



ShalahVR: A User-Centered Virtual Reality Framework for Teaching Islamic Rituals to the Deaf Community

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ABSTRACT

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Hearing impairment experienced by Muslims with disabilities should not be a barrier to understanding Islamic teachings. Equal learning opportunities and adequate facilities are necessary for deaf and hearing-impaired individuals to establish the best practices in applying their Islamic knowledge. Current methods of Islamic religious instruction in the field often rely solely on lectures, discussions, practice, and simple aids, which tends to be slow in achieving learning outcomes and provides insufficient practical experience. An alternative for delivering Islamic teachings can be developed through a simulation utilizing Virtual Reality (VR) technology. This research aims to develop an Islamic learning module for deaf and hearing-impaired individuals, providing a learning experience that constitutes a best practice for the application of Islamic knowledge. The research process employed a three-stage method: problem identification, production, and testing. The resulting product is an educational simulation application based on Virtual Reality, using an interactive and practical experiential approach. It covers the sequence of worship procedures, from performing wudhu (ablution) and reading the Al-Quran to performing salat (prayer). The research concludes that the "Shalah Virtual Reality" application functions optimally and effectively helps deaf and hearing-impaired individuals gain the best practical experience in implementing their Islamic knowledge.

1. INTRODUCTION

Individuals with special needs may experience them from birth or during their lifetime, with various types of disabilities that require special aids to facilitate daily activities. For individuals with hearing impairments, there are challenges in processing information, as their senses do not function normally. The limitations faced by every person with a disability require equal facilities and support in all aspects of life, especially education (Lopez-Gavira et al., 2021). According to the applicable law in Indonesia, Law No. 20 of 2003, in article 5, paragraphs 1 and 2, it is stated that every person has the right to receive a high-quality education, and those with mental, physical, sensory, and intellectual impairments also have the right to special education. Education is also crucial for Muslims with disabilities to expand their knowledge and gain learning experiences, especially in understanding the teachings of Islam.

Islamic religious education is an obligation for every individual, regardless of status or condition, with the aim of instilling faith and piety to form a noble character (*berakhlakul karimah*) (Rachman et al., 2023). A study on Islamic religious learning for students with disabilities at SMP Luar Biasa Bintara Campurdarat was conducted by M. Maftuhin (2018), applying lecture, discussion, and practice-based learning models. A similar learning model was also used for students with hearing impairments at SMA Muhammadiyah 1 Gresik, supplemented with aids like a stylus and slate (*reglet*) (Amirudin & Khodijah, 2023). From

both studies, the success of learning outcomes was determined by the teacher's role in delivering material according to the curriculum through appropriate methods. By participating in Islamic education, students with disabilities are expected to gain a proper understanding of religious knowledge based on correct teachings and have better learning experiences.

The implementation of learning activities for students with disabilities certainly differs from that for students without special needs. Therefore, achieving learning objectives requires several adjustments to the students' conditions across various aspects (Restendy, 2019). In Noor Amirudin's (2023) research, the evaluation of Islamic religious learning for students with hearing impairments at SMA Muhammadiyah 1 Gresik required special adjustments in terms of extending learning time, varying teaching models, and adjusting material difficulty. Similarly, in the evaluation at SMPLB Bintara Campurdarat, each type of disability required a special approach and innovative learning models that utilize facilities to achieve maximum learning outcomes (Maftuhin & Fuad, 2018). This indirectly shows that the learning model significantly influences the motivation of students with disabilities (Safari et al., 2023). However, both studies still tended to use conventional learning models with minimal use of technology-based facilities, which can be a factor in delaying the achievement of learning outcomes.

