Integrating electronic patient records into a multi-media clinic-based simulation center using a PC blade platform: A foundation for a new pedagogy in dentistry

The University of Texas Health Science Center at Houston – Dental Branch, Houston, TX

Abstract

Simulation has been used for many years in dental education, but the educational context is typically a laboratory divorced from the clinical setting, which impairs the transfer of learning. Here we report on a true simulation clinic with multimedia communication from a central teaching station. Each of the 43 fully-functioning student operatories includes a thin-client networked computer with access to an Electronic Patient Record (EPR).

Introduction

Clinical simulation utilizing a realistic mannequin has been an educational practice in dental education for many years, but simulation facilities are usually structured more as laboratories than patient care areas. Years of studies have shown that the closer a training task is to the eventual real-world task, the more likely students are to transfer their skills from the training space to the real world. When students attempt to transfer their pre-clinical skills to the clinic, they are confronted by a host of new issues with real patients, such as medical histories, infection control, living tissue, ergonomics, dental radiographs, and patient management. Strong arguments have been advanced that simulator-based resources should be available alongside the clinical workplace, so that learning can take place in context. The University of Texas Dental Branch at Houston has developed a clinic-based simulation center that combines the use of an EPR and picture archive and communications system (PACS). In addition, the school selected a technology platform for instruction that was contemporary, manageable, and well suited to a clinical education (“student”) environment.

Method

In this research we report on the design and usage of our Clinical Simulation and Learning Center (CSLC), created by reassigning some of the school’s existing clinical space into a single large teaching clinic. The central teaching station includes a fully-functional operatory; overhead, intra-oral and document cameras; DVD and VCR players; and computer video output for displaying MS PowerPoint© or internet resources. All lectures are digitally recorded and archived with a Mediasite© lecture capture system, and accessible to students at any time. Each of the 43 fully functional student operatories is outfitted with a mannequin/torso with dentoform (artificial jaws and teeth). A multimedia monitor that is centrally controlled from the teaching station is mounted on each dental chair. Each student operatory is also outfitted with a networked computer: a “blade PC” system by ClearCube©, which is a solid state thin-client and Remote Desktop Protocol (RDP) to access a CPU located in a centralized/secure data center. Each PC-blade allows up to 4 thin-client RDP connections, thereby reducing hardware costs. Blade technology also provides important redundancy; if a blade PC fails, the user’s session is seamlessly transferred to another blade without losing data or interrupting service.

Results

From June 2006 to March 2007, 164 lectures and demonstrations totaling approximately 651 hours were scheduled. Approximately 25 hours of video from the CSLC is currently available for review. Seven of the school’s eight clinical departments are now users of the center. In addition to clinical training, the CSLC is used for EPR training, online testing, continuing education, clinical competency & licensure examinations, vendor demonstrations, and evaluating new hardware and software technologies.

Conclusion and Future Developments

The CSLC is gaining momentum as faculty, administration, staff and students discover new applications for it as a test bed and learning center. Future plans include high-stakes assessment, supplemental clinical training, and development of a comprehensive library of virtual patients in the EPR.

References