e-Little Hajj: The Development of Augmented Reality Mobile Learning Apps to Enhance Learning Experience in Performing Hajj for Preschool

Mohd Hatta Mohamed Ali @ Md Hani*, Hanie Umi Sofea Mohamad Nizam, Aisyah Syarah Abdul Rahman, Hazlyana Ab Karim

Department of Information Technology, Centre for Diploma Studies,
Universiti Tun Hussein Onn Malaysia, Pagoh Higher Education Hub,
84600, Pagoh, Johor, MALAYSIA

Abstract: Hajj is an annual pilgrimage to Mecca taken by capable Muslims who have to complete it at least once in their lives. This is the fifth of the five pillars of Islam and brings full rewards, benefits, and forgiveness from Allah SWT. The COVID-19 pandemic, which is affecting Malaysia as well as the rest of the world, presents a challenge for learning hajj at this time, just as it does for other subjects. As a result, to maintain the continuity of education, all learning activities are now focused on teaching and learning from home (PdPR). With preschools now offering Hajj learning curricula to their students to foster understanding and interest in performing Hajj, learning about Hajj is no longer restricted to adults. Practical Hajj is done by preschool students through the subjects of Hajj and Umrah. In this critical situation, students find it difficult to learn practical Hajj because the learning is done online. As a result, we will create a mobile learning application that contains the AR code by employing Zappar. Each AR code has an animation video on how to perform the Hajj. Therefore, this project can help students perform a better Hajj. Thus, the children can learn even though they are at home. They can also understand better the concept, reasons, and procedures for performing Hajj. Students can learn Hajj at any time as there is a guide in the e-Little Hajj mobile learning application. For example, students simply scan the AR code to see the animation video on how to perform Hajj.

Keywords: Hajj, Mobile Learning, Augmented Reality, Zappar, Mecca

1. Introduction

Muslims who can do so must make the annual Hajj pilgrimage to Mecca at least once in their lifetime. It brings full rewards, benefits, and forgiveness from Allah (SWT) and is the fifth of the five Islamic pillars [1]. All Muslims who meet the requirements of the hajj law, including children, are required to perform the hajj [2]. Since Hajj and Umrah are subjects covered in the student curriculum, preschool students participate in a practical Hajj. Because the learning is done online in this crucial situation, students find it challenging to perform practical Hajj. Thus, this project can aid students in performing a better Hajj in practice. The children thus complete the Hajj curriculum at home by performing the practical pilgrimage. Students can perform Hajj practically at any time as there is a guide in the e-Little Hajj mobile learning [3]. For example, students simply scan the AR code to see the animation video on how to perform Hajj.

Based on interviews, preschool teachers find it difficult to show students how to perform Hajj in practical activities. For example, teachers had to make a "Google Meet" and explain it one by one because the learning sessions are done by home-based teaching and learning (PdPR). The teacher also can't focus on each student as the view of them is small in Google Meet. Referral materials such as videos about *Hajj* that are available on the internet or YouTube are difficult to understand because they are not in Malay, but most use Indonesian. Based on observations, parents also find it hard to help their children do practical *Hajj* activities because there are few practical materials. Previously, these activities could be done normally. For example, a total of 291 preschool students and six-year-old children took part in the Little Haj simulation program held at Masjid Sultan Iskandar, Bandar Dato' Onn [4]. They participated in religious rituals such as *tawaf* (circling a replica of the Kaabah), *wukuf* (a pilgrimage gathering at *Arafah*), and *jamrah* (stoning the devil), among others, while wearing white robes. They were also exposed to the procedures at immigration counters.

Before the development was implemented, several studies were conducted to obtain the information needed to improve the application development. Some methods of data collection are done mainly through interviews with preschool teachers and parents of students. Information search methods on the Internet, information assistance from friends, as well as several mobile applications for Hajj and Umrah were also studied. Several applications, for example, can serve as development guides. In addition, we also obtain information and reference materials from the journals of previous researchers. Therefore, the study on the application of Hajj and Umrah with the concept of augmented reality is also being investigated and studied to facilitate the implementation of the development of this mobile learning [5].

The importance of the e-Little Hajj project to preschool children is that they have a special feature to learn hajj and umrah practices found in the preschool learning syllabus as it has an AR code containing many videos about *hajj* and can be accessed by using Zappar. In addition, it can make it easier for parents to guide their children.

