

Conference Paper

Blended Learning for Augmented Reality to Increase Student Competitiveness the Filling Subject Toward Making Indonesia 4.0

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Abstract

Human resource development can be done by various step such as improvement of quality education especially model and learning method. The Filling Subject is the important thing to increase the competitiveness of student at Vocational High School especially Administration Department. Today teachers just have conventional method to deliver their knowledge. Therefore student hard to understand the knowledge that delivered by teacher. Indonesia's government have launched policy that called Making Indonesia 4.0 against this global era. Blended Learning is one of the effective method to deliver knowledge to students because this method make student understand easily. Augmented Reality is one of the technology that can be collaborated with Blended Learning. This study purposed to create modul based on Augmented Reality as Blended Learning implementation in Filling Subject at Vocational High School Malang Regency. The study method modified from research and development models that called 4-D (define, design, develop, and disseminate). This study using quantitative dan qualitative data that collected from questionnaire. The questionnaire will be given to the material expert, the media expert and the students in Administration Department at Vocational High School Malang Regency. The result of this study are: 1) product has been validate by the material expert of Filling Subject; 2) product has been validate by the media expert of Augmented Reality; 3) product has been implemented with Blended Learning Model to the Administration Department Student in the Vocational High School Malang Regency and succeed to increase their competence in the Filling Subject. The implementation of Blended Learning for Augmented Reality suggested to be implemented in the other learning subject because it is very effective to increase the student competitiveness and make learning that done by teacher more easily.

Keywords: Augmented Reality, Blended Learning, Filling Subject, Module, Vocational High School.

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1. Background

Departing from the fact that the industrial revolution has reached its peak in the industrial revolution phase 4.0 (Kemenristekdikti, 2018a). In line with this, the Indonesian government has issued a policy with the term making Indonesia 4.0. Today making

Indonesia 4.0 has developed more massively marked by the growing development of Internet of think, big data, financial technology, e-commerce and sharing economy-based businesses such as Go-Jek, Shopee, Lazada, Traveloka, Tokopedia, and I-grow. Industries that use high technology certainly have a big impact to achieve the main objective of making Indonesia 4.0, namely to make Indonesia into the top 10 of the world economic power based on Gross Domestic Product (GDP). One sector that needs to be prepared to support making Indonesia 4.0 is the education sector which can be measured by increasing the quality of human resources by involving several educational components. Important components in education include educators (teachers), students, curriculum, learning methods, learning environment, and learning media (Ahmadi, 2014: 63). Learning methods are proven to be one of the important components that can be used to improve the quality of education through increasing human resources.

Filling subjects is one of the important subjects in the senior high school level that make a major contribution to Indonesia's economic growth. Departing from the success of these subjects will create young businessmen who will establish small and medium enterprises that are proven to survive the economic crisis in Indonesia. Unfortunately these become subjects that are less noticed by teachers and students. Submission of material that seems boring is the main reason for lack of interest in students to learn and explore these subjects. Based on observations indicate that Fillingship teachers only use conventional methods in delivering the material. This becomes the main cause of students difficult to catch the subject matter delivered by the teacher. The use of this method also causes students to be less interested in exploring Fillingship subjects.

In line with of making Indonesia 4.0 that had been formulated by the Indonesian government, the learning methods used by teachers must certainly support the achievement of these goals. The use of internet-based learning media must be carried out by teachers to increase the students' capture of Fillingship material that they want to convey. Rusman (2011: 77) states that the use of information and communication technology (ICT) media in the teaching and learning process is very much felt the need and importance to improve the quality of learning. The use of information and communication technology media in the field of education is called E-Learning (Electronic Learning). Wahono (2007: 226) states that E-Learning is a solution in education in the era of globalization. E-learning and information technology support the delivery of information from conventional learning processes to digital, both in terms of content and system. Munir (2009: 99) states that E-Learning has three main functions in learning, namely as a supplement that is optional (optional), complementary (component), or substitute (substitution). In this study focused on E- learning which functions as a complement,

one of them is the use of Hybrid E-Learning (HEL). Efendi (2014: 1) in his research stated that HEL is a redesigned online learning media in the Learning Management System (LMS) by combining online and face-to-face systems in class to create independent, active, effective and efficient learning activities; 2) the use of HEL as a basic vocational competency learning media using Hybrid E-Learning models has internal and external effectiveness.

