The Implementation of Augmented Reality for WATER Introduction

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Abstract. The use of technology in education is growing rapidly, some of which use augmented reality technology. Augmented reality is one type of technology use not only in education but also in other sectors because it is one technology that is quite useful in facilitating various human activities. However, the reality of the world of education today is that there are still many teachers who have not implemented and innovated the use of technology in learning. This study presents the implementation of augmented reality in wayang learning (WATER). Using augmented reality technology that can create a more real learning atmosphere so that children's interest in loving wayang culture appears. In implementing augmented reality applications, Unity3D and Vuforia tools are supported. This research was conducted by making a prototype of puppet learning media in the classroom. The results obtained, the learning media looks more attractive and the students spend more time with the application to explore the world of the puppet.

Keywords: Augmented Reality · WATER · Puppet · Marker

1 Introduction

Puppets Wayang as an art performance is symbolic communication of human behavior in everyday life. Wayang has been known since pre-Hindu times around 1500 BC. At first, wayang was used by ancestors to perform rituals to connect with deceased ancestors because deceased ancestors were considered to have supernatural powers, so a ceremony had to be held in order to protect the universe. The wayang culture to date has gone a very long way, but its existence now still exists and survives in the midst of the onslaught of globalization.

The existence of wayang until now has received full attention from the UN cultural institution, namely UNESCO. Wayang Indonesia, on November 7, 2003, was announced by UNESCO as a masterpiece of the world. This shows that wayang culture as a traditional cultural heritage has been recognized internationally as a value-laden cultural heritage that plays a major role in the formation and development of national identity. Because wayang has been recognized as one of the world's cultural heritage, the wayang

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culture must be saved and preserved so that it becomes the duty of the entire nation, especially the Indonesian nation. In addition, one of the expressions of the cultural values of the ancient people is wayang. Wayang can be considered as a picture of Javanese culture, which is a manifestation of creativity, taste and intention in all aspects of social and state life. The values of art, beauty, philosophy, patterns of behavior, religious perceptions, dreams and aspirations are all contained and can be seen in the world of wayang.

Many ways or means can be taken to introduce wayang, but the most effective is through education. The inclusion of wayang in education, especially in learning in schools, will have a positive impact not only on the preservation of wayang but also on the sake of education itself. Objects that attract students' attention begin to think and influence the formation of their mindset in inculcating values or character in various ways, including through wayang.

The use of technology in learning is one method that can be used in learning. Augmented is one type of the use of technology in learning where augmented reality technology can be used to combine two and or three dimensional virtual objects into a natural three- dimensional environment and then project these virtual objects in real-time [1–3]. With this media, puppet learning will be more attractive. It can be used to combine puppet images with augmented reality technology so that the reality of the learning will look natural and generate student interest in learning.

In this research, a prototype of augmented reality (WATER)-based wayang learning media will be made. By making a prototype of WATER media, it is hoped that it can attract students' interest in learning so that indirectly WATER media can be used to preserve wayang in the younger generation.

The rest of the paper is organized as follows: Sect. 2 introduces augmented reality and interactive learning media. Section 3 presents the method of research. Section 4 describes our results and evaluation. Finally, Section 5 presents the conclusion and future work of this research.

2 Background

2.1 Augmented Reality

The goal of augmented reality (AR) is to improve users' knowledge of the world around them by superimposing digital information on top of a live feed of the actual thing. This background information might be provided verbally, geographically, historically, or in some other way [4–6].

2.2 Interactive Learning Media

The Latin word "medium" means "intermediary" or "introduction," and its plural form, "media," is derived from that word. Media such as text, audio, video, animations, images, and sounds are all examples of interactive educational media that may be used to convey lessons and engage students' ideas, feelings, and motivation to learn [7–12].

Fig. 1. Design system WATER.

3 Research Method

The methodology used in developing WATER learning media using augmented technology consists four stages: (1) The first stage is the planning stage, where preparation, literature study and problem formulation are carried out. (2) The second stage is collecting data through observation, interviews, questionnaires and documentation, as well as processing the data that has been obtained. (3) The third stage is the analysis and discussion stage. At this stage, system analysis, system design and design, coding, implementation and testing and evaluation of the system applied will be carried out.

4 Results and Evaluations

Data searches are founded on primary sources including interviews, questionnaires, and written records. It has been found that there is a demand for media to support teaching and learning activities, particularly for students and instructors, and that these activities may be provided in the form of novel things using ICT to provide ease in teaching and learning. There are no barriers to media use for either students or educators, regardless of location.

The collected data is then used as the foundation for the design of a brand new kind of educational media that is sure to be original, inventive, and helpful in promoting education for both students and educators. The media is an Android-compatible educational app that uses Augmented Reality on mobile devices as a teaching tool.

Vuforia is a program that helps developers build Augmented Reality experiences. As part of its software development kit (SDK), Vuforia now has built-in image recognition and pattern recognition capabilities. While Unity is software used to produce architectural visualizations and realtime 2D/3D animation, it is also used to create 2D/3D photographs and other interactive material. The Unity program may also be used as a script editor. Vuforia's support for Unity in its SDK format has made it possible to utilize the Unity 2D/3D application as a platform for developing Augmented Reality apps (Fig. 1).