1.1 Related applications

According to the research, there are other existing applications related to Hajj and Umrah that are like e-Little Hajj, for example, iHaji and Let's Hajj [6], but they cannot scan AR codes and watch video animations on how to make the hajj pillar. Such applications can have a good impact and be used to help users learn and understand more about the processes of performing Hajj in the form of animation.

This project, hopefully, will be supported and received by the community, especially by those who are state of the art in technological facilities. The e-Little Hajj is expected to assist parents and preschool students in learning about hajj and guide them through the details. If e-Little Hajj does not exist, preschool teachers and students will likely face difficulties in performing practical hajj, especially when searching for video guidance as the available ones are mainly in Indonesian. This application contains a video animation, which is a value added to an interactivity application.

1.2 e-little Hajj as information channel

The development of e-little Hajj, mobile learning for 2D augmented reality experts, aims to help preschool students make practical pilgrimages while at home because they are unable to study face-to-face due to the pandemic. The application was also developed to introduce methods of using the application to learn. Therefore, the creation of an AR-based Hajj learning application depends on the introduction of suitable hajj for children. This is where users will get a book as a package with an introduction to Hajj along with pictures that make children interested in learning [7]. The AR code provided in the book serves to turn on the image when the smartphone camera is directed at the target image object. With it, the child indirectly learns by looking at the object in motion. Teachers no longer need to look at articles or e-books to help the preschool students learn hajj at home. This is beneficial for both. The development of this application is also an effort to increase the knowledge of hajj among children. Learning conditions, learning environment, and evaluation are elements of learning that affect the learning process in improving children's achievement. This proves that the proper process of learning media also greatly influences the effectiveness of the learning process.

2. Materials and Methods

Additional models that serve as the best benchmarks and guidelines for producing an effective study are part of the methodology used for this project study. Analysis, design, development, implementation, testing, and maintenance make up the ADDIE Model.

These are the sources and graphs used in the research for this project, which is based on **Figure 1**. The gathering of information for the analysis will be done using a variety of key factors, including the use of questionnaires, interviews, and observational techniques. The existing application can't scan the AR code and watch the video animation. Next is the design of our animated video content.
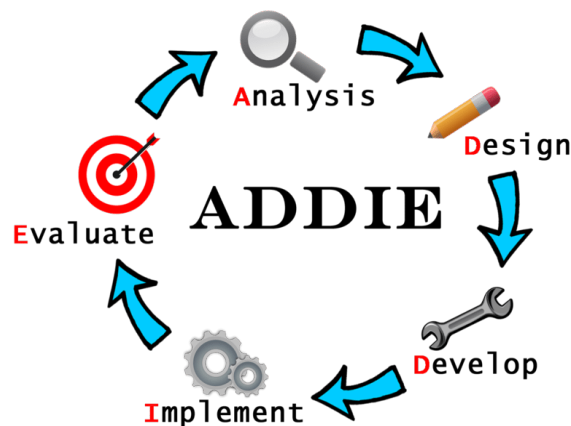
Figure 1: Phases in the ADDIE Model

2.1 Analysis

The study includes an information gathering session to identify common problems that need to be solved, an analysis of the abilities and capabilities in building the product, and the collection of all research data requirements [8]. According to the interview conducted with pre-school teachers, there are issues with general knowledge and sensitivity to the need for performing worship, particularly during PdPR.

Analysis of studies on the existing applications of Hajj and Umrah was carried out to identify the weaknesses, advantages, and software and hardware requirements for the development of e-Little Hajj. Several organizations and individuals have created Islamic apps that can be used on smart mobile devices to help pilgrims perform their Islamic rituals more comfortably [9]. For example, iHaji and Let's Hajj.

2.2 Design

In the design phase, a storyboard was developed as a guide for creating animations. Discussions with the target group are also conducted to obtain input and ensure that the design idea is acceptable and able to attract users.

2.3 Development

The Mobile Learning e-Little Hajj was developed based on the specifications from the design phase. Software is used in development processes, including Adobe Animate CC and Adobe Photoshop.

