

# Implementation of Augmented Reality in Introducing Islamic Pillars Application for Young Children

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## ABSTRACT

Augmented reality (AR) is an emerging technology that is applied in various fields. It is believed that AR technology is mostly utilised in the education area. However, the utilization of AR in Islamic learning for early age children is still rare. This paper presents the development of a mobile AR-based application to introduce children to the five pillars of Islam. The development is following ADDIE's framework and the initial evaluation of this app is also presented.

**Keywords:** *Augmented reality, Islamic learning, five pillars of Islam, early childhood.*

## 1. INTRODUCTION

In recent days, augmented reality (AR) has been an emerging technology that is applied in various fields. Its feature that merges virtual and real-world enables various solutions in improving life standards, however it found mostly in the education field [1]. It is believed that AR can improve student's achievement and motivation and enhance positive attitude when learning [2], [3].

In that regard, the use of AR for early childhood education is prominent [4], [5]. However, it is not the case in learning Islamic study. AR utilisation for early childhood is not as well-known as in other fields [6]. This problem, as well as the importance of our study are further discussed in section 1.1.

### 1.1. Our Contribution

This study proposes an introduction for early childhood to learn about five pillars Islam in an enjoyable approach using augmented reality. To the best of the author's knowledge, AR-based application for learning about all Islamic pillars in one application is still not present. Another application is usually just explaining one kind of pillar, such as salah in [7], [8], or hajj in [9]. ADDIE instructional model is utilised in developing the software, and the application is tested to see whether all functionalities work properly or not.

### 1.2. Paper Structure

The rest of the paper is as follows; the next section discusses the related work; Section III describes

methodology that is used in this study; Section IV presents implementation and evaluation of the developed application; Finally, section V presents conclusion of this work and future perspective.

## 2. RELATED WORK

Development of methods and applications for teaching early childhood have been conducted to enhance teaching and learning [5], [10]. The method for teaching English by designing augmented reality (AR) resources based on Situational Theory found significant differences of effectiveness at different ages between the influence of AR-based English teaching resources and traditional teaching. The group with AR-based teaching resources can remember more words and improve significant participation [5].

Additional work of AR helps the Moslem children to memorize du'a is presented in [11], [12]. The finding of this study shows that AR enhances the understanding of prayer in Muslim Community. Another tool proposed to encourage children to learn salah in [8], [13]. Reference from Setiawan [7] offers an AR-based app for learning wudhu (ablution). Reference from Jarjis [8] encompasses both salah and ablution in its application, named SholatKu. Augmented Reality and gamification have also helped children to learn tajweed methods [14], [15]. The model of ADDIE is proposed to conduct the design and development process in AR application [14]. Augmented Reality is also employed to help hearing-impaired students in memorizing Al Quran [9].

In this paper, we present a method and application to help early childhood to learn about five pillars Islam in an enjoyable approach using augmented reality.

**3. METHOD**

The application to introduce five pillars of Islam (5Pillars app) is a mobile AR-based application. It is developed to introduce five pillars of Islam to children age 4-6 years old in interactive and interesting way.

There are several methods for designing and developing educational/ learning applications using AR technologies, and one of them is the ADDIE model [16]. ADDIE comprises five basic phases: analysis, design, development, implementation and evaluation [17].

5Pillars is different from other similar applications since this application comprises all five pillars, whilst other applications just define part of them. The application will not explain the pillars in detail; however, an important concept will be delivered. Table 1 outlines the learning goal for each pillar.

The application will use simple control as the user is not an experienced user. It also ensures that children can get the most benefit in learning five pillars (without having to worry about the mechanic). However, it should be equipped with mechanisms to help users (or the adult that accompany them) when difficulties arise.

