Chapter 1.13
E-Medical Education:
An Overview

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ABSTRACT

The World Wide Web has made available a large variety of medical information and education resources only dreamed of two decades ago. This review discusses a number of Web-based e-Medical education concepts and resources likely to be of interest to the medical education community as well as a number of other groups. The resources described focus especially on those that are free and those that have an interactive component. The importance of interactivity and its role in the "constructivist" approach to education is emphasized. Problem-based learning in medical education is also discussed. In addition, the importance of "Web 2.0" and related developments is discussed, along with an overview of Web-based medical simulation software that can complement medical education programs. The importance of podcasts and videocasts as an educational resource are also emphasized. Other concepts such as mashups and the semantic Web are briefly described. Intellectual property issues are also discussed, such as Creative Commons license arrangements, as well as the concept of "information philanthropy". Finally, the importance of peer-review and technology evaluation for online educational materials is discussed.

DOI: 10.4018/978-1-60960-561-2.ch113

INTRODUCTION

The Rise of Web-Based Educational Systems

"The student begins with the patient, continues with the patient, and ends his studies with the patient, using books and lectures as tools, as means to an end." -- Sir William Osler, Aequanimitas, 1905

Since the coming of age of the World Wide Web a little over a decade ago, a true revolution in access to information of all kinds has taken place. In particular, recent years have witnessed a quasi-revolution in conventional and distance education as a result. Web-based educational technologies now allow for new approaches to education not previously dreamed of. While this is especially true in the field of distance education generally, it has also had a tremendous impact on medical education in particular (Gallagher, Dobrosielski-Vergona, Wingard, and Williams, 2005; Glinkowski and Ciszek, 2007; Jang, Hwang, Park, Kim and Kim, 2005; McKimm, Jollie and Cantillon, 2003; Sajeva, 2006; Schilling, Wiecha, Polineni and Khalil, 2006; Smith, Roberts and Partridge, 2007; Zary, Johnson, Boberg and Fors, 2006). Clinicians and medical students now have available to them a countless array of online medical journals, CME educational sites, discussion forums, medical search engines, podcasts, wikis, and blogs that they can use to enhance their ongoing learning. A great number of these resources are entirely free.

WEB-SITE DEVELOPMENT SOFTWARE

Web pages are a particularly useful means of providing information of almost any kind. They are easily accessed and are updated relatively easily, at least with some development systems. Links to related documents can be provided, while support for tables, graphics and multimedia objects like audio and video clips can usually be managed with minimal difficulty. As a result, Web pages have proven to be very popular for medical education.

Web pages are primarily built using the HTML language or one of its successors (Katzman, 2001; Lynch and Horton, 1998; Ryan, Louis and Yee, 2005; Wiggins, Davidson, Harnsberger, Lauman and Goede, 2001). There are many advantages to using HTML for Web site development, one of which is that one does not need to buy any special software in order to use it - one can write Web pages directly in HTML using almost any text editor. Still, most Web developers prefer to use a specialized Web page editor, and there are a number of inexpensive or free HTML editors available (as a simple Google search will quickly reveal). Professionals usually use packages such as Macromedia's *Dreamweaver or* Microsoft's *Expression Web*. While these are excellent, comprehensive, general-purpose Web page editors, they are not especially friendly to beginners, and for a number of small projects I have used a less well-known but very easy-to-use system known as *Homestead* (www.homestead.com).

Regardless of the system chosen, consideration must also be given to the use of appropriate design principles in Web page construction (Cook and Dupras, 2004; Gotthardt et al, 2006; Wong, Greenhalgh, Russell, Boynton, and Toon, 2003). In this respect, Where possible, consideration should also be given to adding some degree of interactivity to the process (Coiera, 2003; Despont-Gros, Mueller, and Lovis, 2005; Reynolds, Mason and Harper, 2008; Ridley, 2007; Stout, Villegas, and Kim 2001). Web-based interactivity, discussed in more detail later in this article, can be implemented in various ways. For instance, a section of a Web page may ask the student a question, and offer four possible answers the student may select from. Depending on the student's response, the Web page can provide a different commentary. Other forms of Web-based interactivity may involve the use of discussion forums or online surveys and