

Augmented Reality as a 21st Century History Education Media

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Abstract: Augmented Reality is proof of technological advances in the 21st century, the use of Augmented Reality as a medium for education provides a new view of the world of education that exists today, not only using objects in real terms but also using virtual objects in conveying information. AR is a technology that combines three-dimensional virtual objects into a three-dimensional real environment and displays them in real-time). The purpose of this study is to analyze the learning of history and the use of Augmented reality. This research provides an overview and idea of the results of the literature review on the development of educational technology in learning. This study used a literature review. The application of AR as an educational media can increase students' knowledge of learning History. In Indonesia, the use of AR media is still not widely implemented in history learning. It is necessary to develop this AR media in history learning. AR is expected to be able to support as a medium for students to develop interesting and fun history learning.

Keywords: Augmented Reality, History Learning, Learning Media

Introduction

21st Century Learning, which is synonymous with the rapid development of technology, requires learning as much as it can keep up, it requires transformation from all aspects of history learning to be able to keep up with the times colored by various kinds of technological innovations. So, one aspect in the implementation of history learning that must continue to transform and develop is also the learning media.

Following Munadi's statement (2008: 7) that learning media is everything that can convey and channel messages from sources in a planned manner to create a conducive learning environment where the recipient can carry out the learning process efficiently and effectively. Learning media aims to create an effective learning process and the learning environment supports the achievement of the learning process.

A journal article written by Alwi (2017:150) said that the media development carried out by teachers is still very poor. Because in general, teachers only use simple media such as package books and pictures. For the use of more creative media still does not exist. This is because the ability of teachers to use media is still lacking and the availability of media in schools for learning is insufficient.

History learning should be a means of improving the integrity and personality of the nation as stated by Subagyo (2010:43) history as a study of the past, is a collective (shared) memory and society. Without such a collective memory, society would be rootless and drifting around like someone suffering from amnesia (losing all or part of his memory). Then it is very important to develop history learning that adopts the 21st Century educational style. Of course, this cannot be separated from the role of the teacher as a learning manager has a great influence on the course of learning.

Sadiman et al (2009: 6) stated that to convey learning messages from teachers to students, teachers usually use teaching aids in the form of images, models, or other tools that can provide concrete experiences, learning motivation, and

increase learning absorption and retention. So, the selection of innovative learning media. Teachers as facilitators of 21st-century learning must be creative and innovative in choosing learning media to realize interesting and effective learning.

One of the learning media that can arouse students' interest and learning innovation is Augmented Reality. AR can be used to help visualize abstract concepts for the understanding and structure of an object model. Currently, AR is widely used in the fields of games, medicine, and image processing, while in the field of education it is still rarely used, it is hoped that this alternative research of learning media, it can increase the interest of the younger generation in the lessons of 21st Century history.

Research Methods

This research is of a descriptive qualitative type with literature studies or literature studies. A literature study is a type of research by looking for references relevant to a research topic (Ilman, 2014: 160). Literature studies contain a brief overview of a research topic and are arranged chronologically and thematically. Literature study research according to Mestika Zed (2014) has the main characteristic, namely, researchers face-to-face with available sources. The stages in this research begin with the collection of journals, articles, books, or, other literature related to the learning media of 21st-century history and augmented reality. Then the data is processed and linked to relevant theories into a concept for completing this research.

Results and Discussion

Augmented Reality (AR)

Augmented Reality is a technology that combines two-dimensional or three-dimensional virtual objects and then projects these virtual objects in real time (James R. Valino, 1998). Augmented Reality is defined as a technology that combines the real world with the virtual world, is interactive according to real-

time, and takes the form of three-dimensional animation (Azuma, 1997). Based on the statement above, Augmented Reality (AR) can be defined as a technology that can combine two-dimensional or three-dimensional objects in the virtual world into a real environment and then bring them up or project them directly.

In their book entitled *Augmented reality: a practical guide* Stephen Cawood & Mark Fiala define that, *Augmented Reality* is a way to explore three-dimensional objects and data, and AR is a concept of combining virtual reality with world reality. So that two-dimensional or three-dimensional virtual objects seem to look real and blend into the real world. In AR technology, users can see the real world around them with the addition of virtual objects generated by computers. In its current development, AR technology is easier for students to access using their respective Smartphones.

To run an AR system, consists of a camera, and a display device, and in certain cases requires a special device to interact with virtual objects. The main devices needed to run AR-based applications are displays, input tracking devices, and computers as revealed by Carmigniani in "main device for augmented reality are display, input device, tracking, computer" (Carmigni et al, 2011).

Thomas P. Caudell in 1990 in "The Term 'Augmented Reality'" introduced the concept of AR. Three characteristics illustrate the technology applies the concept of AR (Balandin et al., 2010), namely:

- a) Can combine real environment with a virtual environment
- b) Can display or provide information interactively and in real-time or as if the virtual object exists in a real-time
- c) Can display such virtual objects in three-dimensional form.

