Design of Virtual Reality Application for Taharah Using 3D Blender

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Abstract. Taharah or purification is worship to God through cleaning some parts of the body with ablution and dry ablution or cleansing body from Najis or ritually unclean, such as small or big Hadas. Taharah is compulsory before pray and Tawaf. Moslem should understand the procedures of taharah. Now a days, taharah information is delivered through book, video compact disk (VCD) or websites. Taharah is not only knowledge but should be practice correctly. Therefore, this research aims to develop virtual reality application using 3D animation for learning Taharah, including ablution, dry ablution and cleaning ritually unclean. This application is using an Android operating system, 3D Blender modelling and unity for mobile device design. Furthermore, this application contains the Taharah theory and the rules. Moreover, this research makes a contribution by providing a virtual reality system of taharah based on 3D Blender. The testing result shows this application achieves 69.6% of effectiveness comparing to printing media for taharah learning media. The object testing is Moslem students with age of 11 years above.

Keyword: Application, Learning Media, Taharah, Virtual Reality, 3D Blender

1. Introduction

Worship is a spiritual exercise for the human. The aim of human life is worship to Allah SWT. The fundamental thing for worship is cleanliness and purity of somebody in the prayer, such as body and clothes cleanliness. Therefore, Moslem should take care of cleanliness for physical and spiritual health. Clean is a condition free of any dirt and disease[1]. Keep clean including physical and spiritual is also compulsory for Moslem. Islam is teaching about purity as well. Clean and purity are inseparable. Something pure surely clean, however something clean is not always pure[2]. Pure in Islam is avoid from ritually unclean and hadas. Ritually unclean is something from inside the human body that makes the body, clothe, and the place is prohibited for praying. Hadas is impurity of a Moslem that prohibited for praying. To be pure, a Moslem should do the procedure of taharah through ablution, dry ablution or impurity bath. Ablution is a way to do self-purification from ritually unclean and hadas. Ablution is conducted to clean small hadas[3]. Furthermore, Tayammum is a self-purification as replacement of ablution by wiping face and two palms of hand using dust[4]. Tayammum has requirements as follows: no water, using pure land or dust and already in Pray time. Moslem should know the right procedure for taharah. Taharah is not only knowledge but should be practice correctly. It is very important in the worship as purifying is a requirement of legal prayer.
Therefore, understanding of the correct taharah application based on Islamic rules is needed. Recently, there are various media for learning taharah, such as book, VCD, and websites. However, the user still has difficulties to learn taharah because the book just provides text and 2D image. Some of the moslem are still do not understand taharah application correctly because of less knowledge about it.

Therefore, virtual reality seems more effective for education media as the student has experience in the virtual world. This application is also interesting for Moslem, especially student to improve knowledge about taharah. Virtual Reality application is a computer simulation application generated from three dimension environment. The virtual reality user utilizes glasses as a tool to see three dimension stereoscope scene, therefore it looks like real. This research aims to develop virtual reality application to understand taharah easily through 3D animation. 3D model could give direct experience, real presentation and show the whole object, such as construction and the ways of working. Furthermore, 3D Blender software is utilized as a modelling system to support virtual reality application. 3D Blender is open source software and one of the well known 3D graphics application. Blender has many contents, such as modelling, texturing, lighting, animation dan video post-processing. All these contents support learning taharah using 3D animation. Hopefully, Moslem students at 11 years above at the education process inside and outside of school could learn taharah through this application.

2. Research Methods

Taharah is one of the most important worship in Islam to get clean and pure physically and spiritually as the requirement for worship, such as prayer. Pure is not only body but also all clothes, place, and others. The law of Taharah is compulsory. Hence, Taharah is not only knowledge, but it should be practiced correctly. However, some of the Moslem are still do not understand about Taharah correctly because of less knowledge, therefore they practice it incorrectly. This research aims to develop Taharah application using a virtual reality. Virtual Reality is an application media to describe the environment in the three dimension application. These could be interact with someone. Virtual reality technology has good quality graphics and voice output. However, a lot of technology has been made in 2D, therefore it has limitations in the interaction and visualization. There are some stages to develop a design of robust virtual reality system as follows: data is obtained from taharah material based on Mahzab of Imam Syafii as shown in table 1. Imam Syafii is an author of a book about rules and procedures to understand Al Quran and hadith.

| No | Material          | Sub Material                          |
|----|-------------------|---------------------------------------|
| 1. | Hadas             | a. Definition of Hadas                |
|    |                   | b. Syariat (religious law) and hikmah (wisdom) of bath |
|    |                   | c. Makru (detestable, but not as bad as haram) of bath mandi |
|    |                   | d. Sunnah (tradition) of ablution     |
|    |                   | e. Makruh of ablution                 |
|    |                   | f. Cancellation of ablution           |
|    |                   | g. Requirement of ablution            |
| 2. | Ritualy unclean  | a. Definition of ritually unclean     |
|    |                   | b. Things of ritually unclean         |