Hybrid Learning is a methodological learning approach that connects several Asynchronous Learning Network based approaches or learning methods through internet learning. Guellern et al (2000: 189) revealed this learning developed ALN (Asynchronous Learning Network) by using computer technology to communicate via the internet network. Asynchronous Learning Network through internet learning that is done at different times. Learning by using the internet in Indonesia is popularly called E-Learning. Interesting learning can be made using a variety of learning media. Arsyad (2014: 3) says that media is a tool that conveys learning messages. Learning media can be made by utilizing the facilities and infrastructure available at the school. The facilities provided by the school are currently experiencing many developments. This is evident from the many schools that provide technology-based facilities and infrastructure such as computers, laptops, LCD projectors, etc. The online learning media in the Learning Management System (LMS) is redesigned by combining online and face-to-face systems in class to create independent, active, effective and efficient learning activities, the use of HEL as a basic vocational competency learning media using the Hybrid E-Learning model has internal and external effectiveness that is able to improve understanding skills or theoretical learning for students.

Departing from that, the researchers conducted a study with the title HYLBUS (Hybrid Learning Based on Asynchronous Learning Network): Innovative Learning Media to Increase Teacher and Student Competence in The Filling Subject Toward Making Indonesia 4.0 as an effort to increase the contribution of the education sector in making Indonesia 4.0

2. Literature Study

2.1. The Industrial Revolution 4.0

A famous German economist who is also the founder and chairman of the Executive World Economic Forum (WEF) was the one who introduced the concept of the Industrial Revolution 4.0. in his book entitled "The Fourth Industrial Revolution" explains that

the Industrial Revolution 4.0 has fundamentally changed human life and work. The Industrial Revolution 4.0 was different from the previous Industrial Revolution phase, because in the Industrial Revolution 4.0 it had a wider scale, scope, and complexity. The technological advances that took place in the Industrial Revolution 4.0 integrate the physical, digital and biological worlds that affect all disciplines, economics, industry and government. According to Klaus Schwab (2016) the industrial revolution has four phases that have occurred since the beginning of the 18th century until now. Today the Industrial Revolution phase reached its peak which was marked by the existence of massive impact of internet technology that was directly related to millions of people throughout the world. Not only that, technology has also become the basis for online trade and transportation transactions. The emergence of the online transportation business. This situation illustrates that the industrial revolution 4.0 has occurred Klaus Schwab (2016).

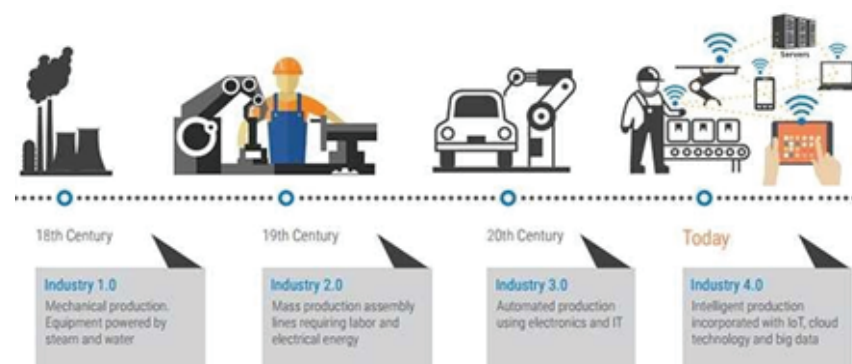


Figure 1: The Industrial Revolution 4.0 (Source: www.kompasiana.com).

2.2. Learning Media

Sanjaya (2012: 61) states that learning media are all things such as tools, environment, and all forms of activities that are conditioned to increase knowledge, change attitudes or instill skills in everyone who uses them. The current learning media has experienced very rapid development which is influenced by the concept of teaching. The old concept says that teaching is the delivery of information from the teacher to students. Meanwhile, the new concept says that teaching is a teaching process on students learn. Therefore learning media is oriented to the ease of students in changing their behavior according to the learning objectives.

