Medical Training Using Virtual Reality

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Keywords:

Virtual Reality,Immersive Tech,Medical Education,Simulations
Serious Games

Introduction:

Research has shown that people remember 80% of what they see, as the human brain processes visuals more effectively. Virtual Reality (VR) simulations, which are entirely visual and interactive, significantly enhance students' retention and understanding.This project introduces advanced technology into the medical education system, aiming to engage and interest learners across various disciplines.
The virtual medical room is created using specialized 3D modeling software, developed in Unity 3D, and implemented on the Oculus Quest 2, an advanced standalone VR headset.

Medical training typically occurs in real-world settings, which faced disruptions during the pandemic. This application allows individuals to learn at their own pace with guided instructions, enhancing traditional learning methods.
This project not only advances learning methods in the medical field but also promotes the growth of the rapidly evolving technology of Virtual Reality in the country.

Objectives:

Aiming to explore various innovative, engaging, and interactive ways to implement virtual reality-based supplementary methods in education and growth.Utilizing this emerging technology also educates people on its use and future potential with VR, providing a great way for individuals to virtually connect with their institutions during the pandemic.Specifically for our project, enabling sophomores in the medical field to gain practical, hands-on experience enhances their learning and prepares them more effectively for real-world medical scenarios.Develop a supplementary method to be integrated into the training and education system within the discipline of medical studies.Explore and research the rapidly emerging technology of Virtual Reality.Implement the project to enhance the learning-by-doing approach for outstanding results.

Methodology:

Requirements:

- PC: Laptop
- OS: Windows
- Device: Oculus Quest 2
- Others: Link Cable
- Design Engine: Unity 3D
- 3D Modeling tools: Blender, 3DS Max, Sketch Up
- Code Editor: Visual Studio/VS Code

- The project development utilizes various technologies such as 3D Modeling, Unity 3D, C#, and several related SDKs and APIs, including Android SDK, Oculus Integration, and ProBuilder, to create a real-time immersive VR simulation.On the hardware side, a standalone VR headset with controllers and link cables is used.The simulation content is developed on a moderately specified PC and deployed to the standalone headset via the link cable.For deployment, a test app is created in the App Lab on the Oculus Developer Portal, providing the application with a unique App ID.The app is then transferred to the VR headset using a compatible link cable, allowing the developed simulation to be experienced in the standalone VR headset (HMD+Controllers).

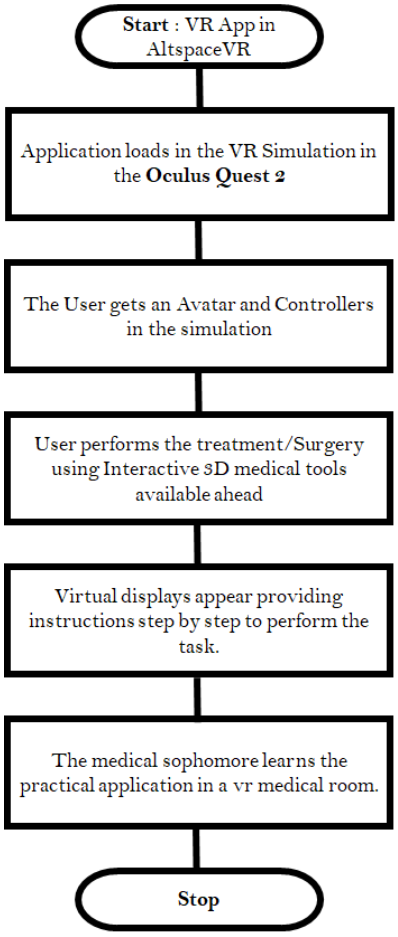
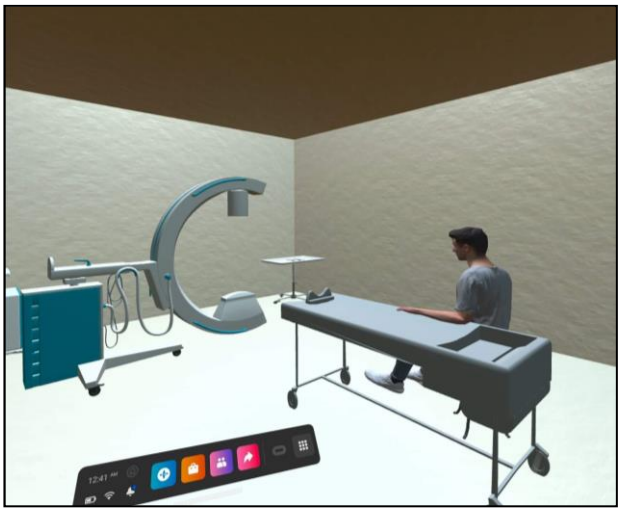


fig 1: Flow chart of the Project outcome

Conclusion:

This project presents a virtual reality training application for medical students, designed and developed to enhance traditional learning methods and facilitate experiential learning.It provides flexibility and self-learning opportunities for students in remote settings, while also optimizing time, cost, and effort for medical institutions by eliminating the need for physical simulation setups.Research and development indicate that integrating interactive and guided learning-by-doing methods, which offer real-life experiences in personal spaces, has significant potential for further implementation across various disciplines, particularly in medical education.



A 3D environment, encompassing a radiography laboratory with its medical equipment, was created as part of the VR application deployed on an advanced standalone virtual reality headset with controllers. The steps to perform diagnostic tasks were more comprehensible compared to reading theoretical instructions. The entire radiography procedure, including patient diagnosis, execution, and result interpretation, was practiced in a realistic setting, allowing students to engage remotely from their own locations.

Scope for future work:

As part of future work for this project, we can research and implement various medical training concepts, ranging from basic anatomy to advanced surgical procedures, and from clinical disinfection processes to other forms of radiography. This approach offers the potential to combine a wide array of training modules into a single VR application, with each concept having its own tailored simulation. Such an application could encompass the entire educational curriculum of medical institutions, providing an efficient learning method and establishing Virtual Reality as one of the most emerging technologies in medical education.