METHODS AND LOGIC IN MEDICINE:  
A NEW COURSE ON ANALYTICAL THINKING FOR MEDICAL STUDENTS

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Purpose: We developed and implemented a course called “Methods and Logic in Medicine” to 1) teach the method by which medical knowledge is derived from biomedical research, 2) develop the ability to critically evaluate the medical literature and 3) have students design a theoretical study in preparation for their required scholarly project.

Methods: The course was divided into two sections. The first focused on developing critical thinking skills in the context of biomedical literature through weekly small group seminars (8-10 students, 2 faculty, 1 hour long). The course design team selected clinical articles that linked with the basic science material in concurrently running courses. The technical design team developed a portfolio-style website to augment student and facilitator interaction. Each week, the students evaluated an article, individually posted answers to analytical questions on a small group website, and asynchronously discussed those answers with their small group peers and faculty on line, followed by the small group face-to-face discussion. In the second section, each student chose a topic of interest, posted three articles and a draft of their literature review on the small group website for peer evaluation, following which the talk was revised and then presented live in the small group. Next, students designed and presented in small group and in writing a study to investigate an important medical hypothesis based on their prior literature review. Grading was based on participation in the web site and in small group.

Results: Based on repeated meetings with the student curricular representatives and informal feedback, students and faculty enjoyed the course. Surprisingly quickly, the students and faculty realized the value and effectiveness of a strongly individualized scientific exploration of medicine in the first year of medical school. Ultimately, almost all came to appreciate the value of such a course in fostering the development of critical thinking skills. The web-based component enforced student preparation for small group sessions, enhanced the peer feedback in the context of active group learning, and provided a convenient record of student thinking and performance. The course directors obtained feedback from faculty and students through an open forum held at the end of the course. Strengths of the course were felt to be tying the articles in section one to the concurrent basic science curriculum, the presentations by the students, mentoring by the faculty, and the interactive web site. The students recommended adding face-to-face meetings. We are currently conducting more formal on-line evaluation.

Conclusions: “Methods and Logic in Medicine” is an innovative educational environment to develop analytic thinking in future physicians and to provide students with the ability to critically evaluate the biomedical literature. Teamwork rather than competition was emphasized throughout the course. The small group discussion format and web-based component allowed us to enhance student preparation, active group learning, and participation in the peer review process. The use of online collaborative learning portfolios created an electronic, portable portfolio of each student’s scholarly work and achievements and enabled a reflective, mentored learning experience.

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