How to use this application consists of several stages, namely (Fig. 2):

1. Open the WATER application that was previously installed.

After the loading process, the main menu page will appear. The let's learn button contains material for wayang kulit Pandavas and punokawan, while the let's play button contains a game about wayang kulit.

When you click on the Let's Learn page, the image below will appear, containing the material for wayang kulit Pandhawa and Punakawan (Figs. 3 and 4).

Fig. 2. Intro WATER.

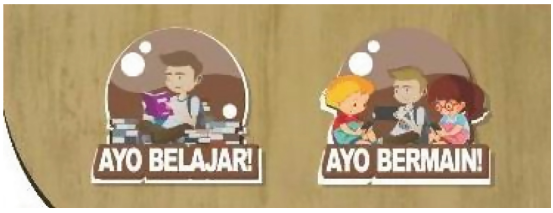

Fig. 3. Menu Display.

Fig. 4. Menu of Pandhawa and Punakawan.

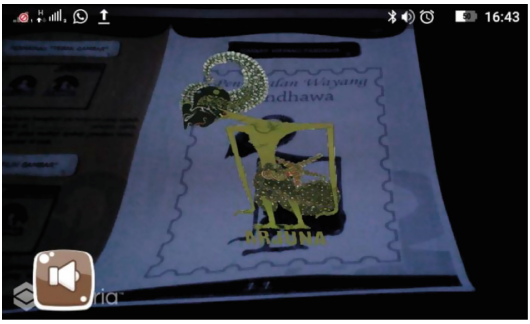

Fig. 5. Menu “Ayo belajar”.

If one of the two options is clicked, it will appear as shown in Fig. 5.

After pointing the AR camera at the marker, a puppet character and the name of a colored puppet will appear, and the sound button above serves to introduce the puppet,

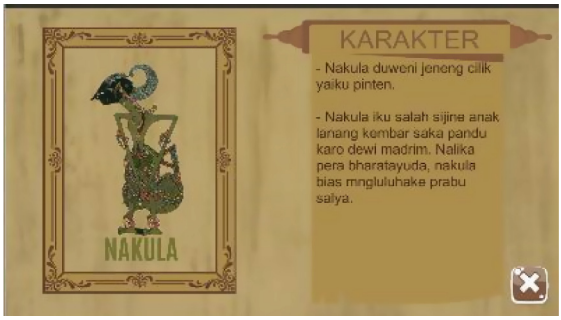

Fig. 6. Explained about Nakula.

Fig. 7. Menu "Ayo bermain".

Fig. 8. Menu "Nama wayang".

as shown above. To display the characteristics of the puppet, as shown below, you have to press the puppet character that appears above the marker (Fig. 6).

The "Ayo bermain" page contains two buttons containing the guessing game and select an image like the image above, as shown in Fig. 7.

If you click on the guess the picture menu, as shown above, it will appear as Fig. 8.

Then, in the image below, the user must follow the questions that are already available by answering the available answers after being sure of the answers, select the "Check" button to see whether the answers entered are correct or incorrect.

Fig. 9. Menu "Pilih gambar".

Fig. 10. Marker Arjuna.

If you choose the game menu, select an image. In this game, the user must follow the questions already available by choosing what puppets are following the questions given, as shown in Fig. 9.

In addition to the menu display above, we will describe the markers used to display the play in the puppets. As below the Arjuna marker is used to see the nakula image in the augmented application along with the explanation (Fig. 10).

Next in Fig. 11, the nakula marker is used to see the nakula image in the augmented application along with the explanation.

Next in Fig. 12, the sadewa marker is used to see the sadewa image in the augmented application along with the explanation.

In addition to the Pandhawa marker, there is also a clown marker. Figure 13 the bagong marker is used to see the bagong image in the augmented application along with the explanation.

Figure 14, the petruk marker is used to see the petruk image in the augmented application along with the explanation.

Fig. 11. Marker Nakula.

Fig. 12. Marker Sadewa.

Fig. 13. Marker Bagong.

Fig. 14. Marker Petruk.

Thus the explanation of some of the menus and markers of the WATER application.

5 Conclusion and Future Work

In the application of AR for learning media, several things need to be considered in further research, including the following. The need for adding animation and more interactive content to 3D objects that appear on the puppet page.

1. The need for integration by involving teachers in the design and use process.
2. Having communication support with mobile services in order to produce interactive content.

The utilization of Augmented Reality Technology starts from needs analysis to implementation and testing. Several conclusions can be obtained after conducting this research, including:

1. Augmented reality can display an object in a simple three-dimensional form that can be seen thoroughly and can be used effectively in learning.
2. Making puppet image markers that are formed with colorful colors will be more interesting than just black and white markers.

Authors' Contributions. Hakim and Darmawan were responsible in application development. Fahmi and Sidhimantra have responsibility in testing and reporting the results in this article.

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