Table 1. Learning objectives of 5 Pillars

The Pillar	Learning Objectives
Shahadah	<ul style="list-style-type: none"> <li>Acknowledged the importance of Shahadah as an Islamic creed.</li> <li>Able to recite the Shahadah.</li> </ul>
Salah (prayer)	<ul style="list-style-type: none"> <li>Know the meaning of salah, able to recognize movement in salah.</li> <li>Acknowledge 5 daily prayers in Islam.</li> </ul>
Fasting	Acknowledged the meaning of fasting and the time to perform obligatory fasting (in Ramadan).
Zakat	Know the concept of zakat and introduce children to one kind of zakat (i.e., Zakat al-Fitr).
Hajj	Know the concept of zakat and introduce children to one kind of zakat (i.e., Zakat al-Fitr).

**4. DESIGN AND IMPLEMENTATION**

5Pillars is a marker-based AR application. It uses a separate and different marker for the five pillars. The design of 5Pillars is accomplished with some usages in developing AR for teaching and learning of Islamic study, which are: AR acts as an aid to substitute the real object, AR helps in explanation of processes, AR acts as

simulation tool and AR is able to attract attention [18]. The concepts are applied in the AR content for each pillar:

- 1) Shahadah: Marker for Shahadah is calligraphy of Shahadah.
- 2) Salah (Prayer): Marker for salah illustrates pose in salah.
- 3) Fasting: Fasting marker illustrates the situation of breaking the fast.
- 4) Zakat: Zakat is the only pillar that uses multi-marker tracking.
- 5) Hajj: Marker for hajj illustrates people in ihram clothing, in front of Ka’ba.

Figure 1 illustrates the marker used in this application. There are six markers representing each pillar, two of them are fasting and hajj.

The main menu for 5Pillars is shown in Figure 2. There are three buttons in this menu; play button, help button and exit button. To start the AR and trace the marker, the user should press the play button. There is also a setting button to turn on (or off) the background music and sound button.

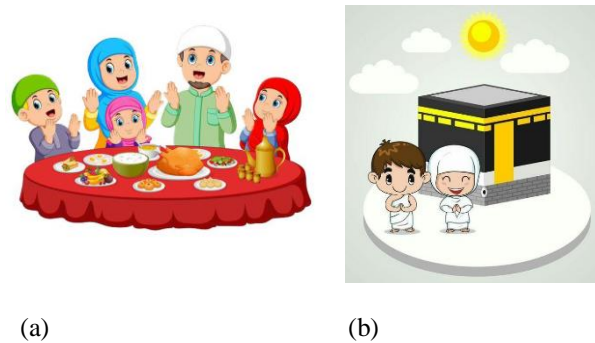


Figure 1 (a) Fasting marker (b) Hajj marker



Figure 2 Main menu of 5 Pillars



Figure 3 AR content of Shahadah marker

In figure 3, the content of the Shahadah marker is shown. There is a brief explanation about Shahadah and 3D animation of Shahadah statements. The explanation is supplemented by audio that reads aloud the text. When the 3D object is touched, audio recitation of Shahadah will play.

Formative evaluation for 5Pillars is carried out throughout the development process of the software. Figure 4 displays the result of the test to ensure that content of the marker can be shown. It is found that the application is worked properly for markers that were placed perpendicular with the smartphone. The object is shown, as well as accompanied audio for explaining the pillar was played. After finishing the implementation phase, summative evaluation with regard to the user should be made. However, this paper does not discuss the evaluations.



Figure 4 Result for 0° experiment

## 5. CONCLUSION AND FUTURE WORK

Learning Islamic values is important for Muslims, and it should be accomplished from an early age. Unfortunately, religious teaching, in this context is Islamic teaching, often perceives as a dull experience, thus many children feel reluctant to engage in these activities. AR technology can enhance Islamic teaching and learning, motivate the learners, and create an enjoyable learning environment.

This study has proposed an AR-based mobile application to help children learn about five pillars of Islam. It includes all pillars of Islam and uses AR to attract children's attention and enhance learning

motivation. Evaluation results show that the application can run smoothly in normal conditions. For future work, 5Pillars will be tested thoroughly and to its respective user, the result of the test will be presented.

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