Hamalik (in Arsyad, 2013: 19) suggests that the use of learning media in the teaching and learning process can generate new desires and interests, generate motivation and stimulate learning activities, and even bring psychological influences to students. The teacher must be able to adjust the learning media with the characteristics of the subject

matter to be delivered so as to improve students' understanding and learning outcomes. Therefore, the use of appropriate learning media is considered very beneficial for teachers in helping deliver material in the teaching and learning process. In line with this, Rusman (2011: 77) states that the use of information and communication technology (ICT) media in the teaching and learning process is very much felt the need and importance to improve the quality of learning.

2.3. E-Learning

Wahono (2007: 226) states that "E-Learning is a solution in education in the era of globalization. E-learning and information technology support the delivery of information from conventional learning processes to digital, both in terms of content and system. E-learning is a learning system that utilizes electronic media as a tool to help learning activities, E-learning can be defined as an effort to connect students with learning resources (teachers and libraries) that are physically separated or even far apart but can communicate. The use of E-learning in learning allows teachers to use the internet to deliver learning material to students, so the learning process doesn't only take place face-to-face in the classroom but also outside the classroom. So that the learning process can be more effective and efficient. Munir (2009: 99) states that E-Learning has three main functions in learning, namely as a supplement that is optional (optional), complementary (component), or substitute (substitution).

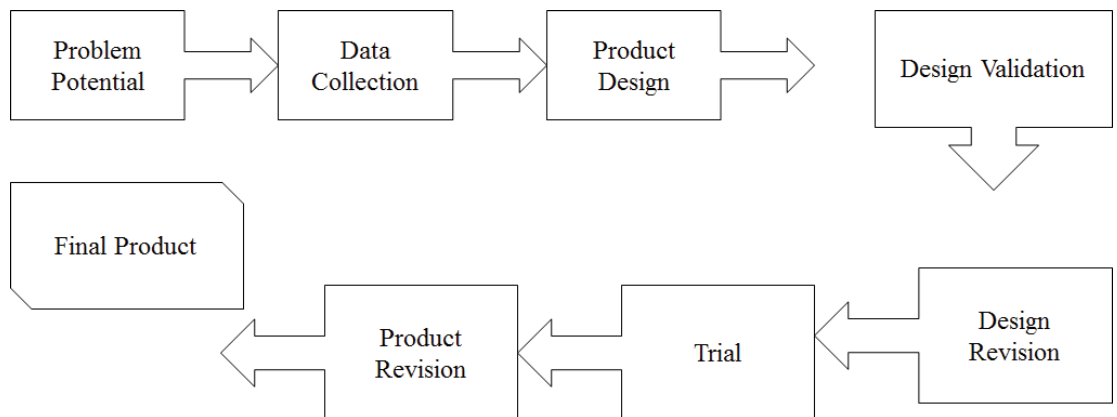
3. Research Methods

3.1. Research and Development Method

The method used in this study is the method of research and development from Borg and Gall. The steps of the research and development process indicate a cycle, which begins with the existence of needs and problems that require solving using a particular product. Researchers don't have to use all the steps of research and development from Borg and Gall, but researchers can choose and determine the most appropriate steps by adjusting the specific conditions faced in the process of research and development that is being carried out.

3.2. Procedure for Research and Development

This research is guided by research and development procedures from Borg and Gall in Sugiyono (2013: 409) with the following steps:



3.3. Trial Subject

The subject of the trial in the development of this learning media is the teacher who teaches in Senior and Vocational High Schools. The school used is 5 schools at Malang city. While for the purposes of validation, researchers will choose material expert validators, namely tutor teachers who have the task of guiding teachers in schools and IT experts as media validation.

3.4. Data Types

Data obtained from this research and development is in the form of qualitative and quantitative data, where qualitative data are in the form of comments and suggestions from media experts and material experts and respondents. While quantitative data is obtained from the results of filling out questionnaires by media experts, material experts, students (respondents) as well as students' pretest and posttest scores during trial use.

