

Designing Application Of Augmented Reality Introduction Of Hindu-Buddha Temple For Elementary School. (Case Study: Pisangan Sdn 01 Morning)

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Abstract

Monotony in learning is one type of difficulty that often occurs in students, in another sense, the importance of variations in conveying lessons. Learning applied to primary schools usually uses a printed book, teacher's explanation, and field practice. To overcome this, a learning aid was created about Hindu-Buddhist temple culture by utilizing augmented reality technology, where this technology is able to present educational information to the real world. Augmented reality technology in the world of education provides a great opportunity to improve user satisfaction and experience. Augmented reality technology combines objects in the real world with virtual objects. The output of the application displays 3D images with audio and visuals. Make it easy for students and instructors to use the application.

Keywords: *Augmented Reality, learn, school children.*

I. PRELIMINARY

Background

Technological progress in this modern age has no doubt had an influence on human life and offers many conveniences for humans and their users. Technology itself has begun to mushroom in the field of Education. Primary students are forged in various fields of study all of which must be able to be mastered by students. In (Law No.20 of 2003 concerning the National Education System) explained the notion of education is a conscious and planned effort set forth in the objectives of national education and education in elementary schools, namely, to create an atmosphere of learning and learning activities with the aim that students actively developing his potential to have spiritual spiritual strength, self-control, personality, intelligence, noble character, and the skills needed by himself and the community, in the nation and state. Learning applied to primary schools usually uses a printed book, teacher's explanation, and field practice. In general, elementary school students can be classified as small children, learning requires a slight change in learning style so that there is no learning exhaustion. Saturation of learning is one type of difficulty that often occurs in students, literally saturation means solid or full so it cannot accept or contain anything. In addition, saturation also means bored or bored (Shah, 2005). [1]

For example, children need a variety of learning methods. In this case, the teacher needs to be creative in such a way according to his talent. For example educators who love to sing, he can invite students to sing when the beginning of learning takes place. A teacher who is good at handicraft, he can invite his students to make a cubit work with the subject matter that has been given. With variations in learning methods, even students will not feel bored, because in addition to getting knowledge, their creativity will also increase. (2013, Sonny Pambudi). To learn the temples in social

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studies subjects, children will easily feel bored because with a picture that is only dominant in black showing the buildings of the temple, and can be monotonous learning. Children do not understand where the cultural side and only think that it is limited to lessons that are not too important and then underestimated. Therefore, this writing intends to design an introduction to the culture of Hindu-Buddhist temples that will help children in providing creative and interactive explanations and increase interest in history in understanding the meaning of temples which are often considered unattractive and boring.

Augmented Reality (AR) technology can present and present educational information in the real world. Augmented Reality (AR) technology in the world of education provides a great opportunity to improve user satisfaction and experience. AR system makes it possible to combine objects in the real world with virtual objects where virtual objects appear to coexist in the same space as the real world because Augmented Reality (AR) is not only limited to the sense of sight but can also be applied to several senses such as hearing, touch.

Identification of problems

Based on the description that has been explained, the identification of problems in the preparation of this Final Project Proposal is as follows:

- a. What is the content of Hindu-Buddha Temple learning material in the Augmented Reality application for elementary school students?
- b. What is an easy-to-understand display of learning for elementary school students using the Augmented Reality application?
- c. How to design an Augmented Reality technology application on the introduction of Hindu-Buddhist temple culture so that it is easy to use for elementary school students?

Scope of problem

To focus more on the Final Project Proposal, the problem boundaries are:

- a. Designing Augmented Reality applications that can explain the types of sounds, shapes and details of the Hindu-Buddhist Temple.
- b. Augmented Reality application that can display six Hindu-Buddhist temples and use the Augmented Reality Marker method.
- c. This application is made on the Android platform so that it can only be run on Android-based smartphones.

II. METHOD

Data Collection Methodology

The research method used in making learning media based on Augmented Reality is the method of observation and interviews.

a. The method of observation is an observation made directly how the activities carried out by the user. This method was carried out by direct observation in the classroom at SDN Pisangan 01 Pagi.

