Chapter 17
Collaborative Online Multimedia Problem-Based Learning Simulations (COMPS)

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ABSTRACT

This chapter describes the development, implementation and evaluation of a Collaborative Online Multimedia Problem-based Learning Simulation (COMPS) instructional model designed to help students and practitioners in the health professions develop clinical reasoning and diagnostic skills. Both students and instructors are searching for effective learning platforms and pedagogical models that enable them to collaborate, study, and work at a distance. In order to address this need, COMPS was developed to support a case-based tutorial model where learners can work together online to solve authentic problems no matter where they are located. The model aims to bring together the strongest features of simulations, namely engagement and immersiveness, with one of the strongest features of face-to-face learning—social interaction. The COMPS model combines these strengths to create a new learning system for health education and examines how students learn in this online environment. This chapter also discusses the next steps in our research and development, investigating the use of a COMPS model on a dedicated platform.

INTRODUCTION

Changes in the health care system have transformed the delivery of medical education. Traditional venues for practice and experience have disappeared due to a higher ratio of acutely ill patients and shorter hospital stays (Issenberg, Mcgaghie, Petrusa, Gordon, & Scalese, 2005). There are now fewer opportunities for face-to-face encounters with patients, and the students may not see the range of diseases and conditions they saw in the past. Consequently, medical students find it increasingly

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difficult to practice and gain experience in hospital settings. This trend has converged with the growth of distance education (Cook & Dupras, 2004), creating a need to standardize learning and teaching experience for medical students no matter where they live or study.

Our research study involved transferring a well-known medical education approach, problem-based learning (PBL), to an online environment. Our goal was to push the boundaries of PBL and transform it into a kind of simulation that would allow medical students to practice their skills together in a risk-free setting. In our pilot study we created and tested an online case-based tutorial in which learners could work together in a distributed environment to address authentic problems and situations, a process thought to be essential for professional development (Albanese, 1993). Our design included the following key features:

a repository of narrative-based case studies created by the instructors and accessible by the students; (2) asynchronous and synchronous tools where students can collaborate with one another; (3) a repository of multimedia resources that students can access as they work through a case study; (4) an archive of group sessions that can be reviewed at a later date; (5) a database that includes information on the client's present illness and medical history, the results of lab tests performed on the client, and medical management information; and (6) lab results and medical records such as x-rays, MRI, and nuclear imaging.

This chapter describes the various design elements of our prototype, as well as the implementation and evaluation of the online tutorial conducted in this model. Our evaluation examined the ability of an online environment to support a collaborative problem-solving approach in health education in two ways: (1) by asking the students to assess the tutorial, and (2) through an analysis of the level of critical thinking that took place. Finally we discuss how this research may inform the development and testing of *COMPSoft*, our new online dedicated *COMPS* platform.

BACKGROUND

Problem-Based Learning in Medical Education

For more than three decades, problem-based learning (PBL) has had a major impact on thinking and practice in medical education (Colliver, 2000). PBL is defined as a method of instruction that uses patient problems as a context for developing students' problem-solving skills, and gaining knowledge about basic and clinical sciences (Albanese, 1993). Case studies provide the structure for problem-based learning and offer an ideal practice environment for social negotiation and reflection – two of the activities that promote high-quality thinking (Orrill, 2002).

PBL's student-centred approach is thought to develop competencies in reasoning critically, adapting to change, dealing with problems, developing self-directed learning skills (Barrows, 1984), adapting a holistic approach, appreciating other points of view, and self-assessment (Kamin, Deterding, Wilson, Armacost, & Breedon, 1999). PBL also seems to be a challenging, motivating, and enjoyable way to learn (Kaufman & Mann, 1997). Lastly, when compared to more traditional methods, PBL appears to lead to equivalent levels of performance on professional licensing exams, which tend to emphasize knowledge acquisition, application, and analysis (Mann & Kaufman, 1999).

PBL is usually carried out in groups of six to eight students with a faculty tutor who offers appropriate feedback and guidance (Wilkerson & Feletti, 1989). The facilitator reveals the case study to the students in stages; at each stage, students discuss the issues of the case, what they already know, and what they need to find out in order to resolve the case. The students then research the learning issues identified in the process of case study and present this new information to the group in order to move the case forward. More specifically, the PBL process uses the following steps (Barrows, 1985):