Improving Students' Interest In Learning Javanese Character By Using Augmented Reality

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Abstract— Javanese script is one of the materials taught in Javanese language lessons starting from elementary school to high school starting to be taught Javanese script. However, many students feel that this lesson is very boring and difficult for students because of the atmosphere when learning and teaching methods that only see from books and listen to lighting from teachers. Therefore, research was conducted by developing an Augmented Reality (AR) system, so that later it could add innovation in the method of teaching Javanese script in order to grow interest in students and students in learning[1]. The game created is called "AJAR (Javanese Aksara AR)" in this AR contains images of each basic level script, videos that contain how to write the script correctly, examples of writing the script in a correct sentence and some practice questions that are used to help measure how much the student's ability to learn the script after using this AR.
The game development method uses waterfall and this game testing method is qualitative by interviewing several sources to get data on whether this game has been successful and has met the target according to the purpose of this AJAR game. From the results of the interview it can be seen that on average all sources feel satisfied and like the existence of this AJAR game because it can help in learning Javanese script more easily and not get bored quickly.

Keywords— aksara jawa, augmented reality, games.

I. INTRODUCTION

Javanese language is one of the subjects in schools both elementary, junior high and high school, especially schools located on the island of Java. in this Javanese language subject is also taught Javanese script writing, Javanese script writing itself consists of writing "HA-NA-CA-RA-KA, DA-TA-SA-WA-LA, MA-GA-BA-THA-NGA, PA-DHA-JA-YA-NYA" and there are still vowels a-i-u-e-o and the last one also has a pair.

Javanese script itself is the traditional script of the archipelago used to write Javanese writing[2]. Javanese script itself has several types of forms including Carakan script, pair script, sandhangan, marda script, partner script, swara script, and Javanese numbers. Due to the many types of characters and some methods of teaching that make students and even people who learn this script have the impression of being lazy to learn Javanese script[3].

Some of the reasons that make students less like Javanese akasa lessons are: (1) there are many Javanese characters that must be memorized, (2) the teacher's teaching method is too fast and boring, (3) lack of teaching aids. Therefore, students often complain of difficulties when learning Javanese characters because in addition to the large number of writings and also the way of teaching which is considered boring because when teaching too fast[4], [5].

In addition to the many types of characters that exist, the reason students are not interested in Javanese characters is the

lack of teaching aids. This props itself is used as a medium so that students or other people can have an idea of what the script looks like. A teaching aid exists because not everyone even children who learn the script do not have an idea of what the Javanese script looks like.

Nowadays, there are many lessons or knowledge that can combine teaching methods using existing technology. By utilizing IT so that it can be incorporated into teaching methods, it might later become a big innovation[6]. So that it can make the interest of students and people who want to learn about how to write or write Javanese script become great. However, there was once a solution that used media such as cartoons which initially succeeded in making people interested but over time it became boring[7][8].

From the existing problems, a game is made that is used as a learning media for school children and the community. So that later school students and even the community can learn basic Javanese script easily and fun. Therefore, the author hopes that this AR application can make school students and the surrounding community practically learn and know various types of Javanese script writing..

Research objectives

The purpose of this report is to be able to fulfill 3 objectives that can be met, namely the first goal is to design the application of learning Javanese script with Augmented Reality, Making the application of learning Javanese script with Augmented Reality and conducting qualitative testing by means of interviews to determine student interest in Javanese script games.

II. METHOD

Augmented reality is a technology that can make a 2D or 3D object real [9]. The object appears directly and makes the object look like real. Augmented Reality (AR) and Virtual Reality (VR) are also very different VR can produce an environment virtually and look like real or arguably VR users can feel like in the environment but if AR can only create objects to make them look real. [10][11].

AR technology is applied in making the AJAR game (Javanese Aksara AR) where players can see real Javanese script writing in the form of 2D images. The contents of this AJAR game in addition to the real form of the letters HA NA CA RA KA to MA GA BA THA NGA there are even examples of writing characters in 1 sentence and in 2 words made in AR form so that players can be interested in this AJAR game, not only images so that players can be interested in this game, video content is provided in the form of an explanation of the characters displayed..

