Web Based Learning Resources Library

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This page is an educators' resource for delivery and management of education via the Internet.

Your suggestions, contributions, and comments are welcome.

Hosted by Robert H. Jackson
email: rbjackson@utk.edu

Last Updated:
Friday, May 18, 2001

An Overview of Web-Based Learning

Web-based learning (a major subcomponent of the broader term "e-learning") is one of the tools with which education is delivered. In traditional academic institutions, web-based learning systems are generally housed administratively in a "distance education" department alongside other at-distance delivery methods such as correspondence, satellite broadcast, two way videoconferencing, videotape and CD-ROM/DVD delivery systems. All such systems seek to serve learners at some distance from their learning source. Many such systems attempt to serve learners interacting with the learning source at different chronological times (for example, email). Distance Education, then, is often referred to as those delivery modalities that seek to reduce the barriers of time and space to learning, thus the frequently used phrase "anytime, anywhere learning". Be careful, however, with that euphemism - not all topics or learning goals lend themselves to "anytime" as a delivery method.

As the field is evolving rapidly, I offer several different ways to categorize or think about web learning tools and strategies as a preface to listings of the tools and resources themselves:

Defining eLearning - Different Shades of "Online" ... a definitional protocol by R. H. Jackson

I've had several problems talking with colleagues about "online courses" as the term seems to be used in different ways by different people. To help clarify these discussions, I've developed this simple definitional dichotomy:

Technology-*Enhanced* eLearning/Online Learning

- Learner audience has the opportunity to meet face-to-face with the instructor
- Supplement to traditional, on-campus learning
  - May replace materials previously delivered to student through "Shrink wrap" course kits, packets or copy centers. Typically includes online syllabi, bibliographies (often hyperlinked), faculty and class backgrounds.
- Instructor-led sessions are live, face-to-face in traditional classrooms
- Typically asynchronous, implemented through either a web editor or an asynchronous course management system (see below)

Technology-*Delivered* eLearning/Online Learning

- Learner audience is never (or only very rarely) in convenient proximity to the instructor
- also known as “Distance Education”, "Distributed Education" or "Distance Learning"
- Instructor-led sessions are either eliminated, adjusted for some different form of non-real time interaction, or replaced with real-time “virtual classrooms”
- May be delivered via blend of asynchronous & synchronous technologies
- Note that this category might also be broken down into two important subcategories:
  - **Course Sharing** - using technology to share a scarce resource (instructor) among geographically disbursed learners in order to create economic economies of scale. Typically, the learner audience will be comprised of multiple groups of traditional on-campus learners gathered together in an electronically group setting and may often involve a proctor/site coordinator that may enhance the group educational content with local customization (thus they may blur into technology-enhanced classes in some cases). Some forms of academic videoconferencing - especially those utilizing H.323 over Internet II to share graduate courses among higher education institutions - are examples of this subcategory. Course Sharing is typically the initial reason many colleges (particularly networks of community colleges) get into "online learning".
  - **Non-Traditional Audiences** - uses technology to deliver courses or programs to learning constituencies that would not typically attend a traditional bricks-and-mortar campus. The focus of this subcategory is creation or sustaining of new, non-typical or underserved audiences (for instance: working adults, homebound caregivers, homeschoolers, military, special education, etc.)
  - These two subcategories are important to appreciate because faculty and learner needs, pedagogical issues, and infrastructure designs may differ dramatically between these two subcategories.

Neither delivery format may be appropriate for for kinesthetic learners who focus best by doing it themselves instead of listening or watching or reading. Kinesthetic learners remember and grasp things better if they engage in physical activity as they learn. In fact, a definitional protocol categorizing learner styles and types of content and prescribing appropriate tools is called for. Sounds like a good grant opportunity....

This web site serves audiences interested in both "technology-enhanced" AND "technology-delivered" educational opportunities, but is biased towards the latter.

Categorization by Learning Format ... researched and developed by R.H. Jackson

It may be helpful to think of learning (web-based or otherwise) in the context of "**Learning Formats**"; i.e. how and when a learner encounters and undertakes the content. There are at least three general formats in which students learn:

1. **Directed study (a.k.a. Asynchronous "Self study")**

   - Directed Study learning experiences rely on some structured plan that directs the learner through learning experiences without real-time interaction from an instructor. CD-ROM based tutorials, paper-based correspondence and "Click-to-learn" web based systems are examples of this learning format.
   - Directed study may be supplemented by asynchronous interaction with the instructor, for instance through email, voice mail, comments from threaded discussions.
   - Traditional "homework" assignments also meet this criteria; thus requiring accredited academic institutions to think about what activities constitute accreditation-based "contact hours" and which activities constitute "homework" not considered to be part of contact hours. The vast majority - probably well over 90% - of today's "on-line learning" is in the directed study format.
   - Learning experiences based solely upon "Directed Study" require the learner to have a highly developed internal self-motivation characteristic. Failure to have such internal drive tends to result in high attrition rates for self-study; this higher attrition rate can be seen in the historically higher dropout rate of correspondence student compared to traditional residential students on most campuses.

2. **Instructor-led Events (a.k.a. synchronous "live, real-time" learning)**

- Instructor-led learning events are distinguished from Directed Study in that some commonly shared experience or event - generally occurring in real-time with highly interactive and structurally dynamically characteristics - is led by the instructor.
- Instructor-led events has the capability to dynamically react to real-time environments and change the plan of study or flow of learning to meet the needs of learners at that particular time. This engagement style helps sustain learner interest and probably contributes to reduction of attrition rates. Traditional seminar-style classrooms and field trips are classic examples of instructor-led events.
- Instructor-led events have traditionally been the differentiating characteristic of accredited higher-education institutions. Yesterday's "For-profit" correspondence school formats (often maligned by higher education as "Diploma Mills" for their purported lack of rigor) either limit or fail to include instructor-led events as part of their curriculums.
- Successful uses of Instructor-led events often capstone material presented in previous Self Directed learning or Small Group Collaborative formats OR create a catalyst for future learning presented in those formats. Additionally, Instructor-led events are often used to assess and supplement cognitive application of abstract learning.
- Instructor Led events over the web require the following capabilities:
  - **Awareness** means a learner is aware of when other members are present online.
  - **Communication** - at least between individual learners and the faculty member and commonly between learners and the learning group. This features is most often implemented with text chat; more sophisticated communication options are implemented with voice communications.
  - **Shared Objects** capabilities enable instructors and learners to view learning content simultaneously. Some shared objects may be interactively shared, such as the group viewing of live documents or applications with others.

  Most instructor-led events may also incorporate the following capability:
  - **Interactive communication** - a refinement of the basic Communication capability requirement, this feature allows two way interaction and may allow selective interaction between learners and/or instructor.

3. **Small Group Collaboration**

Small group collaboration is an informal context defined as that informal education that goes on student-to-student gathering in hallways and libraries between classes and informally digest and share their learning experiences. Sometimes called "community" in the distance education/e-learning literature, this format also embraces one-on-one interaction with mentors/instructors and faculty. Traditional faculty "office hours" fall into this format.

- Learning experiences using Small Group Collaborative formats often address development of practical application of abstract ideas. Small study groups working on a team project learn not only cooperative teamwork skills, but the interpersonal structures and goal setting strategies needed for career-oriented work.
- Small Group Collaborative activity may utilize asynchronous tools common to "Directed Study" (such as email, threaded discussion groups, listserves) as well as use of synchronous tools common to "Instructor led events" (such as telephone, voice-over-ip, and text chat)
- Early research indicates that successful incorporation of small group collaborative learning activities both increase the learner's satisfaction with the learning process (especially as compared to Directed Learning) and can decrease the time required from an instructor in administering and structuring a course or program.
- Small Group Collaborative events over the web require the following capabilities:
  - **Awareness** means a learner is aware of when other learners in the same cohort are present online.
  - **Communication** - at least between individual learners and the faculty member and commonly between learners and the learning group. This features is most often implemented with text chat; more sophisticated communication options are implemented with voice communications.
  - **Interactive communication** - a refinement of the basic Communication capability requirement, this feature allows two way interaction and may allow selective interaction between learners and/or instructor.
  - **Shared Objects** capabilities enable instructors and learners to view and interact with content simultaneously. Typically, shared objects may be interactively shared, such as the group viewing and modification of live documents or applications with others.

Web based delivery is attempting to address all three Learning Formats, with varying degrees of maturity and success. Successful distance education programs seek to combine all three forms of learning in programs of study. Individual courses within a learning program (such as a Master's degree) may not have elements of all three, but often do.

Categorization by Function

It may also be useful to think of software tools used in web-based learning in the context of what general and administrative functions they address. There are at least three general **Functional Categories** of software tool suites covered in this web site:

1. **Educational Delivery Systems** - a software product or suite that facilitates the delivery of content or interaction by the web, but is not necessarily intended to comprehensively measure performance over time or handle course administrative tasks. Placeware Auditorium and Centra's Conference product are examples of an Educational Delivery System.
2. **Course Management Systems (CMS)** - a software product that generally incorporates an educational delivery system for a topic (typically called a "Course" in educational institutions and most often facilitated via asynchronous-based formats) and provides integrated tools for measuring outcomes and reporting progress for individual or groups of students. CMS systems are currently most popular for educational institutions that are inclined to think of on-line development as course-centric. Examples include Blackboard's Courseinfo product and WebCT.
3. **Learning Management Systems** (**LMS**) - a software product that provides learners an integrated view of all their active coursework and assignments in a "syllabus" that spans multiple courses. LMS systems are most often found in large corporate training departments and corporate universities. They tend to be relatively expensive compared to CMS systems and require significant customization, but return a great deal of power to both the corporation and the users engaged in multiple learning projects. Examples include Docent Enterprise, ISOPIA ILMS and Knowledgesoft Enterprise.

Categorization by Capability to Accommodate Third Party Materials ... a categorization developed by Bryan Chapman

Another way to think about these systems is to consider whether they accommodate learning content from other sources than that they themselves deliver. Bryan Chapman of brandon-hall.com (www.brandon-hall.com. and email at bryan@brandon-hall.com) suggests this organizing principle in shopping for learning-management systems: Distinguish between vendors who offer computer-managed instruction (CMI) systems and those offering what he calls "Internet-infrastructure" (or integrated infrastructure) systems. Knowing the difference will cut your work approximately in half, Chapman claims, because CMIs and integrated-infrastructure systems provide distinct sets of services -- for now. First, back to the great divide as shopping tool: Will you buy third-party courseware to use with your learning-management system? "That immediately divides the whole world in half for you," Chapman says. If third-party courseware is among your priorities, choose a CMI system. Integrated-infrastructure systems, Chapman said, don't accommodate third-party courses as well. On the other hand, if you want a mix of self-paced, virtual and live-classroom training, an Internet-infrastructure system is the way to go.

Both product types have benefits and drawbacks. CMIs are open systems -- you can attach third-party courses. CMIs also tend to focus on self-paced courses. They are like "vending machines that dispense learning," says Chapman. The drawback: CMIs focus little on the community aspect of learning. CMIs include Docent, Ingenium, Manager's Edge, Librarian, Phoenix and WBT Manager, said Chapman. Internet-infrastructure systems tend to be quick starters: "Buy it, drop it on your server, and you have all you need for collaboration and student tracking," said Chapman. Integrated-infrastructure systems tend not to be self-paced, instead focusing on collaboration and involvement of an instructor. The drawback: Integrated-infrastructure systems may not recognize courses created elsewhere. Examples of integrated-infrastructure systems include Generation21, Mentorware, TopClass, Virtual U, Web Course in a Box, WebCT, and WebMentor. If you use Chapman's great divide, use it soon. He expects the line to blur and vanish as vendors borrow ideas from the other side. IBM Corp.'s LearningSpace has already crossed the line to CMI-like status by acquiring and incorporating Macromedia Inc.'s Pathware into its Mindspan service. Other vendors are likewise crossing, combining CMI and integrated-infrastructure traits -- and ruining Chapman's shopping shortcut. That's OK with him if it means a wider range of services from individual vendors. "I'm hoping that in a year to two years," Chapman told participants, "that line doesn't even exist."

What to Call the Thing

Web Based learning goes by many names. Here's an excerpt from a good article covering this confusion:

By DAN CARNEVALE. A readership poll by a learning-and-technology research group has found that very few people actually call distance education "distance education." What term is used depends on whom you ask. Some people say "e-learning," some say "distance learning," and others say "Web-based training," according to the Masie Center, based in Saratoga Springs, N.Y. In fact, a discrepancy exists between those who offer courses online and those who take them. Among people who work for institutions and vendors that offer course material online, 40 percent prefer "e-learning," which was the most widely used term. But, according to the professionals, a plurality of students -- 21 percent -- say "computer-based training." About 10 percent of students say "e-learning." Kristin Barton, director of development for the Masie Center, says the discrepancy probably stems from the rapid growth of learning technology, which she says has caused a rhetorical rift between those who stay on top of developments in the technology industry and those who have better things to do. "The learners are not in the industry, so they are more likely to use a term that's more outdated," she says. In late October, Masie conducted an Internet survey of 2,227 learning-and-training professionals who subscribe to the center's publications. People were asked what term they would use to describe "learning with technology." The respondents were given a list of possible names, as well as the opportunity to write in their own choices. People made some suggestions, but nothing new seemed very popular, Ms. Barton says. The poll asked Masie's subscribers what terms they use themselves and also what terms their customers use, but it did not survey students directly.

