Enchancing Teacher Competitiveness Of Entrepreneurship Through Augmented Reality Module: STEAM Approach

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Abstract: Today Industrial Revolution has reach its peak where technology become the basis of human life. Entrepreneurship education is one of the important things that have to be done to prepare Industrial Revolution 4.0. This research purposed to enhance teacher competitiveness of entrepreneurship through Augmented Reality (AR) Module using STEAM approach. The research method is used research and development method with the type of the data are quantitative and qualitative data. The data analysis technique used in the development of instructional media is the percentage descriptive technique. The data obtained is then interpreted with qualitative sentences. The testing subject is used teacher and student in the five high school/vocational high school in the Malang. Based on the result shows the media that was developed is valid to used on Entrepreneurship Learning, with the advantages are (1) user friendly, (2) responsive, (3) accountable, (4) transparent, and (5) trusted. This is suitable to support student achievement and activity also teacher activity. This media existance is one of the solution to realized the succes of entrepreneurship education that will be creating young businessman who will establish MSME’s in the future.

Keywords: Augmented Reality, Entrepreneurship, STEAM Approach, Teacher Competitiveness

1. INTRODUCTION
   Entrepreneurship Education is one of the important things given to students from an early age considering the rise of instant culture in students today (Sulasmi, 2015). The subject of Entrepreneurship is one of the important subjects in the senior high school level which will later make a major contribution to Indonesia's economic growth. In 2018, the contribution of MSME’s to Indonesia's Gross Domestic Product reached 60.34% (BPS, 2019). The Chair of the Indonesian Micro, Small and Medium Enterprises Association predicts that the contribution of MSME's will grow by 5% to 65% or around Rp. 2,394.5 trillion in 2019 (Akumindo, 2019). Based on the data above, it can be seen that MSME's have a significant contribution in Indonesia's economic growth. This is what underlies the success of entrepreneurship subjects is very important to be realized, because of the success of these subjects will be creating young businessman who will establish MSME's in the future. However, the unfortunate thing is that this subject has become less of a concern for both teachers and students. This can be seen from the delivery of material that seems boring to be the main reason for students' lack of interest to learn and explore this subject. Based on the results of observation showed that entrepreneurship subject teachers only use conventional methods in the delivery of the material and use learning media that are less attractive to students. Learning media are everythings that are conditioned to increase knowledge, change attitudes, or skills addition of anyone who uses them (Sanjaya, 2016). This shows that, the use of learning media must be able to provide benefits in the desired learning before. In the framework of increasing the success rate of entrepreneurship subjects, it is certainly necessary to use interactive learning media so that students can have an interesting learning experience (Kusdiyanti, 2018). Interactive as a process of empowering students to control the learning environment (Philips, 2008). The successful use of interactive media certainly needs to be balanced with collaborative learning models that are in line with student conditions. In line with the occurrence of the Industrial Revolution 4.0 where technology is the basis in human life, the use of instructional media is also increasingly developing (Schwab, 2017). One of the learning media that can be applied in line with this revolution is Augmented Reality (Kamelia, 2015). Augmented Relaity (AR) technology combines objects such as video, images, data or other virtual worlds into real-world views in real time (Kounavis, Kasimati, Zamani, 2012). The use of AR has been widely used in various sectors including the education sector (Yu, et al, 2010). In the world of education, Augmented Reality provides real-time learning experiences for students. This learning experience will help students in understanding entrepreneurial material and increase student interest in these subjects. This has become a great opportunity for the use of Augmented Reality media in increasing the success of entrepreneurship subjects in high school. The use of Augmented Reality in entrepreneurship subjects needs to be collaborated with a learning approach that is appropriate to the conditions and characteristics of students (Kamelia, 2015). In entrepreneurship subject, students are required not only to understand the basic material but also to arrange a simple business plan that will be implemented later. The students' thinking process in completing the project making business plan is suitable to be collaborated with the STEAM learning approach (Anisa, et al, 2019). The STEAM (Science, Technology, Engineering, Art and Mathematic) approach is the right approach in increasing the success of entrepreneurship subjects in order to create an output in the form of students' ability to arrange business in real time. In the STEAM approach encourages students to understand every component of STEAM in entrepreneurial learning to produce a reliable businessman in the future (Anisa, et al, 2019). One important component in STEAM is "A" which presents art and