Then, Azuma (1997) stated that several conditions are the main characteristics of a device that can be said to be an AR system, namely:

- a) There is a camera that can record video to capture images directly
- b) Have a powerful processor to be able to combine virtual objects with the real environment or can display 3D objects in real-time

- c) Displays that allow users to interact with virtual and real objects

Based on the explanation of AR above, it can be concluded that AR is a concept of combining the virtual world with the real world which contains information from data that has been prepared on a system based on designated real objects so that the boundary between the two becomes thinner. All information can be added so that the information is displayed directly as if the information becomes interactive and real.

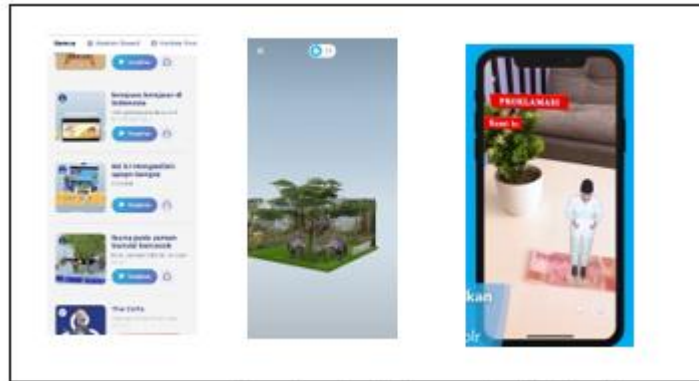
Augmented Reality as a 21st-Century Learning Media

Several studies have shown that AR technology can help learners in developing their skills and knowledge in a more effective way (Estapa & Nadolny, 2015). Therefore, the implementation of AR as a potential historical learning media to improve the quality of historical learning, technically and conceptually, is accompanied by increasing student motivation.

There are several applications needed to be able to create an augmented reality (AR) that all interact with each other in support of a perfect display such as

- a) Assemblr EDU

Assemblr EDU is a platform for teachers and students to make learning more fun and interactive using 3D & Augmented Reality technology.



(Figure 1: Personal Documentation)

b) Vuforia

Vuforia is an Augmented Reality Software Development Kit (SDK) used in mobile devices that allows the creation of AR applications.

c) Rumah Belajar

A learning portal that provides learning materials as well as communication facilities that support interaction between communities. Rumah Belajar is here as a form of learning innovation in the industrial era 4.0 that can be utilized by students and teachers.

Bower et al. (2014) say that some literature suggests AR technology systems can support and improve some types of approaches to learning (Johnson et al., 2010; Shelton, 2002). Learning approaches that can be supported by AR technology systems include:

- a) Constructivist learning, using AR technology, where AR can encourage students to be more involved in a learning process. In addition, learners can also explore and make connections between basic knowledge or knowledge they already have before (Kerawalla, Luckin, Seljeflot, & Woolard, 2006) Enquiry-based learning, AR systems provide virtual models that are displayed in real environments and are easy to manipulate. Then AR is also a supporter of conducting investigations by

- presenting relevant and contextual information about the topic being discussed (Johnson et al., 2010).
- b) Games-based learning, AR systems can be used to facilitate an interesting game-based learning process by creating a digital narrative, then placing learners in a role, and growing contextually relevant information. AR systems can transform real environments into virtual environments, where the games played can generate skills in applying their knowledge to the real environment more simply and easily (Bromine, Sisler, & Slavik, 2020).
 - c) Situated learning, contextual learning allows to be perceived by learners if learning fosters an educational experience in the real world and by bringing a real-world environment into the classroom (Chen & Tsai, 2012; Dede, 2009; Dunleavy et al., 2009; Rasimah et al., 2011).
 - d) Inquiry-based learning, AR systems provide virtual models that are displayed in real environments and are easy to manipulate. Then AR is also a supporter of conducting investigations by presenting relevant and contextual information about the topic being discussed (Johnson et al., 2010).

Based on the explanation above, we can conclude that AR technology systems can be used and utilized as learning media, especially in history learning. This is also in line to be achieved in the industrial era 4.0, namely digitalization in the educational environment. Several researchers have also conducted research and proven that AR can increase the motivation, interest, and learning outcomes of students.

Conclusion

The ability to think critically and creatively is one of the 21st-century skills needed by students in solving problems in real life. The development of critical and creative thinking skills in history learning can be done through the use of learning media, namely digital media, one of which is using augmented reality (AR). AR is a technology that combines real and virtual objects simultaneously

in the same space and interacts directly or as if the virtual object exists in the real world.

The application of AR in history lessons has the potential to improve the quality of history education, both technically and conceptually and increase student motivation. The use of innovative learning media such as AR provides different learning experiences to enable students to have different learning experiences relevant and interesting.

More in-depth research and trials of the effectiveness of directly using AR as a media for learning 21st-century history are needed to realize that the learning carried out by students can be supported by the use of technology that adapts to the times.

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