An Overview of Online Educational Delivery Applications

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Abstract

Many institutions of higher education (IHE) are grappling with ways to implement and manage online instruction by using local personnel and resources, purchasing some components of management, or outsourcing distance education entirely. While each institution will make decisions that meets its unique needs, it is important to know about the range of possibilities available to university administrators today. The major problems confronting IHE's are twofold: (1) the lack of technical skill among faculty members to convert their courses into online formats, and (2) the need to support and manage distance education. This article provides an overview of the most popular online educational delivery applications.

Introduction

Dringus (1999) has discussed the increasing demand for online instruction, a trend that has outpaced expectations earlier in the decade (Elson, 1992). While accurate statistics about growth are impossible to determine, today students can receive education on three kinds of campuses: a residential college community, electronic, and continuing education and training provided by employers and community organizations. Quality concerns are not hindering the spread of distance education (Clark, 1993). In fact, some of the perceived problems of distance education are common in conventional classroom instruction. There is also overwhelming evidence that technologically delivered instruction is equivalent to conventional instruction, using student achievement as the outcome measure, and there is often more student-teacher interaction (Russell, 1997). Even while some traditional institutions remain hesitant, private enterprises are forging ahead with distance education offerings (Oblinger, 1997).

As Jeffries (1997) notes, "educational change is technically simple and socially complex." While this may be true, most administrators will find the demands of creating an infrastructure and developing online courses to be a challenging endeavor. Although any professor with some knowledge of HTML and a little technical support could develop comprehensive courses without a management system, and several already do, institutions want a centralized system to assure uniformity of appearance and, if possible, to manage many other aspects of the course and overall administration.

Many college instructors are embracing instructional technology, ranging from technological applications in lectures to providing online courses through the WorldWideWeb (WWW). Use of technology in higher education is varied and difficult to classify, and some components can be

used in a variety of overlapping ways. A few institutions are strictly online or "virtual campuses" but most others are struggling with ways to combine distance education within the conventional institution. Some writers have proposed taxonomies of technology, but we have considered it in the following way for purposes of this discussion:

> **Technology in Lecture Presentation** - Multimedia, presentation software, computer software, and other applications used within the context of a traditional, self-contained classroom. Technology replaces chalk and the overhead projector.
> **Course Syllabus on the WWW** - Many individual professors, colleges and institutions post online syllabi for courses. In most cases these are electronic replicas of paper syllabi but sometimes there are internal links and resources for students.
> **Web-Assisted Course** - A web-assisted course refers to any traditional course that provides all or substantial portions of course instruction by means of the WWW for students enrolled on campus.   Students are not solicited as "distance education" students but are carried as regular on campus enrollments and the course is likely to show on IHE records as a traditional class with a time and room assignment.
> **Distance Education** (Synchronous or Asynchronous or a mixture) - Excluding correspondence, there are two general kinds of distance education:
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>> *Synchronous.* Some IHE's use satellite, cable, and direct broadcast of live television to include students at remote sites. Other variations are videoconferencing through computer connections, "whiteboard" conferencing, and various "chat" applications.
>>
>> *Asynchronous.* There are several variations of asynchronous instruction including mailing videotapes to students, compressed video, e-mail, and comprehensive web-based courses.

The typical elements of an online course include the "lecture" (in text and/or video clips or compressed video), graphics, other course materials and resources, such as links and downloadable files, audio, e-mail, and perhaps a threaded discussion. Some courses may also include online tests. Some commercial vendors offer some or all of these components and a few provide e-commerce features such as online enrollment and ability to pay with a credit card.

The technologies used in synchronous delivery include two-way interactive video (compressed or full-motion), one-way video with two-way audio, audio conferencing, and audiographic conferencing, and may include electronic white boards. Radio, television, IITS, closed circuit, satellite, and computer-based delivery may be used, where the instructor and students are in real-time contact at an appointed time. Class sessions require students to be at a particular location at a specific time. Depending upon the technology involved, there may be point-to-point and point-to-multipoint connections. In most respects, the classroom structure and routines are similar to a conventional classroom, with the instructor treating persons at remote sites as if they are members of a large class in a lecture hall. In fact, other than using presentation graphics, many instructors do not act much differently than in a conventional classroom. Students on-site or at a remote site are expected to listen, take notes, and answer questions if asked.

