The study on the immersive learning environment for teaching students about hajj and umrah

A look into an immersive learning environment for educating pupils about hajj and umrah

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Abstract—**Even though education keeps experiencing fast revolution from chalk to the computer, most Islamic education are still taught using traditional methods, hence affecting their motivation and achievement levels. This virtual stimulation hajj project proves that using technology could enhance middle school students' learning motivation with increasing their engagement level and giving them a chance to learn more about Hajj just like the real pilgrimage. Due to the lack of students' interest and performance when it comes to learn Hajj pilgrimage, one must create a solution for it. Thus, virtual reality has been chosen as its method with reasons. Using systematic literature review as the methodology, three processes are needed to go through – generating research questions, search process of inclusion and exclusion criteria, select and access the literature, data analysis and proposing a research model. The majority of the development's outcomes have received excellent feedback and comments from its target audience, although additional changes are required. This demonstrates that one of the most suggested learning methods is virtual reality. Future work will include providing a better solution to improve Hajj pilgrims' virtual learning experience.**

Keywords—Islam, Hajj, Umrah, Virtual Reality, education, learning, simulation, systematic literature review.

I. Introduction

Islam is the Federation's religion and it has the most believers in Malaysia. Islam is a monotheistic religion founded in the Arabian Peninsula in the seventh century CE by the Prophet Muhammad ibn (son of) Abdullah. With over 1.8 billion adherents, Islam is one of the world's major faiths and the world's second-largest religion. Those who practices Islam as their primary way of life knows that Hajj is important because it holds the pillars of Islam. Hajj is performed by a Muslim during 8th and 12th Dhul Hijrah, which is a religious

tradition lasting around 5 to 6 days [12]. According to the data provided by the government of the Kingdom of Saudi Arabia for 2018, nations such as Indonesia are more interested in Hajj because it has one of the highest numbers of Hajj quotas (Dadan Sumardani, 2021). Whoever capable of doing the Hajj, must do it at the Holy Kaaba in Makkah, Saudi Arabia. Hajj has high values for Muslims due to the fact it is one of the five pillars of Islam and it is a requirement for a physically, mentally and financially capable Muslim to do at least once in their lifetime and due to this, many Muslims would prefer to do it correctly on their first time. This is why before Muslims starts their Hajj, they need to join Hajj practical courses. Figure 1 shows the journey of Hajj pilgrimage.
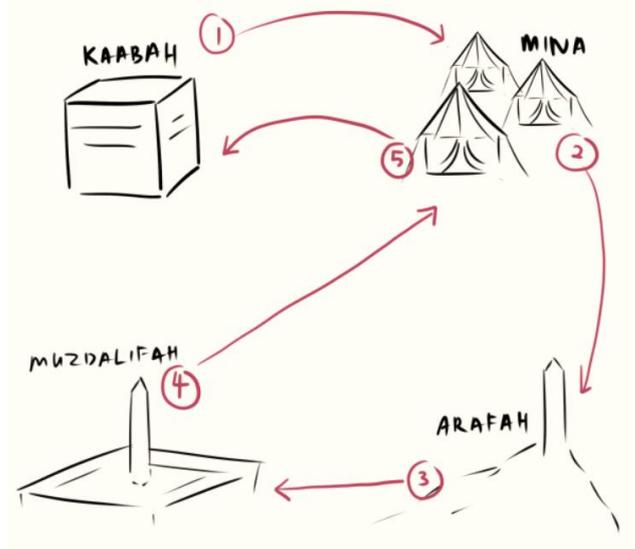

Fig. 1 The journey of Hajj

Most schools always teach Muslim children of the importance of Hajj as there is a chapter on the school textbooks regarding with Hajj as the fifth pillar. Due to using the paper and pen approach, this can be discouraging for the younger generations and because of this, students' general knowledge of Hajj and Islam may be disappointing. Responsible adults and older generations must ensure that the next generations understand the significance of learning how to do both Hajj and Umrah pilgrimage. As stated by Dulay & Burt, 1977; Krashen, 1982, learning is much more effective when students are having strong positive emotions and this is required creative teaching in order to enhance their study performance [1] especially when it comes to fundamental practices in Islam. Because of this, companies who make school-related books such as Sasbadi have added Augmented Reality (AR) technology in their newest published books. Somehow, there is still lack of it when it comes to Islamic education. Traditional approach can be highly discouraging especially for children who were born with high technology gadgets under their fingertips [2]. The low usage of technology in Islamic education potentially encourages students not to focus on the studies [3].