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humanities that provide a more realistic learning experience that is integrated with various disciplines to encourage creativity and problem solving (Gettings, 2016; Miller and Kneze, 2013). One of the parties that has an important role in the success of student education is the teacher. Teachers become an important component in improving the quality of education (Ahmadi, 2014). For this reason, the implementation of Augmented Reality learning media through the STEAM approach can improve teacher competence in entrepreneurship subjects. Teachers haven’t difficulty using instructional media that interest students again, through Augmented Reality students' attractiveness in entrepreneurial learning is predicted to increase which will ultimately increase student performance in entrepreneurship subjects. The implementation of Augmented Reality through the STEAM Approach is also predicted to increase the activeness of students and teachers during the entrepreneurship learning process.

2. THEORITICAL REVIEW

2.1 Augmented Reality in Education
Augmented Reality is a technology that allows computer-generated virtual imagery information to be overlaid into a live direct or indirect real world environment in a real time (Zhou, Duh, & Billinghurst, 2008). It is different from Virtual Reality (VR) in that people are expected to experience a computer generated virtual environment. It can be said that AR bridges the gap between the real world and the virtual in a seamless way (Chang, Morreale, & Medicherla, 2010). There are so many research for example according to Chang, Morreale, & Medicherla (2010) have suggested that motivation for learning and enhance their education realism based practices with virtual reality and augmented reality. In order to spread the information and technology, AR have to be adopted in the classroom. Professionals and researchers have striven to apply AR to classroom-based learning within several subject and adopt it into augmented reality books and student guides (Lee, 2012). During the last few decade, there are many innovation og AR that applied in education training are being used to enchance the education training efficiency of student.

2.2 Effectiveness of STEAM Approach
STEAM was born from additional modification of discipline from the STEM. Art, design, and humanity have to be include in teaching and learning to get more balanced ways because of the sometimes narrow approach toward interpretng and then teaching knowledge, skills, and perspectives sometimes associated with STEM (Brady, 2014; Connor et al, 2015). This defined by transdisciplinary style of teaching encouraging a wide variety of knowledge and skill sets that promote problem solving (Winterman and Malacinski, 2015). The goal of this approach is to prepare the student to be up againsts world’s pressing through creativity, critical thinking and ultimately knowledge in the future. Several finding demonstrate that STEAM approach success to increase the motivation, engagement and effective disciplinary learning in STEAM areas (Henrkisen et al, 2015). According to Kim and Song (2013) shows that student be able to make connected of how technology can assist in solving real world current problems. However, teacher has been understand the clear definition of this approach to improve their practice. According to Herro and Quigley (2016) that create a clearly model defines STEAM teaching practice for teacher to gauge their enactment.

3. RESEARCH METHOD
The method used in this study is the research and development method of Borg and Gall (2003). In this study the most appropriate steps were not taken by adjusting the specific conditions encountered in the research and development process undertaken. The following steps have been modified by researchers based on the method of Borg and Gall (2003):

![Fig. 1. Procedure for Learning Media Development](source)

Source: Borg and Gall (2003), modified by researchers

This research was preceded by preliminary observations aimed at obtaining data needs in the development of instructional media in the classroom. The stages of this research are carried out in three stages, while the stages are the defining stage, the design phase, and the development stage. The testing subjects in the development of this learning media were teachers and students in 5 high schools / vocational high schools in Malang. The type of data used is qualitative data obtained through documentation and interviews with validators and respondents, and quantitative data obtained through questionnaires for validators and tests for respondents. The data analysis technique used in the development of instructional media is the percentage descriptive technique. The data obtained is then interpreted with qualitative sentences. The data processing technique used refers to Arikunto's data processing technique (in Fadli 2013: 26) as follows:

\[ P = \frac{x}{X} \times 100\% \]  

