Curriculum for building medical resources on the Internet—experience in Taiwan

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Abstract

This paper describes our experience with a one-semester course on how to build a medically-related homepage on the Internet, designed for fourth-year medical students. Based on the assumption of limited technical knowledge of the Internet, this class taught students Internet-exploring skills, multimedia authoring and HTML (Hypertext Markup Language) in the first eight-week period. Students were then divided into four-person teams and asked to select a topic for a homepage. These teams were then asked to collect the necessary resources for the development of the homepage both through individual work and, consultation with an advisor. Each group project for building medically-related homepage was accomplished and presented in the remaining four-week period. The resultant projects of these fourth-year medical students were of surprisingly good content and high quality. Medical students rapidly learned to use the software tools, and through proper instruction and provision of equipment, they were able to build significant medical resources on the Internet that can potentially be useful in education, clinical applications and research. © 1999 Elsevier Science Ireland Ltd. All rights reserved.

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1. Introduction

The fast-growing Internet community is a resource which medical professionals cannot afford to ignore. More and more significant medical resources are being published on the Internet in the form of World Wide Web (WWW) homepages at an accelerating pace. In time, we believe that the Internet will become a universal resource which every student and medical professional will use to

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obtain reference materials, to learn about new advancement in science and to communicate with other researchers [1]. Other researchers have also mentioned that the information on the Internet has characteristics such as ubiquitous, interactive, concurrent, up-to-date and freely searchable [2]. In view of the size and depth of the medical information now available on the Internet, we feel that it is important to teach medical students how to take advantage of this enormous information resource. One way to encourage these students to appreciate this resource is to require them to build their own homepage. In the process of collecting materials, transforming them into digital form, and composing the homepage, students not only learn about the complexity and intricacy of building such homepages, but also gain an in-depth knowledge of how to utilize similar resources [3–6].

2. Methods

The course is designed to teach fourth-year medical students how to build a medically-related homepage on the Internet. This one-semester (12 week), two-hour-per-week course was designed for a class size of 20 students. The students were expected to have little experience and knowledge of the Internet and only a basic knowledge of computers. At the end of the class, students were expected to be able to: (1) use the Internet for communication, referencing and supplemental educational material; and (2) collect and present specific medical information using multimedia in a WWW format.

The course consisted of three four-week segments as follows: (1) Introduction, (2) Authoring tools, (3) Composition and (4) Presentation. Details of each segment are described in the following text.

The first segment was an introduction to Internet resources including WWW, FTP (File Transfer Protocol), Gopher and electronic mail systems. Students were trained in the use of major medical resources on the Internet and assigned to find reference materials on specific medical issues with an emphasis on new advancements. They were asked to communicate with other students and researchers through e-mail. Hypertext and multimedia on-line medical textbooks such as those in the Virtual Hospital of the University of Iowa [2] were reviewed. Students were also guided to explore major medical software and hardware related websites.

The second segment trained the students in the use of HTML (Hypertext Markup Language) and several image-authoring tools. Together with their training in the use of HTML editors such as Microsoft Frontpage and Net Object Fusion, students were instructed in the basics of homepage composing. They were also given instruction in the operation of flatbed scanners, digital cameras and major image editing software such as Adobe Photoshop and Ulead Media Studio. They were free to use all of this equipment and software during the development of HTML code in the second and third segment.