Does the proliferation of terms cause confusion? "Absolutely", says Jamie Morley, director of Trinity Learning Solutions. Trinity provides computer-certification courses using what she refers to as distance education. Ms. Morley, who earned her Ph.D. in adult education, found while doing research for her dissertation that, within the distance education community, different groups attach different meanings to the same terms and concepts. Some students assume that distance education involves technology, while others still think of correspondence schools, she says. Even some of those who expect a technology component assume that they will use a CD-ROM and don't immediately understand the practice of taking a course on the Internet. "We have people who call and ask for kits, and we don't have any kits," Ms. Morley says. "You enroll in a course." Even as the Masie poll results were coming in, Ms. Barton found that people disagreed with what different terms meant. Some people, she says, argued that "online training" is a subset of "e-learning." Others contended that "computer-based training" is a broad term that may include both CD-ROM's and the Internet, while "online training" involves only the Internet. Ms. Morley says it's up to individual institutions to explain in detail what they offer and what students should expect when they enroll. It's important to keep in mind that different terms have different meanings to different people, she says. Masie conducts polls on education and technology every month. "Whatever tickles our fancy that month, that's what we survey," Ms. Barton says. Other than "e-learning," few terms seem to be widely used by people who offer the courses. The poll listed 14 other terms and phrases that people in the industry use, but respondents did not appear to favor one consistently, Ms. Barton says. Terms that didn't win endorsements from even 1 percent of those surveyed include some obscure options, such as "electronic-performance support" and "i-learning." Vague terms like "learning" and "training" fared almost as poorly. The confusion over names isn't limited to those in the education industry. Someone who combed through federal documents would probably conclude that officials tend to use the term "distance learning." But when Congress organized a group of higher-education experts and members of Congress to study learning on the Internet, that group was called the "Congressional Web-Based Education Commission." From the Chronicle of Higher Education, issue dated January 12, 2001 Section: Information Technology Page: A33

What lies below

This web site attempts to informally catalog (and occasionally compare, contrast and editorialize on) the tools, topics and issues of interest to those developing for web-based learning initiatives.

Quality Criteria and Proposals

Much is being written about how to establish standards of quality practice in distance education. A deeper look at the debate will establish that education is at a critical crossroads which would have been reached without web-based learned but which web-based learning techniques are escalating more rapidly than expected. Quality and performance measurement, access vs economics, intellectual property and business models in education are all in play. Below are links to proposals and discussions on broad, overarching criteria for standards that begin to address these items with particular emphasis for web-enabled e-learning.

- A Credo for Going the distance - a white paper funded by Jones Education Network, edited by the American Council on Education, and embraced by a number of predominately asynchronously-focused learning organizations, including PBS. This reference is an abstraction of a more detailed reports from ACE entitled "Guiding Principles for Distance Learning in a Learning Society"
- 24 Measures of Quality OnLine - a research paper funded by software vendor Blackboard and the National Education Association, this work has received wide publicity in the Distance Education field. Final IHEP Report - Benchmark Study "Quality" is a link to the PDF file file at the Institute for Higher Education Policy (IHEP) where you will have access to the copy of the final report.
- Balancing Quality and Access: Principles of Good Practice for Electronically Offered Academic Degree and Certificate Programs - Funded by US Department of Education and researched by the Western Cooperative for Educational Telecommunications.
- Implementing the 7 Principles: ... Technology as Lever by Arthur W. Chickering and Stephen C. Ehrmann - In March 1987, the AAHE Bulletin first published "Seven Principles for Good Practice in Undergraduate Education." With support from Lilly Endowment, that document was followed by a Seven Principles Faculty Inventory and an Institutional Inventory (Johnson Foundation, 1989) and by a Student Inventory (1990). The Principles, created by Art Chickering and Zelda Gamson with help from higher education colleagues, AAHE, and the Education Commission of the States, with support from the Johnson Foundation, distilled findings from decades of research on the undergraduate experience.
- Digital Diploma Mills: ... (Part 1) - "Digital Diploma Mills: The Automation of Higher Education," by David F. Noble. This paper argues that the trend towards automation of higher education as implemented in North American universities today is a battle between students and professors on one side, and university administrations and companies with "educational products" to sell on the other. It is not a progressive trend towards a new era at all, but a regressive trend, towards the rather old era of mass-production, standardization and purely commercial interests.
- Digital Diploma Mills, Part II - The Coming Battle Over Online Instruction - Confidential Agreements Between Universities and Private Companies Pose Serious Challenge to Faculty Intellectual Property Rights
- U of Illinois Report - 1998-99 Faculty Seminar
  Website for the Report of a 1998-1999 University of Illinois Faculty Seminar, "Teaching at an Internet Distance: The Pedagogy of Online Teaching and Learning." This document is the product of the University of Illinois Teaching at an Internet Distance Seminar. The group met throughout 1998-99 to study the pedagogy of online learning, to examine what made teaching to be good teaching, whether in the classroom or online, and to suggest how online teaching and learning can be done with high quality at the University of Illinois.
- Council for Higher Education Accreditation (CHEA) - is the voice of the nation's colleges and universities on all matters regarding accreditation -- a uniquely American approach to assuring quality and public accountability in institutions and programs through voluntary, non-governmental self-regulation. Established in 1996 as a non-profit organization, CHEA also acts as the national policy center and clearinghouse on accreditation for the entire higher education community. CHEA has an ongoing research project on higher education references by this link. Core Academic Values, Quality, and Regional Accreditation: The Challenge of Distance Learning is another reference from the CHEA site.

Newsletters and eZines in Distance Education

- Best Educational E-Practices (BEEP) is a monthly ezine for a federally funded program called Project Eagle at St. Petersburg Junior College. Each issue highlights one particular topic (e.g., student support services, online teaching and learning, organizational obstacles to effective e-learning delivery), with links to the best sources of information on those topics on the Internet.
- Distance Education.Com - designed and written by professionals who have several decades of experience in educational radio, educational television, and the use of integrated telecommunications systems such as the Internet for teaching and learning.
- The Encyclopedia of Educational Statistics - The Encyclopedia of ED Stats brings together data from several National Center for Educational Statistics sources including: The Condition of Education, The Digest of Education Statistics, and Projections of Education Statistics.
- Elearning Start4All - A very nicely categorized links list to elearning resources worldwide.
- Distance Education in Latin America - a Spanish language web reference for distance education and virtual learning managed by the UNESCO Chair in Distance Education, held by the Universidad Nacional de Educación a Distancia (UNED) of Spain.
- eLearningPost - Daily links to corporate learning, community building, instructional design, knowledge management, personalization and more.
- Learning Circuits: A nicely done Web ezine on e-learning, presenting a monthly suite of feature articles, departments, and columns that examine new technologies and how they are being applied for workplace learning
- Distance Educator.com - a nicely designed portal targeted at distance education's learners, faculty and administrators.
- Syllabus - An online version of a commercial magazine regarded as a mainstay for K-12 and higher education technology-based learning ideas.
- The Masie Center - Hosted by Elliott Masie, a highly regarded and articulate reviewer of trends and technologies in at-distance and technology-based delivery. Has a nice links list and opportunity to subscribe to a listserve. Also offers a for-pay monthly newletter.
- Distance Learning on the Net - Hosted by Glenn Hoyle, this site helps teachers and administrators with screened links.
- the Node - theNode.org provides networked support for instructors, trainers, designers and administrators with a professional interest in teaching with technology. It delivers timely, targeted resources that will help you make effective use of learning technologies. Anytime. Anywhere.
- Lifelong Learning - Consultant/publisher of directories of e-learning and on-line programs
- Cause/Effect (published by Educause) - CAUSE/EFFECT is a practitioner's journal for college and university managers and users of information resources--information, technology, and services--published quarterly by EDUCAUSE.
  The journal is distributed in print form to approximately 6,000 individuals on more than 1,300 college and university campuses. Written by campus practitioners, articles are peer-reviewed prior to publication. Articles related to planning for, developing, managing, evaluating, and using information resources on college and university campuses are welcomed.
- The Journal of Asynchronous Learning Networks - The Journal of Asynchronous Learning Networks (JALN) is published on-line by Vanderbilt University for the ALN Web.
- Educom Review (published by Educause) - Educom Review explores the changing ways we will work, learn and communicate in the digital world.
- The Technology Source - This journal is published online by the University of North Carolina at Chapel Hill. The purpose of "The Technology Source" is to provide thoughtful, illuminating articles that will assist educators as they face the challenge of integrating information technology tools into teaching and into managing educational organizations.
- Asynchronous Learning Networks Magazine - The ALN Magazine is devoted to topics in ALN that do not fall in the traditional journal format. These topics include reports of uses of technology, experiences with ALN courses, reports of activities on various campuses or in industry.
- The Journal of Interactive Learning Research - The Journal of Interactive Learning Research (JILR) publishes papers related to the underlying theory, design, implementation, effectiveness, and impact on education and training of the following interactive learning environments: authoring systems, cognitive tools for learning computer-assisted language learning, computer-based assessment systems, computer-based training, computer-mediated communications, computer-supported collaborative learning, distributed learning environments, electronic performance support systems, interactive learning environments, interactive multimedia systems, interactive simulations and games, intelligent agents on the Internet, intelligent tutoring systems, microworlds, virtual reality based learning systems.
- The American Journal of Distance Education - designed for professional trainers; teachers in schools, colleges, and universities; researchers; adult educators; and other specialists in education and communications. Created in 1987, The Journal disseminates information and acts as a forum for criticism and debate about research in and the practice of distance education in the Americas. Distance education describes teaching-learning relationships where the actors are geographically separated and communication between them is through technologies.

Listserves Of Interest Professional Organizations

A listserve is an email mailing list that works like a magazine subscription, except it is free. Listserves are ways of creating and sharing timely content with a large group of similarly interested individuals. Listed below are some of the listserves useful to those developing web-based instruction.

- **IEEE Learning Technology Task Force (LTTF)** - This Learning Technology newsletter is an effort to document the lessons learned from the integration of existing technologies, as well as new developments, in modern education. It will also report the activities of the IEEE Learning Technology Task Force, announcements of various conferences and other events in this field, and opportunities for participation various projects.

  To subscribe to this listserve, send an e-mail to LISTSERV@LISTSERV.READADP.COM with the following in the body of the message (no subject needed):

  subscribe LEARNING-TECHNOLOGY firstname lastname

  (Please replace 'firstname' and 'lastname' with your firstname and lastname.)

  HTML version: http://grouper.ieee.org/ltsc/ifets/lttf/learn_tech/

  - Back issues are available at http://lttf.ieee.org/learn_tech/issues.html
  - A web page giving further info on this organization is available at http://lttf.ieee.org/learn_tech/issues

- **Support of Faculty Using Computing Technology in Higher Education Teaching**
  - North American Faculty, send email to FACSUP-L@UCONNVM.UCONN.EDU
  - An equivalent listserve for United Kingdom faculty is available at http://www.jiscmail.ac.uk/default.htm
- **New York Times' College Times** - The New York Times has launched its College Times Web site, allowing college students and faculty to more easily locate information related to their specific areas of interest. Visitors to the college site can search for recent Times articles by subject and can sign up to receive free e-mail alerts when new articles related to their specific fields of study are published on NYTimes.com. In addition, users can access a number of additional resources, from career- planning information for students to instructional resources for faculty. The Faculty section includes Teaching with The Times, a set of free curriculum guides that offer innovative ideas about how to augment course content with The New York Times and suggest tips for lectures, discussions, research essays and tests in various subject areas. Faculty will also find direct links to education news and other relevant content from NYTimes.com.
- **VNU Business media** offers several online newsletters.
- **Catalog of Listserves** - collection of education-focused discussion groups

North American Conferences and Trade Shows on Web Based Learning

- **OnLine Learning Conference And Exposition** - Hosted by Bill Communications. Generally combined with Performance Support 2000 and various other smaller shows, this conference attracted ~7,500 attendees in Denver during Fall, 2000. Attracts both trainers and educators, though a little biased towards trainers.
- **TechLearn** - Sponsored by the Maise Center, this elaborately staged gathering has no formal expo, but provides attendees with a bag full o' brochures and some high quality seminars and hands-on presentations. Attracts both trainers and educators.
- **The EduCause Annual Conference** - Although the Educause organization hosts several other conferences annually, their Annual namesake is regarded as a primary resource for academic web based learning information.

Asynchronous Web Based Software Suites

This category attempts to group software suites of tools that quickly allow an instructor to convert existing basic electronic documents to a hierarchical system with relative ease. Although most of these suites may require limited HTML knowledge to fully exploit, relatively little programming or other technical expertise should be needed to effectively use these software suites.

Key characteristics of major players in asynchronous suites typically include capability for secure student login via standard Java browser, centralized database-centered syllabus with links to internal or external web pages, on-line, time-monitored quizzes with randomized dynamically-generated testing, discussion groups, and integrated email. Systems also provide instructor development tools to ease transition from other media to these products.

A number of of organizations are attempting to establish open standards for this class of product; review the topic on Industry Standards later in this document for more information.

Note: Subsets of these software suites may be found in products listed as Web Based Training/Learning Development Tools later in this document.

Some asynchronous web delivery systems are available only from Application Service Providers (ASPs); such products are listed later in the Consultants and Application Service Providers section.

Aqua colored shading below indicates market-share dominant products in this category.

Courseinfo	Blackboard's Courseinfo product has replaced both Topclass and WebCT on many higher education campuses in the last two years due to its aggressive pricing strategy and relative ease of use. Courseinfo is a classic Course Management System based on templates. Available for both Unix and NT servers (with the Unix platform the Blackboard recommendation) Courseinfo does not provide significant internal content development tools, but has import features from many stand-alone content development tools. While attractively priced, early versions of Courseinfo seemed to suffer significant stability problems and lacked scalability suitable for large classes. Blackboard is now aggressively pushing the higher-tier (and significantly higher priced) product in its line, "Courseinfo Enterprise", which markets itself as a scalable, robust enterprise-class system. Like most of its competition, however, Courseinfo Enterprise will require very significant custom programming to integrate into a tightly-integrated "campus-wide" tool.
Lotus LearningSpace	LearningSpace is an add-on application written in Lotus Notes. Currently targeted towards corporate users. Lotus purchased technology from Databeam for inclusion in LearningSpace to add synchronous facilities to this product, resulting in the LearningSpace Live product. The "Live" component apparently will be an optional add-on to the asynchronous LearningSpace product.
WEBct	Low cost, asynchronous delivery and course management system developed by University of British Columbia for higher education faculty. A collection of development tools and custom CGI scripts, it is maturing into an integrated tool suite. WEBct was purchased by Universal Learning Technology in May of 1999.
WBT Topclass	The "elder statesman" of this category, Topclass has been the most mature product in the top tier, but seems to be losing its appeal in North America among higher education institutions to its North American rival Blackboard Courseinfo.
Manhattan Virtual Classroom	Manhattan is similar to BlackBoard's CourseInfo in features and ease of use, but it has been released under the Open Source General Public License for free. Anyone can download the complete, fully functional system, along with the source code, with no strings attached, from the website. While some institutions will find the fact that Manhattan is a free course management solution inviting, the fact that it is completely open and non-proprietary is its real benefit to higher education. Any programmer, at any institution, can freely modify Manhattan as long as they make their modifications available to the community. Steve Narmontas at Educational Technology Center, Western New England College, Springfield, MA is the author of the system, which runs under Linux, but which is already being 'ported' to run under other versions of Unix. Manhattan has been used extensively at Western New England College in Springfield, MA since February of 1997.
Total Knowledge Management (TKM) *previously Generation 21*	guides developers in building small "chunks" of information—Dynamic Learning Objects. These small chunks of learning can be linked in unlimited configurations to countless courses—for different skill levels, competencies, audiences, and formats. Uses pre-tests to determine what learners already know and compiles only the learning objects needed to fill particular learning gaps. In addition, a performance support feature allows users to search the entire database for information when they need to perform a task or answer a question. The associated learning objects—and other pertinent information from the knowledge library—are delivered right to the learner's desktop. A management function tracks requirements, history, grade books, and learner performance.
Avilar WebMentor	WebMentor is a training environment with a complete feature set available for developing, administering, and delivering web-based training over the Internet, intranets and extranets. Product is one of the few allowing creation of modular reusable content.
Docent	An enterprise training automation product. Comes with an outliner, publisher, server and reporter. Product is one of the few allowing creation of modular reusable content.
ISOPIA's ILMS (Integrated Learning Management System)	A Canadian-based firm creating data-based systems comparable to Docent's Learning Management Product. Product is available for direct sale and as a service-bureau product (in a package called LearnTone).
The Learning Manager	The Learning Manager Product is a Windows NT server-based system with software characteristics competitive with advanced Learning Management Systems, Version 3 adds IMS-compliant learning object storage allowing improved content interchangability. Developed originally in Canada, and refined by use in Campus America in very early campus automation projects, this software package exhibits a maturity not found in many startup packages.