In order to be effectively understood and implemented, curriculum teachings in Islamic Jurisprudence frequently require practical experience. When it comes to prayer lessons, teachers cannot just use discussion tactics because they must teach the prayers in a realistic manner so that students understand and can pray correctly. The same may be said for Hajj, which cannot be taught purely through dialogue or debate methods, just as many other subjects in an Islamic Jurisprudence curriculum are difficult to teach solely through argument and discussion. This may lead to an increase in the difficulties Muslims confront during their Hajj performance due to a lack of awareness of Hajj's practical processes [4].

Visual stimulation may be able to fill the gap for students to have a better view on Hajj practical application and this will enable a positive impact to learn about Hajj as if they are in Mecca, performing the Hajj. A lot of researches have shown the positive improvement of learning and teaching when using virtual reality technology in their studies [5]. An immersive environment in virtual reality is a digital location that gives the viewer with a fully realised and interactive experience, either to mimic a real-world setting or to create a new, fantastical universe. Wearing a VR headset or other piece of equipment that tracks the user's motions and displays a 3D virtual environment is usually required.

II. RELATED WORKS

There are several attempts on developing Hajj virtual reality application by various researchers all over the world. Using literature review as the method, it will create a purpose of locating the research studies and providing completed list of all kinds of studies such as insights, background and contexts that are related to the topic [6]. The main goal of this paper is to gather information that is related to Hajj and Virtual Reality.

Systematic literature review (SLR) is a technique of searching and evaluating available literature on topics of specific interest. One main reason for performing such a study is to identify the areas that require the most investigation and research [7]. According to Muhammad Salleh et al., the reader must present the precise criteria used to: (a) formulate the research question; (b) set inclusion or exclusion criteria; (c) select and access the literature; (d) assess the quality of the literature included in the review; and (e) analyse, synthesise, and disseminate the findings in order to make sure the reliability of one's research. [5] Thus, steps that are mentioned in the subsections need to be taken by the researcher.
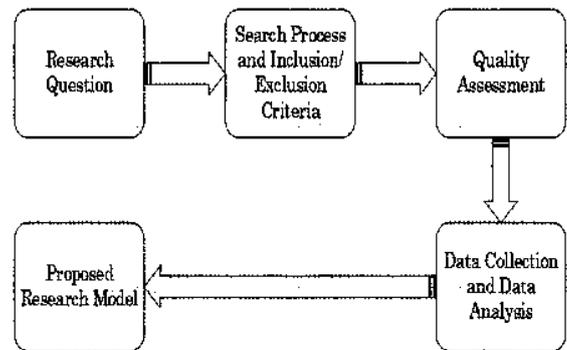

Fig. 2 Systematic Literature Review

A. Research Questions

In order to make sure the systematic literature review is still aligned with the direction of the research topic; the following questions are needed to be addressed: -
- How can school authorities be encouraged to normalise the use of technology in their educational system?
- How do you create an interactive and enjoyable educational simulation?
- How do you simulate a real-life Hajj and Umrah experience?

B. Search Process and Inclusion and Exclusion Criteria

The main tool for source collection during this process is a manual search by using Google Scholar engine which always brings to the well-known database pages such as IEEE Xplore, ResearchGate and ScienceDirect. Inclusion and exclusion criteria were applied when searching such resources.

The articles will be included in the paper if only they contain the following criteria:
- The papers were either written in English or Bahasa.
- The articles must be related with both virtual reality simulation and Hajj/Umrah.

- Make sure the keywords are in the papers.
- Papers that are included with the keyword 'learning', 'simulation' are being prioritized and will be used more often.
- Papers that were published during the last 5 years are much more being prioritized.

Studies that were not fulfilling such criteria above and duplicated papers will be ignored and excluded in this research.

C. Quality Assessment

Quality assessment is the collecting and analysis of data to demonstrate the degree of adherence to established standards and criteria [9]. If the quality is judged to be unacceptable through this method, efforts are made to determine why.

- Is the paper included with a prototype?

- Is there any data collected from using the prototype by the target audience?

- Is the paper strongly use virtual reality equipment for their testing?

- Does the study contain framework or model?

D. Data Collection

Since studies, rather than reports, are the unit of interest in systematic reviews, numerous findings from the same study must be identified and linked together before or after data extraction [11]. The following data has been gathered from each study:

- Research area in learning Hajj by using Virtual Reality.
- Research questions and objectives.
- Software development tools
- Hardware/VR equipment [10].
- Details and outcome analysis of the developed prototype virtual reality Hajj application made by the researcher.
- Students' behaviour and performance when learning Islamic education.
- Author affiliation information (name, institution, and number of researchers based on their nations).
- User interface and interaction complexity.
- 3D modelling.
- Collision, physics, and deformation in the virtual world.
- User behaviour when using the VR application.

