

Proposal for a Best Practices at the ED-MEDIA 2005 World Conference on Educational Multimedia, Hypermedia and Telecommunications

PICU: A virtual problem-based situated learning environment for medical residents

We developed a problem-based situated learning environment (a Shockwave© application delivered via WebCT) for post-graduate medical residents to circumvent the problems of their frequent inability to participate in structured learning opportunities. The collaborative efforts of experts in instructional design, medical content and media authoring allowed for the creation of an objectives-based prototype module of post-operative cardiac care for multiple cases.

Our results revealed significant subjective improvement ($p < 0.01$) in the understanding of junctional ectopic tachycardia (JET); the interpretation of atrial EKGs; the initial investigation of JET and the stepwise therapeutic management of JET. The learners' overall comfort level with post-operative cardiac patients trended towards increased comfort. They rated the instructional method as easy to use, realistic and much better than text-based learning. We also evaluated learning using a knowledge-based objective short answer questionnaire. The combined evaluation results strongly support the gain in knowledge regarding the causes, diagnosis and treatment of JET.

The application of sound instructional design (the coherence of objectives, strategies and evaluation) was vital in the development of this module. First, given that the existing objectives were focused on problem solving, it was important to create an electronic environment to guide residents through the process of diagnosis, investigation and treatment. Assimilation of information from a textbook does not allow learners the opportunity to practice their problem solving skills in a guided learning environment; they would only be able to "practice" on a patient at the bedside. By allowing learners to construct their problem solving knowledge in an authentic (situated) learning environment, they can better transfer these skills to a real situation. Simulations can also provide immediate feedback to the learner about the appropriateness of their actions given the clinical situation.

This module allows for learning to occur anytime and in any location. Residents can schedule their learning opportunities when they are most receptive to instruction. They have the opportunity to examine a patient at a virtual bedside, formulate a diagnosis, pursue appropriate investigations and implement the necessary treatments without even being physically present in a hospital.

Additional benefits of this program include learner-paced instruction, flexibility to meet different preferred learning styles (e.g. theory review or direct case solving) and rapid access (via a computer in PICU) for review while managing real patients. The ability to update the module with relative ease could become a very important advantage in the era of evidence-based medicine. In comparison to text-based instruction, which remains static, on-line education can be modified based on the most currently available medical evidence. Future developments include SCORM 1.3 compliance as well as multiple cases as part of the virtual environment.