COSE	Creation of Study Environments (COSE) is a software system intended to provide a system and tools for the creation of Study Environments rather than "material" and to enable their development to take place in the context of a coherent pedagogy and which promotes good practice. It attempts to allow the creation of study environments which can exploit material in a wide range of media and allow easy provision of mechanisms for support, feedback, collaboration and self-assessment without recourse by staff to skills such as scripting and mark-up languages.
Bravo	Universal Learning Technology's Bravo product is an IMS compliant asynch course management system. ULT also owns webCT.
ucompass Educator	Product is either sold per server or hosted and sold per student. Provides chat rooms, customized evaluation, grade databases, web-based email, discussion boards. Capability for on-line textbook publishing and guest websites. System seems to also integrate instant messaging for chatting among students.
IntraLearn	With IntraLearn, a student can register, receive training, submit tests, communicate and collaborate with others, and receive certification over the Internet. Students can learn any time, any place, and at any pace with the point-n-click simplicity of their standard Web browser. No special plug-in is needed to use IntraLearn, nor programming to install. IntraLearn integrates remote registration and proctoring, lessons, interactivity, streaming multimedia, communications, testing, tracking and reporting to provide a secure and self-contained online education solution. The IntraLearn Software Corporation also offers complete technical support and Web hosting services. Intralearn and a complimentary product called ICOSA are capable of spanning multiple servers, a rare characteristic for current LMS/CMS systems. Intralearn is AICC Certified and a Microsoft Tier 1 Partner.
Belvedere	Knowledge Mapping collaborative software from the University of Pittsburgh. Students diagram and reflect on their own learning processes interactively while learning is underway.
CyberProf	an ongoing late beta research prototype for web learning and authoring. Final product to be available in 2000.
Convene.com	Convene.com has been creating customized online education solutions for schools, colleges, universities, and training organizations since 1993. Convene's unique learning platform ac@deme, incorporates exclusive WebSync technology that captures and automatically updates the user's computer with a synchronized Internet environment so that students and teachers can be as productive online as off. Convene.com is equipped to handle everything it takes to successfully build an organization's virtual campus and then support it with network, customer development, hosting, and around-the-clock helpdesk services, as well as one of the most comprehensive faculty training programs in the industry.
Mgen, Inc	offers Mgen, a video/multimedia server control and distribution system. mGen is comprised of two products: mGen authoring station, the software to build and maintain courses and mGen operating system the user interface that runs over the network
Qualtech, Inc.	provides the "Presentation Commander" allowing: Create and edit specific segments of VHS videotape that can be accessed at random, creation of scripted presentations that automatically access video clips in a predetermined sequence, allowing for "hands-free" operation with minimal interaction from the presenter, Integration of PowerPoint slides alongside video clips in your presentations, documents and annotate any video recorded event, catalog and organize videotapes and video clips, create a searchable library of videotape and PowerPoint resources.
Saba Software	Inc. of Burlingame, CA, released its Education Management System for creating and managing learning environments for employees and customers.
FlexTraining	is a distributed education framework for companies and organizations who require on-demand training for Employees, Customers, Clients, or Members. The FlexTraining platform that lets you define, create, and conduct your own training courses over an Intranet or the Internet. Unlike other Web Based Training systems, it requires no extra "plug-in" software, and courses can be set up and managed on an ongoing basis without direct involvement from your Information Systems staff.
Web University by Information Management Group	Offered a free starter kit for trial deployment. System is built on Microsoft Backoffice software. The company seems to have withdraw their initial publically-purchasable option in favor of using it as a platform for customized solutions, presumably under contract.
Intrakal by Anlon	founded in 1996 by John Kaliski, Ph.D., and John Weir, M.A.
Mentorware Education Server	Mentorware delivers a comprehensive on-line learning support system providing course development, class management, student enrollment and progress tracking features integrated into an easy-to-use interface.
Pathlore Phoenix Internet	Provides authoring, presentation and administration on IBM mainframes, DOS-based PCs, and local area networks (LANs).
Pebblesoft Learning Environment	A suite of tools which help organizations develop content for delivery over networks.
Caucus Systems	Server centric Web-based based asynchronous conferencing software. Caucus components consist of the Caucus Markup Language (CML), CML scripts which configure Caucus conference centers and events, and the Caucus server.
The Saratoga Group's CyberWISE EMS	CyberWISE Online Event Management System (EMS) is a Web-based system for planning, managing, and allowing users to register online for corporate events, such as training sessions, corporate meetings, trade shows, and product launch events.
KnowledgePlanet	a flexible solution framework that provides an integrated approach for streamlining and automating the management of enterprise learning, competency-based workforce development and workforce performance management for optimal business advantage.
Teamscape's Learning Junction™	TeamScape Learning Junction™ is a comprehensive internet based solution for online training management which streamlines business processes across the entire training chain. It enables your corporate training department or business to seamlessly integrate all your training constituents including training staff and other employees, external consultants, instructors, students, partners and suppliers.
eWeb	A Value added remarketing service that also sells a Web-based learning environment supporting collaborative learning. Distributed as either a turnkey hosting service or via CGI scripts for your server.
Virtual-U	an online software system under development which allows universities and organizations to offer their courses online. Developed at Simon Fraser University, the Virtual-U Research Project is part of the TeleLearning Network of Centres of Excellence
Cyberlearning Labs ANGEL	CyberLearning Labs, a technology venture of The Indiana University Advanced Research and Technology Institute (ARTI), is offering its Angel (A New Global Environment for Learning) software free to educational institutions nationwide. Angel software is free to all K-12 and higher educational institutions in the United States. These institutions can use Angel in whatever capacity works best for them. The free Angel 2000 offer includes a portal (a Web page feature that links to an institution's existing databases as well as to Web resources), comprehensive course management tools, a calendar and other e-Learning tools. The free license permits the development creation of an unlimited number of courses, users, and user accounts.
Well Engaged Discussions	Provides forums and discussions, individual user accounts tracks participants so they may return and see what's new and provides user profiles and newsletters to allow you to build a community with your visitors
Gone by the Wayside	**Below are products that have either been discontinued or merged. Their listings are preserved to help those who are doing trend analysis on how products fair in this changing market.**
Mad Duck's Web Course in a Box	Previously a standalone product, Madduck was purchase by Blackboard in Spring of 2000.
Comparative reviews of Asynchronous web-based education delivery software	A Comparative study by Wichita State Comparison Study of CBT and WBT tools by Dr. Geri Kristapiazzi A comparative study by Dr. Bruce Landon Marshall University review of Software (includes selected synchronous tools **UT Continuing Studies 1997 review of selected asynchronous tools** Asynchronous Learning Networks - an on-line journal of asynchronous learning studies Web Based Training Solutions - Reviews by InfoWorld Part 1 - Reviews of Asymetrix and Docent Part 2 - Reviews of Asymetrix, WBT Systems, Macromedia, Docent, Micromedium and Allen Communication Web Based Instructional Tools - a review by Sharon Gray - Briarcliff College reported in Syllabus Magazine Web Ed Web Based education links Integrated Learning packages, a peer review of software hosted by The Node: Technologies for Learning Choosing a Virtual Communal Space for Your Course, provides links to several hands-on demonstrations of virtual communal spaces, as well as links to several sites that have information relevant to virtual communal spaces. Tools for Designing Web Courses, an article from The Chronicle of Higher Education Oct. 1997 From Douglas College, New Westminster, B.C reviews and distinguishes between "integrated applications" and "components" From the University of Manitoba David Woolley Discussion group web page PC Week August 1997 review ... failed to review several industry leaders and combined suites with components, but worth looking over Building a web-based education system - a series of reviews and pointers to user surveys

Synchronous (real-time) Web Based Training solutions

Shading below indicates author's choice for dominant or industry-leading products in this category.

Major Synchronous Players for Instructor-Led training	Is the product Voice **Interactive** over Internet?	Key characteristics of major players include: browser-based, IP-based two way audio (usually half duplex), collaborative application sharing, whiteboard, synchronized web browsers, some on-line testing - designed for use over Internet dialup connections or corporate intranets. This class of product is most appropriate facilitating relatively formal, instructor-led, hierarchical learning events, such as a seminar or interactive classroom. Some of these products incorporate "talking head video" (a.k.a. "Streaming video with some image of the instructor); most of these products suffer from poor video quality and tend to require 128KBPS (a.k.a. ISDN class) dial-in connections for acceptable performance; although a compelling sales feature tending to appeal to instructors familiar with videoconferencing, the author is not convinced that current "Talking head video quality" over dial-up Internet connections is worth the effort; most students ignore such poor images very quickly into the course. It is therefore wise to compare packages on features other than talking head video capabilities since these data and audio features are more likely to be valued and appreciated by learners.
Centra 99 (a.k.a. Centra Symposium)	*Yes*	Originally designed for intranet corporate use, Centra was the first to market with voice-over-IP at dial-up Internet bandwidths. A digital replay feature is now incorporated, allowing previously held Centra events to be replayed at full resolution and with instructor and student interaction audio, where appropriate. Product has recently been updated and repositioned in three permutations: 1. Symposium, allowing interactive instructor-led presentations with voice-interaction over the internet. Note: Symposium is used at the university of Tennessee by the author of this web page. 2. Conference, featuring a very fast client install and scalability to hundreds of users per session, but with only broadcast audio capabilities. 3. E-Meeting - an ad-hoc scheduled system allowing individuals to call and attend meetings. Useful for administrative and team meetings. Centra also offers an Application Service Provider (ASP) version of its product call CentraNow. Once you sign up to be a CentraNow member, you can begin creating and attending meetings. There is no software to download. Simply schedule a meeting time, invite attendees via email, and hold your meeting on CentraNow. What you can do: Hold a spontaneous or scheduled meeting, show a PowerPoint slide presentation, broadcast applications - Excel files, software demos - to all meeting participants, speak with participants through two-way voice-over IP or phone, control who can speak and collaborate, share Web pages, pictures, and graphs; poll meeting participants instantly, highlight your point with whiteboard mark-up functions; communicate via public and private text chat.
HorizonLive	Yes	Utilizing a common web browser, Horizon connects a presenter and an audience. The speaker's voice and presentation materials are "pushed" to participants located anywhere on the Internet, or company intranet. Participants can type questions or responses back to the presenter, and to each other, just as in a real classroom. Content for a presentation can be anything to help strengthen your words, in any Internet-ready format. Possible formats include Microsoft PowerPoint or Word bullet points, graphics, animations, forms that students fill in — anything that could be on a website, including live websites. Horizon also offers an Application Services Provider (ASP) version of its product, meaning that they host the product from their web servers for a fee. The service, called OfficeHoursLive, first virtual office designed specifically for faculty, teaching assistants, tutors, counselors, and other distance learning professionals. The product enables instructors and students to speak with each other live over the Web, and can be used to hold virtual office hours, "Q & A" sessions and study groups, deliver live lectures, host exam review sessions, or present guest speakers. The OfficeHoursLive environment allows educators to interact with students live and in real-time through standard Web browsers, without custom software and on virtually any PC, Mac, or Unix computer. Each virtual Office features a teaching and learning tool kit, and a set of templates provide instructors a way to create and deliver interactive slides and exercises, as well as real-time polls, surveys, and evaluations.
Lotus LearningSpace AnyTime	Yes	• LearningSpace is a suite of products, the first such asynchronous/synchronous web delivery suite from a major vendor. 1. (1) Its asynchronous component is called LearningSpace Forum. Based on the Lotus Note/Domino server, Forum is a custom application of Lotus Notes. 2. LearningSpace Live, based on the Databeam Learning Server technology acquired by Lotus in 1998, is a synchronous web-delivery system allowing instructor-led, real-time courses with features similar to Centra. Pricing starts at $10,500 per server and $300 per enrolled user. • The basic learner client for LearningSpace Anytime can be either a java-enabled web browser or the Lotus Notes proprietary client. • Lotus will offer a high-end version of LearningSpace Anytime called "LearningSpace Campus" which provides more sophisticated administrative tools and other scalability improvements for larger learning environments.
LearnLinc	Yes	The "elder statesman" of this category, Learnlinc's product is the most recent permutation of their product line. LearnLinc 4.0 features instructor/student floor control, class coordination, synchronized multimedia or Web-based courseware, application sharing, whiteboard and text chat, instant student progress verification with polling, Q & A, and feedback.A wide selection selection of communications options, including audio and video conferencing, streaming video, and IP multicasting include support for 2-way interactive desktop video. Version 4 adds firewall tunneling, an assistant instructor, integration with Microsoft SQL Server, web-based administration and automatic upload of a Powerpoint presentation as basis for a class presentation (all features common to Centra's current Symposium Product). Additionally, Learnlinc will incorporate a still photo of the speaker, when available, as an alternative to bandwidth-intensive streaming video. Internationalization is also available in version 4.0.
Classpoint	Yes	Product combines a proprietary version of WhitePine's CU-See Me clients (with both audio and video components) with White Pine's Meetingpoint Multipoint Control software for servers.
Placeware Conference Center	No	In a PlaceWare Auditorium event, presenters give slide shows and answer questions from the audience. Audiences respond to the presenter and to each other, vote, and assess the presenter - without leaving their desktop. A hosted version of this software is available from Envoy Global.
Astound	Yes	Not a purchasable product, but an annually contracted hosting service providing voice, application sharing and slide show capability
Educata Classroom	Yes	Apparently a service bureau, offering online "Learning Centers" that allow educators and corporate trainers to create, integrate, customize and deliver educational material within a single, flexible environment. Combining leading-edge technologies with a range of content and services – including research, research enablers, courses, test preparation and assessment materials – Educata sets itself apart by consolidating the resources required to impart and access knowledge into a single place, the Learning Center.

