Development), focused on the product design phase of model development conducted in the Electronic Engineering Department. The development procedure in this study uses the 4D Model development method [9] consisting of: Define, Design, Develop and Disseminate. The design model that was developed can be a solution to increase the competency of vocational education graduates through the application of technological innovation strategies in the learning offered.

The sample of this research is the students in the Department of Electronics Engineering, the Faculty of Engineering with 36 students. The sampling technique uses simple random sampling.

The procedure used for the development of learning model with 4D. The following are the stages of the development procedure using 4D:

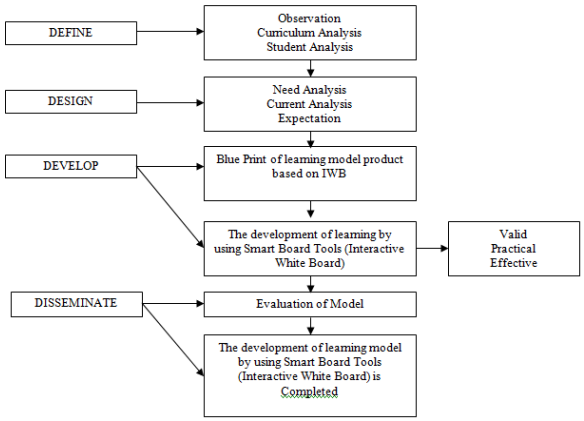

Figure 1 . The procedure for developing with modified 4-D model

Source: [9]

In this article, we only reveal the practicality test of the products have developed. Practicality tests performed in this study to determine the level of usability / practicality of the product being developed. The practicality test is a standard measure in terms of product practicality and the results of the user or user evaluation. The product is said to be practical, if the user was easy used it. Practical evaluation by users or users, based on the answers to the questionnaire provided.

Regarding the practical aspects of the results, [10] explains how to measure practicality by observing the explanations of experts or users. A product is concluded practical, (1) theoretically practical, if the product can be applied in the field; (2) the product is concluded practical, if the level of performance of the product is classified as good.

III. RESULT

The development of learning that is modeled is by using Smart Board Tools (Interactive White Board) as the main media in classroom learning.

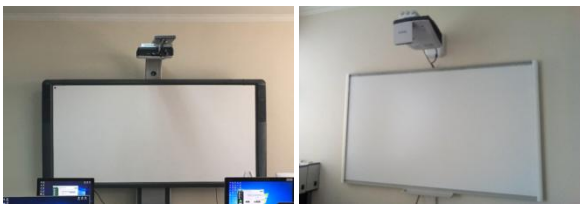

Figure II . Two Type of Interactive White Board (IWB) as The Media of The Model Used

After the interactive learning model product based on IWB is completed, then there are several stages of product development testing carried out through several test stages. In general there are 3 (three) test stages of this study, namely the level of validity, practicality, and effectiveness of the IWB media. as follows:

A. IWB as Media Validity

The learning model product was validated by experts consisting of 3 experts (lecturers) at Universitas Negeri Padang. IWB media validation assessment instruments take the form of a validity assessment questionnaire.

The validity results are used as a guideline in revising the product to be used. The instrument for evaluating media validity consists of four components, namely content quality, learning quality, interaction quality, and display quality. Each assessment indicator is given a score of one to five. The results are presented in Table 1.

Table II: Media Expert Validation Results

No	Assessment Components IWB Media	Score Validity	Criteria
1	Content Quality	86,50	Very high
2	Quality of learning	86,80	Very high
3	Quality of interaction	88,60	Very high
4	Display Quality	87,50	Very high
	Average	87,35	Very high

The average value of the validity of using IWB Media with is 87.35, based on the (11) validity criteria, the validity value is very high (range 81-100). During the validation process, the three validators provide comments and suggestions as a basis for revising the resulting product model, so that it can be used in the learning process.

B. IWB Media Practicality Test Results

After the validity test is done, then the next step can be done practicality test. The practicality test on the use of the IWB media model is conducted on the students participating in the course. Practicality analysis is seen based on the results of a questionnaire analysis containing 36 students' responses. The practicality assessment component for using the IWB model consists of 18 items of statement instruments.

Table II: Practicality Test Results for IWB Media Use

No	Statement	Mean	Std. Deviation
1	Learning with IWB is more fun	4.18	.945
2	Learning with IWB is more interesting	4.13	.972
3	I participate more actively in lessons using IWB	3.75	.978
4	I understand better in lessons using IWB	3.76	.923
5	I am more creative in learning to use IWB	3.70	.953
6	My grades are better in lessons using IWB	3.60	.947
7	I complete more work in a shorter amount of time during lessons using IWB	3.75	.988
8	I remember more from lessons using IWB	3.69	1.028
9	I prefer lessons using IWB because I learn better when I do things	3.69	1.018
10	I feel more independent in learning to use IWB	3.66	1.049
11	I work in groups in lessons using IWB	3.45	1.104
12	I don't like lessons using IWB because I don't like technology	1.87	1.230
13	Learning using IWB is useful for difficult / abstract subjects (eg, Engineering)	3.85	1.188
14	Lessons using IWB are useful for easy subjects (e.g., Language learning)	3.42	1.193
15	My lecturer is skilled in using IWB	3.34	1.129
16	My learning style fits in with lessons using IWB	3.77	.950
17	I hope we can use IWB in all lessons	3.95	1.017
18	IWB will replace conventional boards in the future	4.04	1.193

Based on the data presented in Table 2, it can be understood that, most students think that the lessons taught using IWB are more fun and interesting. Also a large number of students believe that the Interactive White Board (IWB) will and must replace conventional class boards today in the future. In addition, they report that IWB plays an important role in their understanding and success in difficult courses. Perhaps a strong indicator of the need to improve IWB learning at universities is a negative student response or strong disagreement with item 12, which highlights students' exposure to sophisticated technology. Students generally maintain neutrality when asked to express their opinions about the ability of Lecturers to use IWB effectively.

This neutral response can be related to the fact that the use of IWB in these Universities is relatively new and until now Students have not fully understood the dynamics of their effective dissemination and therefore may not know when to use them properly or not like traditional teaching methods where students usually have an opinion about the effectiveness or ineffectiveness of their lecturers.

IV. CONCLUSION

1) Interactive whiteboards can make learning more real, interactive, and increase student participation, motivation, and concentration in the teaching and learning process. Interactive whiteboard has the potential to increase the interaction between the teacher and students in the classroom, where there is ICT and there are indications that teaching with interactive whiteboard is more fun, interesting, and influences the pleasant classroom atmosphere, speed in understanding something.
2) The implementation of research in one year is a short time in this interesting research, so it is felt that many things cannot be developed yet. The researcher suggests to other researchers to investigate the relationship between students' attitudes towards the use of IWB in education on the achievement of student learning outcomes; teacher background on attending training before or in the office about using IWB; teaching strategies, methods and techniques used by teachers with IWB; or the suitability of the software or material used with the IWB. On the other hand, lecturers or teachers as practitioners and education managers are advised to use IWB to get feedback from students about the productivity of using IWB in their classes or educational institutions.

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