(1)

To determine the conclusions reached, criteria such as the following table are set:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% - 100%</td>
<td>Valid to Used</td>
</tr>
<tr>
<td>60% – 79%</td>
<td>Valid Enough to Used</td>
</tr>
<tr>
<td>50% - 59%</td>
<td>Less Valid to Used</td>
</tr>
<tr>
<td>&lt;50%</td>
<td>Invalid to Used</td>
</tr>
</tbody>
</table>

**TABLE 1**

DETERMINATION OF THE PERCENTAGE OF RESULT
4. RESULT AND DISCUSSION

4.1 Description of Module based on Augmented Reality

ARMod (Augmented Reality Module) is an integrated module with AR (Augmented Reality) based Mobile Apps as learning media for entrepreneurship teachers in the five schools located in Malang Region. The fundamental principle of this learning media is E-Learning Multimedia Augmented Reality which integrates several aspects needed by students in increasing their understanding of entrepreneur delivered by the teacher from material module. Entrepreneurship teacher implement this media through STEAM approach which teacher uses a practice module that has been linked to Augmented Reality Mobile Apps. The teacher as the main user gives direction through this learning media so that it is easy for student to understand the material in order to spread Industrial Revolution 4.0.

Fig. 2. (a) Cover of the Module based on Augmented Reality for Practice, (b) Cover of the Module based on Augmented Reality for Material

It is related to research from Kamelia (2015) that show Augmented Reality is the right media for learning in this revolution era. The material taught in the module has also been adapted to the current conditions in the entrepreneurship field to connect every component in the STEAM approach. It is supported by Anisa, et al (2019) that show STEAM component encourage student to understand easily about entrepreneurship, and create capable young entrepreneur in the future. Students will have a contextual picture through the learning media used, so that the entrepreneurial practices that will be implemented can be real time for the student. It is related to Gettings, 2016; Miller and Knezek (2013) that shows STEAM approach give realistic experimental learning for student integrated several field to encourage student creativity and problem solving. The teacher as a facilitator in learning shows an intense interaction because the Mobile Apps that are used must be explained together with the material in the module. So that, it wold be increasing technology literacy by the teacher. Following is the ARmod design that will be created.

Fig. 3. (a) Module based on Augmented Reality that created, (b) Simulation of Augmented Reality in the ARMod

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 media 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) transparent, 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.

4.2 Testing Result of Module 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 67.74% 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
The application of Module based on Augmented Reality has been able to improve student learning achievement which are quite significant at 25.76%, with a very good category. The decline occurred at 6.4% 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. Student learning achievement are also inseparable from the activities of teachers and students. Before applying Module based on Augmented Reality teacher activity was not too high at 65.27%, while student learning activities were relatively low at 50.63%. 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 Module based on Augmented Reality can increase teacher activity and also student learning activities in 5 schools throughout Malang. Teacher activity increased by 19.45% from pre-action to action 1 and an increase of 3.72% from action 1 to action 2 with the criteria of "very good". The increase in student activity was 33.34% from pre-action to action 1, and an increase of 6.33% from action 1 to action 2 with the criteria of "very good". Increased teacher and student activities are presented in the graph as follows:

![Figure 4. Increasing of Student Learning Achievement](image)

4. CONCLUSION

Based on the discussion above it can be conclude that learning media using augmented reality is really important to improve student and teacher learning effectiveness. Module based on Augmented Reality that developed is valid to used on Entrepreneurship Learning. The advantages are (1) user friendly, (2) responsive, (3) accountable, (4) transparent, and (5) trusted that suitable to support student achievement and activity also teacher activity. This media existance is one of the solution to realized the succes of entrepreneurship education that will be creating young businessman who will establish MSME's in the future.

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