Using the Internet to Assess and Teach Medical Students in Dermatology

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Abstract

Background and Objectives: We wish to develop and evaluate a user-friendly online interactive teaching and examination model as an adjunct to traditional bedside teaching of medical students during a clinical rotation in dermatology.

Methods: Following completion of an online examination, senior medical students at the University of British Columbia (n = 178) were asked to complete an online survey to evaluate their acceptance of this new method. The online examination model was evaluated through students’ responses to the questionnaire-based evaluation they were asked to complete following their examination. Responses were evaluated on a standardized 5-point scale.

Results: A high response rate was achieved (98.9%). Overall, 93% of senior medical students felt that the Internet was a useful and effective way to administer a dermatology examination. Most (90%) preferred the online examination to a traditional paper-and-pencil examination and the majority (88%) felt that the quality of digital images presented was sufficient to make an accurate diagnosis. In addition, students strongly supported the further development of teaching resources on the web and would use these resources in learning dermatology (93%).

Conclusions: The development of an online interactive examination tool for dermatology is technically feasible with current technology. Senior medical students are not only accepting of this new technology but also prefer it to more traditional formats and indicate enthusiasm for the development of further online teaching resources in dermatology.

Sommaire

Antécédents et Objectifs: Concevoir et évaluer un modèle d’apprentissage et d’examen en ligne, qui soit convivial et interactif, afin de servir de complément à l’enseignement traditionnel des étudiants en médecine au cours d’une rotation en dermatologie.

Méthodes: À la suite d’un examen en ligne effectué par des étudiants finissants en médecine de l’université de la Colombie-Britannique (n = 178), on a demandé à ces étudiants de remplir un sondage en ligne afin d’évaluer leur degré d’acceptation de cette nouvelle méthode. Les réponses au sondage nous ont permis d’évaluer le modèle d’examen en ligne. Une échelle normalisée de cinq points a été utilisée dans l’évaluation.

Résultats: Le taux de réponse était élevé (98.9%). En général, 93% des étudiants jugent qu’Internet est un moyen utile et efficace d’effectuer un examen en dermatologie. La plupart (90%) préfèrent l’examen en ligne à l’examen traditionnel sur papier et la majorité (88%) pensent que la qualité des images numériques était assez bonne pour
permettre de poser des diagnostics exacts. De plus, les étudiants favorisent l’élaboration de ressources d’enseignement sur le Web et les utiliseront dans l’apprentissage de la dermatologie (93%).


Recently, undergraduate medical education in North America has been undergoing changes in pedagogic principles and methods. Time-honored and traditional lecture-based curricula have given way to problem-based, self-directed learning that is facilitated by student-focused tutorial groups. In concert with these changes, the number of formal hours devoted to teaching many specific medical disciplines has decreased. For example, the average number of teaching hours spent on dermatology in medical schools had dropped significantly from 18 to 10 hours between 1983 and 1996. While specific case studies can be effective for developing and refining general problem-solving skills, they do not lend themselves well to the acquisition of the comprehensive knowledge base that must be mastered during medical training. The provision of dermatologic care uniquely necessitates a complex, visually-oriented skill set that must be learned by students in order to allow for accurate and timely dermatologic diagnosis. It is imperative that these specific diagnostic skills be assessed, in addition to “facts” about dermatologic diseases and problem-solving (i.e., management) abilities.

The recent explosion of Internet availability has profound implications for dermatology. There are numerous resources available on the World Wide Web which are useful for dermatologists. From a teaching standpoint, the Internet also provides for new and innovative ways to both teach and evaluate students. Traditional evaluation formats have emphasized dermatologic knowledge as opposed to the understanding of the principles of dermatologic diagnosis (i.e., the visual skill set). Moreover, traditional examinations have been labor-intensive and/or costly to administer. For example, printing color plates of sufficient quality to permit accurate diagnosis is expensive, and showing 35 mm slides to small groups of students can be time-intensive, particularly given the ever-shrinking availability of dermatologist teachers. A web-based examination circumvents these problems by allowing images to be used in a relatively inexpensive fashion. This gives educators the ability to ask more advanced “second-order” questions where the ability to recognize the disease entity shown is inherent in answering the question.

In this article, we describe the creation of an online interactive examination model for senior medical students who have completed a mandatory one-week rotation in clinical dermatology. In addition, we present the results of a survey inquiring about students’ reactions to this new format of evaluation. It was hypothesized a priori that senior medical students would prefer the new interactive evaluation format over that of a more traditional format.

Methods

A multiple-choice examination database with digital images was constructed using Access 97 (Microsoft Corp., Redmond, WA). The questions were adapted from a previous paper-and-pencil text-based examination administered previously to senior medical students. Image resolution parameters were developed based on previously published recommendations. All images were digitized from slides taken from the Margaret Anderson Teaching Collection of the University of British Columbia Division of Dermatology. All images were scanned with an automated 35 mm slide scanner (Nikon Coolscan) into Photoshop 5.5 (Adobe, San Jose, CA). This database was then exported into WebCT (WebCT, Vancouver, BC) a web-based, course-authoring application (www.webct.com). The WebCT interface has several strengths including secure access, an easy-to-use student and designer interface, and provisions for automatic student grading and tracking. In addition, no special hardware or software is required to run WebCT beyond an Internet-connected computer.

All students rotating through the mandatory clerkship week of clinical dermatology were required to complete the open-book online examination between September 1998 and May 1999. The open-book format was chosen in order to make the examination an integral part of the learning process. During this week, students would attend outpatient teaching clinics with different academic staff dermatologists in addition to participating in hospital-based inpatient dermatology consultations. The examination consisted of 50 multiple-choice questions divided into five-question modules. The scope of the questions was broad, designed to encompass both common and uncommon dermatologic diseases. Approximately two-thirds of the questions were associated with an image (Fig. 1A). Following completion of the examination, students were given immediate feedback, including a brief explanation of the most correct response (Fig. 1B). Students were also invited to participate in an online survey evaluating the new online format. Students were given several statements to evaluate and were allowed to answer on a standardized 5-point Likert scale.