

## Chapter 9

# Knowledge Management of Medical Information Resources and Tools

**Misa Mi**

*Oakland University William Beaumont School of Medicine, USA*

**Jill E. Stefaniak**

*Old Dominion University, USA*

### **ABSTRACT**

*This case demonstrates how problem-based learning (PBL) was used as a teaching method to help medical students integrate their knowledge of basic sciences with a clinical application at a medical school. PBL promotes self-directed, problem-solving, and lifelong learning. In the PBL context, students sought out a variety of resources to tackle their learning issues and help them arrive at a solution to a patient problem. The existing strategy for curating resources was not aligned with the type of thinking and activities in the PBL process. Therefore, a knowledge management system was developed to provide an online knowledge base of medical information resources and tools easily accessible at the point of students' needs.*

### **ORGANIZATION BACKGROUND**

The Longdale University College of Medicine (LUCOM) is located in south Toledo, a city in northwest of Ohio. It is an accredited M.D.-granting medical school that provides four-year general professional education of physicians and prepares medical students for supervised practice during residency training. The medical school has an annual enrollment of approximately 700 students. Once admitted to the study of medicine, medical students start two years of classroom-based coursework to learn scientific principles and acquire the foundation of formal knowledge of biomedical sciences on which clinical practice is based.

Foundational courses are followed by two years of clinical practice (clerkship or clinical education) that are organized into specialty blocks called clerkships. During the third year, students rotate through

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a series of required clerkships of core specialties such as family medicine, internal medicine, pediatrics, surgery, obstetrics and gynecology (Cooke, Irby, & O'Brien, 2010). The fourth year is primarily electives (rotations) that are designed to accommodate the diverse educational needs of students and to help them with career selection. In the fourth year, students have more freedom to choose electives that interest them. The electives provide them with the opportunity to further develop their medical knowledge, skills, and attitudes and prepare them for graduate medical education, residency in a variety of specialties. During their fourth year, students are also busy in making arrangements for interviews at multiple residency programs in their chosen specialty.

At LUCOM, the medical curriculum was presented in a discipline-based structure. The first-year curriculum comprised courses (organized as separate blocks) focused on normal structure, functions, and processes of the body in disciplines such as anatomy, physiology, microbiology, histology, and biochemistry; during the second year, students learn pathophysiology and disease management. The curricular structure and content of such a model reveals a lack of coordination or reference to clinical relevance. As a result, students may fail to construct conceptual understanding and to understand and appreciate the interconnectedness and integration of knowledge. When students arrive in the clinical setting, they may be unable to access and apply all the knowledge to patient care (Cooke et al., 2010).

The medical curriculum incorporated PBL and case-based discussion into a longitudinal course—*Clinical Decision Making* (I & II) during the preclinical years (first and second years). The PBL method addresses domains of performance or skills that are ignored in the discipline-based curriculum. These performance and skills include synthesis, integration, evaluation of information, as well as interviewing, communication, and physical exam skills. One of the Liaison Committee on Medical Education (LCME) standards stipulates that a medical education program provide instructional opportunities for active learning and independent study to foster the skills necessary for lifelong learning (Liaison Committee on Medical Education, 2013). The PBL experience in the curriculum infused traditional instructor-led didactic lectures with active learning opportunities and created the “lens of situated learning” or a clinical context for preclinical education that trained students for problem-solving, critical thinking, self-directed, and lifelong learning. The course provided students with an opportunity for integrated learning--integrating formal scientific knowledge with clinical medicine through PBL group discussion on unique patient cases. One objective of the course was to develop students' ability to apply scientific knowledge to solve clinical problems and to build students' basic skills related to the process of lifelong learning, specifically the ability to identify learning needs and locate evidence to resolve learning issues and inform clinical decisions about a patient problem.

## **SETTING THE STAGE**

The PBL process in the course required first-year medical students in a small group of 10-12 students to meet for 2 hours weekly to work on a simulated patient case over a course of three weeks. At group discussion sessions, students in each group engaged in a series of learning activities such as patient history taking, physical examination, generating hypotheses, ordering laboratory tests, and identifying learning issues related to the patient case. Students were expected to spend time out of class in independent and self-directed learning to tackle the learning issues by searching and consulting various information resources. When they returned to their PBL group discussion, they shared their knowledge and findings pertaining to the identified learning issues. The process of information sharing, collaborative learning,

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