2.1. Game Development Method

The method taken is the waterfall method. This waterfall method is one type of application development model which emphasizes a sequential and systematic phase. In the waterfall method, there is a sequence from top to bottom, the contents are Requirement Analysis, System and software design, Implementation and unit testing, Integration and System testing and the last is maintenance[12].

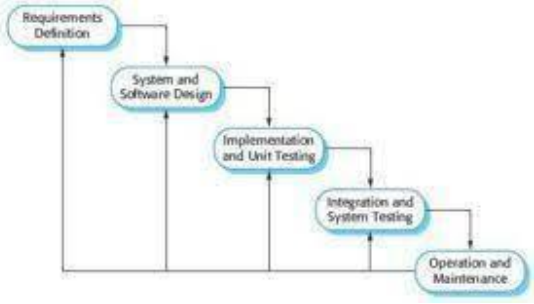


Figure 2.1 Waterfall Method Flowchart Image

The following are definitions and also examples written based on what the author has done during the making of this AJAR game.

- *Requirement Analysis*

At this stage Requirement Analysis is a method used to collect all information and later the results of the information are used to obtain data results to determine the

usefulness of the device used whether it has benefits for users. From the data collection process that has been carried out, it turns out that some students experience difficulty or boredom when learning Javanese characters. Therefore, this AJAR game can be a solution to overcome these problems.

- *System and Software Design*

At this stage, it is carried out to help development know what software or applications must be prepared which are useful to support the manufacture of the device to be made. Making AJAR uses several applications such as unity (used for making AR from AJAR games), Barcode Generator (used for making barcodes as markers), Vuforia Engine (used for making Software Development Kit (SDK) whose function is so that when the camera on the cellphone can detect the marker that has been given and display 3D or 2D objects), Kinemaster (used to edit videos).

- *Implementation and Unit Testing*

In this phase, a test and examination of the device that has been made is carried out whether it meets the desired criteria or is still not appropriate. Of course, at this stage, when making always check every part of the finished game and always design by making a blueprint or initial print first to get an idea of what the game will be like. In the picture below is one of the designs before the game is made.

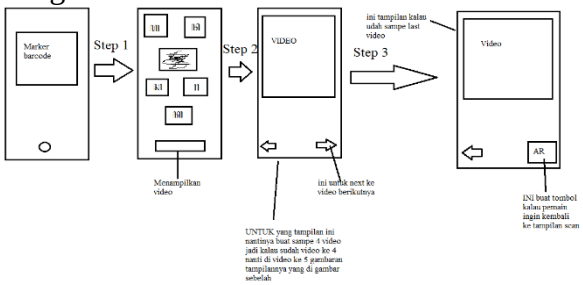


Figure 2.2 Sketch Drawing of AJAR Game Making Design

- *Intergration and System Testing*

At this stage, all units or models developed will be tested. Which later aims to find out or identify any errors and system failures at this stage. When testing this AJAR game, there are many bugs or errors that occur when the game is running, so the bug or error must be fixed first.

- *Maintenance*

This stage is the last stage when the application has been completed and is ready to be published. When there are issues about errors in the system or other things. At that time, justification must also be done so that the damage or error can disappear and users can use the application smoothly.

2.2. Metode Pengujian Game

Testing is done by conducting interviews. The interview was conducted by interviewing 11 respondents and the respondents answered 10 questions that had been prepared by the source. From the results of these interviews the author can get data from the results of answering these questions. This interview itself is a type of qualitative research method[13]. Qualitative testing itself means a research method that uses data in the form of written or spoken language that comes from other people. This qualitative method is usually used to explain an event that occurs individually or in groups[14][15].

III. RESULTS AND DISCUSSION

A. RESULT

- **Game Design**

Game Analysis and Objectives

The game "AJAR (Javanese Script AR)" was created as a more modern method of learning Javanese script so that later if the community and students who are still students want to learn then with this game it can make it easier to learn the basic level in Javanese script. In this game there are 3 methods, the first is that players can see what each Javanese script looks like and also how to write it, the second can see how

to write Javanese characters such as divided into 1 word, 2 or 3 words and also 1 sentence and the last there are 5 quizzes where players can find out how to master the basic level of script. In addition to writing, of course, the writing method will be in the form of a video so that players can understand how to write it correctly.