The augmented reality experience on e-Little Hajj has been enabled using the software that is available online called *zapworks.* The zappcode for the app was generated via the *zapworks* platform as shown in **Figure 2**.
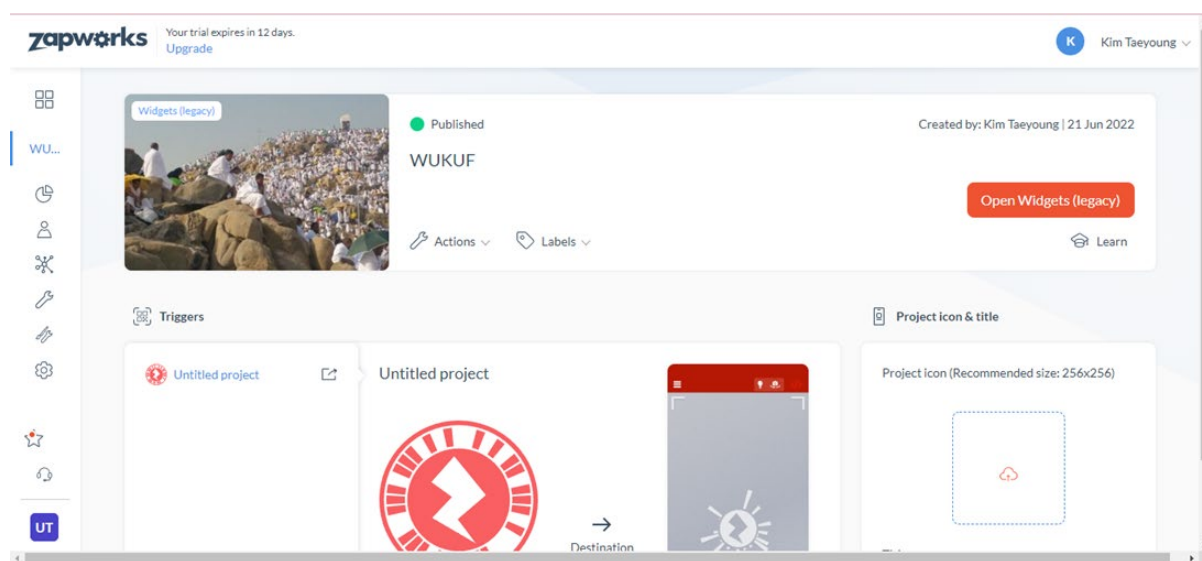

Figure 2: Zapcode generators on *zapworks*

2.4 Implementation

In the implementation phase, the generated zapcode was printed and turned into a book as shown in **Figure 3**. **Figure 3** is an e-Little Hajj front page display as well as a printed book picture designed with an interesting combination of colour, animation, and interactivity.
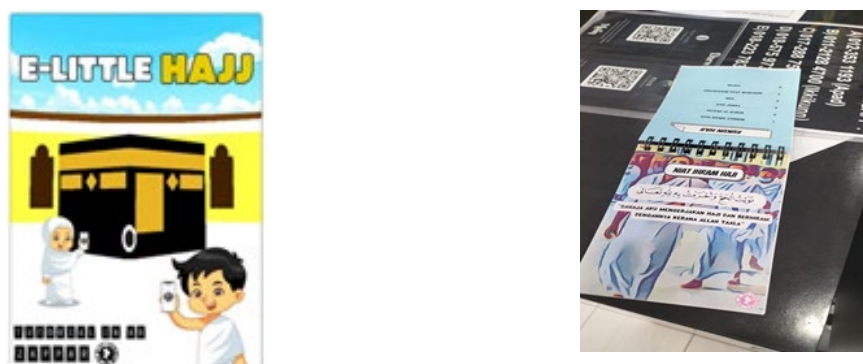

Figure 3: (a) e-Little Hajj front interface; (b) printed book design

2.5 Evaluation

In the evaluation phase, the process of measuring the impact of mobile learning e-Little Hajj was carried out. The questionnaire is administered by a face-to-face method [10]. The face-to-face questionnaire method was selected as the respondents were preschool students who are more likely to provide unwritten feedback. Students' feedback has been gathered in two stages of pre-use: pre-use and post-use. In **Figure 4,** we show the user testing environment of our application. Students and teachers are allowed to test the usability of e-Little Hajj. In the early stages, they were given guidance on how to access animated videos through the zappar application by scanning the zappcode found in the e-Little Hajj book. The book contains the meaning of the *Hajj pilgrimage* and the obligatory pilgrimage, as well as an explanation.