The development of learning models is essential to support Islamic religious education efficiently and optimize learning achievements. Research on innovating learning models in Islamic education by Anamisa (2019) involved designing a virtual reality application for the topic of *taharah* (ritual purification) using 3D Blender software. The results proved that delivering *taharah* material to elementary school students through a 3D application was very helpful in creating a more creative learning experience and fostering student motivation compared to only using print media. The application of Islamic learning models using virtual reality can be said to provide the best practice experience and enjoyable learning for all students (Chițu et al., 2023). Through such experiences, students with disabilities have the same opportunity to experience Islamic education by utilizing virtual reality technology, just like other students.

Stemming from the problem of conventional Islamic learning models for people with disabilities, the researcher was inspired to develop a learning model in the form of a virtual reality application. This application aims to provide the best practice experience in learning Islamic knowledge, such as the procedures for worship, including performing *wudhu* (ablution), reading the Al-Quran, and performing *shalah* (prayer) in a practical way. The application of **Shalah Virtual Reality as a Best Practice in Islamic Religious Education for Individuals with Hearing Impairments** can be an innovative solution to improve the quality of their experiences and create memorable learning outcomes, so that the understanding of Islamic teachings can be easily practiced in daily life.

This paper documents the methods, outcomes, and implications of the community engagement program, offering a model for university-driven MSME empowerment that bridges academic knowledge with real-world application in the field of communication and design.

2. RESEARCH METHOD

This article aims to describe the creation process of **Shalah Virtual Reality** as a learning and training tool specifically prepared for individuals with hearing impairments. To achieve this goal, the research was structured using a three-stage methodology.

2.1. Problem Identification

The initial stage involved identifying problems related to the hearing limitations of Muslim individuals with disabilities. Individuals with hearing impairments face challenges when learning the procedures for *wudhu* (ablution), reading the Al-Qur'an, and performing *Shalah* (prayer). Conventional learning models, such as merely listening and asking questions, are considered ineffective in helping them. Virtual reality is a new technology with the potential to meet current needs (Jans et al., 2023). Therefore, the development of a virtual reality-based *Shalah* (prayer) aims to provide an innovative solution for individuals with hearing disabilities.

2.2. Production

After completing the problem identification process, the next step is the production stage. In this phase, the **Shalah Virtual Reality** application is developed. The production process involves various aspects, from the initial design of the user interface, system requirements and design analysis, and asset creation to its implementation in Unity 3D (Viitaharju et al., 2023).

2.3. Testing

To evaluate the performance of the **Shalah Virtual Reality** application, testing is required to measure the effectiveness of user learning, user experience, and to identify performance issues and potential problems within the application (Boffi et al., 2023). The testing phase will be conducted by an expert technician using **black-box testing** as the method to test the application's functional performance, thereby fulfilling the objective of detailing the creation process of **Shalah Virtual Reality** (Alfando & Sanjaya, 2023).

3. RESULTS AND DISCUSSION

"Shalah" is a virtual reality application developed as an advancement in Islamic religious education models for individuals with hearing impairments. The implementation of VR technology in this learning medium serves to provide a realistic visualization concept for delivering material on the procedures for performing *wudhu* (ablution), reading the Al-Qur'an, and carrying out *shalat* (prayer) (Steuri et al., 2023). The "Shalah" application organizes Islamic educational material by adjusting the difficulty level and incorporating interactive techniques to create an enjoyable learning atmosphere.

Individuals with hearing impairments can use the "Shalah" application with the help of advanced Oculus virtual reality devices, enabling them to gain the best practical experience and efficiently improve the quality of their learning outcomes (Harrington et al., 2017). The understanding gained from learning activities using the "Shalah" application is expected to facilitate the easy implementation of Islamic religious knowledge in real life. The design process for "Shalah" also went through several planned stages of system requirements analysis, including user interface design, flowchart diagrams, black-box testing, and user guides, to create a high-quality educational virtual reality application (Blackburn et al., 2019).