Netopia Webseminar	n/a	Netopia originally licensed the Picturetalk (now Pixion) Web Seminar product. It appears that they have discontinued selling of this product services as of 6/19/2000.
Pixion Picturetalk WebSeminar	Yes, optionally	**Features include:** • registration, email notification for attendees and meeting administrator, quizzing and polling, web surfer, slide show mode, record and playback capability, firewall friendly Java applet for attendees. Optimized for 28.8 connections.
InterWise	Yes	A synchronous product, currently used by the database vendor SAP, that appears similar in features to the major players. Features full duplex audio interaction and editable replays.
iSync	No	A hardware product from a startup company that allows recording of a streaming video presentation (talking head) played back adjacent to a large screen view of digitized 35mm slides. The system uses RealNetworks web-based player. The product appears limited to use of 35mm slides as the supporting media, but produces a nice presentation.
Alive E-show	No	Live streaming media presentation system or hosting service. Tailored for non-techies.
Mimio Boardcast	No, not by itself	essentially a product that (1) lets you write on a conventional whiteboard with markers, (2) capture what you are writing and what you are saying, and (3) stream it using RealServer to clients using RealPlayer. Much like the RealProducer software, which is used with PowerPoint slides and audio - but boardCast would permit a faculty member to be spontaneous in a lecture - and capture all this for on-demand streaming over the Internet.
WebSentric	No	A cross platform system that presents PowerPoint slides with one or two way audio requiring only 4x level web browsers. System can cross most corporate firewalls and presents very high quality presentations. Can be live or on-demand replay. Seems to be integrated with a for-pay hosting service. Users log onto a Web site and enter a password to gain access to slide presentations with whiteboard and interactive chat capability. Participants needn't install new software or run on the same system. WebSentric can run over slow Internet connections since its graphics are preloaded before presentation begins.
Eloquent Communications Server	No	The Eloquent Communications Server is an enterprise-scalable software platform that manages, delivers and enriches multiple content formats, including streaming and rich media, for business communications. Turns streaming media into rich media. Delivers integrated information across an intranet, extranet, or the Internet. Supports over 200 popular content formats, including RealNetworks Real G2 and Microsoft Windows Media. Delivers personalized content to specific audiences. Features interactive (text chat) discussions, polls, documents, and URLs. Uses intelligent search capabilities. Provides scalable architecture that enables an organization of any size to reach thousands of users with an unlimited amount of content. Ensures enterprise-level security and access control of content.
Rotor Learning	No	A new startup system designed for educators. Unlike the leading synchronous products designed for corporate training environments, this hardware/software combination product attempts to simplify the interface and enforce a higher level of instructor control over the learning process. System provides Netshow and RealVideo as part of its video system. The product allows a web-broadcast with streaming video and audio originating from the host site. Students interact via polling and text-based chat. Product appears to address a niche market for educators seeking alternatives to expensive satellite-based delivery, but may also be of interest to audiences considering primarily seminar format, "sage on the stage" sort of presentations where significant interactivity is inherently limited.
Gilat TrainNet	No	An unusual satellite-based interactive system using phones and IP multicasting for audio/video and data interaction. Separate versions available for academic and corporate users; systesm support synchronous group sessions and asynchronous PC based learning.
Magideas ClassWise	No	ClassWise delivers live, interactive classes over the Internet and automatically records live sessions for asynchronous playback. It is also significantly less expensive than competitors like Ilinc and Centra. Features include real-time audio, shared whiteboard with PowerPoint slides, QuickSymbols(TM), text chat and more.
Visual Rendevous	No	This VisualTek Solutions, Inc. product is a full-featured Java based Internet/Intranet/Extranet Conferencing, Collaboration and Communication system. It provides a platform-independent groupware environment with simultaneous text sessions, shared whiteboards, drawing on common canvas, file and document sharing, and screen and image sharing and annotation.
NCSA Netlearningplace	No	Building on the strengths of netWorkPlace™ and other collaborative tools developed at NCSA, netLearningPlace™ is a collaborative environment focused specifically on teaching and learning. netLearningPlace™is an environment which integrates multiple tools for collaborative distance education, and just-in-time training. The framework provides both synchronous and asynchronous collaboration capability. *netLearningPlace™* is currently under construction.
V.O.I.C.E.™ System	No	The is a virtual classroom for synchronous and asynchronous distance learning over the Internet using a web browser, including easy-to-use instructor templates and administrative features.
Podion Corp netPodium	No	Assemble, deliver, and archive a live, interactive Web broadcast. Audience members hear you speak, see slides and other visuals, and interact with you.
Picture Talk Distance Learning Server	No	PictureTalk's Distance Learning Server lets you deploy distance learning systems across intranets and the Internet, reaching students on any platform (Windows 3.1, Windows 95, Windows NT, Macintosh, UNIX, or Java).
PBS Business Channel	No	Offers scheduled lectures and events on-line. The events are from 1 to 2 hours in length and cover a wide variety of topics. Intended for mass broadcast - not individuals.
Evoke Communications (previously Contigo)	No	Offers hosted services with internet-based content and telephone conference call-based audio to provide web conferencing, collaboration, and webcasting.
Activetouch Webex	Yes	A hosted synchronous service bureau solution. Not currently available for sale as a stand-alone product.
Sneakerlabs iMeet	No	Includes application sharing and interactive browsing. A hosted synchronous service bureau solution. Not currently available for sale as a stand-alone product.
Review of Selected Synchronous Software Tools		• **Teleconferencing Magazine - Collaboration, streaming and conferencing converge: An analysis of recent activity in the Web conferencing space** • **UT Outreach/Continuing Studies review of selected Synchronous instructor-led tools**

Other Comparative Reviews

- **Evaluating Online Learning Options** - part of an online course by Chris Saeger providing comparative information. Mr. Saeger is manager of individual and organizational learning in disaster preparedness at Red Cross national headquarters in Falls Church, Va.
- **More overviews and comparative charts** on Education Delivery, Course Management and Learning Management Systems
- **Learning Management Systems 2001** - How to Choose the right LMS, a well received publication from Brandon Hall

H.323 MCU-based synchronous products

H.323 multipoint control unit (MCU) based units are a significant subset of synchronous delivery systems. For users already familiar with traditional two-way interactive videoconferencing, H.323 represents most of those functional features but designed for operation at individual computer desktops connected to the internet.

Key characteristics of this segment include: adherence or tacit support for H.323 audio and/or video conferencing, and T.120 whiteboard standard, cheap or free clients, presence of separate multipoint control unit to allow simultaneous peer-to-peer operation by more than 10 users in a session and hosting multiple ad-hoc sessions simultaneously. Most of these products support Microsoft's Netmeeting as a key software client. The most stable products in this segment heavily weight two-way audio and high resolution data collaboration and tend to de-emphasize "talking heads" video.

This class of product is most useful in facilitating small group projects, advising and other ad-hoc small group Voice-Over-IP (VOIP) with collaboration events. A typical system requires software for each user (a.k.a "Client software"). Sessions of more than 2 people simultaneously often (though not always) require a intermediate server to act as controller. As the number of simultaneous users in one session increases, the desirability of a robust central server increases exponentially.

Currently, the H.323 standard is more hype than functional products on the commodity internet. Relatively few H.323 clients exist and few in deployment are used regularly - largely to to the lack of functional multipoint public gateways. Many technology professionals expect H.323 will be implemented universally by 2005, replacing H.320 videoconferencing protocols as well as proprietary web-synchronous systems. However, the use of Internet2 - a dedicated high speed network often available between universities - is helping to drive greater interest in H.323 protocols as users on Internet2-equipped campuses generally have a great deal of unused bandwidth to experiment with. On Internet2-equipped campuses, videoconferencing - a notorious bandwidth hog - is not as distasteful (and far more useful) in comparison to use on the commodity internet. There are currently a number of experimental H.323 multipoint gateways available for cheap or free on Internet2; it will be interesting to see whether this free, open access to a fairly expensive resource (i.e. multipoint gateway/MCU's) will continue.

Competing new protocols to H.323 have been in development. H.323 suffers from a variety of scalability problems. The Internet Engineering Task Force is building two new protocols, MGCP (Media Gateway Control Protocol) and SIP (Session Initiation Protocol), built from the ground up for use on the Internet. Special attention is being paid to extensibility and scalability, and the protocols are optimized to run over IP networks, (i.e. over the Internet). The likely direct competitor to H.323, Version 2 is SIP. SIP has the following improvements over H.323:

1. *built-in support for multicast, allowing efficient conference calls*
2. *Ability to run on TCP or UDP protocols; H.323 is limited to TCP protocols*
3. *Gateways do not have to monitor call information*
4. *Support for routing loop detection using a BGP-like method to traverse multiple domains.*

It is not clear whether SIP/MGCP will replace H.323 for managed Internet synchronous delivery; however, it would be wise to invest only in systems that support (or plan support for) both H.323 and SIP protocols.

H.323 MCU's - This is essentially the "brain" of a multipoint videoconference with multiple endpoints (clients). There are two distinct implementations of MCUs - those that are all-in-one dedicated hardware units and a group that requires UNIX or NT servers and runs as a software application. As of late 2000, hardware MCUs (RADVision, Cisco, Accord) account for 86% of MCUs sold. All the software MCUs combined are only 14%. Accord's Marketshare will probably grow as more organizations require larger and more flexible MCUs.	
RADVision	Most popular Hardware MCU
Cisco H.323 MCU	A Hardware MCU branded by Cisco, but manufactured by RadVision
Accord	A scalable H.323 MCU designed for larger environments
White Pine Meetingpoint MCU	uses Microsoft Netmeeting or Whitepine's CU-See Me as clients. Version 4.0 added support for streaming output in Microsoft WindowsMedia (formerly NetShow) Cisco's IPTV and RealNetworks streaming content. Continuous presence allows four people to be seen simultaneously. Available for NT, Solaris and Linux. Base cost $8995 for 10 users, plus $4995 for continuous presence or streaming options. White Pine also offers a bundle of MeetingPoint Server and a customized version of CUSee me for students and instructor; the bundle is called **Classpoint**
OnLive! Technologies ACS 300 MCU	using Microsoft Netmeeting as a client
Databeam Net120 MCU with Meetingtools	using Microsoft Netmeeting or Databeam Farsite as clients
Picturetel 330 MCU	with Microsoft Netmeeting as client. With Picturetel's Video Application Server, multimedia applications can be streamed in Starlight's MPEG, Realnetwork's G2 and Microsoft's Windowsmedia formats. A Picturetel service bureau (eVideo) will be available essentially renting time on the Video Application Server product; pricing starts at $1000 per hour.
Other Useful Links for H.323 MCU Systems	Reviews of Current MCUs and the state of H.323 from Network Computing An overview of Desktop Conferencing Technologies Review of H.323 MCUs by PC Week Reviews of H.323 clients by Network computing SURA's Videoconferencing Cookbook, with a significant section on H.323
H.323 Clients - "clients" (a.k.a. "endpoints") are the end-user connection for H.323 systems. There are two classes of H.323 clients - software only systems and software/hardware combinations.	
Visitalk	New H.323 client with an ICQ-like people directory based on a unique identifier.
Microsoft Netmeeting	A Freebee for Windows-based computers. Probably the best known and most widely implemented H.323 client.
Intel ProShare System	A hardware/software combination for H.323 implementation.
WhitePine CuSeeMe Pro	An H.323 compatible update to the popular CuSee Me voice and video over IP software product.
Zydachron Z350 & Picturetel 550	A hardware/software bundle review by Network Computing
Polycom Viewstation and Viavideo	Market leading H.323 small videoconferencing appliances
VCON Escort and VIGO systems	H.323 Hardware addin for a PC

Other Voice Over IP (VOIP) systems that may or may not be H.323 compliant, but still worth looking at. Note: Many of these products are intended to be sold to internet service providers as a value-added enhancement or to replace traditional telephone infrastructure within corporations; still, there are merits to understanding how these technologies utilize the internet for interactive communications:

Voyant Technologies Instant Conferencing	The platform allows service providers to offer instant, "n-way" conferencing capabilities using the Session Initiation Protocol (SIP) for conference setup and teardown. This enables end users to easily launch a voice conference without a prior subscription or reservation, making it "subscriberless". Conferences can be initiated from either a SIP phone, a web interface, a PC with a soft phone, or a PSTN phone through a gateway. Additionally, point-to-point conversations can be seamlessly expanded into an "n-way" conversation without disruption or redialing. End users of these easy-to-use, highly effective services will experience improved productivity, greater flexibility and increased competitiveness.
Firetalk Communications	A victim of the dot com crash, this company helped start interest in low cost, voice over IP technology, but is now (apparently) dead.
Dynamicsoft Inc.	Intended to replace traditional telephone systems in medium to large corporations, dynamicsoft provides carrier-class infrastructure software for packet-based wireline and wireless communications networks.
Long Board, Inc.	Intended to replace traditional telephone systems in medium to large corporations, the LongBoard LMAP infrastructure and applications platform provides the software, operations, and advanced applications infrastructure that enables basic and advanced telephony and IP services.

More information on Videoconferencing

- ZDNet Online - Article on Personal Videoconferencing

Learning Portals

This emerging permutation of Personal Collaborative Environments is attempting to combine student services and community building through an integrated web-enabled system, much like the search engine portals Yahoo and Lycos.

