1025

Physical Manifestations of Virtual Patients

Gregory Welch, PhD,[3] Diego Rivera-Gutierrez, BSc,[5] Peter Lincoln, MS,[1] Mary Whitton, MS,[1] Juan Cendan, MD,[4] David Chesnutt, MD,[2] Henry Fuchs, PhD,[1] Benjamin Lok, PhD,[5] and Richard Skarbez, MS[1]

[1]Computer Science, The University of North Carolina at Chapel Hill, Chapel Hill, NC, USA; [2]Ophthalmology, The University of North Carolina at Chapel Hill, Chapel Hill, NC, USA; [3]Institute for Simulation and Training and Computer Science, University of Central Florida, College of Medicine, Orlando, FL, USA; [4]Medical Education and Surgery, University of Central Florida, College of Medicine, Orlando, FL, USA; [5]Computer and Information Science & Engineering, University of Florida, Gainesville, FL, USA

INTRODUCTION/BACKGROUND: 2D virtual humans have been used to train and assess humans in interpersonal scenarios for applications including medical interviews and examinations.[1] However, some examinations require physical interactions with the patient and spatial awareness that are difficult to simulate using flat displays. Human Patient Simulators afford physical interactions, spatial awareness, and simulated physiological behaviors, but otherwise have static appearance-based interpersonal behavior.

DESCRIPTION: We combine computer-controlled conversational virtual patient technology with corresponding facial animation digitally projected onto the animatronic (physical) human head of a life-sized human mannequin[2] to achieve a conversational physical-virtual patient (PVP) for training and assessment. The PVP body and animated head is naturally seen by multiple viewers, allowing for scenarios where an instructor and multiple students are involved in the training. A computer-controlled actuator moves the head appropriately during conversation, providing natural gaze awareness and eye contact with nearby humans. We created an interactive training experience for medical students to conduct ophthalmic exams on a PVP. We performed a formative evaluation of the system (n=8) using medical educators and students previously trained in such exams. Each participant was introduced to the system, performed a patient interview and exam, responded to online questions addressing usability and co-presence, and participated in a guided discussion with the investigator(s). Exams lasted about 25 minutes, and discussions about 30 minutes. Sessions were video recorded to facilitate analysis. Participants received $15 in compensation for their participation. The participants expressed positive and negative comments about the paradigm, prototype, and potential utility in medical training. The PVP was seen as having an advantage over standardized patients because it can present pathologies that a healthy person cannot, e.g. restricted motion of one eye. All participants reported that the physical symptoms were clearly visible in the PVP's behaviors and responses. All participants felt the funduscopic exam was unrealistically easy and were concerned about the lack of realism, which is consistent with previous findings.[3] Some participants, especially females, complained about poor speech recognition. Most participants were positive about the paradigm. One reported "We don't have to move around a lot for this type of thing, but. . .I would think it will be a huge thing to learn how to move around an exam room with a patient. . .when you are for the first time seeing patients in real life, biggest thing that I thought about was I don't want to embarrass myself if I don't know how to move around" (P2).

CONCLUSION: Recently we recently updated our prototype to address issues identified during our formative study. We now use rear-projection imagery to avoid shadows. We implemented a "Wizard of Oz" capability (an experimenter interprets the users' speech and specifies the PVP's responses) to eliminate confounding factors from the speech recognition. We switched to a new animatronic control unit, resulting in smoother and quieter PVP head movement. We are running a new study comparing this new PVP to an equivalent patient interview presented in conventional flat displays.

DISCLOSURES: Henry Fuchs: *Stockholder/Owner/Partner:* InnerOptic Technology, Inc. Benjamin Lok: *Grants:* National Institute of Health grant. *Stockholder/Owner/Partner:* Shadow Learning, Inc.