During the third four-week segment, composition of the medical homepage took place. Students were divided into teams of four or five people and specific medical issues were selected independently by members of each team. Students were then asked to start composing the elements of the homepage. No constraints were placed on topic selection as long as it was medically related. The instructors gave a short list of potential advisors to each student group once their topics were chosen. Teams were encouraged to contact
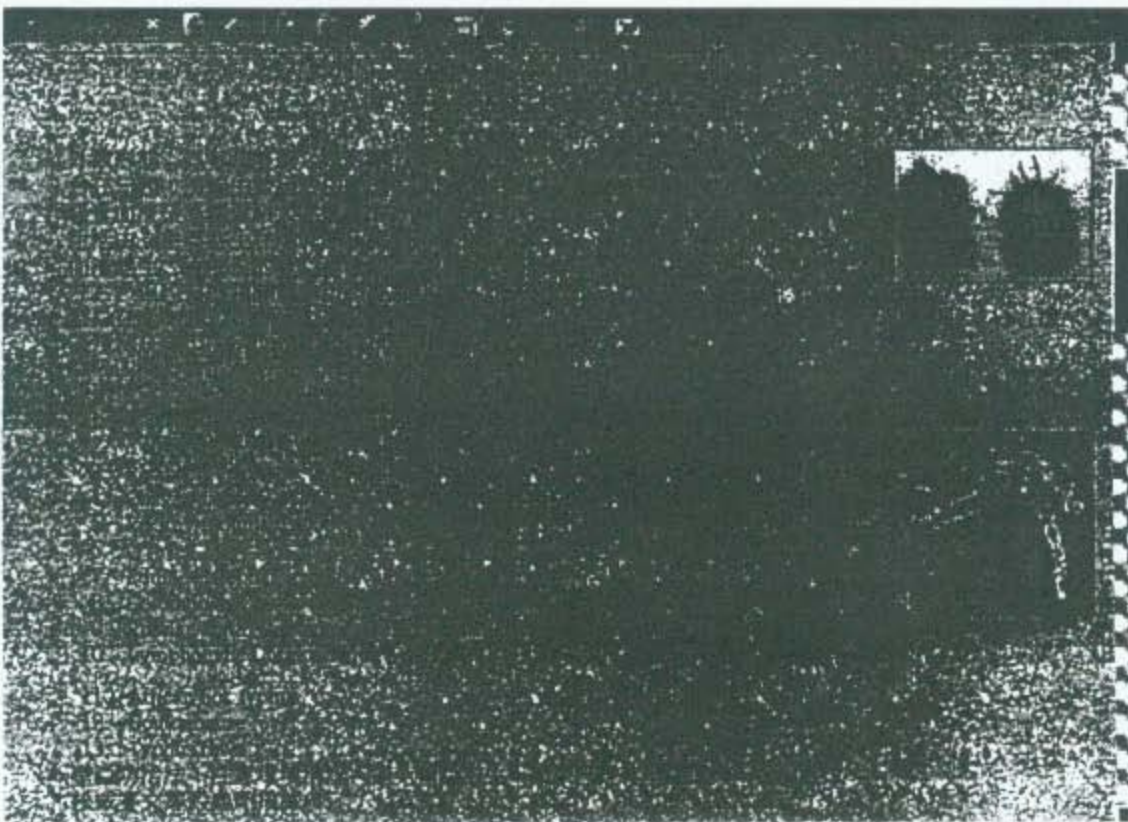
Fig. 1. Parasitology Image Bank

these potential advisors to seek for help in the gathering of materials on their chosen topics. The selection of the right advisor turned out to be one of the key factors to the success of a project. Some of the advisors were very helpful and provided many clinical images and lots of information, while others provided only verbal comments with minimal documents. Each team was allowed to choose one and only one project and each project was presented as a prototypic and then as a final version. During the four-week period, all students were asked to comment on each other's projects by sending e-mail to instructors and project authors and by critiquing during the presentation sessions. The proto-type and the final version of the project were also posted on Taipei Medical College's homepage for public comments.

3. Results

For one-semester projects, the works of these fourth-year medical students were surprisingly good in content and quality. Some of the topics selected for homepages included Parasitology (Fig. 1), Chinese medicine (Fig. 2), Emergency Medicine (Fig. 3), Lupus Erythematosus (Fig. 4) and Nephrology. In these homepages, exceptionally-detailed contents and vivid images were presented in an orga-

Fig. 2. Introduction to Chinese Medicine

nized fashion with stylish backgrounds and colors. In the Parasitology website, most of the parasites in the Protozoa and Metazoa subkingdoms were introduced. The website even included an ova index that showed images of the eggs of 17 different parasites. The Emergency Medicine homepage, on the other hand, listed definitions, precautions and detailed emergency procedures such as those for cardiopulmonary resuscitation and the management of shock, burns, fractures and foreign body obstruction. The Nephrology homepage used a different approach, categorizing its information into four major menus including Anatomy, Physiology, Pathology and