The design results of the "Shalah" application, based on the system requirements analysis, are as follows:

3.1. User Interface

The user interface design of **Shalah Virtual Reality** implements an educational and interactive system, allowing individuals with hearing impairments to use the application easily without needing guidance from others (Sun & Li, 2023). The purpose of designing the **Shalah Virtual Reality** user interface is to innovate the development of Islamic religious learning models by providing the best practical experience for individuals with hearing impairments. Figure 1 are the results of the system requirements analysis for the **Shalah Virtual Reality** user interface as displayed through the Oculus virtual reality device.

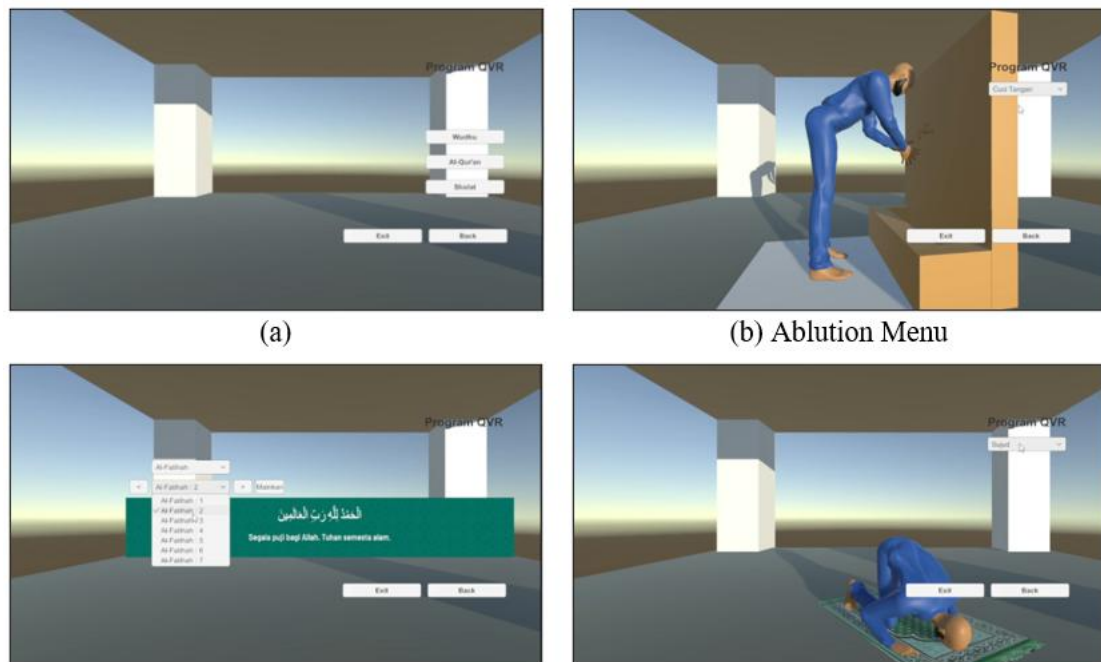


Figure 1. a) Shalah Application Menu, b) Ablution Menu, c) Al-Quran Menu, d) Prayer Menu

3.2. Flowchart Diagram

The flowchart diagram for Shalah Virtual Reality is used by developers to sequentially model the application's system workflow. This ensures that individuals with hearing impairments, as well as stakeholders, can use the application effectively and that its operation runs smoothly in accordance with its development objectives (Tsai et al., 2023). Figure 2 are the results of the system requirements analysis for the Shalah Virtual Reality flowchart diagram.