The use of the term "Learning portal" could imply either the basic software product needed to develop a portal OR the actual use of such software to create a learning experience. For the purposes of this listing, the listing below addresses the area of basic software. Learning portals are combined with other learning opportunities at the author's Learning Opportunities site

PeopleSoft Campus Portal	A pre-built, role-based enterprise portal for higher education. Using its portal technology developed on PeopleSoft's new Internet architecture PeopleSoft 8, the Campus Portal turns an institution's Web site into a virtual campus delivering tar- geted content to all campus constituencies -- students, staff, faculty, alumni, suppliers, employees, visitors, and prospects. Each user, whether student or faculty, outside vendor, or alumni, has access to information specifically geared toward his or her interests and needs--from admissions information to financial aid data to distributed learning.
SCT's Campus Pipeline	An integrated, web-based software system/portal sold to campuses allowing integration with existing campus-wide software systems (such as Banner2000). Provides a communications, limited course management, and announcement systems. Includes web-based email and live chats in addition to administrative applications and course information. Academics don't like the built-in advertising that is part of this product.
Blackboard 5 Enterprise	An enterprise enhancement to Blackboard's dominant Courseinfo product, the Enterprise tier of the Blackboard product allows more custom programming (to existing campus information systems) and scales to larger organizations. Product also creates a personalized web page for each user showing all tasks/assignments due that day from all courses for which the student is registered.
Jenzabar	Founded by Chai Ling, Tiananmen Square protest leader, system allows colleges/universities to outsource personalized calendars, student directories, course information from a web-interface. Product appears to be hosted by Jenzabar on their Cambridge computer rather than sold to campuses.
Mascot Network	A campus- specific intranet community service that combination of enhanced communication, campus-specific content, personalization features, targeted commerce facilities, and scalable platform for students, faculty, and staff.

Personal Collaborative Environments

This is an emerging category of software allowing individuals to interact one-to-one or in small groups. The category may also be referred to as "Instant Messaging", or "Buddy Systems". The author expects this type of tool will become integral in advanced web-based learning programs. Typically, tools in this category allow "awareness" of user-selected individuals and the ability to instant message (i.e. "chat" one-to-one) with individuals. Most programs provide for ad-hoc chatting in small groups. Some of these programs permit application sharing, voice-over-ip or other useful over-the-web features designed to allow individuals to interact.

Some vendors (including Tribal Voice, Microsoft, Infoseek, Activerse, and PeopleLink) are contributing towards an industry standard for "instant messaging". The Internet Engineering Task Force's Instant Message and Presence Protocol represents the current form of the proposed standard. If such a standard is successful, it may better validate this category of software, making functionality more ubiquitous and uniform than the current proprietary environment. Currently, this category of software is plagues by the lack of interoperability. AOL, although tacitly in favor of interoperable information in and out of its dominant AOL Instant Messenger, has generally blocked competitors from interacting with its AIM product. This protectionist stance is creating barriers to entry for AIM competitors.

Collaborative Environments	
Jabber.com	Creating an "open source" form of instant messaging, allowing any programmer to design applications for it. Targeted at internet service providers and large companies worried about compatibility and security.
Paperfly's CollaborEdit	an Interactive collaboration platform that allows multiple people to edit and comment on Microsoft Word documents through standard e-mail and Web browser programs. Because CollaborEdit documents are dynamically updated, participants can view the tracked changes and comments made by other participants in real time. The Web-based application is initiated when a user uploads a document, enters the e-mail addresses of editors, sets an editing deadline, and writes a brief message for participants. Each participant receives an e-mail message containing the document and instructions. The document can then be viewed in a standard Web browser and participants are able to make changes and add comments through the browser. Each time a participant opens or refreshes the document, the participant sees the most recent changes made by any other participants. The initiator of the CollaborEdit session can view edits made by others and check the real time status of a project--when a participant has opened the e-mail, started editing the document, and completed their changes.
Microsoft Messenger	Launched in summer, 1999, this is Microsoft's entry into the instant messenger field. Using technology to interconnect its new product with AOL's Instant Messenger product, Microsoft and AOL then locked horns in an ongoing battle as to whether AOL viewed that as proper. Still, the new product has been widely downloaded.
ICQ	Now owned by AOL, ICQ was the original instant messenger application and still has one of the largest audiences. Its interface is quirky, often hard to figure out - making it a favorite of hard core techies rather than casual messaging users.
AOL's Instant Messenger	Its association with North America's largest proprietary ISP, AOL, makes Instant Messenger one of the most popularly used IM clients in the world. Also available for non-AOL users.
Tribal Voice's PowWow	Available in two forms. (1) The original free download PowWow provides presence notification and instant text chat messaging. (2) PowWow for private networks offers additional user capabilities including web site sharing, whiteboard discussion and file transfer. Administrators get session logging, secure management and scalability. Prices start at $3995 per server and 25 users.
Yahoo Messenger	A free on-line service hosted by the Yahoo portal. Allows you to text chat or voice chat (for Windows users) instantly with friends, family, colleagues, and others. Product indicates when they come on- or go offline. Yahoo Messenger alerts you instantly when you have new mail in your Yahoo! Mail and Yahoo! Personals accounts or when it's time for one of your Yahoo! Calendar appointments. Has built in Stocks, News and Scoreboard tabs so that you can keep track of all your personalized information no matter where you're surfing on the Internet.
Lotus Sametime	Born of the IBM/Lotus acquisition in 1998 of Databeam (and its H.323 technology) and Ubique (known for its awareness and chat interaction software). Product may be being developed as a front-end for Lotus' emerging Notes LearningSpace/Sametime product line. Lotus is also developing a separate Quickplace product for integration with the Lotus Domino Server. Quickplace focuses on text document development and collaboration.
e/pop	From WiredRed Software, this product is intended for intranet and lans but is worth watching as it may eventually evolve a low-bandwidth internet-compatible version. Client-side-only application, which works on NetWare- and Windows-based networks, doesn't require additional server hardware to operate--making it quick and easy to implement.
Netlert	A corporate-focused, secure IM application intended for corporate-sponsored deployment.

WebCrossing	Offered as either a software product or ASP service, Web Crossing's features include discussion groups/bulletin boards, integrated newsgroups and mailing lists, full email services, calendar services, real-time chats, live events and full web application programming features.
Activerse Ding	notable for its Java language-driven approach to Instant Messaging.
Peoplelink	Features "iGroups" which include a member directory where you can view the profiles of each member and see who is online with our "porch light" indicator. By clicking on the online now button you can talk to that person, one-on-one, in real-time. You can also participate in an email discussion with other members of the iGroup. The original Peoplelink Software is now used by the Excite portal in a slightly repackaged version (Excite PAL) as Excite's own IM client.
Instinctive Technologies E-room	Hosted collaboration server.
Lotus Quickplace	Hosted collaboration server
Punch Networks' Webgroups	Hosted collaboration server updates files on users hard drives by sending and integrating only the data that has changed.
OpenText Livelink Online	Leverages livelink Intranet and Livelink Cluster Architecthure to provide end-to-end encryption
eproject.com	Tracks pending tasks, events and messages managing documents via web. Free Service.
Sitescape webWorkzone	offers web-based collaboration and document sharing. Hosted service.
Teamwave Workplace	Teamwave is a hybrid product. Part collaborative software, part Teamware, this product combines document collaboration with on-line presence.
Yahoo Clubs	A private community posting service, its first page shows recent messages as well as how many users are in the chat etc. Allows you to get your own free members-only chat room, message boards and links area, build relationships with a group of people who share similar interests, schedule meetings with the calendar, send email to everyone in your club with the latest announcements and updates, and control the level of privacy, and delete unrelated posts.
E-groups	**eGroups** are designed around email. Members have an easy time finding, reading, replying, and sorting messages, as well as controlling their membership in the group. The eGroup moderator also has an easy time managing the operations of the eGroup: there is no software to learn and eGroups.com automates the routine clerical work of subscription, unsubscription and software maintenance.Features: Web interface to manage the group, flexible group policies (moderated or unmoderated, private or public), no software to install, reliable - 95% of all messages delivered in 50 seconds or less!, Spam-Free. We use a proprietary spam detector to block spam, full-text searchable. Control panel for all groups, whether hosted on eGroups.com or not, messages readable via e-mail, on the Web, or in digests, group polling feature, group calendars.
Eproject	Software allows project teams to use the Internet to privately exchange information, track deadlines and milestones, solve problems, and discuss ideas from any computer with web access. A free version is available.
Other Useful Links for Collaborative Environments	• PC Magazine's January 2000 Review of Instant Messaging Systems • Chat links on Yahoo • Buddy Systems review in CNET - a 10/15/97 review of Instant Messaging/buddy systems (another term for Collaborative Environments) • Conferencing Board On Dave Central - a well maintained list of software used for conferencing • A List of Instant Messaging services on Freesources • PC Week Article 1/18/99 Prime Time for Real Time

Teamware

A new breed of collaborative software is emerging. Dubbed "Teamware", software members in this category aspires to create virtual project groups. Typical tools include threaded discussions, text chat, and easy file exchange. Advanced software in this category includes group scheduling and ability to route items. Systems should also require relatively little technical expertise to manage after installation as projects must be easy to create, edit or terminate.

Taking a page from both the Internet (which is itself a huge file swapping network) and the mixed messages of Napster's audio file swapping success, some companies are experimenting with peer-to-peer networks as a basis of personal collaboration. Some firms are combining instant messaging clients with file-sharing systems to product elements of a virtual meeting room.

eRoom Technology's eRoom	This product is probably the most mature of the Teamware category. Offers otpional off-line editing and strong management capabilities. Good user interface. Based on Windows NT/2000 servers. $10,000 per server.
Inovie's Team Center	Similar to eRoom, Team Center is a pure java-based system running on multiple server and client platforms. More customizable than eTeam. ~$15,000 per server plus $350/user.
SiteScape WebWorkZone	A hosted solution with fewer messaging tools than eRoom or Team Center, but without the management overhead. ~15 per user per month.
Lotus Quickplace	Focuses on text documents and collaboration.
Involv Intranet	Requires the Lotus Domino Server. Available as a service bureau
Groove Networks	lead by Ray Ozzie, programming guru for Lotus' Notes products, this startup company develops server software tracking documents on individual machines, share documents while collaborating by instant messaging and whiteboard - all behind a secure shared space. The product (which can be viewed as a platform for other solutions or a basic standalone product) is a peer-to-peer, synchronous, and asynchronous product that may be a good fit for academia as a tool for small group collaboration and study groups. May be useful to think of this product as a richer alternative to Instant messaging, adding conversation persistence, security with role assignments, voice-over-ip, threaded discussion, share links, files web sites, role assignment. Microsoft's Netmeeting is a component of Groove's Version 1.0 release.
Aimster	Uses AOL Instant Messenger
Roku	adds wireless and handheld devices to file exchange
Reviews Online	• Read a PC week review on selected Teamware products • Read an Internet World article on Teamware

Streaming Media

Real time and on-demand video/data playback was one of the earliest applications of the commodity internet. Still unable to compete with the quality or ease of use of regular television, this media continues development anticipating broadband internet access.

- **RealNetworks RealVideo** - Generally considered the market leader in multi-client platform streaming media.
- **Microsoft Windows Media** - Previously marketed as "NetShow", this product line seems now lost in the Microsoft software warehouse. Its software client is the default media player for Windows 9X and Windows 2000 Workstation installations, arguably making it the most installed streaming media client in the world.
- **Apple Quicktime** - A standards-based multimedia streaming platform with clients for Macintosh and Windows..
- **ImOn** - A streaming media technology with instant web linking, view directed video branching, video-on-demand and context sensitive web research in the software client.

Tips for web based education using streaming media

- I CAN STREAM.COM is an online tutorial intended to help new streaming media users develop for web streaming.
- **Creating Dynamic Online Lectures with Real Presenter** deals with the use of RealPresenter in delivering streaming media lectures via the Internet.

Videoconference Streaming Solutions - Vendors of videoconferencing systems seem to be jumping on the streaming bandwagon with add-on products allowing their H.320/H.323 systems to simultaneously stream video and audio over the internet. Several such vendors are listed below:

- **Polycom** - Streamstation adds streaming to Polycom's line of videoconference systems; webstation allows Powerpoint/html slides to be shared via the internet and showstation IP allows live media to be broadcast over the net.
- **Picturetel** - Starcast system added to Picturetel's tradtional video conferencing system allows high bandwidth streaming broadcasts over corporate Lans while eVideo adds multimedia to browser based delivery.
- **Vtel Turbocast** is Vtel's add-on solution for video streaming, compatible with Vtel's line of codec equipment.

Web Based Education Development Tools

This category attempts to collect basic and single purpose tools that meet specific needs but are not themselves intended to be a turnkey implementation system. They are generally visual authoring tools or programmers toolkits or meet a very specific web-based need.

