

Walking on the Web Without Getting Stuck

by A. Malcolm Campbell

Introduction

After I read the article about Hyperteaching in the March/April issue, I wanted to share my experiences with the World Wide Web (WWW) and undergraduate teaching. I think Dr. Ahern made some very good points in his article that do not need to be repeated, so I will focus on specific examples of how I have woven the WWW into my courses. The guiding principle I have tried to maintain is to use the WWW only to augment my teaching goals, and not as bells and whistles to distract me. My aims have been:

- 1) I want students to be able to establish home pages and be familiar with HTML (the code that generates the WWW format) because I think all college graduates should develop this skill.
- 2) I want to provide information to students that I cannot photocopy or draw on the board.
- 3) I want to archive certain research papers that I use in my courses, since the copies in the library are being destroyed due to repeated student use.
- 4) I want to establish an archive for research papers and posters that students have presented.
- 5) I want students to help me find good teaching sites on the Web.

Learning The WWW

In order to "encourage" students to learn how to make home pages, I give two assignments that must be posted on the Web. I utilize the computer center's ongoing tutorials in HTML to establish a foundation for students to use. The first assignment is for each student to establish a home page, describe one of the molecular methods we have covered in class, provide at least one image related to the molecular method he or she has chosen, and to establish at least one link to a related WWW site. They must also link their home pages to the home page for this course, and make it easy for people to email them from their home pages. All of this is graded very generously, so students will not feel punished for experimenting with their home pages. The real benefit is apparent when the second assignment is due, a term paper where students must choose a research paper to review, and propose additional experiments. They are not inhibited by the mechanics of producing material

for the WWW since they have done it once before. At the beginning of the semester, many students groaned about having to work with computers so much, but in the end, they became quite enthusiastic about their home pages and loaded many "extras" on their pages. To see a selection of these student home pages, visit <http://www.davidson.edu/academic/biology/student/student.html>. It is important to remind students to cite the URL of origin for any images they use on their pages.

Dynamic Images

Biology is the study of dynamic processes, and many aspects of biology are difficult to draw on the board or photocopy. Therefore, it is useful to have images of complex structures available for teaching. These images can be used in classes that have a networked computer and a projector, or can be given to students as reading assignments. I have used images of cells labeled by immunofluorescence, karyotypes with fluorescence in situ hybridization (FISH), as well as diagrams I have drawn to clarify certain topics. Even more useful are files that allow me to view and manipulate molecules in 3D using the RasMol program (both the files and RasMol are free and can be accessed from the URL below). Finally, I have collected a variety of QuickTime (QT) movies which can be viewed with Netscape 3.0 or other comparable WWW browser. For example, it is difficult to draw a wave of calcium as it sweeps across an egg when fertilized, but one point and click initiates a 10 second QT movie that makes the calcium wave easy to understand. To facilitate student usage, I have collected the WWW sites of many images in a few convenient lists that can be accessed from this WWW site: <http://www.davidson.edu/academic/biology/courses/courses.html>.

Cyber Reprints

For my upper level courses, I have increased my reliance on primary literature for teaching purposes, thus meeting several additional goals. It allows students to sink their teeth into a series of related papers where they must fully understand the data in order to extract the take home message. It enables students to get over their fears of reading scientific literature, and eventually they mature into critical readers. From these papers, students

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