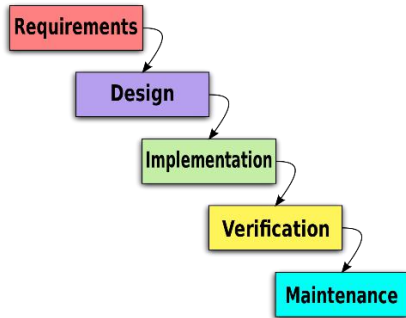
b. This interview method is used to find out how attitudes and behaviors towards business processes are running, and to find out how the problems actually occur. This method was conducted in direct interviews with teachers and students at Pisangan Elementary School 01 Pagi.

Analysis Method

Waterfall model

According to Pressman (2015) [2], the waterfall model is a classic model that is systematic, sequential in building software. The name of this model is actually the "Linear Sequential Model". This model is often referred to as the "classic life cycle" or the waterfall method. This model is included in the generic model in software engineering and was first introduced by Winston Royce around 1970 so it is often considered obsolete, but it is the most widely used model in

Software Engineering (SE). This model approaches systematically and sequentially. Called the waterfall because step by step through must wait for the completion of the previous stage and run sequentially.



Gambar 1. Metode Analisis menggunakan

III. **LITERATURE REVIEW**^{Waterfall}

IV. Learning Media

Learning media is a messenger technology that can be used for learning purposes, so learning media is a tool that can be used for learning. Augmented Reality According to Jens Grubert and Dr. Raphael Grasset Augmented Reality is a combination of virtual (virtual) and real world (real) made by computers. Augmented Reality can be applied to all senses, including hearing, touch and smell. Besides being used in fields such as health, military, manufacturing industry, Augmented Reality has also been applied in devices used by many people, such as on mobile phones (Grubert and Grasset, 2013) [3].

Augmented Reality can be classified into two based on the presence of marker user actions, namely:

a. Augmented Reality Marker

A method that utilizes markers which are usually in the form of black or white rectangular or other illustrations with thick black borders and white backgrounds. Through the expected position on the smartphone, then the smartphone will carry out a scan to create a 2D or 3D virtual world.

b. Markerless Augmented Reality

One method of augmented reality that is currently developing is the markerless augmented reality method. With this method the user no longer needs to use a marker to display 3D objects or the other. Even though it is called markerless, the application still works by scanning the object, but the scope to be scanned is wider than marker based tracking.

Unity 3D

The basic programming language used by Unity 3D is C # and javascript, developers can choose one of the programming languages that they want to use, video game applications developed using Unity 3D can be built into several platforms such as IOS, Android, Windows Phone, Tizen, Windows, Windows Store Apps, MAC, Linux, WebGL, Playstation 4, Playstation Vita, XBOX One, XBOX 360, Nintendo WII U, Nintendo 3DS and virtual reality applications. [6]

Blender

Blender is an open source software for creating 3-dimensional model creation, in addition to 3-dimensional models Blender is also used for texturing in 3-dimensional models, lightning (lighting) in 3-dimensional models and animations, Blender has features to make mimics of human movements in the form of simulations 3 dimension [4].

NoSQL database

NoSQL database is a way of storing data (datastore), where the way to store and retrieve data can be done quickly, like a relational database in general, but not based on mathematical relations between tables as in the relational database [5].

Vuforia SDK

Vuforia SDK is an Augmented Reality Software Development Kit (SDK) for mobile devices that enables the creation of Augmented Reality applications. Vuforia uses Computer Vision technology to recognize and track markers or target images and simple 3D objects, such as boxes, in real-time [6]. In making an application based on Augmented Reality a database and metadata are also needed. This database and metadata are used to store markers and their information. Vuforia provides 2 types of database services namely device database and cloud database. To build AR applications that are not too complex or less than 100 target images, you can use a database device. Where the target image recognition process occurs in the local database [7].

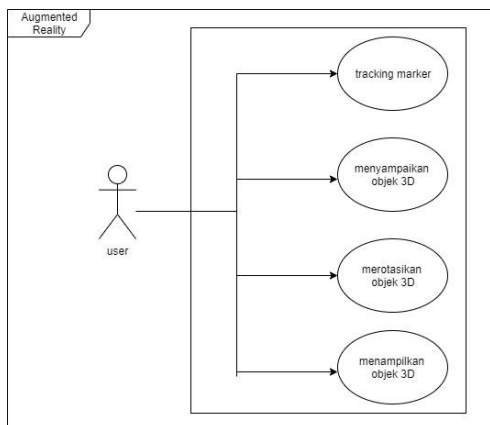
BlackBox Testing

BlackBox Testing is software testing in terms of functional specifications without testing the design and program code. The test is intended to find out whether the functions, inputs, and outputs of the software comply with the required specifications [8].