Genre,Platform and Target Audience

AJAR game is based on Augmented Reality (AR). Players must first install the "AJAR application. When the player downloads and installs the new player can do the barcode that has been provided and the player can see the basic Javanese script that has been provided. The target of this game is students and students at junior or senior high school level and also people who want to learn Javanese script at its basic level.

Game Overview

"AJAR (Aksara Jawa AR)" is an Augmented Reality (AR) based Android game that aims to display images or writings or videos in 2D or 3D that will appear in the real world that can be seen through a cell phone. The purpose of this game is also so that people who want to learn basic Javanese Script can learn it with a more modern and fun method.

Gameplay

Learning 1 is used to provide knowledge of knowing the forms of Javanese script from HA-NA-CA-RA-KA to PA-DHA-JA-YA-NYA and also to affix words and vowels. In addition, players can also watch videos to find out how to write the correct script.

Learning Chapter 2 is used to find out the correct order of writing if there will be 1 problem to write 1 sentence in Javanese script. In addition to the form of 1 sentence there is also a way to write in the form of 2 words and even 1 word. Besides in the form of pictures we can also understand it by watching the video that has been prepared to make it easier.

Finally, the EXERCISE on this page is used to train players to what extent they understand Javanese characters. Later a problem will appear and players only need to choose which one is right and which one is wrong. When answering one of the answers, a video will appear in the form of an explanation of whether the answer that has been answered is correct or incorrect and there will also be an explanation such as whether the writing is correct or what answer should be correct. Please note that for training there is no assessment which is useful so that players can find out the level of their understanding of Javanese characters.

Below is the flowchart for the AJAR game.

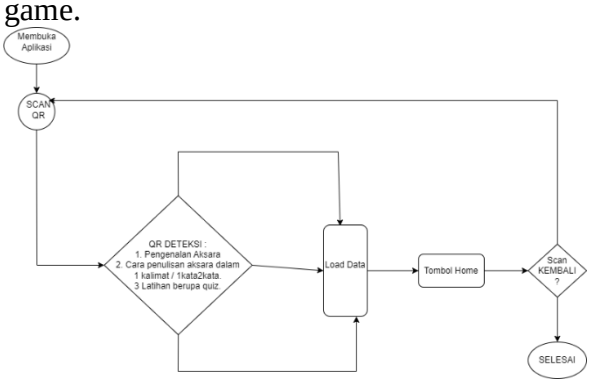


Figure 3.1 AJAR Game Flowchart

- **Game Result**

Game Development

A. Marker

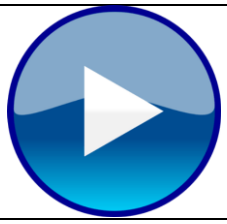
In making this game there are various important components that exist and the most important component is the marker. Markers used barcodes made with Barcode Generator which can be downloaded through the Play Store. The markers needed in making this game are 13 markers. In Figure 3.2 is an example of one of the markers.

Figure 3.2 An Example Of the MA-GA-BA-THA-NGA Aksara

B. Button

Here are the buttons that exist and are used in the game.

Table 1 Button Icon Used In AJAR Games

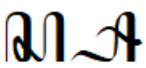
	This Play button is used to open the video that has been prepared.
	This button is used when the player wants to return to the camera view to scan the barcode again when entering the video page.
	This button is used for selecting answers on the exercise page...
	This button is used for selecting answers on the exercise page...

C. 2D Aksara Figure and Exercises

In the game, there must be 2D images that will appear after the player scans the barcode marker that has been provided. The 2D image consists of all the characters and also the existing practice questions. Of course, these images have been assembled and differentiated based on the markers that have been provided. In Figure 3.4 and Figure 3.5 are some forms of script that can later be displayed after scanning the barcode provided.

Ha

Figure 3.4 Image of Aksara HA



Sa

Figure 3.5 Image of Aksara SA

Figure 3.5 is a display of Javanese characters that can be seen after the player scans. Of course, it does not only appear like that, it will appear like a frame that brings up 5 characters at once and also a button to display the video. In Figure 3.6 is the display in the game when the player scans.