3.5. Data Collection Techniques and Research Procedures

Data collection techniques used in this study are documentation, questionnaires, interviews, and tests (pretest and posttest) to respond. This research was preceded by conducting initial observations aimed at obtaining data on learning activities that will take place in the classroom. The stages of classroom action research are carried out

in two cycles, where in one cycle there are two meetings. Each cycle consists of four stages, as for the stages, namely the planning stage (planning), the stage of action (action), the stage of observation (observation) and the stage of reflection (reflection).

4. Results and Discussions

4.1. Description of Produk Mobile Application based on Augmented Reality

BlendAR (Blended Learning based on Augmented Reality) is the one of the integrated module based on Augmented Reality as one of the learning media for student in the filling subject. The fundamental principle of this learning media is the *E-Learning Multimedia Augmented Reality* that integrated several aspect to increase student competitiveness in the filling subject. Filling subject teacher integrated the learning through Blended Learning model. In the practice teacher connected the module to Augmented Reality application that make student understand the material easily. Teacher who understand fully about the material as a main user that will operate this application. The material is related to current condition in the filling subject that will be optimize from Blended Learning Model. Student get contextual capture throught leaning media that used, so the practice that done by the student can be understand easily. Teahcer as a fasilitator in the class show the increasing of intens interrraction because Mobile Apps that used together with module. It will be increase the technology literacy of teacher..

The advantages of this media are (1) user friendly, which makes it easier for users to find important material information that will be delivered to students. The content on this product is also neatly arranged. On the main page, you can easily find the most frequently discussed business issues, and the latest information regarding the latest articles and posts from each user; (2) responsive, who can easily adjust the display according to the device used; (3) accountable, who can find out the results of evaluations that have been made after completing learning. In addition, you will also easily find out the feedback provided by each user. (4) transparant, which allows each user to see the latest information that has been updated by other users. (5) trusted, which provides trusted information that has been updated by each user such as giving teacher assignments and completing assignments by students.