Clinical Diseases. Each category covered a different aspect of the kidney and was illustrated with text, hyperlinks and images. The Lupus homepage, students started with the underlying mechanisms of autoimmune response and elaborated to clinical presentations of DLE (Discoid Lupus Erythematosus), SCLE (Subacute Cutaneous Lupus Erythematosus) and SLE (Systemic Lupus Erythematosus). Several common features of all the student homepages were: (1) a credit page that gives all the names and e-mail addresses (where available) of the authors and advisors; (2) reference page that lists all the reference materials; (3) a 'leap gate' to external Internet hyper-
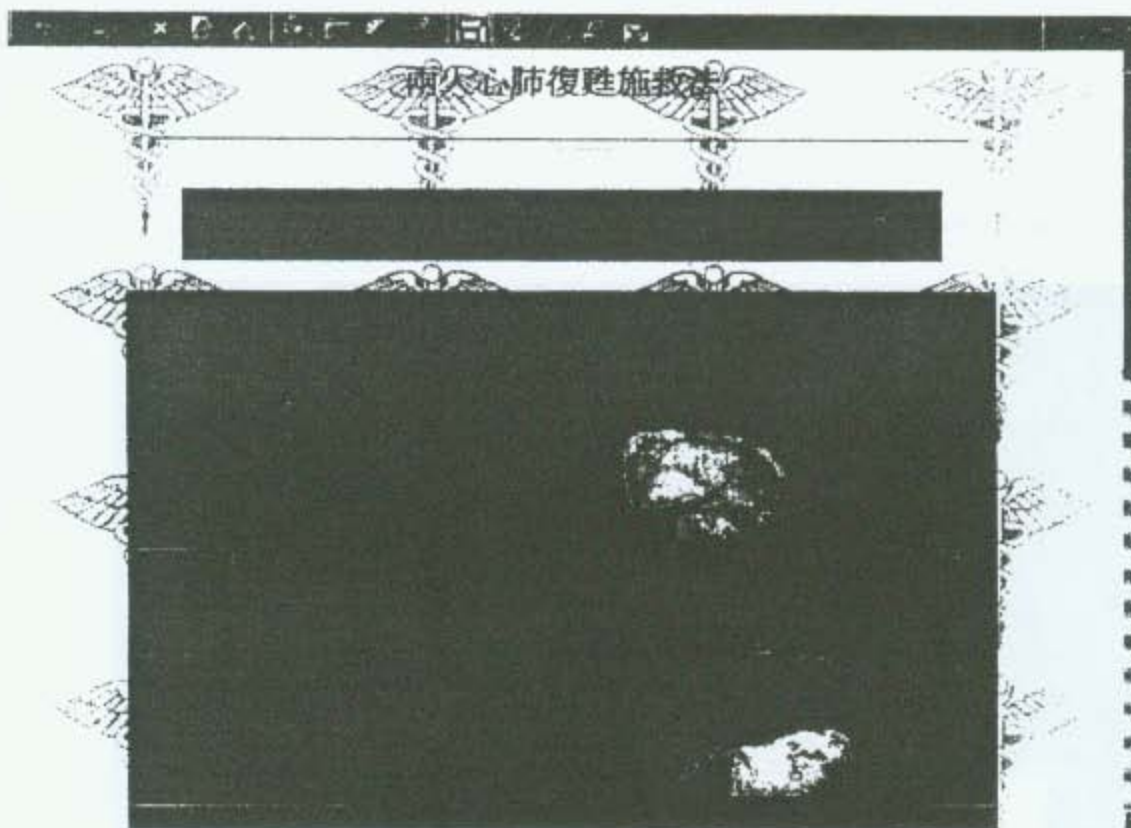
Fig. 3. Emergency Medicine Homepage

links related to the topic of the homepage; and (4) a disclaimer for all responsibility and legal implications.

All of these items were specified by the instructors as required before the projects started.

Because of the assistance given by the highly experienced clinical advisors, some of the student homepages were well suited to serve as supplemental medical education materials and some can be used as clinical references. The resultant projects were installed in Taipei Medical College's WWW server for demonstration; they can be reached through: http: //www.tmc.edu.tw/medimage/default__eng.htm [7].

4. Discussion

In our two-year experience with this course, we have found that the key success factors in building a medical homepage are: (1) choice of a suitable topic; (2) choice of an experienced and helpful advisor; (3) proficiency in the use of HTML development software; (4) experience in publishing and artistic talent in drawing; and (5) peer pressure.