Table 1. Data result with color moments
3. Purification guidance

a. Ablution
b. Dry ablution
c. Cleaning ritually unclean

Furthermore, 3D animation software is needed to develop this android based application. Moreover, taharah guidance will be presented using an object in the implementation process. After that, the user needs a virtual reality glasses as an additional tool. This tool will help the user to get in and interact directly in the 3D world as presented in Figure 1. In this research, Blender supports the 3D workflow, such as modelling, rigging, animation, simulation, video editing, and game development[12]. In the design process can be done in a window called viewport. The design process that occurs is quite easy because basically the Blender application has features that make it easier for designers to carry out the design process. Then, unity is implemented in the virtual reality, where unity is a movement tool for the games. Unity is a tool for games development and gives interactive experience in the web, desktop, mobile phone, and console[13]. Unity is a multiplatform game engine. Unity can be published as Standalone (.exe), web-based, Android, iOS Iphone, XBOX, and PS3. And graphics on Unity have high-level graphics for OpenGL and DirectX. Furthermore, virtual reality application is suitable for eyesight application until 70% compared to the hearing application that achieves 20%[14]. The design of the 3D model for the application of thaharah uses Blender 3D, can be seen in Figure 2, where the menu structure of the virtual reali application has three menus, such as ablution, dry ablution and washing ritually unclean while the navigation design of the thaharah application in this study is shown in Figure 3.

![Figure 1. Design of the Virtual Reality Taharah Application Based on 3D Blender](#)

![Figure 2. A Procedure of Virtual Reality Applications for Taharah Based on 3D Blender](#)

3. Results And Discussion

Modelling is a technique in computer graphics to produce digital representations of objects in three dimensions that form objects so that they look like life. The 3D modelling process produces digital objects that can be moved freely, making it one of the processes needed in animated characters and special effects. The essence of modelling is a mesh (a 3D object) that may be most deserved to be described as a set of dots in a space.[15]. These points are mapped into a 3D grid and are combined into polygonal shapes, usually triangles or rectangles. Every point or vertex has its coordinates in the
grid, by combining these points into shapes, then the surface of an object is created. In this research, the software used for 3D modelling is a blender. Blender is a free and open-source 3D modelling program. Provides a strong toolset that is capable of producing professional quality assets and animations[16]. The steps of the Virtual Reality Taharah Application Based on 3D Blender, including:

- 3D modelling with Blender, where a collection of vertices, edges and faces combine to form a surface object. In the blender application, select the cube object and cut it in half vertically in the middle, then give a mirror modification on the x axis (or y) to become an intact box object and cut it in half horizontally. So forming human character, shown in Figure 4.

**Figure 3.** Design of Navigation Structure of Virtual Reality Applications for Taharah Based on 3D Blender

![Design of Navigation Structure of Virtual Reality Applications for Taharah Based on 3D Blender](image)

**Figure 4.** Modelling 3D By Blender

- Many technological innovations have contributed to the life of developers, one of which is VR technology. Many variations and various shapes, materials, qualities and features. Samsung is working with Oculus to develop a VR device called Samsung Gear VR. By entering a simple 3D object, then enter the package and switch to the Android platform such as displaying animation, sound and interaction on human objects, can be seen in Figure 5. Game ini diprogram menggunakan mesin game Unity 3D[17]. All controls are done adding Box Colliders to different parts of the user skeleton, and using OnTriggerEnter(), OnTriggerStay() and OnTriggerExit() functions in different scripts, as well as different tags[18].

**Figure 5.** 3D Models That Have Been Imported to Unity
User by using virtual reality glasses. User by using virtual reality glasses. Among the interactive technologies one could consider, VR appears as a promising choice[19]. In the Skeleton feature, if a user chooses one object of ablution, dry ablution or washing ritually unclean, what is needed is an Android smartphone. In this research to exploit the widespread Personal Electronic Devices (PEDs)[20], such as smartphones and tabletssailing 5 to 5.5 inches which has sensors such as gyroscope and accelerometer, and of course a Cardboard. If you already have a Cardboard and a smartphone that supports it, you can get a taharah application, can be seen in Figure 6.

![Figure 6](image)

**Figure 6.** Implementation of Virtual Reality Applications for Taharah Based on 3D Blender: (a) Main Menu, (b) Ablution, (c) Dry Ablution, (d) Washing of ritually unclean

Based on the implementation result, then it needs testing about system effectiveness. There is currently an absence of a comprehensive and accessible literature review of how printing media technologies are being used in the education system[21]. This research then conducted analysis testing about the influence of system quality for Moslem children age 11 years old above as captured in table 2. Testing result shows a student at year 6 more interested in 3D learning model than printing media, such as book, CD and, websites for taharah learning. Traditional media are less effective as students feel boring and less interested in reading the book. Beyond traditional media approaches, where students could not creative learning. And teachers act as eager facilitators to spur students self-motivation[22].

| Table 2. Comparison of Targets and Realization of Questionnaire of training Implementation |
|-------------------------------------------------|-------------|-----------------|
| Response of User | Sample of Target | The Reality User |
| Study with print media | 15 | 10 |
| • Student of 3rd Class | 10 | 8 |
| • Student of 6th Class | 5 | 2 |
| Study with 3D Animation | 40 | 23 |
| • Student of 3rd Class | 20 | 5 |
| • Student of 6th Class | 20 | 18 |
| Total | 55 | 33 |

4. Conclusion

This study has identified some conclusions as follows: (1) this application produced 3D animation about ablution movement, dry ablution, and washing ritually unclean, (2) This application helps Moslem to learn taharah knowledge through 3D animation, (3) Testing result shows this 3D application has effectiveness 69.6% comparing to printing media. The object testing were Moslem students at 11 years old above.

However, this virtual reality application needs more improvements in the future, such as: (1) Additional detail object to make a better realistic image, (2) Exercises and the highest mark saving features to make the application more interactive.
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