Moving into asynchronous online courses poses a lot of problems for the instructor because it substantially changes the major activities of the instructor. Aside from the technical skills necessary for developing online courses, asynchronous distance education requires an entirely different view of instruction, a difficult step for many to conceptualize. In the asynchronous

method of distance education, the instructor and students are not required to have real-time contact on a regular basis. Asynchronous means that access to any remote resource is at the student's convenience, or on demand, not the convenience of the institution. It is not time and location dependent, as in a traditional class.

In an asynchronous model there are no class sessions, although there may be occasional or scheduled meetings for specific purposes, which can be accomplished by chat or other forms of group meeting. The addition of threaded discussion enables students to interact at different times. Students study independently and in virtual groups, electronically. As conceived in this model, virtually all contact is by means of computer technology. File sharing, downloading, chats, and e-mail are used for access to "lectures," assignments, transfer of reports, library, other on-line resources, and communication.   Due to the fact that most college instructors lack the skills necessary to produce and manage online courses, IHE's want technological solutions to "step over" the lack of skills and the infrastructure problems. If most instructors were capable of developing their own courses, it would be reasonable to expect that online courses could be handled almost as routinely as traditional courses. Due to the fact they are not easy to develop and manage, distance education is commonly handled by a central authority such as a director of distance education or continuing education.

While various organizations have an interest in IHE standards, only Educause (1999) through its Instructional Management System Project is proposing specific technical standards and tools for management and access of online learning materials and environments. The extent to which this effort will have an impact on IHE's or vendors cannot be predicted. In the meantime, many IHE's and commercial developers are forging ahead with various management and delivery systems of their own.

In an attempt to assess the extent of these developments, we conducted a web search of online educational delivery applications.   Many universities have comprehensive web sites, although they may not offer many distance education courses. Universities with extensive or limited web presence commonly have syllabi online or web-assisted courses. Finding and evaluating courses from any IHE or vendor is becoming increasingly difficult because most providers do not want "lurkers" or visitors, although some sites offer a glimpse of a course through some tour. This is more common with some vendors who want to showcase their products, but the typical course can only be accessed by means of a login and password. Examples of web-assisted courses can be found at many institutions but it may take a lot of searching to find them.

In-House IHE's Systems

Some IHE's provide their own management systems with varying degrees of comprehensiveness. Below are some examples of efforts by institutions without significant commercial vendor support.

> **University of Virginia.**
> (http://toolkit.virginia.edu/cgi-local/pm/class/.tkdocs/displaydocs). Instructional Toolkit at the University of Virginia permits development of a syllabus, roster, announcements, feedback, links, and notes. Students can submit their homework electronically.

> **Iowa State University**. (http://classnet.cc.iastate.edu/). The management system for Internet-based instruction is called ClassNet and provides the following services: creation of a class by an instructor, enrollment in the class by students, creation of

tests and assignments, student submission and automatic grading of materials, student and class scores, discussion forums and chat rooms, e-mail between students and instructors, and portfolio development by students.

Florida State University. (http://dl.fsu.edu/). The software for development and delivery of web-based courses is called Construe. Construe "provides a shell for developing and managing instruction over the World Wide Web in a way that rescues 'instruction' from its narrow meaning and provides practitioners with a set of expanded options." Like most courses online, visitors are not permitted to see a course or a demonstration.

Penn State University. (http://www.courses.psu.edu/CourseWeb/about.html). The CourseWeb Toolkit permits Instructors to create a class home page, class policies, a schedule, announcements, assignments, and materials.