In this course, the topics for each project are chosen by the student groups and approved by the instructors. There is no limitation on the range of topics other than that they are
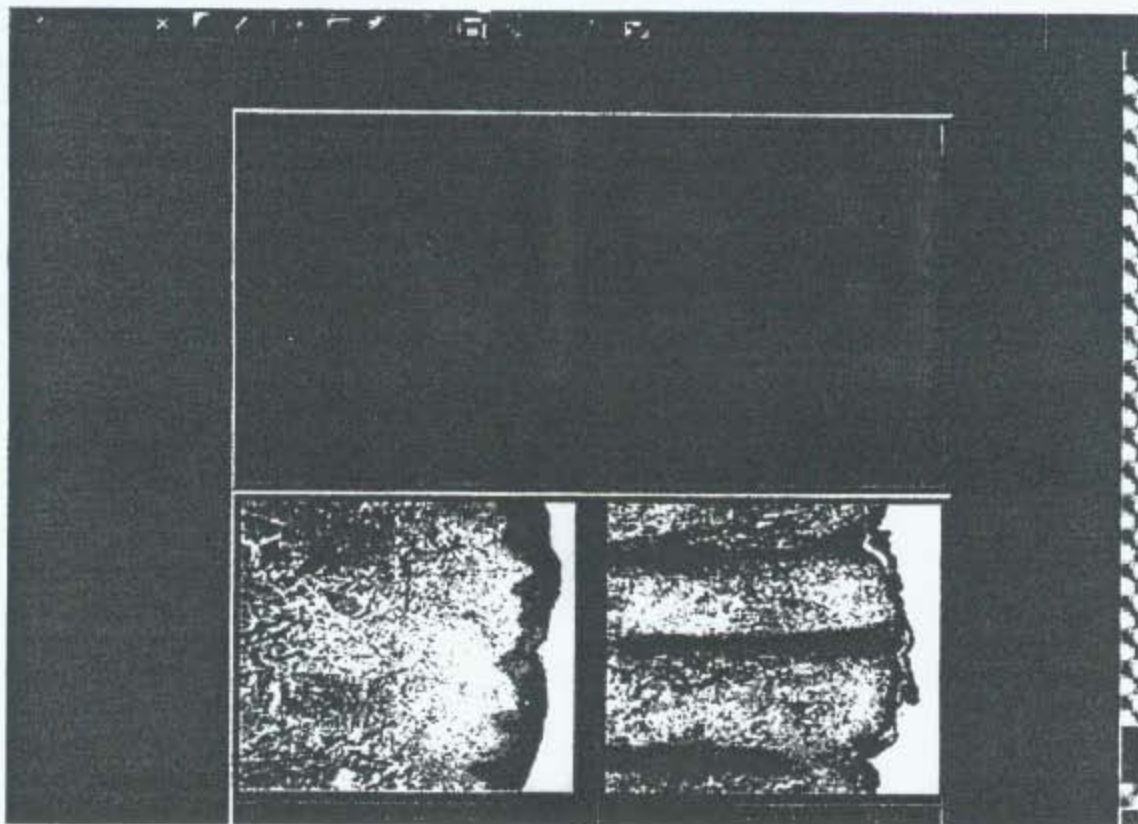
Fig. 4. About Lupus Erythematosus

considered medically related by the instructors. It is also important that the instructors must be familiar with Internet technologies and have a thorough knowledge of general medicine. We were fortunate to have several medical doctors with experience in building homepages to serve as our instructors. They were very helpful in assisting the students in the choice of the right topic with appropriate depth and breadth, which is an essential factor for a project to be successful. After a topic was chosen, the instructors recommended several potential advisors that have an in-depth knowledge of the topic. Each student group was responsible for contacting these advisors and asking for help. We found that the quality of the contribution given by the project advisor was often deterministic to its success. More than half of the project advisors actively offered precious clinical images and useful reference materials on student request. These projects resulted in valuable medical resources on the Internet. Besides, proficiency in the use of HTML development tools and experience with publishing and drawing talent were helpful in constructing sophisticated looking homepage. In the course of the project, we arrange different teams to comment on each other in the class and with e-mails. This peer pressure was also one of the factors that kept the enthusiasm going through out the whole semester.

Our experience with this course for medi-

cal homepage building suggests that such a class can be taught in one-semester together with an introductory course on the basics of the Internet. The medical students who attended our course were quick to accept and utilize the concept of HTML, and through proper instruction and provision of equipment, they were able to build significant medical resources on the Internet with relative ease. These resources can potentially be useful to education, clinical applications and research. Students who successfully completed the course tended to develop a greater appreciation and awareness of the medical resources on the Internet and can now potentially contribute to the global Internet community by actively building similar resources in the future.

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