Frameless

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Use of AR to Bring Medical Simulation to Life

Zhenhua Yu
3D Digital Design, Rochester Insitute of Technology

Richard L. Doolittle
College of Health Sciences and Technology Rochester Insitute of Technology

Caroline J. Easton
College of Health Sciences and Technology Rochester Insitute of Technology

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Zhenhua Yu*
3D Digital Design, College of Art and Design
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College of Health Sciences and Technology
Rochester Insitute of Technology

MEDICAL SIMULATION TRAINING

Use of simulation facilities and equipment in medical training has become the fabric of curricula across nearly all professions, most notably medical school, nursing, and related medical sciences programs. The gold standard for simulators is SimMan3G, Laerdal Inc., which offers a static electronic mannequin that affords the opportunity to create disease states, signs/symptoms, and real physiological/vital sign data complemented by voice interactions between faculty (within the control room) and student. All sessions are videotaped and, through a 15-30 minute debriefing, students exchange thoughts and impressions with faculty and engage in a deep reflective learning experience. The other option for medical simulation training is the use of "standardized patients"; people who serve as mock patients to mimic signs and symptoms but, clearly, cannot mimic real disease states or physiological changes. To bridge the gap between static mannequin and real human as patient, we have begun work on the utilization of AR to bring our SimMan3G mannequin to life.

PLAN OF APPROACH

To start, we are using Live Link Face software on an iPad within the control room to capture facial expressions and voice of the AR "patient" (faculty member). That information, in real time, is sent to a PC laptop and is interfaced with an avatar created in Unreal. The avatar is then sent to a second iPad, which is mounted over the head of the SimMan3G mannequin in the simulation lab. This way, during a training exercise with students, there is head movement, eye contact, and a full range of facial expressions that would more realistically represent a student's interaction with a real patient. In this

*Corresponding Author, Zhenhua Yu
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way, the mannequin offers all that is needed for effective training i.e., a capacity to represent the full range of disease entities and all associated organ system changes (heart rate, respiratory rate, bowel sounds, etc.) along with the ability to fully connect and engage with the patient through eye contact and facial expression, so critical in establishing trust and overall patient rapport. Pilot studies have begun with students in the Physician Assistant program that will include experimental groups (those utilizing the AR interface) and control groups (traditional simulation).

CONCLUSION

Presently at RIT, simulation exercises are conducted with students in the Physician Assistant, Clinical Psychology Internship, and Nutrition/Dietetics programs with plans to expand opportunities to all CHST majors. Medical simulation is an integral part of many healthcare training programs to deepen the learning experience and to most efficiently and effectively prepare students for future patient encounters.

Keywords—*Simulation, training, augmented reality, avatar*

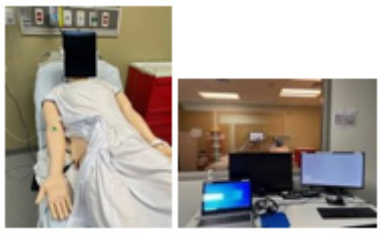

Fig. 1. iPad positioned over mannequin (left) for interface with avatar controlled and transmitted from control room (right)

Fig. 2. Live Link Face real-time facial/eye movements transmitted from iPhone to PC/Unreal software to then transfer, in real-time, to mannequin iPad

REFERENCE

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