Evaluating User Interface Satisfaction of Virtual Umrah Application

Siti Dhalila Mohd Satar, Azilawati Rozaimee, Normala Rahim, Nazirah Abd Hamid, Wan Malini Wan Isa, Jamalluddin Hashim and Wan Ismail Wan Abdullah

Faculty of Informatics and Computing, Universiti Sultan Zainal Abidin, Malaysia
Faculty of Islamic Contemporary Studies, Universiti Sultan Zainal Abidin, Malaysia

Abstract: The existing applications used for the training of umrah mainly rely on the conventional method, such as using plain text to deliver knowledge. Multimedia elements or virtual reality technique are not integrated in these applications. To overcome these shortcomings, an application named ‘Virtual Umrah’ has been developed using virtual reality technique to be used as an alternative tool to promote learning. This paper discusses users’ satisfaction of the interface design of this Virtual Umrah application. The satisfaction evaluation was carried out among lecturers in Faculty of Islamic Contemporary Studies, Universiti Sultan Zainal Abidin. The respondents completed a set of questionnaire on User Interface Satisfaction which measures their overall reaction towards Virtual Umrah application, the terminology and system message, screen design and layout and the system capabilities. The analysis shows that the mean value ranges between 7.3 and 7.9 which indicate that the users are satisfied with the Virtual Umrah interface design.

Key words: Virtual Reality · Usability Evaluation · Virtual Umrah · User Interface Design · Technology Enhanced Learning

INTRODUCTION

Virtual reality technology has grown immensely over the past few years. This technology provides developers with a visualization of real situations that are hard to imagine or experience in physical reality. Furthermore, it can assist in envisaging the intended concepts and create innovative and creative ideas of a situation [1]. Virtual reality has been implemented in many important applications related to health and safety [2], rehabilitation [2] and education [5, 16] as it can create environment similar to the real world.

However, virtual reality has not been well adopted in the learning technology related to hajj or umrah. There are many existing applications for learning about hajj or umrah in the market, though its unable to adequately address important information to the users particularly the pilgrims [6]. These applications rely heavily on the conventional method and use plain text to deliver knowledge, they lack the capability to visualize the concepts of umrah. This situation may eventually lead to the misunderstanding of umrah activities and rituals.

[7, 17] developed an application that implementing Virtual reality technology combining with multimedia elements for learning Muslim rituals. These applications used avatar to guide learner or pilgrims through virtual reality environment. However, the satisfaction among the users about interface design of application developed by [7] is not yet evaluated. This study assessed the user satisfaction by examining the usability of the Virtual Umrah application where the users completed a questionnaire which measures their interface satisfaction.

The remainder of this paper is organized as follows. Next section describes the background of Virtual Umrah application and its usability evaluation followed by methodology and actual test environment whilst the evaluation results are presented in next section. Last section draws the conclusion of this study.

Virtual Umrah Application: Virtual reality technology creates an interactive environment based on the computable information that has been developing progressively. Specifically, it adopts computer technology as the core of the modern high-tech to generate realistic
vision, hearing, touch, specific range of integrated virtual environment. According to [8], virtual reality is a simulation in which computer graphics is used to create a realistic-looking world. This technology attracts developers to implement it in various fields because it can be used to create situations similar to the real world. Furthermore, it can assist in visualizing the concepts and create innovative and creative ideas of a particular situation.

Virtual reality has been adopted in the virtual umrah application developed by Rahim et al [7]. The technique used in this application is 360 Degree Photography which is useful in producing a simulation of real-world using image based model with high degree of realistic user experience. This application is based on the framework which contains five components as explained below:

- Content- provides accurate and precise information on the rituals and activities in pertaining umrah.
- Virtual reality technology- modeling technique used is image based model because it provides a better quality image and accelerates the rendering process.
- Multimedia elements- information can be presented in different formats. Multimedia elements such as text, images, audio, video and animations are used in delivering the knowledge.
- User profile- the profile is designed based on the user centered approach where user is actively involved in the phases of application development in order to fulfill the need and requirement of intended user.
- Usability evaluation- the evaluation process is performed to identify the user requirement and propose suitable solution.

**Usability Evaluation:** An application which incorporates virtual technology must fulfil the requirement of the usability. According to [9-10], usability refers to any computer applications that are easy and pleasant to use. In human-computer interaction, usability can be considered as a tool or way to measure and evaluate the user interaction of a particular product or system [11]. Neilson and Mark [12] define usability as a standard of quality to assess the easiness of user interfaces.

In the software usability of an application, user satisfaction is one of the main attributes which can be applied to all aspects of a system which human interact with [13]. According to [14] satisfaction can be divided into five aspects shown in Table 1. In this work, the authors have chosen learnability, efficiency, memorability, errors and satisfaction as the usability criteria.

<table>
<thead>
<tr>
<th>Table 1: Five aspects in Satisfaction Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspect</td>
</tr>
<tr>
<td>Efficiency</td>
</tr>
<tr>
<td>Affect</td>
</tr>
<tr>
<td>Helpfulness</td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Learnability</td>
</tr>
</tbody>
</table>

In order to assess the user satisfaction of the Virtual Umrah application, usability evaluation must be carried out. Usability evaluation is essential to identify any usability deficiencies, so that the design could be improved. Failure to discover the usability deficiencies may lead to confusion and misinterpretation, which in the case of Virtual Umrah would lead to the misunderstanding of Umrah activities and rituals and risks the failure to achieve perfect (mabrur) Umrah.