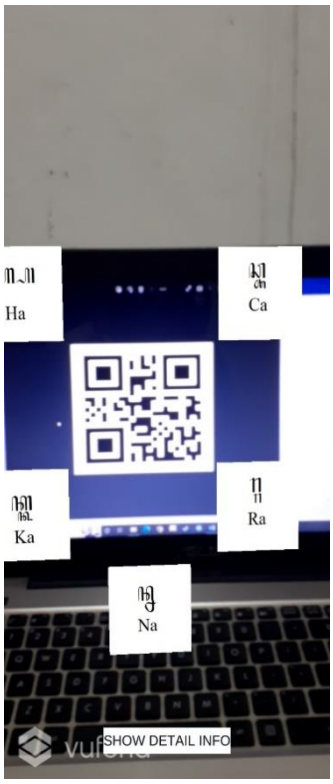


Figure 3.6 Display When Scanning the Aksara HA NA CA RA KA

Figure 3.7 is the display after the player scans the barocde in the training section.

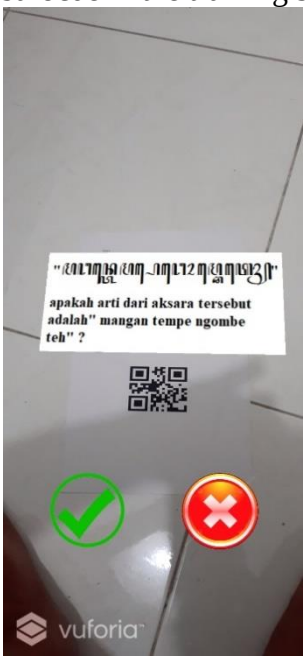


Figure 3.7 Display After Scan on Exercise Question

In Figure 3.8 is an example of an illustration of when the player scans the script writing method for 1 sentence.

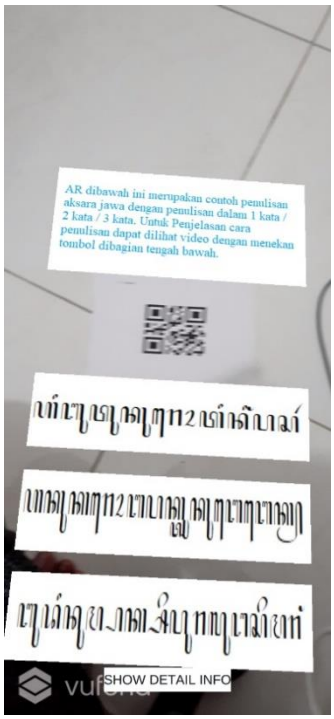


Figure 3.8 Display After Scanning the 1 sentence writing example

B. DISCUSSION

To get results that can determine whether the game is successful or not in fulfilling the objectives of the author making the AJAR game. Therefore, the writing uses qualitative testing by means of interviews. By interviewing several people by asking 7 questions. It can be seen from the results of the interview that the average student who has tried feels happy with the AJAR game because students can learn Javanese script by playing and learning, even with this game learning Javanese script is more fun.

Not only positive conclusions were obtained, there were also shortcomings of this AJAR game obtained from the results of the experiments of all participants. Participants hope that later this game will have additional sounds when touching and hope that in the future the game can practice writing Javanese script.

IV. CONCLUSION

The following is the conclusion of the AJAR (Javanese script AR) game research.

With AR-based teaching and learning innovations, it is hoped that (1) there is a

teaching aid, namely games in learning Javanese script, (2) another important thing is when students use the AR game "AJAR" will change the mindset that learning Javanese script becomes interesting and fun (3) Teachers can teach with new innovations, namely combining learning with games.

The existence of the Augmented Reality method, the latest innovations in the teaching system can be done. Not only for Javanese script lessons, even other lessons can also be made with this AR method. The reason for using this AR is that later school students will not be bored when learning. In addition, with the AR game, it will be interested because of the content contained in the game such as images and even videos that can be a distraction for students so that they do not only listen to the teacher and see the material, especially if there is a small image on a picture that causes students to feel tired when learning.

ACKNOWLEDGMENT

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