III. CURRENT METHOD OF IMMERSIVE LEARNING

An immersive VR environment's goal is to offer the user a sense of presence and total immersion, as if they are actually in the non-physical reality. Realistic images, spatial sound, and haptic input (physical sensations like as vibration or pressure) are used to achieve this (Laura Freina, Michela Ott, 2015). The outcomes of the research question were provided in this part. Following a thorough examination of the literature, research areas and issues are identified and explored and these will support and improves one's research.

A. Analysis

A total of 11 articles have been selected after went through the SLR processes and data extraction shows that almost all has the same aim and objective when it comes to creating the virtual reality application – seeks to educate and equip pilgrims before they embark on their Hajj (or Umrah) journey [13]. Most of the researches showed that using virtual reality method can lower the cost and sustainability for the pilgrim to learn about the Hajj and almost all the research has the same target audience, which is the pilgrims. Questions such as these are handled by undertaking a comprehensive study to guarantee that the development is in line with the requirements:

- Who is the intended audience?
- How might virtual reality be used to inspire people to learn more about Hajj?
- How can learners (users) be immersed in Hajj learning?

B. Design and Development

Creating a virtual reality application can be very complicated, as the outcome is to make sure the user can feel themselves in the virtual world. Thus, more research is needed when it comes to layout maps and the rites due to the fact this will be in 3D environment. Detailed yet descriptive of layout maps must be planned before making the interactive replica in the virtual world; enhancing the virtual experience. This is critical because it lays the groundwork (requirements) for development, ensuring that communication between computer scripts with user interfaces and humans or users is much more deliverable. This is also to make sure the users engage to the virtual world.

This step will include testing and debugging to ensure that they are engaging with people and effectively delivering the materials. This stage will take a long time and a great deal of attention to detail in order to meet the research objective and requirements.

C. Outcomes

Most of the outcomes of the development have positive feedback and remarks by their target audience but more improvements are needed. This shows that using virtual reality as the learning method is one of the most recommended.

D. Comparison between VR Hajj projects

Authors	Period	Focus	Target Audience
[3]	2017	To develop a plan for implementing a virtual simulation environment for teaching students in Arab Saudi, hoping a better result in a more differentiated instruction and improved performance when it comes time for their pilgrimages to Mecca.	Students/young children
[4]	2021	The major goal is to make it easier for pilgrims to understand the Hajj content using their smartphone, and the author is interested in developing a Virtual Reality application to aid in the learning process of Hajj rituals.	Pilgrims
[5]	2021	To create a strategy for developing a virtual simulation environment for teaching young children in Malaysia, with the goal of improving their Fiqh understanding and performance during their pilgrimages to Mecca.	Students/young children
[10]	2011	Focusing on Tawaf ritual, making a simulation which is based on crowd technology, a new approach to control the movements of human characters around the Kaaba.	Pilgrims
[13]	2021	To create a platform through which individuals can experience Hajj via Virtual Reality (VR)	Pilgrims
[16]	2023	To study what demographic and geopolitical pressures issues can be solved using Hajj VR	Global
[17]	2022	To make it easier to understand Hajj rituals for pilgrims	Pilgrims
[18]	2017	For ease of understanding, a 3D animated virtual walkthrough of numerous hajj steps is offered	Pilgrims
[19]	2022	By using non-immersive virtual reality of tawaf in class, it is expected this will enhance the teaching and make the students to appreciate and understanding more about the pilgrims	Students (specifically Form 4 students)
[20]	2016	Aim to provide a better learning aid in order to support self-paced learning for Hajj	Pilgrims
[21]	2019	To study the numerous digital ways of teaching Hajj and one of them is virtual reality	Global

Table 1 shows the comparison between VR Hajj projects

IV. THE USE OF VR IN LEARNING

Clark (2006) stated over two decades ago that VR technology can make learning more exciting and pleasurable. As a result, student motivation and concentration will improve [5]. With changing lifestyles and new forms of entertainment, a traditional approach may be immensely discouraging to young minds. The research on the use of virtual reality technology in education has resulted in significant improvements in academic performance (Di Serio et al., 2012; Kreijns et al., 2013; Roca & Gagne, 2008). Despite this, many educators have expressed a strong desire to incorporate technological advancements into their teaching and learning activities.

V. CONCLUSION

As a result, concerns were described based on the study questions, and current works that suggest solutions to the issues in learning the pilgrimage were also included. Systematic Literature Review conducted research is capable of generating more information about the positive impact and benefits of using Virtual Reality as a method of learning Hajj pilgrimage as visual stimulus is capable to cover the gap in students' understanding of Hajj practical application. Future work will include developing a better solution to improve the virtual learning experience of Hajj pilgrims.

VI. ACKNOWLEDGEMENT

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