SimTools
A new paradigm in high fidelity simulation

Cyle Sprick¹, Prof. Harry Owen², Assoc. Prof. K J Reynolds¹

¹School of Informatics and Engineering. Flinders University, Australia
²School of Medicine. Flinders University, Australia

Background

Virtually any clinical instrument can be simulated in this way.

• Point of Care Testing Devices (Hematocrit, Troponin T, Blood Gas)
• Stethoscope
• Glucometer/Thermometer

Advanced SimTools devices include:
• More complex devices (like the ECG monitor) are implemented in
• Simple static manikins get an “instant upgrade”

Which patient would you rather treat?

Hi-tech manikins:
• Expensive
• Require extensive training
• Typically stationary
• Have limited interaction
• Allow invasive procedures

Standardized Patients:
• Paid hourly (if at all)
• Require minimal training
• Highly mobile & versatile
• Excel at interaction
• Often provide an unrealistic physical exam
• Resistant to invasive procedures

SimTools enhances manikin and standardized patient simulations.
• Simple static manikins get an “instant upgrade”
• Standardized patients now provide a realistic physical exam

Devices

SimTools bridges the gap between these two extremes by bringing the smarts out of the manikin, and putting them into the tools of the trade.
SimTools provides a set of diagnostic tools that can be used on SPs or static manikins and still provide all of the simulated information to the clinician as it is normally gathered.
The basic set of SimTools devices includes:
• Stethoscope
• BP Cuff
• Glucometer/Thermometer
• Pulse Oximeter
• ECG Monitor/Defibrillator
• Pulse bands
• Coaching intercom/Vocal speaker

Information is presented to the clinician through the normal device interface.
• Simple devices have a generic user interface.
• More complex devices (like the ECG monitor) are implemented in software on a touch screen display, and model a specific device for more realistic training.
• Device appearance and operation can be changed to simulate any model.
Advanced SimTools devices include:
• Point Of View cameras
• Point of Care Testing Devices (Hematocrit, Troponin T, Blood Gas)
• Suction Catheter
• ETCO₂ – Colour Change Indicator
• Fetal Heart Monitor

Virtually any clinical instrument can be simulated in this way.

Facilitator Controller

The central controller is a small PC (Pocket PC, Ultra Mobile PC, Tablet) with a GUI for the facilitator to control the patient parameters. These parameters are delivered wirelessly to the individual devices. The state of the virtual patient can be updated manually, or through various levels of scripting and trending.

Windows XP version

Windows Mobile version

Results

The result of this project is a basic set of prototype SimTools devices, and Central Controller software. These tools demonstrate the functionality of the SimTools concept. Evaluation of this system by a wide variety of students and educators is currently underway. Preliminary results are very positive.

Patient parameters are controlled in real-time by the facilitator, and are delivered wirelessly to the clinicians via their collection of diagnostic tools.

Conclusion

SimTools provides the framework to simulate any type of clinical device with outputs including sound, video, numerical values, colours etc.

The augmented reality arising from use of SimTools combines the high fidelity of expensive manikins with the patient interaction and non-verbal cues realised using standardized patients at much lower cost.