Enhancing Virtual Patient Simulation in Dentistry: Custom Case Creation for Tailored Learning Experiences

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Virtual Patient Simulators (VPS) are vital in dental education, providing a safe environment for students to practice clinical skills, diagnostic skills as well as to practice formulating treatment plans. However, existing tutoring-type simulators, which use 3D models, often fail to replicate a broad spectrum of clinical cases due to their inability to automate the 3D model according to each different clinical case. This limitation hinders students' knowledge acquisition, as they are not exposed to a wide range of clinical scenarios with different presentations. Addressing this gap, this study aims to enhance the developed web-based VPS, by introducing a tutor (teacher) portal for custom case creation, without software expert support. This semi-automated approach requires the tutor to input case details into form-based interfaces provided by the system, which then uses these details to automate the 3D model according to the case. Additionally, a built-in question bank prevents repetitive questions, enhancing interactivity. The system evaluations were conducted with both dental students and tutors in order to measure their user experience and satisfaction with the enhanced simulator. The results indicate higher levels of user satisfaction and usability for custom patient case creation with the newly introduced approach. This novel method offers a promising solution to the current limitations of VPS and paves the way for future advancements in dental education technology.

Keywords: Virtual Patient Simulator, 3D Model Generation, Custom Case Creation, Patient Case Libraries, Score-Based Feedback System

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