

USC Standard Patient



Overview

Funded by the Defense Medical Research Development Program, USC Standard Patient (USCSP) is an online virtual standardized patient (Virtual SP) learning center and authoring community. The goal is to enable simulated patient interactions that can offer the fidelity of a real patient encounter with objective performance measurement and formative guidance to improve performance. Learning objectives are centered around medical diagnostic skills with most emphasis on interviewing. The USCSP system is capable of natural language interviews (spoken or typed), branching Virtual SP encounters, and diagnostic tests; all utilizing the advanced Inference-RTS assessment engine.

USCSP features the freeware ‘Standard Patient Studio’ that enables medical educators to author new content in short order. Case authoring is guided and is as easy to use as popular tax preparation software programs.

Successes to date:

- Winner of the international 2015 Serious Games and Virtual Environments challenge
- Two IRB-approved randomized controlled efficacy trials completed with excellent results:
 - o +68% case performance gains after 20 minutes of use.
 - o Performance verified by independent analysis.
 - o The best natural language understanding AI for a medical interview in the world, 92% recognition w/ 96% accuracy rate.
 - o The most advanced automatic medical performance assessment system ever created, accurate within 5%.
- The first comprehensive Virtual SP authoring system.
 - o A reduction of virtual human patient authoring time from 6 months to less than 1 day.
 - o No coding necessary. The author just needs to provide ideas, medical knowledge and text.
 - o Open Source Content
- No special hardware. No installation required.
- Emotionally expressive virtual human patients.

Work in Progress

- Amazon cloud-based – no need for DIACAP and Certificates of Networkiness.
- 48 patient avatars of varying ages (7-77) and ethnicities as well as gravid, heavy, thin & military uniform variants.
- Two large independent research studies starting.
- Research study console and analytics.
- Public academic and commercial transition prep.
- Research collaborations with civilian institutions.
- Surface Warfare Medical Institute is adopting USCSP and is creating content to train Independent Duty Corpsmen.

Future Work & Capabilities (if funded)

- High Fidelity Virtual Physical Examination.
- Expansion of cases to sick call, independent duty corpsman, medic and other operational environments.
- Conversational, biologically active virtual patient characters within Virtual Reality and Game-based environments; especially tactical simulations.
- Autonomously interactive manikins and medical androids
- Patient safety and health improvement applications.
- Communications training & psychological interventions.
- Persistent assessment system for competency milestones
- Adaptive competency management.

Implications

Now that a functional Virtual SP is feasible, standardized patient encounters are now repeatable at will and as often as necessary until the learner can achieve mastery; all while avoiding the expense and logistics of paid human actors.

The concrete and objective performance measurements free educators from checklist and video review systems. Assessment is automatic and more than 95% accurate. The combination of repeatable encounters and automatic assessment has the potential to greatly reduce the cost and effort of clinical training.

USCSP capabilities focus on training that accounts for the vast majority of military health system encounters, including major causes of indemnity & patient safety lapses. In fact, inadequate diagnostic interview & physical examination are the #1 & #2 sources of indemnity payouts in the US.¹

USC Standard Patient feature demonstrations may be requested by contacting this email: talbot@ict.usc.edu.

Award #W911NF-04-D-0005-0039. USC Institute for Creative Technologies: A University of Southern California / Army Research Laboratory University Affiliated Research Center (UARC). No DoD endorsement or editorial implied.
¹PIAA Data Sharing Project DSP2009-2013; 2014 Edition.