**MATERIALS AND METHODS**

The objective of usability evaluation is to determine the user satisfaction of the Virtual Umrah application. This evaluation is done by adapting the Questionnaire for User Interaction Satisfaction (QUIS) version 5.5. According to [15], QUIS is a standardized, general user test instrument for interactive computer systems. Moreover, QUIS can be considered as a measurement tool which is designed to assess a computer user’s satisfaction with the human computer interface.

The evaluation process involved nine end users. These end users are lecturers and have possessed more than 10 years of experience in the Islamic studies. These end users also have extensive umrah-related knowledge.

**Evaluation Procedure:** Nine staff of Faculty of Islamic Contemporary Studies (FKI) at University Sultan Zainal Abidin (UniSZA) had been selected to take part in this evaluation process. The Virtual Umrah application had been installed in the researcher's laptop and the evaluation procedure consisted of three steps as shown in Figure 1.
Fig. 1: Steps in the evaluation Process

In phase 1, Virtual Umrah application was introduced to the users where they were informed about the flow of the application. The steps to use the Virtual Umrah application were demonstrated. This step is important to ensure the end user understands the interactive features of this application.

Phase 2 involved the process of assessing the application. In this phase, the end users were allowed to use the application by exploring, navigating, controlling and manipulating the application. The users also viewed Tawaf Ritual interface, saî’e ritual interface and other aspects of the content in order to learn how the umrah ritual is performed.

In the last phase, users provided their feedback by answering the questionnaire and giving comments or any suggestions about the application in the open-ended section in the questionnaire. Figure 2 shows the evaluation process that has been conducted in the meeting room.

Questionnaire: The questionnaire consists of two sections, 1) Demographic Information and 2) User Satisfaction towards Virtual Umrah application. Demographic information consists of five questions related to age, gender, level of education and position and level of computer skill. Meanwhile User Satisfaction section was measured based on the four criteria: i) Overall Reaction toward Umrah Application; ii) Screen Design and Layout; iii) Terminology and System Message; and iv) System Capabilities. The questions took the form of Likert scale, ranging between 1 to 9. Table 2 shows the types of questions in each part.

<table>
<thead>
<tr>
<th>Section</th>
<th>Subject</th>
<th>Number of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Demographic profile</td>
<td>Demographic profile</td>
<td>5</td>
</tr>
<tr>
<td>2 Overall reaction to the software (Satisfaction)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Screen (memorability)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Terminology and system information (Errors)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>System capabilities (Efficiency)</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

RESULTS AND DISCUSSIONS

In this section, the results of user interface satisfaction of Virtual Umrah application are presented and discussed and the complete analysis of the questionnaire includes many significant results. The demographics profile shows that nine female staffs of Faculty of Islamic Contemporary Studies took part in the evaluation and they acquired Master or PhD degree that related to our field of studies. The users also held more than 10 years of experience in the Islamic studies and all of them have good computer skills.
Prior to the evaluation process, the users used the Virtual Umrah application and then answered the questionnaire. The results of the questionnaire were analyzed by calculating the means score of each criterion as shown in Figure 2.

The mean score of 7.9 for overall reaction criteria shows that this application meets the users' need by providing comprehensive content especially of Umrah rituals. The application also explains basic information on Umrah, such as meaning and decree of Umrah and time to perform Umrah. Besides, the flexible navigation and high level of interactivity of the application ease the control of the menu button and option button and the navigation from page to page. Figure 3 shows the example of option button that give the user to choose male or female pilgrims.

Moreover, the analysis shows that the score for terminology and system message criteria is 7.9. This value suggests that the application uses correct, suitable terminology and consistent information. Furthermore, this application offers a system message by providing help button and displaying suggestion through dialog box. The users also satisfied with this application that does not contain any system errors, such as the redundant interfaces or broken links which indicate that this application is error-free.

Additionally, the analysis also includes the screen design and layout criteria scores. The score is 7.6 which suggests that the users are satisfied with the interface design and layout of the application. The design of the menu button is suitable for every age because the font is easy to be read. Also, the font color of the text is contrasted with the background which makes the reading process smoother. In addition, the animation in the Saie ritual helps the user to understand the ritual better for example they should walk back and forth between the hill of Safa and Marwah for seven times. Figure 4 shows the saie ritual that is performed by a female pilgrim.

The last criterion is efficiency with the score 7.3. This score indicates that the users were able to complete their task efficiently by using hint for the button to get more information. In this application, users will be notified with the important information by highlighting it with the red color. This application also provide user with video and animation in order to give clearly information about the Umrah ritual.

CONCLUSION

As the conclusion, based on the above mentioned results, it can be concluded that the design of virtual umrah application satisfy the users' requirement since it
provide a immersive experience in using the application. The satisfaction of using the application has been examined and the results show that the users were satisfied with the usability of the application. Moreover, the animation and virtual reality technology embedded in this application can construct an interactive and immersive learning platform to support learning environments through simulations and visualization.

The proposed Virtual Umrah application serves as an unconventional method to convey learning material information because it is created using a framework that consisted of five components namely content, virtual reality technology, multimedia elements, user profile and usability evaluation. The implementation of the framework in this application assists the pilgrim in preparing for umrah activities and ritual. Besides, this application also provides the opportunity for users to engage in realistic experience in learning to perform umrah by using virtual reality technology.

REFERENCES