Developing Course Materials Using The World Wide Web

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Abstract

The World Wide Web provides a powerful new resource for education in agriculture and the life sciences. This article describes some development tools and strategies employed by the College of Agriculture & Life Sciences at North Carolina State University to help teaching faculty to develop and explore new educational methodologies that take advantage of the Web and other emerging technologies.

Introduction

Over the past two years, the World Wide Web has emerged at NC State University as a strategic technology for agricultural education. In a single technology, the World Wide Web offers:

An easy-to-use and increasingly available environment for world-wide exchange of documents, images, video, sound, interactive software, and other information formats.

Platform-independent technology that allows students and faculty to access and interact with materials and programs regardless of their location or of the computer operating system that they are using.

Electronic access to world-wide information services, so that students and faculty alike can search for material related to their discipline, and incorporate this into their research, course assignments, reports, presentations, etc.

Opportunities to test diverse educational models such as student-centered learning and time- and location-independent programs for traditional and non-traditional students, whether they are on campus or on the other side of the world.

The prospect of new educational clients world-wide by providing new on-line services such as short courses for agribusiness, joint programs with other educational institutions, etc.

Many two and four year colleges and their faculty are asking how to best integrate this technology into courses and programs. While technically-minded faculty will quickly embrace the use of the World Wide Web, for the mainstream of faculty, there needs to be a support infrastructure that encourages exploration of this new medium, that simplifies development and promotes good design, that reduces redundancy of effort and inappropriate use (such as copyright infringements), and that achieves all of this with limited technical staff resources. The Web is a vastly different technology from traditional information services and there are usually few existing guidelines or support mechanisms in place to help administrators, staff or faculty move quickly to implement Web-based projects. This article describes how the College of Agriculture and Life Sciences at NC State is working to meet these challenges.

Providing a General Infrastructure

The need to develop a coherent and efficient strategy for development of on-line materials is especially true for a large college - CALS serves over 4000 full-time students, enrolled in two-year, four-year and graduate degree programs, in twenty two different departments. The college is fortunate to be part of a well-integrated network environment at NC State: all students, faculty and staff have campus computing accounts which include access to the Internet, e-mail and other on-line resources. This environment includes technical staff who manage the file servers used to deliver World Wide Web services, as well as staff who provide an overall online information environment for the college.

To facilitate the use of these resources for instructional purposes, over the past eighteen months, CALS computing staff have developed and implemented a wide range of services and tools designed to achieve college-wide acceptance of Web technology by faculty, students and staff alike. These include: easy access to file space for Web development, World Wide Web policies and guidelines, "Taking Your Course Online" workshops and templates for fast production of on-line course materials, and

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tools to simplify the creation of useful interactive tools such as on-line tests and surveys. In addition the college has modified its college-wide introductory courses to ensure that all students quickly learn to make use of the World Wide Web, e-mail and other general-purpose computer applications.

Following these efforts, all CALS two-year and four-year students are now required to use e-mail and Internet resources as a part of their programs, while some 60 to 70 CALS courses currently provide a wide range of on-line materials. Other important on-line academic services include curricular and advising information, CALS Career Services, student clubs and organizations, as well as the extensive on-line resources provided by the North Carolina Cooperative Extension Service and the North Carolina Agricultural Research Service. Anecdotal feedback has been overwhelmingly positive from both students and faculty. Each time that the faculty workshop "Taking your Course On-line" has been advertised, the twenty five available seats have been filled within days. Students have also reacted especially favorably to the availability of on-line course materials and intercative on-line tests.

By encouraging widespread use of the Web in its more traditional programs, the college is at the same time developing an infrastructure that allows faculty and students alike to explore new teaching and learning methods, and that facilitates migration to new educational services. For example, on-line materials that has been developed to support traditional, lecture-based courses may also serve off-campus students with little modification, or provide components of short courses to agribusiness or other non-traditional clients.

Course Templates and Workshops

The development of special templates for on-line course material have proved especially successful in encouraging many of the college's instructional faculty to make use of the Web in their own courses with minimal support from technical staff. Special workshops are also provided to demonstrate the use of the templates, and related Web development procedures, and to encourage discussion of design and pedagogical issues associated with on-line delivery of information. The course templates provide a set of Web pages for a "typical" on-line course (syllabus, course policies, assignments, lecture notes, image/document/video libraries, links to world-wide resources, old exams, interactive tests, etc.). Faculty that use the templates are free to choose among the components, to modify them as needed, or for that matter to reject them if they are not found to be suitable for their needs. The templates are a dynamic resource, modified regularly to reflect improvements in the technology and

innovations by faculty. The templates are available on-line and can be downloaded and customized for specific purposes. (Fig.1).

The templates not only serve to simplify development, they also encourage a consistent look and feel to on-line course materials that have been developed by different faculty, and provide a basis for experimentation, development and debate. By combining the templates with workshops and by publishing design policies and development guidelines, the college has been able to promote the generation of on-line materials in a way that encourages creativity and experimentation by faculty and, at the same time, ensures that institutional identity and design consistency are preserved.

Interactive Test and Survey Generators

Following the initial success of the templates, college staff have provided some effective development tools that allow faculty to quickly and easily create interactive on-line tests, surveys and mail-back forms. These interactive course components are proving popular with both faculty and students. For example, an instructor can develop a Web-based multiple choice test by simply creating a simple text file containing the test questions (and list of possible answers to each question) and another text file which contains only the number of each correct answer. The questions can include images, videos, links to other Web pages, etc. The test can contain any number of questions. Once these two files are created, a Web page is needed to specify their location. When a student wants to take the test, a program automatically generates a Web page with the questions, that include a Submit button. When a student submits his or her answers, the program processes the student's answers, and then displays a new Web page that shows each question, this time with the student's response, along with the correct answer and their total score (see figure depicting screen after student submits answers). The feedback is virtually instantaneous for the student. The results of these automated tests may be sent via e-mail to the instructor or teaching assistant (this option may be switched off if the intention is to allow students to test themselves without being monitored).

Some programming is needed to provide Web-based tests and other interactive forms, which will create a real bottleneck if custom programming is required for each test. To avoid this problem, we have focused on developing a small program that can handle any multiple-choice test without writing a new script for each test. Once the original program script has been written there is no need for

additional technical support, apart from occasional how-to presentations and improvements, and any number of faculty can place any number of interactive tests on-line quickly and easily. Similar scripts have been developed to allow faculty to develop matching term questions. surveys and mail-back forms of different kinds.(Fig. 2 and 3).

Conclusion

Perhaps one of the most exciting aspects of the Web lies in its widespread acceptance among students and faculty once they have been given the opportunity to get involved. A support infrastructure such as that employed by CALS will greatly facilitate development and support services. This infrastructure should include education and training, guidelines and policies, and tools and other resources for effective development. The tools and services described here continue to evolve, but they have already proven themselves to be effective in providing faculty and students with some of the "stepping stones" that they need to move forward into this new environment.

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