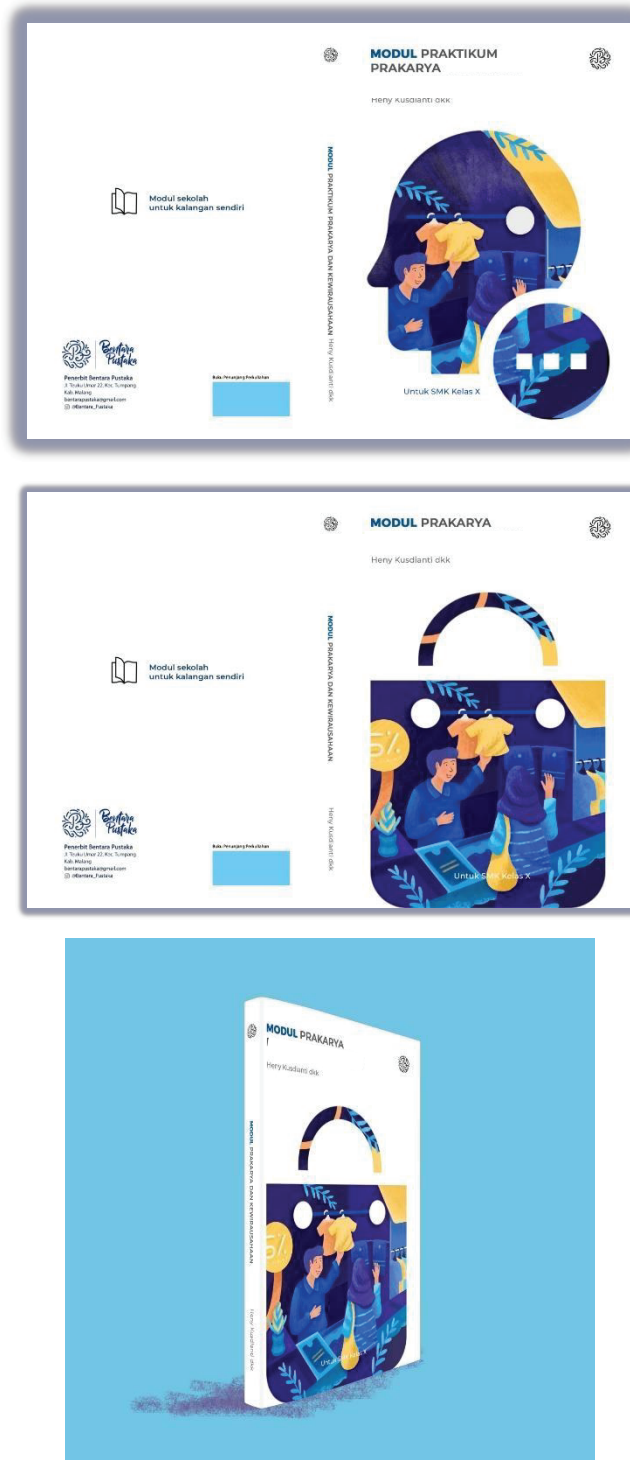


Figure 2: Picture of BlendAR.

4.2. Testing Result of Produk Mobile Application based on Augmented Reality

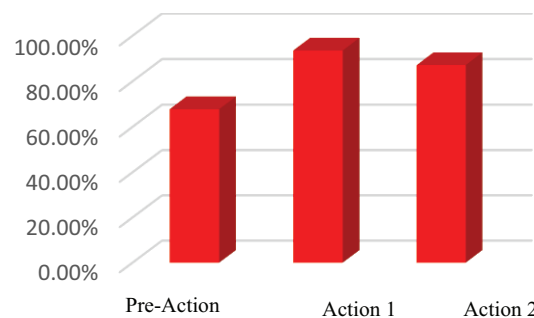
Achievement of competencies can be seen from student learning outcomes in 5 schools throughout Malang when pre-action carried out through pre-test was only 66.54%

and there were a number of students with low academic abilities, and were less active in class. After applying this media, student learning outcomes have increased. improvement of learning outcomes from pre-action, action 1, and action 2 are presented in the following table:

TABLE 1: Table of Learning Outcomes Improvement.

	Percentage	Improvement
Pre-Action	66,54%	
Action 1	94,6%	28,06%
Action 2	89,29%	-5,31

The application of integrated module based on Augmented Reality has been able to improve student learning outcomes which are quite significant at 28.06%. With a very good category. The decline occurred at 5.31% from action 1 to action 2 because the factors that cannot be controlled by the researcher include 6 students who were permitted when the study took place because it coincided with the sudden assignment given by the school, while at the time of taking 6 students present, so there is a value gap. Students' completeness percentage can be seen in the following graph:



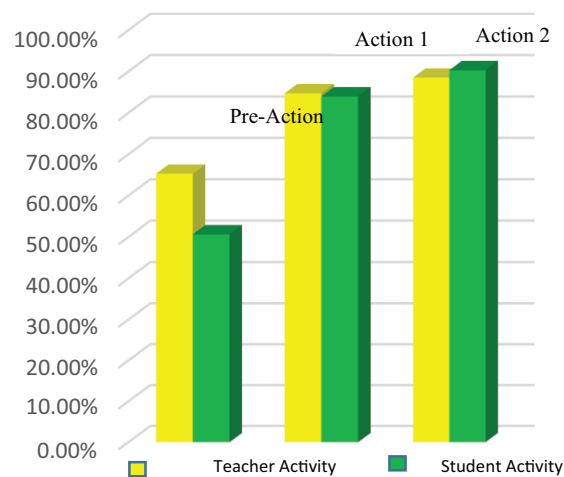
Student learning outcomes are also inseparable from the activities of teachers and students. Before applying integrated module based on Augmented Reality teacher activity was not too high at 63.81%, while student learning activities were relatively low at 52.31%. The activities of teachers and students also increase after being given an explanation by the researcher and implementing learning in accordance with the Draft Learning Tools (RPP) that had been planned previously. Student and teacher learning activities starting from pre-action, action 1, and action 2 are presented in the table as follows:

Application of integrated module based on Augmented Reality Products can increase teacher activity and also student learning activities in 5 schools throughout Malang. Teacher activity increased by 17.35% from pre-action to action 1 and an increase of 5.55% from action 1 to action 2 with the criteria of "very good". The increase in student

TABLE 2: Table of Improvement of Teacher and Student Activities.