I. DISCUSSION

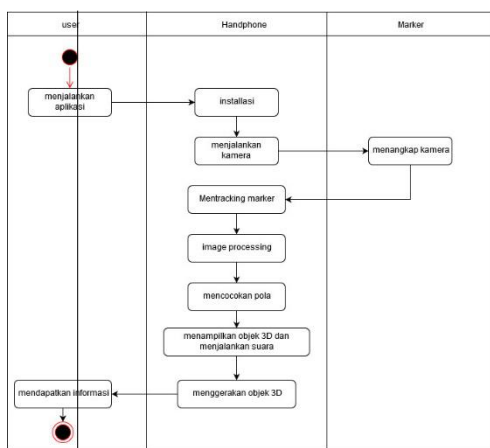
Application workflow process

Figure 2 is a workflow process that explains what the user can do in the application of Hindu-Buddhist temple learning in Indonesia.



Gambar 2. Use case diagram yang user dapat lakukan pada aplikasi.

After explaining what can be done in the application, Figure 3 explains the flow process of the Hindu-Buddhist temple learning application.



Gambar 3. Activity diagram proses pembelajaran candi Hindu-Buddha.

Desain User Interface

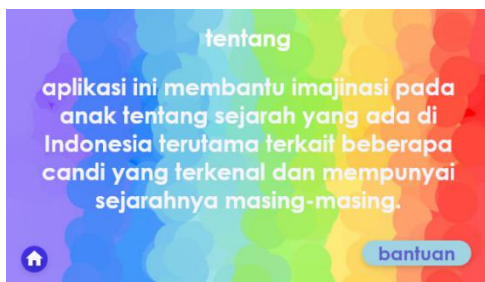
The main page design in this application has a button;

1. Scan: the purpose of this button is to capture the image or can be called a marker for the exit of the destination temple.
2. About: the purpose of this button is to find out what the purpose of this application is.
3. Exit: the purpose of this button is to end the lesson on this temple introduction application.



Gambar 4. Desain User Interface halaman awal aplikasi.

As explained in Figure 4, here is one of the display buttons on the front page of the application.



Gambar 5. Salah satu tampilan tombol yang berada di aplikasi.

In picture 5 is one of the views on the main page, relying on colorful aims to be a variation on this application.

Testing Evaluation

Evaluation is done to validate the application on the smartphone that has been determined.

Table 1. Spesifikasi *smarthphone*.

=	Levina Wijaya
=	085889495312
=	Samsung
=	A8+
=	8.0 (Oreo)
=	6GB

Through a smartphone that has been determined following the results of unit testing that has been done.

Table 2. Unit *blackbox testing*.

ting : 24 Januari 2020				
	nario	Hasil	asil	
	ujian	arapan	ujian	mpulan
	ujian awal asi	menampilkan aplikasi serta <i>screen</i> sesuai durasi yang ditentukan	harapan	
	an menu ama	menampilkan aman utama udah dapat i pada saat lihat	harapan	

	an menu <i>AR</i>	menampilkan kamera yang fikasi <i>marker</i> andi	harapan	.
	an menu ng”	menampilkan penjelasan mengenai an aplikasi <i>ted Reality</i> candi Hindu- ddha	harapan	alid
	an menu an	menampilkan ntuan singkat informasi <i>Augmented</i> genalan candi -Buddha	harapan	alid
	an menu ar	p system dan ke tampilan <i>martphone</i>	harapan	

II. CONCLUSION

After designing the Augmented Reality learning media application with the Augmented Reality Marker method, the following conclusions can be drawn:

1. This augmented reality application provides alternative learning besides using printed books from the original school, this application consists of 6 Hindu-Buddhist temples.
2. This application cannot record or update data, because this application uses no sql database, and uses the waterfall method for its development and analysis.

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