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Scenario-Based Learning Using Virtual Optometrist Applications

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Abstract : Diploma in Optometry (OPT) course is a three-year program offered by Ngee Ann Polytechnic (NP) to train students to provide primary eye care. Students are equipped with foundational conceptual knowledge and practical skills in the first three semesters before clinical modules in fourth to six semesters. In the clinical modules, students typically have difficulties in integrating the acquired knowledge and skills from the past semesters to perform general eye examinations on public patients at NP Optometry Centre (NPOC). To help the students overcome the challenge, a web-based game Virtual Optometrist (VO) was developed to help students apply their skills and knowledge through scenario-based learning. It consisted of two interfaces, Optical Practice Counter (OPC) and Optometric Consultation Room (OCR), to provide two simulated settings for authentic learning experiences. In OPC, students would recommend and provide appropriate frame and lens selection based on virtual patient's case history. In OCR, students would diagnose and manage virtual patients with common ocular conditions. Simulated scenarios provided real-world clinical situations that required contextual application of integrated knowledge from relevant modules. The stages in OPC and OCR are of increasing complexity to align to expected students' clinical competency as they progress to more senior semesters. This prevented gameplay fatigue as VO was used over the semesters to achieve different learning outcomes. Numerous feedback opportunities were provided to students based on their decisions to allow individualized learning to take place. The game-based learning element in VO was achieved through the scoreboard and leader board to enhance students' motivation to perform. Scores were based on the speed and accuracy of students' responses to the questions posed in the simulated scenarios, preparing the students to perform accurately and effectively under time pressure in a realistic optometric environment. Learning analytics was generated in VO's backend office based on students' responses, offering real-time data on distinctive and observable learners' behavior to monitor students' engagement and learning progress. The backend office allowed versatility to add, edit, and delete scenarios for different intended learning outcomes. Likert Scale was used to measure students' learning experience with VO for OPT Year 2 and 3 students. The survey results highlighted the learning benefits of implementing VO in the different modules, such as enhancing recall and reinforcement of clinical knowledge for contextual application to develop higher-order thinking skills, increasing efficiency in clinical decision-making, facilitating learning through immediate feedback and second attempts, providing exposure to common and significant ocular conditions, and training effective communication skills. The results showed that VO has been useful in reinforcing optometry students' learning and supporting the development of higher-order thinking, increasing efficiency in clinical decision-making, and allowing students to learn from their mistakes with immediate feedback and second attempts. VO also exposed the students to diverse ocular conditions through simulated real-world clinical scenarios, which may otherwise not be encountered in NPOC, and promoted effective communication skills.

Keywords : authentic learning, game-based learning, scenario-based learning, simulated clinical scenarios
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