Action	Teacher Activity	Student Activity
Pre-Action	63,81%	52,31%
Action 1	81,16%	80,61%
Action 2	86,71%	92,31%

activity was 28.3% from pre-action to action 1, and an increase of 11.7% from action 1 to action 2 with the criteria of "very good". Increased teacher and student activities are presented in the graph as follows:



The application of integrated module based on Augmented Reality is carried out in accordance with the stages in Arikunto, S (2010: 137). The stages of application include: planning (planning), the stage of action (action), the stage of observation (observation) and the stage of reflection (reflection). The Blended Learning can improve student learning competencies due to the Blended Learning, students not only passively accept material from the teacher but also actively participate in the learning process starting from self-study through the website, question and answer, group discussions, where each member group exchange ideas and help.

Dimiyati and Mudjiono (2009: 62-63) state that to be able to cause learning activeness in students, the teacher can implement the following behaviors: 1) using multimethods and multimedia, 2) giving assignments individually and in groups, 3) giving opportunities for students to carry out experiments in small groups, 4) give assignments to read learning materials, record things that are not clear, and 5) hold question and answer and discussion. This can increase the interest and activity to take part in Fillingship learning. In addition, students also do not feel bored and bored because of variations in the implementation of learning.

Based on the exposure to the research data, the Action test results of 1 student from 5 schools throughout Malang after carrying out learning with the application of this media showed that the average score of students was 94.6%. When compared with the results of the previous pretest with the percentage of learning outcomes reaching 66.54%, action 1 has experienced a good improvement. The average student in action 1 is 86.53 with the highest score of 100 and the lowest value of 67.5. The average value is more than the average SKM of 80. It is felt that there are still a number of things that need to be corrected and also evaluated, then Actions 2 are continued. Action 2 is better implemented which can be seen from the results of observations of student learning activities and activities of teachers who have met the classification in the category of "very good". The percentage of students completeness reached 89.29% with an average value of 81.29 with the highest score of 95 and the lowest of 67.5. When compared with action 1, there was a slight decrease in the average student completeness. Based on observations of researchers, this is because the material is new to students and the number of study hours is too short. However, the achievement of student competencies is still said to be increasing and has exceeded the average Minimum Standards of Understanding (SKM) which is 80.

This is also in accordance with the results of Widya's study (2016) which shows that the Blended Learning can improve student learning effectiveness and also Rusman's research (2011: 77) states that "the use of information and communication technology (ICT) in the teaching and learning process is very much felt by the needs and its importance to improve and improve the quality of learning".

Based on the results achieved during the implementation of the integrated module based on Augmented Reality, students experience increased learning skills and competencies carried out not only in the classroom but also outside the classroom. This is consistent with research from Rovai and Jordan (2004) defining Hybrid Learning as a flexible learning approach where learning is not only done in one time and place but can also be done at different times and places.

5. Closing

5.1. Conclusion

Based on the results and findings, some conclusions can be drawn including:

1. *BlendAR (Blended Learning based on Augmented Reality)* has become one of the learning media that integrates several aspects needed by students in increasing

the capture of Filling learning delivered by teachers with several advantages including (1) user friendly, (2) responsive, (3) accountable, (4) transparent, and (5) trusted.

2. Based on the five testing criteria used to test this product, it was found that this learning media is very good for use by teachers to improve student competitiveness in supporting the achievement of making Indonesia 4.0

5.2. Suggestion

1. The Ministry of Research, Technology and Higher Education is expected to be able to consider the diffuse needs of the industrial revolution 4.0 in developing policies.
2. The government is expected to be able to provide supporting facilities for school learning in order to realize making Indonesia 4.0
3. Fillingship teachers are expected to better prepare themselves to meet the competencies needed to realize making Indonesia 4.0
4. Fillingship teachers are expected to continue to carry out scientific updates and updates on the latest information from the industrial revolution 4.0

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