A Study to Investigate the Efficacy of a Novel Interactive Web-Based Virtual Clinical Scenario System (Virtual People Factory) in Medical Education.

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Introduction
In recent years, there have been numerous innovations and developments with web-based virtual patient (VP) simulations. Despite improvements to these learning tools, VP simulations are still limited by a labor intensive and highly technical development process, lack of a common platform, and an inability to mimic human-to-human conversational fluidity.

A team of developers at the University of Florida has built a software platform (Virtual People Factory, VPF) that implements a uniquely designed conversational technology (Human-centered Distributed Conversational Modeling, HDCM) that addresses the fore mentioned issues. Using this software, we have created a web-based interactive clinical scenario that enlists users for rapid and robust script development.

The use of the VPF program is a beneficial learning tool for preclinical medical students to improve their method for obtaining the most thorough history and physical examination. Our goal is to demonstrate that an encounter with the VPF software will be found to have an educational value and increase medical student preparedness for actual standardized patient encounter.

Methods
The first phase was to create a web-based script and graphical user interface to simulate a patient encounter using the VPF software. A dialogue of possible questions and answers encountered during a history and physical were established for a patient presenting with neurological symptoms. The script was beta tested on ten first year medical students with no previous knowledge or usage of such virtual software. The beta testing allowed the user to identify script errors that were quickly corrected by the editors. The user generated revisions and additional triggers enlarged the scope of relevant questions and helped create a seamless patient interaction.

The next phase was to deploy the web-based VP simulation to our target subjects. Forty-six second year medical students at Georgia Campus - Philadelphia College of Osteopathic Medicine (GA-PCOM) used VPF to interact with a VP complaining of a suspicious headache, general malaise, fever, and nuchal rigidity. Following a brief online tutorial, students were directed to the VPF via a web link where they accessed the clinical vignette. Students were encouraged to obtain an H&P, request lab results and other diagnostic tests, and ask any other reasonable questions.

Upon completion users received performance feedback and completed a survey regarding the educational value of the application.

Results: Analysis
Of the students in the test group:
• 63.27% Found educational value in the VPF encounter (rating = 3)
• 71.43% Found the system to be easy to use (rating = 3)
• 26.53% Found the virtual patient to simulate a real-life interaction (rating > 3)
• 79.59% Found the program to be beneficial in their preparation for live standardized patient encounters (rating ≥ 3)
• 91.84% Would like to have the virtual patient technology available for future training purposes (rating ≥ 3)
(Rating scale of 1-5 was used in the survey).

Conclusions
Implementation of a user-friendly virtual patient encounter was shown to be educationally valuable and to complement student-patient interaction. VPF provides an alternative for students to learn history-taking and physical examination skills. Immediate and objective performance feedback from the system provides students the opportunity to improve their performance in conducting a patient interview and familiarize themselves with the H&P process. The interaction allows the user to identify any problems with recognizing classic signs and symptoms of specific diagnoses. VPF allows students to refine their communication skills before interacting with a standardized or clinical patients.

Future testing of the VPF can be targeted at monitoring the academic performance of students that use the VPF tool prior to a live SP encounter. Future clinical scenarios will have a more robust database of questions and answers by including a wider range of beta testers for script validity and editing. These steps aim to improve the correlation with real-life interaction.

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