- **Respondus, Inc.** is a software application company specializing in testing, assessment, and survey tools for the e-Learning market. It makes a plugin testing enhancement for Blackboard, among other items.
- Clever Content from Alchemedia - Clever Content technology allows Web surfers to view images on your site, without the ability to copy, print, save or capture them. Runs on most of today's most popular Web servers.
- SecureExam - enables students to use laptop computers in the exam room. It permits use of basic Microsoft Word features -- while eliminating access to any other files or software applications on the student's computer. Once the exam is completed, Securexam encrypts exam answers to prevent them from being accessed or altered. A separate instructor application decrypts student exam answers and provides assistance with the grading process.
- **Intelligent Essay Assessor** - The Intelligent Essay Assessor™ (IEA) automatically assesses and critiques electronically submitted text essays. IEA supplements teacher interaction with an independent learning tool for knowledge acquisition. Students can put what they know into words and find out how well they've done. Operating as a web-based service, the Intelligent Essay Assessor supplies instantaneous feedback on the content and conceptual quality of the student's writing.
- DazzlerMax - a rapid content development tool that allows for "sophisticated" interactive learning content to be developed in a fraction of the time over comparable scripting and plug-in based technology. A 100% drag and drop, object oriented content development tool offering all the robustness of scripting based authoring tools without the requirement or hassles associated with learning a scripting language. E-learning content is a small Java applet for cross platform delivery and there are no royalties or plug-ins needed to preview content. Content can also be 100% AICC compliant. Easy to use (no scripting), content can be developed considerably faster (time compression) and robust. Useful for those developing entire self-paced courses complete with testing, interactions and for those looking to create interactivity to the generally flat HTML mediums found in Blackboard, WebCT....
- Technology Tools for Today's Campuses - This link connects to UNC's "Technology Source" and provides access to a collection of 72 articles, presented in seven sections, by Editor, James Morrison. The articles address important and useful information that you can use in deciding if you want to use such tools as listservs, e-mail, the World Wide Web (WWW), or multi-user domains (MUDs) in your teaching. Each article has links to such illustrative material as syllabi, student papers written on the Web, and reference sites. The collection can be obtained on CD-ROM You will be able to see all links by connecting to the Web when viewing the CD.
- Information Technology Tools & the Future - This links to UNC's "Technology Source" and provides access to: "Information Technology Tools and the Future: An Interview with Sally M. Johnstone by James L. Morrison."
- Link Systems TechBoard - threaded messaging system for technical discussion groups. Customizable and designed for ease of use, TechBoardTM will provide your users with the means to relate mathematical, technical, or graphical issues. Comprehensive management tools are provided with intuitive user interfaces. TechBoardTM is available on NT and Unix platforms, and is entirely HTML 3.0 compliant.
- Link Systems WWWhiteboard - WWWhiteboardTM is an interactive graphical chat tool designed to allow realtime communication of technical concepts. Gif and jpg images can be imported and annotated. Text can be entered on the board or in an attached chat window. Scientific and mathematical notation, special symbols, geometric primitives, graphing and freehand drawing are supported. The WWWhiteboardTM was designed for use over the internet; it can be used successfully with a modem. It is cross-platform, so users do not have to standardize on expensive hardware or software. The WWWhiteboardTM is versatile and can be embedded in different applications.
- Link Systems NetTutor - a web-based graphical chat, threaded and platform independent
- EduHound - A prescreened listing of tools for K-12 online development
- EsaTest - an object oriented testmaking user interface into its latest test generating program with On-Line Testing, Web Testing, and Item Analysis.
- QuestionMark - a company specializing in software tools for on-line testing, including options for secure testing
- Third Voice - Third Voice is a controversial free browser companion service that allows users to express thoughts and opinions by placing inline notes on any Web page. Unlike existing forms of Web communication (e-mail, chat, instant messaging or message boards) and Web sites with read-only content, Third Voice empowers users to form inline discussions that weave together their opinions with existing content making the Web more meaningful.
- FatBrain - A professional on-line bookstore for technical books
- SoftArc - FirstClass Intranet Server, a group collaboration and messaging system. FirstClass is an integrated package that provides full featured e-mail and groupware plus an intranet server all in one. Newer product targeted at education is called FirstClass Collaborative Classroom. Both products still seem to be a communications tools subset of the necessary suite for full course delivery asynchronously. FirstClass is the base product for a value-added service for Executive MBA programs from EMBANET.
- Allen Communications - Vendor of software tools including Designer's Edge™ (pre-authoring, instructional design), Quest® (multimedia authoring), and Manager's Edge™ (training delivery, management).
- Asymetrix - Vendor of software tools IconAuthor™ & ToolBook II Instructor™. These tools assist with authoring & the development of CBT. Additionally, Asymetrix offers Librarian and Ingenium, both learning management system. Librarian and Ingenium are in the process of being integrated, a combination which may place the resulting product in the "full software suite" category of asynchronous web delivery software.
- Macromedia - Vendor of software tools, including the Authorware™ & Director™ authoring tools, for developing interactive training (and other) applications.
- MicroMedium - Digital Trainer Pro™ - Software tool that assists you with the creation of interactive training courses. Comes with a 60/60 guarantee, (60 minutes to begin creating your own interactive training or 60 days satisfaction guaranteed or your money back).
- Netsage - NetSage provides custom software solutions based on its patented technology for Web sites, incorporating intelligent, animated software agents called Sages that make computer work more personalized, efficient, and entertaining. Sage Solutions are targeted at Web-based learning, e-commerce, and employee service and support applications.
- Street Technologies - Developers of StreetSound™ from Street Technologies. An inexpensive external sound card, StreetSound unlocks the world of sound from any multimedia program off of CDs, corporate LANs, intranets and the Internet.
- WebFuse - a general Web publishing tool adapted to creation of Web-based classrooms.
- Libraries of Java and Javascript Applets
  - Sun Microsystem's Java Applet Library
  - Educational Java applets for Math and Sciences

Legal and Copyright Issues affecting Distance Education *including Intellectual Property Rights*

Policies for ownership of online courses has been a contentious issue for higher education. Some institutions retain ownership themselves, some allow faculty members to retain ownership, and some create arrangements under which ownership is shared.

- Crash Course in Copyright - gives excellent and extensive copyright information, especially for online-course development. Creator of the crash course is Georgia K. Harper, manager of the intellectual-property section for the University of Texas System's general counsel in Austin.
- Consortium of College Testing Centers - group of college testing centers across the United States who have agreed to proctor distance learning students under secure conditions. Each institution sets its own policy for when, how, and charge for testing students. Go to http://www.geocities.com/nctatesting/ to learn more about the CCTC. The CCTC is sponsored by the National College Testing Association. NCTA also hosts a listserve in which you could post a call for assistance in a particular case where proctoring might be needed at a site not listed in the CCTC.
- The Power of the Internet for Learning; Final Report of Web-Based Education Commission - Published on December 19 and recently placed online by the US Department of Education, the final report of the Web-Based Education Commission (WBEC) constitutes the "most comprehensive analysis ever undertaken of education and the Internet." Chaired by Nebraska Senator Bob Kerrey, the WEBC urged the new administration and Congress to fully embrace e-learning, address gaps in Internet access, and revise certain regulations that they believe impede >innovation. Users can read the full text of the 169-page report its >entirety or in five parts in .pdf format.
- The Issue of Intellectual Property Rights at a University
  - Policies for ownership of online courses has been a contentious issue for higher education. Some institutions retain ownership themselves, some allow faculty members to retain ownership, and some create arrangements under which ownership is shared.
- Model Agreements
  - Intellectual-Property Policy at Stevens Institute of Technology - faculty members at the New Jersey institution will be paid to develop online courses, will own the material in the courses they develop, and will control how and when that material can be used. The institution will control the copyrights of the online courses and will manage the courses' distribution. In return for giving up the copyright on a course, a faculty member will receive a third of the revenue whenever a business or other institution purchases use of the course, says Robert Ubell, director of Web-based distance learning at Stevens and is also chairman of the committee that developed the policy. He says that faculty members, who usually don't have the resources to market courses themselves, will benefit from Stevens's handling of promotion and distribution chores. "It's very much like a traditional publishing agreement," Mr. Ubell says. "The model has been in place for centuries." A faculty member who leaves Stevens can take his or her courses to a new institution if it pays Stevens a licensing fee -- in which case the professor would get a third of the money. The policy offers incentives that let faculty members know "that what they are creating is valuable both financially and in terms of developing a quality relationship with the institution and community." Excerpted from an on-line article, Nov 2000, in The Chronicle of Higher Education.
- Congressional Lobbying Power - Two of the biggest players in the distance-education market have come together to create a new lobbying group here that will tell federal policymakers about Web-based education. The group -- the Online Learning, Research and Training Association -- was formed this month and is backed so far by the University of Phoenix and Capella University. The association plans to have about six founding members eventually and hopes to sign up other institutions soon, including possibly Pennsylvania State University's World Campus and the University of Maryland University College, said Leslie T. Thornton, the group's acting president. More...
- The NII Copyright Protection Act
  This link will connect you to the page of the law firm, Dow, Lohnes and Albertson, and a menu where you can access the following articles: "The Rules of the Road: The NII Copyright Protection Act," by Ken Salomon. May, 1996. CLICK on the menu button for "Educational Institutions" and scroll to the article.
- Intellectual Property/Computer Audit
  This link will connect you to a menu where you can access the following article by Ken Salomon of Dow, Lohnes, and Albertson,"Protecting Institutional Rights Through a Distance Learning Intellectual Property/Computer Use Audit." CLICK on "Educational Institutions" and scroll to article.

- DL's Regulatory and Policy Environment
  This link will connect you an article by Michael Goldstein, Dow, Lohnes and Albertson, "The Regulatory and Policy Environment of Telecommunicated Learning," December 7, 1993.
- DL and Federal Financial Aid
  This link will take you the article, by Michael Goldstein, of Dow, Lohnes & Albertson, "Telecommunicated Learning and Federal Financial Aid"
- The Rights Stuff - (Intellectual Property Issues)
  Who owns the intellectual property in electronic course materials and online courses, and how should the rights, responsibilities and revenues of that intellectual property be assigned? These are contentious questions as new technologies upset the academic equilibrium and leave faculty and administrators struggling to find a new balance that recognizes and respects the contributions of all parties while fostering the creation and dissemination of new knowledge.
- Copyright Office Study on Distance Education
  On October 28, 1998, H.R. 2281, the Digital Millennium Copyright Act, was enacted into law. Section 403 requires that the Copyright Office consult with representatives of copyright owners, nonprofit educational institutions, and nonprofit libraries and archives, and thereafter submit to Congress recommendations on how to promote distance education through digital technologies, including interactive digital networks, while maintaining an appropriate balance between the rights of copyright owners and the interests of users. Such recommendations may include legislative changes. The Digital Millennium Copyright Act (In Adobe Acrobat format)
  - **Copyright Office commentary** on the Digital Millennium Act with regard to Distance Education
- AACC - Policy Statement on Copyright and DL
  While educators had hoped that Congress would pass legislation to codify the recommendations of the Copyright Office, this has not yet occurred. Opposition to changes in the copyright law by the powerful publishing and entertainment industries has made it very difficult for this issue to be seriously considered by Congress. To attempt to overcome this strong opposition, AACC has partnered with other education entities. This coalition, comprised of postsecondary education, K-12 education, and libraries has set to work drafting legislation based on the Copyright Office recommendations.
- ACE - Distance Education Policy for 21st Century
  The advent of distance education is forcing many institutions to review and amend many of their existing policies and procedures. The following is a primer on the issues an institution will confront as it plans to integrate, implement, and harmonize distance education into its existing policies.

  - A Copyright Commentary - web site from University of Idaho
  - Association Urges a Greater Voice for Professors in Distance Education
  - Clearinghouses for multimedia copyright permissions
    - Total Clearance
    - For United Press Syndicate materials
    - For United Features Syndicate materials

Learner Feedback on Distance Education

- Articles on Assessment
  - Seven Principles of Effective Teaching: A Practical Lens for Evaluating Online Courses by Charles Graham, Kursat Cagiltay, Byung-Ro Lim, Joni Craner and Thomas M. Duffy
- Articles of Interest
  - A study indicating that in certain learning situations, students effectively gain skills from e-learning exclusively (without classroom interaction).
  - Dave Buck (dbuck@visumllc.com)chief learning officer with vendor Visum LLC in Knoxville, TN offers three criteria for a learning situation to lend itself solely to e-learning:
    - The e-learning environment must closely approximate the environment in which the learner will eventually perform the skill.
    - The learner must be able to respond as required in the learning objective, and the computer must be able to measure the response.
    - The delivery system must offer feedback that reinforces accurate responses and helps correct incorrect responses.
  - Opening the doors to online learning - by Linda Knapp, Special article in The Seattle Times. According to a recent poll by MSNBC and PBS, of those who've taken courses online, 52 percent rate their experience as excellent, and only 4 percent say they would never recommend it.
  - "Students' Frustrations with a Web-Based Distance Education Course" by Noriko Hara and Rob Kling of Indiana University
- Financial Aid and Distance Education Courses
  - In an outdated effort to avoid financial aid for low quality education through traditional "diploma mills", most Federal Government financial aid programs prevent students from receiving financial aid for programs delivered at-distance. Although some institutions skirt the issue by not disclosing that some courses are delivered by distance education and therefore allow students to receive federal aid for such courses, the government now realizes that the regulations are outdated and need revision. When it opens a pilot project in financial aid to an additional 35 higher-education groups and institutions in 2001, the Department of Education will be looking for distance-education programs that experiment with new methods of teaching.
- "The Future of Multimedia in Education" by Allyn J. Radford, senior research fellow at RMIT University in Melbourne, Australia

Learner Services for Web Delivered Courses

Example student self assessments and tutorials

- http://www.brevard.cc.fl.us/distlrn/
  - There are two key buttons to look at here. First is "Is Distance Learning for me?" That is a list of assessment questions that get right at the heart of "is DL for me." Then, go to "Everything you need to know about online classes." In the 3rd paragraph there, you can click to go to their Blackboard orientation/demo course. You can login and go through the orientation.

