University of Peradeniya

Enhancing Virtual Patient Simulation In Dentistry With Custom Case Creation And Evaluate The System Effectiveness

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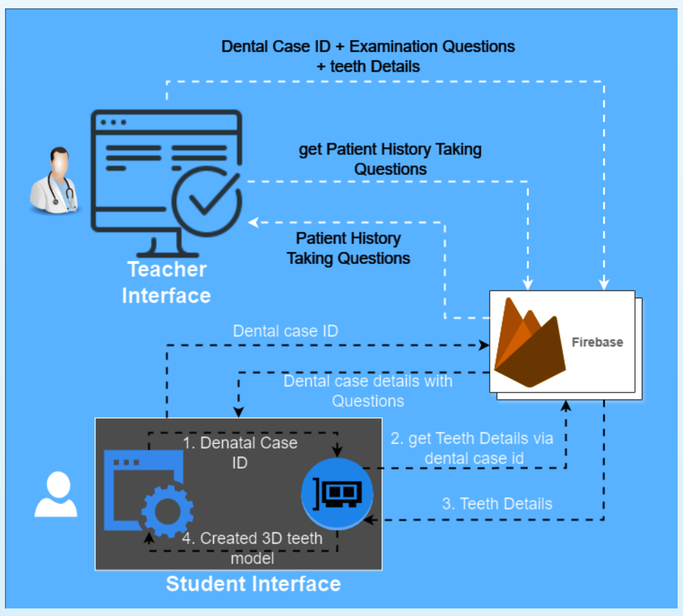
Abstract- VR in dental education improve learning with Virtual Patient Simulators. Current simulators lack diverse clinical cases, limiting knowledge. This research enhances a web-based tutoring type simulator for custom cases and evaluates its effectiveness, addressing these limitations.

Introduction

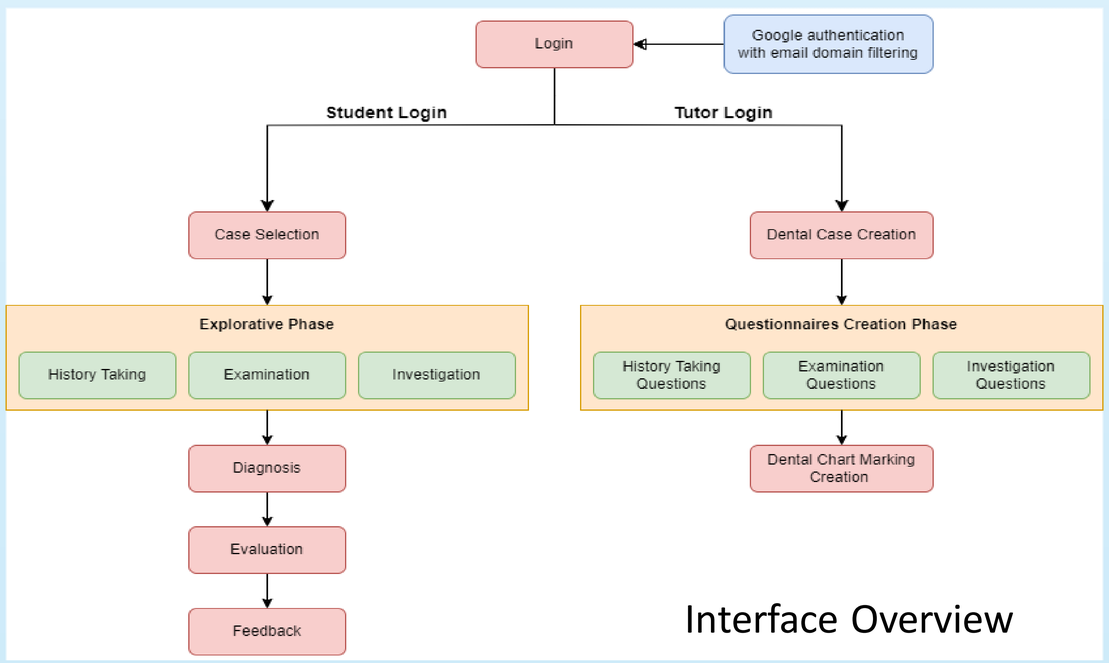
- Existing simulators lack patient cases, feedback mechanisms, and require high technology.
- Previous work is limited to a single patient case, one-tooth dental chart marking, and lacks haptic integration.
- Our solution includes custom patient cases, semi-automated 3D model modification, a markable dental chart, haptic device integration, and effectiveness assessment.