REFERENCES

1. Johnsen K, Dickerson R, Raij A, Lok B, Jackson J, Shin M, Hernandez J, Stevens A, and Lind D: Experiences in Using Immersive Virtual Characters to Educate Medical Communication Skills. Proceedings of the 2005 IEEE Conference 2005 on Virtual Reality (VR '05): 179–186.
2. Lincoln P, Welch G, Nashel A, Ilie A, State A, and Fuchs F: Animatronic Shader Lamps Avatars. Proceedings of the 2009 8th IEEE International Symposium on Mixed and Augmented Reality: 27–33.
3. Kotranza A, Johnsen K, Cendan J, Miller B, Lind D, and Lok B: Virtual multi-tools for hand and tool-based interaction with life-size virtual human agents. Proceedings of 2009 IEEE Symposium on 3D User Interfaces: 23–30.

1026

Simulation-based Patient Safety Initiative (SBPSI): Improving Patient Safety by Team Approach and Interprofessional Learning

Rohit Garkoti, MBBS, MD, FRCA, FCARCSI,[1] and Makani Purva[2]

[1]Anaesthesia, Hull and East Yorkshire Hospitals NHS Trust, Hull, GBR; [2]Medical Education, Anaesthetics, Hull and East Yorkshire Hospitals NHS Trust, Hull, East Yorkshire, GBR

INTRODUCTION/BACKGROUND: The Clinical Skills Facility's at Hull and East Yorkshire Hospitals NHS Trust will deliver training to clinical teams based both in wards and theatres on human factors and its impact on patient safety by its Simulation-based Patient Safety Initiative (SBPSI). Under this programme, we hope to run half-day training sessions based mainly on Serious Untoward Incidents (SUI's) or Never Events, which will focus on the five skills of Teamwork, Communication, Leadership, Decision-Making and Situational awareness. This programme will provide integration of clinical skills with human factors to enhance learning through cognitive, psychomotor and affective learning domains. However, integrating high-fidelity patient simulation (HFPS) to interactive patient scenarios will require focused use of resources (financial, human and technical), teamwork and planning. This abstract describes the benefits, processes and challenges of initiating HFPS across the trust to all teams at Hull and East Yorkshire Hospitals NHS Trust.

DESCRIPTION: Learning scenarios will be designed from SUI's, breaches in early warning scores, patient complaints, coroner's reports and past experience to supplement actual clinical experiences. The training will involve simulated scenarios tailored to a clinical situation on high-fidelity SimMan 3G. The training will also focus on team building and SBARD (Situation, Background, Assessment, Recommendation, Decision) mode of communication with a take home message to put the learning into practice in actual clinical situations. An after action review (AAR) method of structured de-briefing would be used for analyzing what happened, why it happened, and how it can be done better, by the participants/team. The AAR brainstorming builds consensus and is distinct from simple debriefing in that it begins with a clear comparison of intended vs. actual results achieved. A facilitator provides explanatory feedback and will help steer participants to examine their performance through guided self-evaluation where they will be encouraged to identify problems and develop approaches to correct them. It creates an atmosphere of trust and openness and emphasizes on learning and development rather than performance evaluation.

CONCLUSION: Very few health care systems have recognized that simulation training is an integral part of patient safety improvement and can change both knowledge and culture of safety in the organization. Besides, lack of knowledge of roles and scope of practice and stereotypical views within teams has been identified as stumbling blocks, which limit effective teamwork. SBPSI will be specifically important in improving teamwork and communication within a team during urgencies and emergencies as overall understanding of patient safety improves. It will improve emotional intelligence of the team and will help develop decision-making, prioritization, time management and conflict management skills of team members in a complex environment. SBPSI will increase both self-learning ability and self-confidence as learners get an opportunity to interact in a safe and non-threatening environment. The advantages of SBPSI also include learner or team focused pedagogy in context of resource scarcity and patient safety. This continuing professional development (CPD) and learning innovation has an overall aim of improving quality of patient care amidst competing demands on nursing time and efficiency. This model will probably be integrated to departments of clinical audit and risk management. The programme will use simulation as a diagnostic, training and intervention tactic to identify best practice to improve patient care and reduce both cost and medical errors. Long-term assessment of impact of SBPSI strategies could be identified from hospital outcomes, learner feedback and decrease in number of SUI's.

DISCLOSURES: None