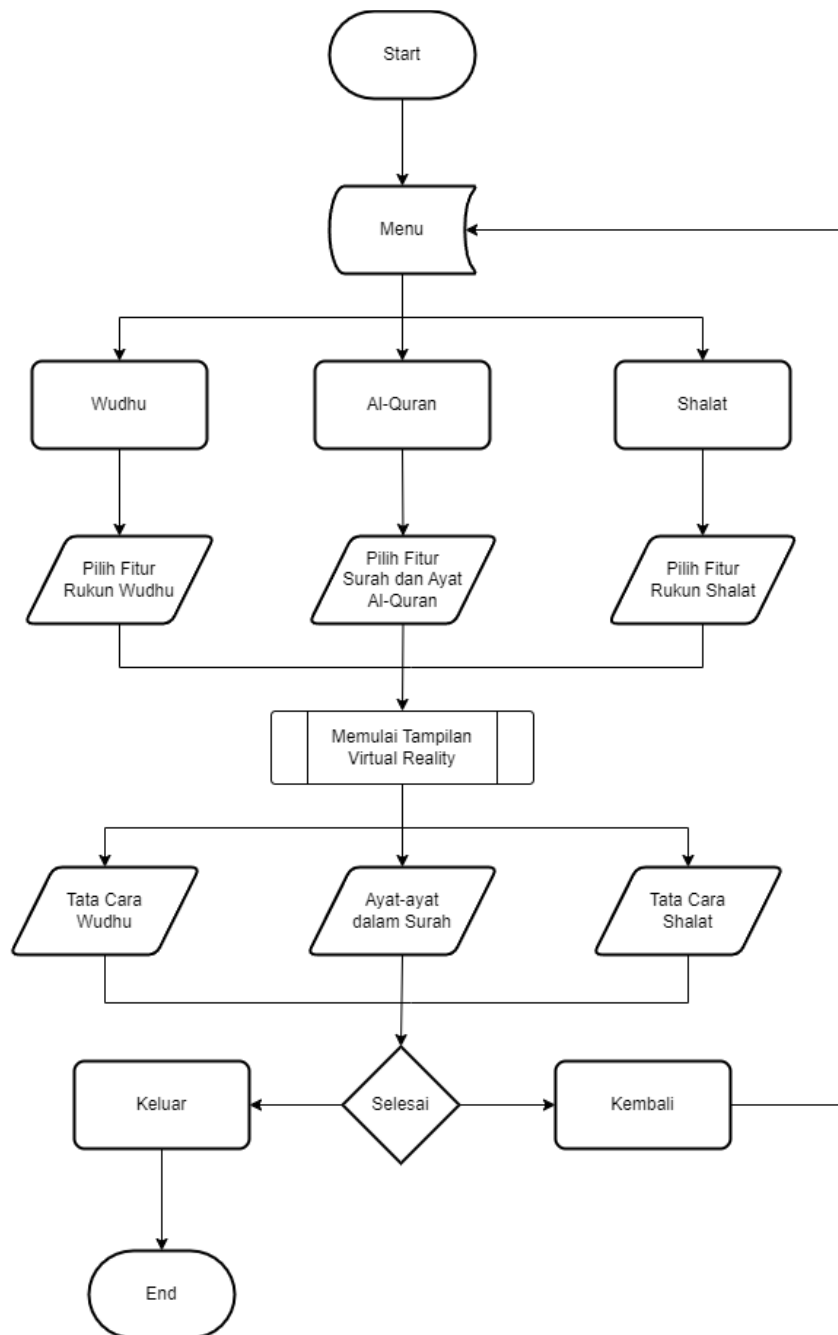


Figure 2. Comparison of success rate of items in the experimental and control class.

The results of the black-box testing, conducted based on the system requirements analysis for Shalah Virtual Reality, are presented in Table 1.

Table 1. The results of the black-box testing in Main Menu.