Figure 4: Users testing the e-Little Hajj application

3. Results and Discussion

3.1 Results

Many positive effects were observed from the survey conducted on the E-Little Hajj project, which included an increase in religious knowledge, particularly about how to perform each pillar of Hajj. The children did not understand the details on how to perform each pillar of Hajj, but the addition of the AR code scanning on the book to view the video animation has increased the effectiveness of guiding them in performing worship more correctly. Following that, we are aware that this book is intended for those preschool students who need guidance to make Hajj practical while also wanting to maintain a high level of worship. Hence, the presence of e-Little Hajj features in the book increases their knowledge and confidence in worship to some extent.

Table 1: Opinion about the E-Little Hajj book after using it

Scale	The number of respondents
1	0
2	0
3	0
4	5
5	8

The findings of the study from respondents' satisfaction with using the e-Little Hajj are displayed in **Table 1**. Findings indicate that scale 4 is 38.5%, with 5 respondents, and 61.5%, or 8 respondents, on scale 5. This demonstrates their high level of satisfaction with the creation of e-Little Hajj.

Table 2: Opinions about the Augmented Reality (AR) animation video after watching it

Scale	The number of respondents
1	0
2	0
3	0
4	7
5	6

The findings of the study from respondents on the opinions of users following the use of e-Little Hajj are displayed in **Table 2**. Findings indicate that scale 4 is 53%, with 7 respondents, and 46%, or 6 respondents, on scale 5. This clearly shows that the e-Little Hajj animation video was produced nicely and can attract a wide range of ages, including children.

4. Conclusion

The e-Little Hajj mobile learning is extremely useful and beneficial for Muslims and pre-school students. This application has useful features, especially for Muslims. The use of guidance videos and notes in this mobile learning aids users in their daily affairs and increases their sensitivity to Islamic worship. Users will gain access to a guide for performing each pillar of *Hajj* and *Umrah*.

References

[1]   A. F. Fatan, G. Dofira, and R. Budiawan, "Let'S Hajj Application: Ar- Based Hajj Guidance for Elementary Student," e-Proceeding Appl. Sci., vol. 6, no. 2, pp. 3988–3995, 2020

[2]   M. Noor, "Haji dan Umrah", Humaniora Teknologi, vol. 4, no. 1, Dec. 2018.

[3]   M. Hatta et al., "e-Pocket Musafir (e-PM): The Development of Android Mobile Apps as a Mobile Companion Information Application for Muslim Travelers," vol. 3, no. 1, pp. 70–78, 2022

[4]   M. Popular, M. News, A. New, and S. Times, "Adorable pilgrims ' in good spirits at Little Haj simulation programme," pp. 21–22, 2022

[5]   M. H. Mohamed Ali, A. Hafidzi, J. Mohamed, M. Abdul Hamid, I. A. Bahrudin, and N. Abdul Samad, "Pembangunan Aplikasi Pembelajaran Mobil (M-Learning) Adik-Adik Jawi bagi Meningkatkan Pengalaman Pembelajaran dalam Kaligrafi Jawi," J. Quranic Sci. Res., vol. 2, no. 1, pp. 27–34, 2021.

[6]   A. F. Fatan, G. Dofira, and R. Budiawan, "Let'S Hajj Application: Ar- Based Hajj Guidance for Elementary Student," e-Proceeding Appl. Sci., vol. 6, no. 2, pp. 3988–3995, 2020

[7]   A. F. Fatan, G. Dofira, and R. Budiawan, "Let'S Hajj Application: Ar- Based Hajj Guidance for Elementary Student," e-Proceeding Appl. Sci., vol. 6, no. 2, pp. 3988–3995, 2020

[8]   T. Annesley, "The Discussion Section: Your Closing Argument",Clinical Chemistry, vol. 56, no. 11, pp. 1671-1674, 2010. Available: 10.1373/clinchem.2010.155358

[9]   An analytical study of mobile applications for Hajj and Umrah services. Applied Computing and Informatics, 14(1), 37–47. https://doi.org/10.1016/j.aci.2017.05.004

[10]   Y. Fujiwara, J. Fukushima, and Y. Maeda, "A Face-to-face Education Support System Capable of Lecture Adaptation and Q & A Assistance Based on Probabilistic Inference," no. 19500782, pp. 394–400, 2008.