Faculty and Content Development Issues

- In an interesting use of the web to educate educators and administrators, The Alfred P. Sloan Foundation has announced that the source code to Virtual U, the university management simulator, is available to the public on the Virtual U Web site. Virtual U, a simulation of the daily management of a university system, introduces managers and university administrators to the complexities of university management and helps them to assess their own approaches to the job. Said Jesse Ausubel, program director for Virtual U, "By opening the source code to our project we hope to share our collective knowledge and inspire new types of training and public policy tools." The first pass of the public source version is available at http://www.virtual-u.org/publicsource.html. Academics and programmers can learn from the project's unique modeling engine. Virtual U will be published as public source under a license that provides free use of the source code for any purpose other than commercial projects without the Foundation's and developer's consent. Modifications to the code must be provided to the project's community.
- ADVISOR is a decision support tool. It helps you analyze a course to determine the most economical blend of delivery methods (including instructor-led, print, tapes, computer based training, web based training, electronic performance support systems, audio/computer/video conferencing and others) that will meet your training needs.
- A new e-learning poll from WebCT shows strong faculty preference for Web-enhanced classroom instruction over either traditional classroom-only instruction or online-only distance education. Faculty also say student learning achievement is maximized in courses that combine online and classroom elements. The e-learning poll also reveals the impact of distance learning programs on higher education institutions. 73 percent of poll respondents say their institution's implementation of a distance learning program allowed their institution to reach and serve new student populations. 42 percent said implementation of a distance learning program effected a change in intellectual property policies; 31 percent said it effected changes in facilities, and 27 percent said it generated a change in faculty compensation policies. Ed note: it should be noted that the survey seemed to define online-only distance education as asynchronous web-based only.
- An informal checklist of skills appropriate for an experienced web learning developer from John Nelson (JohnNelson@firsthealth.com):
  - HTML, the universal language of the Web.
  - Extensible markup language (XML), which allows customization of Web pages for individual users.
  - CGI (common gateway interface) programs, which are designed to accept and return data that conforms to the CGI specification. CGI programs are often used for Web forms that users fill out and submit.
  - Streaming audio.
  - JavaScript.
  - Relational database design and programming.
  - Web-server administration.
  - Security.
  - Graphic design.
  - "And whichever core client-side programming choice you've made," says Nelson -- Java, Flash, dynamic HTML or another.
- "Humanizing Learning-at-Distance." A guide to best practices for instructors who run live e-learning. For her doctoral thesis, Kat Barclay (kat.barclay@usa.net) interviewed 20 synchronous e-learning instructors and distilled eight strategies for online live instruction. Barclay is a Holualoa, Hawaii, training consultant.
- Administrivia: Sample Forms used in Web Based Learning Programs
  - Registration, Proctoring and other Forms from Colorado State
- With the rise of distance education, some professors are worried about whether they will be compensated for the work they do to bring their courses online. The University of North Texas is using a series of unusual policies to do just that. The university pays royalties to professors when their online materials are used by other instructors, and the university also shares some of the tuition from online courses with the professors who create them. North Texas officials and the professors who are receiving the royalty checks praise the arrangement for providing concrete rewards to those who take on extra work to make distance education possible. But some students at the university fear that the model encourages professors to shift their attention away from students who are enrolled on the campus. More..
- www.SiteTrainer.com Developed by Judy Smith as an online education resource for faculty and instructors who teach online ...or, at least to help strengthen the bridge between content, technology, and user limitations.
- Compensation Survey - "Early Patterns of Faculty Compensation for Developing and Teaching Distance Learning Courses" a paper for ALN by Gary Berg
- Evaluating Websites for Educational Uses
  This site developed by Carolyn Kotlas, UNC-CH, Center for Instructional Technology, aggregates articles by librarians and other information specialists on how to evaluate Websites. A checklist of questions to ask when evaluating a Website as a potential educational resource is included. More checklists are available in the articles cited.

- Evaluation Tools for Interactive Learning
  The site from Multimedia in Manufacturing Education offers a collection of ten tools for evaluating interactive learning systems. Tools include interview protocol, questionnaire, user interface rating form, focus group protocol and formative review log.
- NCES Reports on DL "98062" & "2000013"
  The two report cited above are comprehensive reports on distance education developed by the U.S. Department of Education's National Center for Educational Statistics (NCES). When you're at the site enter one of the report #'s in the entry box provided. You will be able to browse/print or download the reports.
- Faculty Survey on Distance Education - From an NEA telephone poll, the results of a survey confirm growing acceptance and satisfaction among faculty for distance learning
- Institute for Higher Education Policy Quality Benchmarks for Distance Learning in Higher Education - A useful starting bullet list of 24 key criteria for distance education
- AN ILLUSTRATIVE, INSTRUMENTAL, MULTIPLE-CASE STUDY OF EXEMPLARY INTERNET COURSES. Abstracted from A multiple-case study of exemplary online courses performed by a doctoral candidate in instructional technology, Georgia State University dept. of Middle-Secondary Education and Instructional Technology, under the direction of Dr. Stephen Harmon.
- E-moderation: The key to teaching and learning on-line. A web site designed to accompany Gilly Salmon's new book, the site itself shares a number of interesting insights. Dr. Salmon, who teaches in the Business School for the British Open University, has a number of other papers on this and other subjects at http://pcbs042.open.ac.uk/gilly/
- Education with New Technologies: Networked Learning community. A portal developed by teachers and researchers at the Harvard Graduate School of Education, this networked community is designed to help educators develop powerful learning experiences for students through the effective integration of new technologies.
- Facilitating Knowledge Construction and Communication on the Internet by Maggie McVay. In this article written about the faculty development in the new environment, student development in the new environment , McVay comments "Communication is the key to Maintaining the Learning Community". and suggests keys to facilitating knowledge construction on the Internet are INTERACTION and COMMUNICATION.
- Teaching Instructional Design: An Action Learning Approach by Brenda Bannan-Ritland, George Mason University
- Finding data on academic awards by discipline and level in easy to use format for profiling Research I peer institutions, you may wish t look at The JMA Instructional Program Comparative Data CD: profiles grouped by discipline, by Carnegie Class (including Research I institutions), by highest award, and by state; public and private colleges and universities. Two CD volumes of data on all higher education institutions. Files in dbf format readable by any spreadsheet program. Users of Excel 7 or higher will have fingertip access through our special data map feature. For more details and pricing: http://www.jma-inc.net
- Conference Proceedings from the Conference on Asynchronous Learning Networks, October 1999.

Screen Capture Software

Some on-line courses need the visual clues of computer screens and screen sequences to provide learners a frame of reference. Computer screens - in still and movie-like form - can be electronically captured for web replay using products in this category of screen capture utilities. Generally, screen capture products are created for specific operating systems and computer platforms. Be careful to determine whether you are needing to capture still images or to capture a motion sequence; products below generally do only one or the other. If you are planning to use motion playback, be aware that the web - in its current sluggish form - may have problems playing back long audio/video motion sequences. Look for products that can significantly compress motion for internet playback, preferably without confusing, time consuming browser plugins.

Screen Capture For Microsoft Windows

- ViewletBuilder2 http://www.garbon.com - capture and annotation software. It's free (financed by banner ads) but there is a corporate no-ad version for $999.Creates very compact, Java driven playbacks that can be viewed though a Java enabled Browser with no extra plug-ins and very compact files. Contributed by Tim Baker (tim.baker@gemplus.com)
- **Capture Lite** and **Capture Professional** (Creative Softworx, Inc) - Professional features Editing and scanning options beyond the Lite version.
- **Screencam** and **Streamcam** (Lotus) - *Screencam* is screen capture software for Windows platforms. Lotus ScreenCam turns your PC into a VCR that records every click, scroll and action on your screen.You can add captions and the sound of your voice. Then edit your instant PC movies and share them over the Internet or by e-mail with customers, colleagues and employees. Viewers can play them back even if they don't have ScreenCam on their computers. Offers full Windows integration including 32-bit support for OLE, Notes/FX, SendMail. *Streamcam* is is Lotus Development's streaming server technology that enables ScreenCam movie playback directly from a web page. StreamCam is based on a Lotus protocol code named Avian which was used at Lotusphere 97 on kiosks and the Lotusphere website.
- **HyperCam** and **Hypersnap-DX** - (Hyperionics) - **Hypersnap** is the screen capture (screenshot, print screen) program that can capture regular Windows screens (also from multi-monitor setups), DirectX, Direct3D and 3dfx Glide Games (Voodoo series cards) and even some video/DVD players. **HyperCam** records AVI movies (screencam) directly from your monitor.
- **Snaglt, Camtasia** (TechSmith Corp) - **Snaglt** captures anything on the Windows® desktop from one-step capture of scrolling web pages to video capture and text conversion. **Camtasia** is a screen camcorder and video production tool, including technology for recording exact copies of screen activity to highly compressed, industry standard file formats including AVI formats.
- **Winstructor** (Flickerfree software) - capture sections of the computer screen at regular intervals and save the picture sequence in AVI, FLI, FLC, JPG, and BMP formats. While capturing the actions on screen it can also record your spoken instructions from a microphone, which makes it ideal for producing instructional videos.
- **Screenwatch** (OPTX International) - captures full motion of windows on Windows NT systems fro streaming via Realnetworks G2 servers or for licensed playback on CD-ROMS

AVI Editing Software

If you are using screen capture software that creates motion playbacks in audio/video interleaved (AVI) format, you may want to edit that production. Here are some tools for AVI editing

- **DubIt** (Techsmith Corp), is a real-time AVI audio editing tool. Add or revise the audio track of your AVI while viewing the video. Also creates an AVI from your graphical image and voice annotation or WAV sound clips.
- Videoframer and Personal AVI Editor (Flickerfree software) - Videoframer records audio from any Windows supported sound card. Captures video from any Windows supported video capture card; Produces AVI, FLI, FLC, BMP, JPG & WAV files; Imports/produces BMP & JPG bitmap sequences. Personal AVI editor is a lite version of Videoframer.

Screen Capture for the Macintosh

- **Screen Catcher (**St. Clair Software**)** a screen capture application capable of taking snapshots of screen images and saving them as PICT, GIF, or JPEG files. It also allows images to be captured to the clipboard, the printer, or to Screen Catcher's own windows, where they can manipulated to change the color palette or reduce the number of colors in the image before copying, printing, or saving.

Course Development How Tos

- Online Learning Communities: If You Build Them, Will They Stay? , a paper by Janette R. Hill
  University of Georgia and Arjan Raven, Georgia State University. Here's an excerpt: "In terms of the overall research question, What are the best techniques/strategies to enhance learning and community building in WBI?, there appear to be several
  strategies that can help facilitate community building in on-line courses. The strategies we implemented can be broken out into four main categories: atmosphere, foundation, communication, and technology. A brief description of some of the main strategies is provided in the following paragraphs; we suspect that more strategies will be revealed as we continue the analysis of the
  data. "
- UNC - Pedagogical Resources - This collection of pedagogical links is an interesting sampling of the available resources on the topic of pedagogy and networked instructional technology. The compendium includes the observation, view, and research from a wide representation of faculty and institutions.
- MHEC - Interactive Courseware Program
  The MHEC Interactive Courseware Program is a region-wide initiative of the Midwestern Higher Education Commission developed and implemented by the MHEC Interactive Courseware Committee. The Committee comprises academic officers and courseware specialists from public and private colleges, universities, community colleges and technical colleges located in the nine member states of the Midwestern Higher Education Compact.
- Using the Web to teach - article in "Internet World" formerly "Web Week."
- Web Course Evaluation Checklist - essentially a series of suggested evaluative instruments, this site is the results of a student survey of literature and local needs.
- **Pedagogic Models - Theories of Learning**
  - THE COSE model poses three distinct levels of learning: Primary, Secondary and Advanced
- Content Development guides from the University of Washington.
- Article: Shifting Perspectives in Educational Technology by Dirk Rodenburg
- Gestalt Systems Inc. of Vienna, VA, offers Internet courseware manuals for use in a stand-up training environment with or without Internet involvement.
- **Videoconferencing Cookbook** - an introduction and suggested procedure for use of videoconferencing. Special emphasis on H.323 and learning scenarios.
- Using Instructional Design Principles to Amplify Learning on the World Wide Web - an overview article
- Current Issues in Web Usability - a discussion group with topics of interest to instructional designers
- **Technology Standards for Global Learning Conference** - (Microsoft Word Document) a significant and comprehensive document for technology-based academic delivery sponsored primarily by Western Governors University
- Delivering Instruction on the World Wide Web
- Challenges to the Optimal Delivery of A Training Program via the World Wide Web - White Paper
- HOW TO OFFER A COURSE
- Dyro's WBT Home Page
- WEB-BASED TRAINING INFORMATION CENTER: WBT, Online Learning, Distance Education
- Web-Based Courses Resources a collection of scholarly papers on web based education
- Using Laptops as Course Tools tips and strategy on use of laptop computers in a mandated education program
- HTML for Instructional Technology - an on-line course for basic web skills used in web based teaching
- Share Carolina - a suite of user-supported tools for technology delivery from the University of North Carolina

Return on Investment and Cost Comparison Tools

Author's Note: There is a great deal of interest and disinformation about the costs and return on investment of web-based education delivery. I've heard administrators and tenured faculty at higher education institutions say "Internet courses are free"; I've also heard corporate executives say that internet-delivered education will cost at least $1,000 per minute - neither statement SHOULD be true. But the truth is indeed hard to pin down with rapid changes in resources and availability of bandwidth. Below are references on outcomes for selected forms of web based delivery and other forms of distance education and links to comparisons allowing the foundation for comparing delivery modes. As a first generation question, I hope we avoid obsessing regarding the cost side and neglecting the benefit side. Perhaps we should do more on measuring benefits in the future (even if we can't assign dollar figures to those benefits). It would be useful to be more concrete on how much these programs are expanding the student audience and providing educational opportunities in more learner-useful ways versus giving students who'd attend a face to face offering a more convenient educational alternative.