Commercial Products and Services

Course Development

To encourage instructors to develop online courses, some IHE's offer workshops in the use of a common set of tools such as Netscape Composer, Microsoft Frontpage, and related HTML and graphics programs. Some commercial products are available to enable instructors to develop courses without using HTML programming and to simplify all aspects of course development:

- CourseWriter
- CyberProf
- eWeb
- IntraKal
- Serf Distance Education Environment (SERF).
- Simple Start

On the other end of the continuum are vendors who provide online education to universities. Some companies provide substantial services but require the institution to prepare content, graphics, and other elements of a course. Other vendors offer a "turnkey" operation but careful reading of their services finds that there may still be substantial reliance on IHE personnel to develop course content. In most cases, courses are apparently owned by the IHE but the vendor may develop graphics and assist with audio and video clips, as needed. Depending upon the arrangement or the requirements, courses can be stored on the IHE server or on a commercial server owned by the vendor. While some companies provide products that target both education and training, we have excluded those applications that seem to be strictly aimed at corporate training.

Comprehensive Delivery Applications

The following commercial vendors are in alphabetical order, either by name of the product or service or by the name of the company, whichever is most prominent in the literature. Some of the vendors provide aids to develop courses, others offer various tools for synchronous courses, and some offer comprehensive services including management for the IHE. Costs are not discussed because it is almost impossible to determine due to the menu of services and different costs associated with scalability and number of users.   Furthermore, there is no intention to

evaluate these products or to suggest that one product is better than another, a determination best made by potential clients. Finally, some products were excluded from consideration because they are specifically designed for corporate training or do not appear to have the necessary components to circumvent the greatest obstacle, namely the inability of instructors to create web content.

Blackboard. (http://www.blackboard.com/) Blackboard Inc. provides Blackboard, "CourseInfo" and "Campus" for hosting their own courses for individual courses, multiple course sites, and academic intranets, respectively. Blackboard allows instructors to point and click to incorporate learning materials from word processing, audio and video, and presentation files. At the high end, with "Campus," the services include a comprehensive management system and the software becomes a campus portal for all distance courses and a variety of related services: business and strategic planning, content conversion and course migration , instructional design , systems integration and project management, application integration, training and education, web hosting, and maintenance and support.

Collegis. (http://www.collegis.com/) Services can range from implementing web-based courses into the curriculum through support services to incorporating campus-wide "Administrative Technology Services" such as new student, finance, to providing comprehensive Network Infrastructure Services such as planning and developing technology migration strategies. Collegis advertises its product by stating that personnel will be assigned to the campus to work with faculty in the development of course content and other aspects of development, delivery, and maintenance of a distance education system.

Complete On-Line Teaching System or COLTS. (http://www.corgisoft.com/public/colts/index.html) COLTS uses form-based tools to create classroom homepages. An instructor can input text or paste from word processing then convert the text to HTML code. The instructor can create or edit seminars, quizzes, and exams through a library structure. Also included is a "Student Journal Module" to allow an instructor and student to work together on a document.

Convene. (http://www.convene.com/) Convene develops partnerships with IHE's and provides a six-week training program for instructors. Convene also offers a host server and network, technical support, and other services.

Creator. (http://www.melbourneit.com.au/creator) Universities, schools and corporate trainers can use "Creator" to create online learning environments with interactive elements including video/audio-conferencing, newsgroups and chat sessions.

eCollege (http://www.ecollege.com/student/index.html) eCollege is a recent project created by Real Audio/Real Video to offer partnerships with IHE's to build online courses. In the Premium program the IHE receives course development, instructional design, student orientation, virtual campus development, hardware and software as a complete "turn-key solution" for distance education. The eCollege page is prominent on the IHE home page and serves as the portal for distance education connection.

e-education. (http://www.e-education.com/software.html) Instructors can use a set of tools to create courses or in the full service plan. An IHE may simply provide course content in an electronic format and e-education will create a course. In the "self-service option" the instructor creates the course content. Course elements include a course builder, announcements, roster, TestMaker, and forum administration.

Embanet. (http://www.embanet.com/) Courses can be created with an online wizard, including tests and other features. The company claims that courses can be operational in two months if instructors develop the content, or in a matter of days if the company makes the course. The best known courses of Embanet are those operated through the UCLA
extension service.

