Creating authentic learning environments on the Web:  
On-line case authoring for faculty

Anju Relan, PhD  
Director, Instructional Design and Technology Unit  
School of Medicine, UCLA

Introduction

The purpose of this paper is to discuss the objectives, characteristics and structure of a case authoring tool developed and evaluated in a medical school. The tool tests the interactive potential of the Web in providing effective, authentic learning environments for clinical reasoning. Although it is primarily targeted towards medical students and clinical faculty, the design allows for the generation of problem solving cases in diverse specialties.

Background and Rationale

The Web is presently a significant medium of content delivery in medical schools. The School of Medicine at UCLA is no exception, with a large repertoire of highly interactive, web based applications illustrating concepts, procedures, and problem solving objectives via multimedia or virtual reality presentations, in open ended or program controlled formats. However, this is largely true of the first two years of medical school, with relatively few opportunities for interactive learning during students’ critical clinical experiences in the final two years. This formed an overriding concern for the development of case based learning opportunities. A needs analysis via faculty meetings was undertaken to identify reasons for robust development of web based cases. The following concerns emerged as significant determinants for proceeding with the development:

- It was difficult to “capture” student experiences in clinics spread all over the metropolitan Los Angeles area. While the curriculum specified common problems that students needed to see in clinics, students were unable to reproduce their clinical experiences for assessment and evaluation.

- The chronological split between basic sciences and clinical years necessitated that practice opportunities to integrate the two were critical to hone clinical reasoning skills.

- Inadequate expert feedback to students on site by clinical faculty could be addressed by ensuring that appropriate feedback was made available via the cases.

- Both common and unique cases could be provided in order to standardize the problems students would see.

- Practice for the board exams, which are increasingly incorporating patient simulations for assessment could be effectively provided via the simulated cases.

Although practical considerations cited above provided an adequate rationale for the development of simulated cases, cognitive reasons for supporting the development of the tool overshadowed these. Participating faculty unanimously believed that simulated web based cases offered a powerful scaffolding strategy for the development of clinical reasoning skills (Felciano, et. al, 1994; Friedman, 1995; Jonassen, 1996).
The discussions with faculty centered not only on benefits of case based learning accruing to students, but also on the process of developing a case bank. One objective was to make the process of development transparent to all clinical faculty interested in generating cases, irrespective of their knowledge of web programming. Consequently, an authoring interface for case based learning was proposed, as illustrated in Figure 1.

Insert Figure 1 about here.

Methods

The blueprint of a design for the Web based case authoring tool was generated using storyboards. A modular approach to the selection of cases was envisaged, in order to infuse flexibility to the tool. The structure and components of the tool are exemplified in Figure 2.

Insert Figure 2 about here.

The case author starts by assembling images, text and external links required for a case. Depending upon the nature of the case details, modular components that would accommodate the content are selected. Information about each component is added via prompts. The option to edit as one enters the case information is available. As individual case components are entered, the case is dynamically added to a common case bank. In addition, the student viewing mode is dynamically generated. A sample screen shot of the case authoring interface is presented in Figure 3.

Insert Figure 3 about here.

Discussion

An important mission of medical schools is to foment a deeper, more meaningful connection between the basic sciences and clinical reasoning skills, which are taught at different chronological points in the traditional 4-year curriculum. The separation of basic and clinical sciences has been shown to result in inability to access critical knowledge components during the clinical reasoning process, resulting in “inert knowledge” structures. This phenomenon has led medical educators to pursue the development of case simulations to scaffold the processes that experts use in the complex domain of diagnostic reasoning.

The authoring tool described in this paper is one such attempt to improve diagnostic reasoning skills among novice clinicians. The design of the tool, however, is founded upon principles of learning prevalent in problem solving, and can be modified for diverse learning environments. As the case bank develops, the efficacy of this environment can begin to be evaluated.

Bibliography


Figure 1. Structure of the Case Authoring Tool.

Figure 2. Components of the Case Authoring Tool.
Figure 3. An example of case authoring interface for Patient History.
Anju Relan is an Assistant Professor of Medicine, and the Director of Instructional Design and Technology Unit at the School of Medicine, University of California, Los Angeles. She earned a degree in Educational Technology from the University of Minnesota in 1991. She assists the medical school faculty in the design and development of instructional web sites related to the 4-year undergraduate curriculum. Her research interests include web based multimedia in education, metacognitive strategies in case based education and the efficacy of handheld devices in the practice of medicine.

Anju Relan, PhD
Director, Instructional Design and Technology Unit
60-051 Center for Health Sciences
School of Medicine, UCLA
Los Angeles, CA 90095
Email: arelan@ucla.edu
Phone: 310-206-0572
Fax: 310-267-0320