Methodology

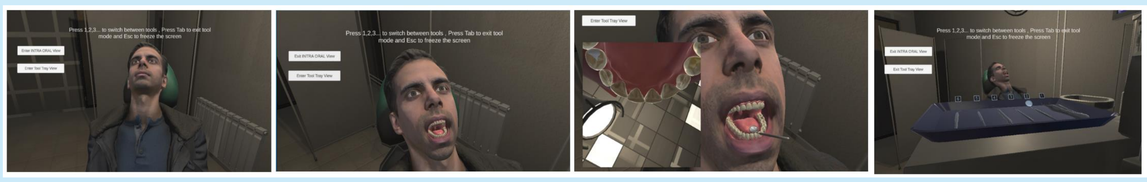
- Developed a tutor portal for custom patient cases, supporting both Student and Tutor roles.
- Customized 3D models using tutor data.



Data Flow of the System



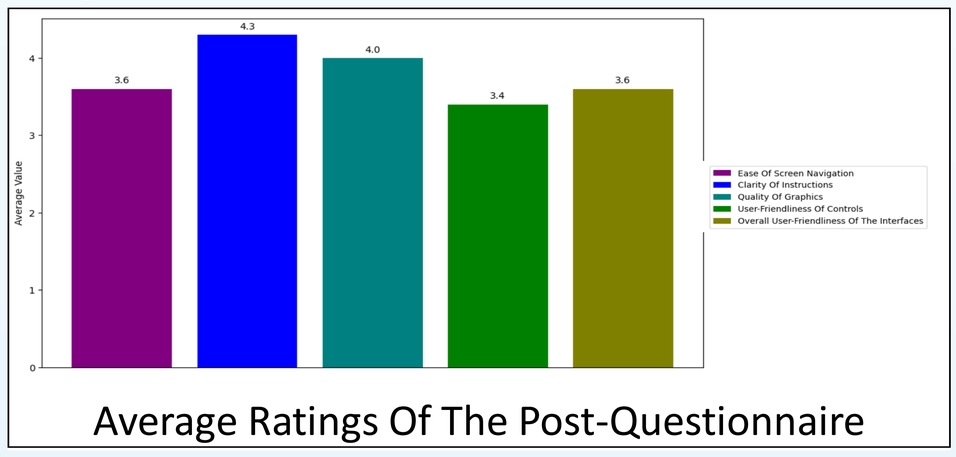
Interface Overview



3D Simulator

Results

- 10 dental students from the University of Peradeniya participated in the HCL test, showing moderate proficiency.
- Post-test results indicated high satisfaction with instructions and graphics, and moderate satisfaction with navigation, controls, and interface.



Average Ratings Of The Post-Questionnaire

Factor	P-Value	Significant Difference (Threshold = 0.05)
Proficiency Level (1 - 5)	0.307	No significant difference in completion time based on the proficiency level.
Gender (Male, Female)	0.208	No significant difference in completion time based on gender.
Academic Semester (5th - 9th)	0.417	No significant difference in completion time taken based on the academic semester.
Web Navigation Familiarity (1 - 5)	0.795	No significant difference in completion time time taken based on the web navigation familiarity.

ANOVA Test Results

Discussion

Key Findings:

- VPS provides a realistic simulation environment, aiding students in practicing clinical skills without ethical concerns.
- Students showed a reasonable level of computer proficiency and frequent use of web-based learning platforms, indicating readiness for VPS adoption.

Areas to Improve:

- Students reported excessive scrolling for tasks like history taking, detracting from the user experience. Optimizing the layout to reduce unnecessary navigation is suggested.

Implications of VPS:

- The VPS provides a safe, controlled environment for students to practice clinical skills, including exposure to rare and complex cases, without ethical concerns.

Scan the QR code for more details

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