MadDuck Technologies (http://www.madduck.com/) This company provides three major products: Web Course in a Box, Web Campus in a Box, and Web CourseBuilder ToolBox. "Web Course in a Box" provides for development of a syllabus, calendar and/or scheduler, announcements, personal web pages, forums, lessons, tests, a whiteboard, and chat. The "Campus" tool supports building lists of instructors, students, announcements, active courses, inactive and archived courses and home pages for instructors and students. The "Faculty" tool supports home page, forum development, and campus lists of courses.

SocratEase. (http://www.SocratEase.com/school.htm) Primarily for corporate training but also used by universities, SocratEase incorporates a course management, testing and test tracking, built-in e-mail communication for discussion and questions, and a course authoring tool.

Virtual - U. (http://www.vlei.com/) Contains a "Conferencing System" for group communication in a newsgroup-style. "Course Structuring Tools" includes a method for developing a course syllabus and resources to download files, text, Web links, assignments, and multimedia. "Assignment Submissions" allows the instructor to request, receive and comment on assignment submitted by students. There is a "GradeBook" and the "System Administration Tools" provide support for the system administrators to install and maintain the Virtual - U files.

WBT Systems. (http://www.west.ie/) The company provides "TopClass," which is a comprehensive system including course development, quizzes, discussion, and other features of web-based courses. Sections from one course can be imported into other courses. "TopClass Assistants" enables Microsoft Office 97 documents to be converted automatically into courses. "TopClass Creator" instructors "authorized by TopClass Server" have access to web tools for assembling complete courses from any "web-compatible" content. Other tools can render presentations or documents into courses.

WebCT (http://www.webct.com) Tools include a conferencing system, chat, student progress tracking, group project organization, student self-evaluation, grade maintenance and distribution, access control, navigation tools, auto-marked quizzes, electronic mail, automatic index generation, course calendar, student homepages, course content searches and much more.

Evaluation of Online Delivery Applications

Comparisons or evaluations are beyond the scope of this article but the interested reader may find such information in various computer magazines, such as ZDNet (http://cma.zdnet.com/) and The British Columbia Standing Committee on Educational Technology (http://www.ctt.bc.ca/landonline/choices.html)conducts its own evaluations and also includes links to reviews online. Comparisons are difficult because of the differences in features and the variety of services available. Products can be evaluated in terms of technical aspects, support, training, cost, and many other features that can be of variable importance to different IHE's. For institutions that outsource everything, only cost and services are important. For those interested in providing a mechanism for inexperienced instructors to develop course content, the nature of the development tools and continued support or management features may be more important. Some programs emphasize tests and test management, which may be unimportant to some and critical for others. In general, the following areas are used in developing evaluation criteria:

- Circumvention of HTML to develop course material
- Password and username security
- Desktop based file management
- Flexibility for instructors to revise and manage course content
- Test banks (development, randomization, timed, scoring, reporting, feedback options, etc.)
- Feedback on tutorial questions
- Progress tracking for instructor and student
- Electronic Mail
- Bulletin board
- Chat facility
- Logged chat
- Application sharing
- Asynchronous sharing
- Synchronous sharing
- File exchange
- Newsgroups
- Whiteboard
- Virtual space
- Videoconferencing
- E-commerce (registration, fee payments, enrollment, and so forth)
- Technical issues (numerous and often unique to each site)

Conclusion

As many IHE's consider the need to develop distance education because of student demand and competition, outsourcing or contracting with a private vendor is an option many consider. As indicated in this article, there are several options. Whether or not an IHE develops its own system or contracts for the services, the more difficult issues are resistance by segments of the faculty to distance education, faculty intellectual property fights, workload, training and technical support, faculty support, and job security. These are important concerns for any administrator or faculty. The WWW threatens to widen the gap between rich and poor, between North and South, and perhaps between IHE's that thrive and those that go out of business.

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Back to Journal of Distance Learning Administration Contents