No	Test Item	Input	Output	Blackbox Testing
1	Wudhu Menu	User presses the Wudhu Menu button	Navigates to the Wudhu page	Success
2	Al-Quran Menu	User presses the Al-Quran Menu button	Navigates to the Al-Quran page	Success
3	Shalat Menu	User presses the Shalat Menu button	Navigates to the Shalat page	Success
4	Back	User presses the Back button	Returns to the main menu page	Success
5	Exit	User presses the Exit button	Closes the application	Success
6	Wudhu - Intention	User selects the Intention feature	Displays the procedure for the wudhu intention	Success
7	Wudhu - Hand Washing	User selects the Hand Washing feature	Displays the procedure for washing hands	Success
8	Wudhu - Mouth Rinsing	User selects the Mouth Rinsing feature	Displays the procedure for rinsing the mouth	Success
9	Wudhu - Nose	User selects the Nose feature	Displays the procedure for washing the nose	Success
10	Wudhu - Face	User selects the Face feature	Displays the procedure for washing the face	Success
11	Wudhu - Arms	User selects the Arms feature	Displays the procedure for washing the arms	Success
12	Wudhu - Head	User selects the Head feature	Displays the procedure for wiping the head	Success
13	Wudhu - Ears	User selects the Ears feature	Displays the procedure for wiping the ears	Success
14	Wudhu - Feet	User selects the Feet feature	Displays the procedure for washing the feet	Success

15	Al-Quran - Surah Al- Fatihah	User selects Surah Al- Fatihah	Displays the first verse of Surah Al- Fatihah	Success
16	Al-Quran - Verse Al- Fatihah	User selects a verse in Surah Al-Fatihah	Displays the selected verse of Surah Al- Fatihah	Success
17	Al-Quran - Surah Al- Ikhlas	User selects Surah Al- Ikhlas	Displays the first verse of Surah Al- Ikhlas	Success
18	Al-Quran - Verse Al- Ikhlas	User selects a verse in Surah Al-Ikhlas	Displays the selected verse of Surah Al- Ikhlas	Success
19	Al-Quran - Surah Al-Falaq	User selects Surah Al-Falaq	Displays the first verse of Surah Al-Falaq	Success
20	Al-Quran - Verse Al-Falaq	User selects a verse in Surah Al-Falaq	Displays the selected verse of Surah Al- Falaq	Success
21	Al-Quran - Left Arrow	User presses the Left Arrow button	Displays the verse from the previous surah	Success
22	Al-Quran - Right Arrow	User presses the Right Arrow button	Displays the verse from the next surah	Success
23	Al-Quran - Play	User selects the Play feature	Plays the murottal recitation of the verse	Success
24	Shalat - Intention	User selects the Intention feature	Displays the procedure for the shalat intention	Success
25	Shalat - Takbiratul Ihram	User selects the Takbiratul Ihram feature	Displays the procedure for Takbiratul Ihram	Success
26	Shalat - Ruku'	User selects the Ruku' feature	Displays the procedure for Ruku'	Success
27	Shalat - I'tidal	User selects the I'tidal feature	Displays the procedure for I'tidal	Success
28	Shalat - Sujud	User selects the Sujud feature	Displays the procedure for Sujud	Success

29	Shalat - Sitting Between Sujuds	User selects the Sitting Between Two Sujuds feature	Displays the procedure for sitting between two sujuds	Success
30	Shalat - Standing from Sujud	User selects the Standing from Sujud feature	Displays the procedure for standing after sujud	Success
31	Shalat - Final Tasyahud	User selects the Final Tasyahud Sitting feature	Displays the procedure for the final tasyahud sitting	Success
32	Shalat - Salam	User selects the Salam feature	Displays the procedure	Success

4. CONCLUSION

This study confirms that subsidized fertilizer governance has not favored smallholder farmers, particularly those in Nglarangan Hamlet, Selosari Village. Farmers complained about the distance from their homes to subsidized fertilizer kiosks, which they considered less than ideal. Fertilizer allocation data in the i-Pubers system is inaccurate and often does not reflect actual conditions on the ground. The lack of firmness from the organizers regarding SOPs regarding subsidized fertilizer collection makes it difficult for farmers to obtain subsidized fertilizer on time, resulting in delays in the planting process. Limited fertilizer choices result in less than optimal harvests due to differences in soil compatibility with available fertilizers. Several problems still occur among farmers. This results in reduced agricultural productivity, which can lead to a food crisis. Poverty among farmers will worsen, indicating the need for policy intervention to address these issues.

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