Learning About Screening Using an Online or Live Lecture

Does It Matter?
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OBJECTIVE: To determine the impact of an online lecture versus a live lecture on screening given to medical students who are participating in an outpatient clerkship.

DESIGN: Prospective, randomized, controlled study.

PARTICIPANTS AND SETTING: Ninety-five senior medical students in a primary care medicine clerkship based at university and distant clinic sites.

INTERVENTION AND MEASUREMENTS: Forty-eight medical students were randomized to the live lecture on screening (live lecture group), and forty-seven medical students were randomized to the online lecture on screening (online lecture group). Outcome measures included students' knowledge, use of time, and satisfaction with the lecture experience.

RESULTS: Compared to students in the live lecture group, students in the online lecture group demonstrated equal post-intervention knowledge of screening (P = .91) and expended 50 minutes less time to complete the lecture. Online lecture students who used the audio feed of the lecture were equally satisfied with the lecture as the live lecture students. Without the audio feed, online lecture students were less satisfied.

CONCLUSIONS: An online lecture on screening is a feasible, efficient, and effective method to teach students on outpatient clerkships about principles of screening.

KEY WORDS: medical education; students; lecture; education measurement; computer-assisted instruction.


Without question, the landscape of medical education is changing. New discoveries have led to a plethora of information resources that challenge all learners in medicine. Technological advancement keeps pace with the rate of change of information by providing rapid and efficient access to information. Meanwhile, trainees in medicine travel farther from the inpatient medical center to receive instruction.1 Students in medicine, nursing, pharmacology, and other disciplines are required to complete community rotations to achieve learning goals in the new context of medical care delivery, the ambulatory setting.

Given these trends, many medical educators are considering the use of computer-aided instruction (CAI) as a means of delivering curricular content to students. Uses range from the simple, such as the display of syllabus notes on web pages, to the complex, such as the use of multimedia interactive learning modules.2-4 Enthusiasm for CAI depends on whether implementation of the new technology is feasible and whether its use is associated with gains in the efficiency of delivering course material and gains in the learning of students.

Many of our medical students complete rotations at distant sites and return to campus to attend required lectures. For these students, we asked the question whether we could deliver medical curricular content, specifically a core lecture, to our students on a clerkship at distant sites through the Internet using a relatively simple CAI tool.

METHODS

Objective

We hypothesized that medical students could expend less time but demonstrate equal satisfaction and knowledge in participating in an online versus a traditional classroom lecture on screening.

Setting

We conducted a prospective randomized controlled trial that involved senior medical students at Vanderbilt University who were participating in the Primary Care Medicine Core Clerkship. Students complete the clerkship by working with primary care physicians either at the Vanderbilt Medical Center or at distant practice sites in the region or in other states. Students are required to complete a core set of lectures on the Vanderbilt campus to gain credit for the course. If they are unable to attend the lectures during the clerkship, they attend makeup lectures at another time during the year.

Participant Eligibility and Enrollment

Approval for the study was obtained from the Dean of the Vanderbilt University School of Medicine and the Institutional Review Board. All senior medical students at Vanderbilt were eligible for the study. Enrollment occurred during each monthly orientation to the 4-week Primary Care Clerkship during the academic year from July 1999 to May 2000.
Informed Consent and Randomization

Students signed a consent form that specified that 1) participation and performance in the study were confidential and had no bearing on the final grade, 2) the clerkship co-directors and clinic preceptors were blinded to student participation and student group assignment in the study, and 3) students must learn the material of the lecture as part of their clerkship requirement. Block randomization was accomplished by randomizing a new group of students into 2 groups during orientation to each 4-week block. Students chose an envelope that included the group assignment and the student identification number for tracking results. To maintain randomization, students in the live lecture group were not given access to the online lecture until they had completed the live lecture. In addition, an assistant blinded to the study protocol and outcomes checked the list of participants in the live lectures against a list of students randomized to the online lecture. There were no instances of participation in the live lecture by a student randomized to the online lecture.

Intervention

The control group (n = 48) participated in a live lecture on screening; the intervention group (n = 47) participated in an online lecture on screening. The same faculty member who has given the lecture in the clerkship for the past 5 years conducted the live lecture. The live lecture occurred in a conference room and included 10 to 15 participants. The lecturer began with a didactic introduction followed by the presentation of 4 patient cases. The lecturer then led a group discussion of the 4 cases. During the discussion, the lecturer provided structured information about approaches to the patient cases that included 3 major concepts about screening derived from the United States Preventative Services Task Force (USPSTF) on screening: the burden of suffering of the disease, the efficacy of the screening tests for the disease, and the effectiveness of early detection in the treatment of the disease. A handout that outlined the material covered during the lecture was provided at the conclusion of the session.

The online lecture presented the same information, in the same order, as the live lecture. It consisted of an Internet-based Power Point slide presentation from the same lecturer with the option of audio. It began with a didactic introduction of the same material as the live lecture. Then the same 4 cases were presented to the learners with the same discussion questions for consideration that were posed in the live lecture. Next, identical information about approaches to the 4 cases following the USPSTF format was displayed. Following the online lecture, students were able to review the slide material at any time. In the online group, there was no interaction between lecturer and students through online chat rooms or other online discussion groups. Students completed the online lecture on their own time at the site of their choosing, such as home, school, or the office practice site.

Outcomes

The primary outcome variables were students’ knowledge of screening, time used to complete the lecture assignment, and satisfaction with the lecture presentation. Pre-intervention variables were obtained to determine the demographic profile of the 2 study groups.

Pre-intervention Measures. The pre-intervention measurement battery included 1) a survey on demographic attributes of participants, 2) a survey on computer skills, and 3) a pre-test on knowledge of screening. The computer skills survey queried participants’ access to computers, their attitudes about the use of computers for their education, and their skill and attitudes in using computers. Computer skills of participants were determined by asking them to rank their skill level on 15 computer tasks. A summary score on the 15 computer tasks was derived. The summary scale showed high internal consistency (Cronbach’s α = 0.88) and was used to classify each participant’s skill level as either beginner, intermediate, or advanced. A beginner computer user would be, for example, very familiar with creating and moving files, have some familiarity with creating handouts, but have little understanding of using e-mail attachments or virus scans. An advanced computer user would be, for example, quite adept at creating power point slides and efficient at browsing the Internet, writing HTML language, and using spreadsheets. Finally, participants were asked to rate the importance (not important, important, very important) of each of the 15 computer tasks in order to determine their attitudes regarding the importance of these computer tasks. The summary scale for ratings of importance also revealed adequate reliability (Cronbach’s α = 0.82).

The pre-test on knowledge of screening was a 12-item exam that had been used in the course for 1 year. The exam included 10 multiple-choice items and a discussion question worth 2 points that covered information about screening that would be presented in the subsequent lecture. Analysis of the internal consistency of this pre-test measure of screening revealed only modest reliability (Cronbach’s α = 0.38), uniformly low inter-item correlations (φ coefficients), and an average correct response over the 12 items of 47%.

Post-intervention Measures. Post-intervention outcome measures included measures of time, satisfaction, and a post-test of knowledge of screening. Students were asked to report their travel time to and from the lecture, time to access the online lecture on the computer, time to participate in the lecture, and time used in reviewing reference materials after the lecture. Students rated their satisfaction with their lecture on a 5-point Likert scale, and they provided narrative comments about their experience with the live lecture and the online lecture.

The post-test knowledge of screening was an open book exam that has been used in the course for 1 year.