- A report from the Lumina Foundation for Education suggests that studies showing higher education technology spending between $2.7 and $4.4 billion per year may not fully capture the total cost of technology at colleges and universities. Based on a survey of state finance officers and experts and institutional representatives on technology financing, "Funding the 'Infostructure:' A Guide to Financing Technology Infrastructure in Higher Education" concludes that, because most colleges and universities lack appropriate plans and policies to finance technology, the amount of money spent on technology in higher education is unknown. Many colleges and universities fund technology as an add-on, not as an ongoing part of institutional planning. Written by Jane Wellman and Ronald Phipps, senior associates at The Institute for Higher Education Policy in Washington, D.C., the report suggests policies to help colleges and universities finance technology, provides a common language to describe the elements of the technology infrastructure, and presents innovative funding options to help institutions keep pace with rapidly changing technology.
- Electronic Tuition Rates Overcome Distance Learning Barrier by Bracey Campbell
- GETTING TO 50:1 D.K. Evenson (devens@hallmark.com) hasn't gone below 200 hours' development time per hour of computer-based training time -- yet. But the IT training specialist with Hallmark Cards Inc. of Kansas City hopes that blended learning will mean developers can go as low as 50:1. That's 50 hours' development time for each hour of instruction time. Evenson's unit develops and delivers technical training on proprietary computer applications using methodology from training firm Friesen Kaye and Associates(FKA) of Los Angeles. The FKA methodology accommodates design for classroom, online and self-paced training -- "pretty much any delivery method our organization could think of," says Evenson. Given a course outline or list of teaching topics, the methodology helps estimate time required to teach each topic. With that information, trainers can estimate total development time based on certain ratios -- more of which below. MORE MEDIA = MORE DEVELOPMENT TIME. In three years of developing online learning, Evenson has learned that more media means more development time: text, graphics, sound, animation, movies and simulations add hours and days. Evenson's strategy is to "pack a CBT with content in whatever form is necessary to communicate the subject matter. However, we avoid including multimedia for the express purpose of entertainment." Why? "Cost," says Evenson. "It takes additional time to develop multimedia." Somebody has to compose and/or record the music, for example -- or get rights to music that's already recorded. "We tried to circumvent these things once," confesses Evenson, "but our legal department quickly reminded us of the copyright laws when they heard a short snippet of a favorite Top 40 song in the CBT." Evenson uses these ratios (hours of development time to hours of course time) to estimate e-learning development time: o 200:1 for interactive CBT with graphics, exercises, testing and feedback. Such CBT would include low-level simulations of a computer application students must learn: Click the button and get positive feedback, click the wrong button and get negative feedback. It would also include simple animations and minimal sound. This type of CBT does NOT have voiceovers, audio-only content, video, movies, advanced animation or advanced simulations. o 250:1 for CBT like the basic 200:1 above, but including complete voiceover that reads text on the screen. This type of CBT does NOT have audio-only content, video, movies, advanced animation or advanced simulations. o 275:1 for CBT like the basic 250:1 CBT, but including either audio-only or advanced animation. An example would be a show-and-tell scenario in which students click a button and watch a series of steps on the screen. "If you include both audio- only and advanced-animation content, make the ratio 300:1," advises Evenson. This type of CBT does NOT have video, movies or advanced simulations. o 400:1 for CBT requiring any type of video or movie content or advanced simulations. Evenson hopes to get ratios as low as 50:1 with blended solutions -- delivering content via a combination of classroom, job aids and CBT. "It is our belief that the development ratio will be dramatically reduced when CBT is just a component of a multiple delivery-medium package," says Evenson. The ratio may drop to 100:1 on a simulation used in classroom training, or 50:1 on a CBT "that is a show-and-tell demonstration of a series of screen steps." Excerpted from Online Learning News, Feb. 26, 2001
- WebCenter for Learning Networks Research, a Sloan Foundation sponsored cyberspace for researchers on the effectiveness of Learning Networks to find and exchange information and ideas and opinions.
- Report from Sloan Foundation on Costs of on-line development COLLEGES ARE TRYING TO FIGURE OUT how much they are spending on distance education, and whether they can actually profit from online programs.
- Blind Scores in a Graduate Test: Conventional Compared with Web Based outcomes
- Comparisons by Bell Canada of the ROI of using either self-paced and live synchronous delivery versus the traditional classroom showed the following: ** A 2.5-hour asynchronous course with a short video, using WebCT software, took 1,487 hours to develop. It had a five-year return on investment of 288% -- that is, for every $1 Bell spent on Web-based training, it saved almost $3. Payback, the point at which Bell recovered its investment, came "after the first 111 students used the course," says Whalen.** A four-hour synchronous course using Centra's Symposium software took 144 hours to develop and had a five-year ROI of 3,283%. That is, for every $1 Bell spent on Web-based training, it saved $33. Payback came after the first four students used the course.Bell compared costs of producing and delivering the Web-based courses with costs of producing and delivering traditional classroom courses that offer comparable content, says Whalen." In summary, it took the customer 16X longer to develop an hour of content for self-paced delivery than from Centra delivery, and Centra offered 10X the ROI of developing that self-paced content. As a general rule, self-paced delivery will be more competitive with live delivery when you are dealing with stable content and very large audiences (1000+) but the vast majority of custom corporate training needs deal with smaller audiences and a cost and time-sensitivity more appropriate for Centra delivery. (Source: JBurkett@centra.com)
- **An Interactive Cost Worksheet for Administrators** - Part of a paper and thesis project by Marshall University's Brian Morgan in Distance Education Costs
- The No Significant Difference Debate
  - Higher education faculty often debate the strengths and weaknesses of technology-enhanced delivery systems. A number of academic studies have been undertaken to determine whether students learning via non-traditional means (including web-delivery systems) have significantly less or greater learning outcomes than students in an otherwise equivalent traditional classroom. The results are controversial, but some studies indicate "No significant difference", a statement used in a 1928 study comparing traditional classrooms with correspondence study. Below are some links to both sides of this debate:
    - No Significant Difference ... Study
      On this Website you will find the often quoted study by Thomas Russell.
    - A counterpoint to the above argument
    - "What's the Difference..." Report
      What's the difference between distance learning and traditional classroom-based instruction? This question has become increasingly prominent as technology has made distance learning much more common. This report reviews a broad array of research and articles published in the last decade to determine the overall quality of the analysis, the gaps in the research, and the implications of the research for the future. The report finds that the overall quality of the research is questionable and thereby renders many of the findings inconclusive. Numerous gaps in the research require more investigation and information. These gaps include the fact that the research: emphasizes student outcomes for individual courses rather than for a total academic program; does not adequately explain why the dropout rates of distance learners are higher; does not address the quality of digital "libraries"; and does not take into account differences among students in how they learn. Implications of the research findings on college access and the "human factor" in learning also are included.
    - The Difference Frenzy (A Rebutal or Response)
      "The Difference Frenzy Matching Buckshot with Buckshot" by Gary Brown and Mary Wack reviews and critiques the "What's the Difference.." report published by the Institute for Higher Education Policy (IHEP) .
- What Matters in Judging Distance Teaching? Not How Much It's Like a Classroom Course, an article from the Chronicle of Higher Education by By DAN CARNEVALE. An interesting article describing why comparing distance education delivery and traditional classroom delivery may be inappropriate.
- **A Quantitative Review of Academic Delivery Costs, by modality** - a 1999 cost study prepared by the host of this web site, R. H. Jackson, for various distant delivery modes used at the University of Tennessee, Knoxville.
- **Media Pro's ROI calculator** helps compare costs and calculate the return on investment (ROI) between varying methods of training. Using the ROI calculator you can compare training costs by student, class, or year, by life expectancy of the course, by cost of facilities, maintenance, or equipment. Can also calculate Percentage of Savings, Payback and Breakeven Points and Return On Investment (ROI)
- Quality Magazine's Training Resources has a section on return on investment tools.
- Vuepoint has a web-based ROI estimator for both in-house and external training.
- CD Rom Professional featured an article by Rex Allen entitled the ROI of CBT.
- **BNH Expert Software offers** Advisor 3.0, a media-selection and return-on-investment tool. Advisor analyzes and recommends training-delivery methods and evaluates the impact of course supplements -- such as computer-based testing and performance support tools -- on the effectiveness of delivery methods.
- Measuring Intranet Return On Investment looks at intranet based returns
- **The "Three Rs" of ROI** features a good article on return on investment in Electronic Performance Support Systems (EPSS)

Industry Standards for Web-based Learning

Several groups are attempting to establish working industry standards to permit interoperability and free exchange of content developed in various software packages. As open standards tend to guide technology development in other areas, it would be prudent to carefully consider the value of a standards-based software suite when making long term investments.

Vendors and standards committees are together recognizing the need to encourage development of on-line content in a production mode similar to computer software programming. Years ago, computer programmers realized that creating modular subroutines (a.k.a. "objects") within code - carefully designed to be reusable - improved productivity. Selected companies in the web-based learning software market are applying this "object-oriented engineering" philosophy to development of on-line content. This subset of vendors has different terms for their modularization, but most will refer to "learning objects". The Sharable Course Object Reference Model (SCORM) standards under development by Advanced Distributed Learning Network (ADL) directly address this need. Although still a relatively small sector of this industry, the author expects this segment to grow quickly, especially among corporate universities and institutions that teach protocol, procedures and skills. Modular, reusable learning modules are likely to be most appealing to those audiences. Although traditional academic institutions will resist creating "modular learning" - feeling instead that every learning experience is a unique and personal creation of its individual faculty - the author expects that the productivity, richness, and high degree of maintainability of "learning objects" will eventually permeate both the software products in this category AND change traditional academic thinking due to economic and competitive pressures. Modules may also be "Tagged" with computer-readable tags allowing more convenient cross-system exchange of data. Most such metatag systems are evolving towards the XML standard.

The technical standards development organizations below require some explanation. Most of the draft or published technical standards derive from the Aviation Industry CBT (Computer-Based Training) Committee (AICC) standards development begun by the airline training industry in the late 1980s. Although still the most thoroughly documented of the published standards, AICC is in the process of collaborating with IMS and ADP to develop a (apparently joint) working draft for submission to the IEEE Learning Technology Task Force for the creation of a worldwide set of standards.

- Aviation Industry CBT (Computer-Based Training) Committee (AICC) - Beginning in the late 1980's, the airline industry, long a user of distributed information systems for training, developed a set of standards, including AICC Guidelines & Recommendations (AGR's) for on-line course software courseware delivery standards. Officially, the AICC develops guidelines for aviation industry in the development, delivery, and evaluation of CBT and related training technologies. In practice, the AICC's AGRs are considered standards for most of the computer-based training industry.

  - **Editor's Note**: since both IMS and ADL have embraced the AICC standards, a product that is AICC Certified or AICC Compliant to **AGR-010 - Web-based Computer Managed Instruction** is mostly likely to preserve your content development investment into the future. Interestingly, relatively few of the major software vendors for web educational software are AICC Certified.
- Instructional Management System (IMS) Global Learning Consortium - originally an Educause design initiative, this standards group plans a deliverable of (a) a specification of on-line learning tools and (b) a prototype product meeting that design plan. This initiative is a membership of academic, commercial and government organizations, developing a set of specifications and prototype software for facilitating the growth and viability of distributed learning on the Internet. IMS Global Learning Consortium, Inc. (IMS) is developing and promoting open specifications for facilitating online distributed learning activities such as locating and using educational content, tracking learner progress, reporting learner performance, and exchanging student records between administrative systems. IMS has two key goals:

  1. Defining the technical specifications for interoperability of applications and services in distributed learning, and
  2. supporting the incorporation of the IMS specifications into products and services worldwide. IMS endeavors to promote the widespread adoption of specifications that will allow distributed learning environments and content from multiple authors to work together (in technical parlance, "interoperate").

Microsoft has released a set of utilities (Learning Resource iNterchange - LRN) to convert content from Microsoft Office to IMS compatible modules. LRN is the first commercial application of the recently released IMS Content Packaging Specification. The IMS Content Packaging Specification (one of several specifications proposed by IMS) provides content producers the means to describe and package learning materials into interoperable, distributable packages. More...

- Advanced Distributed Learning Network (ADL) - Essentially, ADL is a U.S. government-sponsored superset of the IMS initiative. In November 1997, the Department of Defense (DoD) and the White House Office of Science and Technology Policy (OSTP) launched the Advanced Distributed Learning (ADL) initiative. A major collaborative ADL partner and presenter at the Kick-Off Meeting was the Instructional Management Systems (IMS) Project. ADL's stated charter is to

  - Develop guidelines needed for large-scale development and implementation of efficient and effective distributed learning
  - Identify and promote business models and economic incentives that serve the needs of both consumers and providers of distributed learning
  - Establish a rapidly growing networked community of education and training consumers
  - Stimulate large-scale collaborative developments by organizations that share learning requirements
  - Identify technical challenges that exceed the current state-of-the-art, and initiate collaborative research and development programs to overcome those challenges
  - Share lessons learned and accelerate the development of a robust, highly diverse object-oriented open environment for Advanced Distributed Learning

  To assure an "anchor tenant" for ADL-compliant systems, The Department of Defense (DoD) is backing ADL to establish a cost-effective distributed learning environment that is consistent across the military services and all other DoD components. DoD and other Federal agencies want to make use of specifications representing best commercial practice. In order to facilitate the development of specifications that meet the interests of all participants, ADL will ensure that a common set of guidelines for this new object-oriented learning environment is developed through active collaboration with the private sector, where many of the innovations in network technology and software design are taking place. ADL's Technical Working Group is developing a Sharable Course Object Reference Model (SCORM) that provides a reference model defining a Web-based learning "content model"; set of interrelated specifications; process that knits together disparate groups; and a bridge from emerging technologies to commercial implementation. ADL embraces the AICC recommendations in its development work.
- IEEE Standard for Computer-Based Learning - IEEE is one of the world's largest Standards Development Organizations (SDO) and is accredited by the American National Standards Institute (ANSI). Within IEEE, the Computer Society is sponsoring the development of these standards through the IEEE Learning Technology Task Force, The purpose of this task force is to contribute to the field of Learning Technology and to serve the needs of professionals working in this field. Its organizational goal is to become an IEEE Computer Society 'Technical Committee' by the end of 2000. It appears that IEEE LTTF is accepting drafts from AICC, IMS and ADL towards development of the IEEE standard.
- The Training Sector in Australia has been active in agreeing on Australian standards to be used for electronic delivery (contributed by J.L.Henry@det.qld.gov.au). Site includes a user friendly table to enable practitioners to determine which standards are relevant to their activities

Many web learning projects include digital motion audio/video. While defacto industry standards exist by virtual of two market equals (RealNetworks RealPlayer and Microsoft's Windows Streaming Media), the broader motion picture industry (the Motion Picture Experts Group- MPEG), which is aligned with the Geneva-based International Organization for Standardization (ISO) has developed a series of MPEG encoding and decoding standards.

- The latest but as yet not broadly available MPEG standard for streaming audio/video is MPEG-4. Based loosely on Apple's Quicktime, the standard allows the possibility of interacting with objects in the digital stream, potentially enabling an actively learning experience from traditionally passive media.

Simultaneously, the higher education academic accreditation bodies have begun developing "quality standards" for higher education.

- Accreditation Reviews of Distance Education Courses - The authorities that grant accreditation to colleges and universities in the United States are near agreement on guidelines for evaluating distance education that differ from traditional accrediting standards by focusing on how much students learn.

  - View the In late 2000, the regional accrediting commissions released the document "Guidelines for the Evaluation of Electronically Offered Degree and Certificate Programs" for review and comment.

    - View the early accrediting standards draft
  - The document was developed by directors of the eight regional accrediting commissions with assistance from WCET staff. Based upon the comments received from the original documents, the wording was revised resulting in two new documents: (1) The Statement of Commitment by the Regional Accrediting Commissions for the Evaluation of Electronically Offered Degree and Certificate Programs; and (2) Best Practices for Electronically Offered Degree and Certificate Programs. Note especially the change from "Guidelines" to "Best Practices" in the title of the document. Both documents are currently being considered by each commission separately in keeping with their own policies and procedures. Questions or comments regarding these materials should be directed as appropriate to one of the commissions, whose e-mail addresses can be found in a footnote in either document.

    - 'View the new drafts.
- The American Federation of Teachers (AFT) released in January 2001, DISTANCE EDUCATION GUIDELINES FOR GOOD PRACTICE, a "set of quality standards for distance education in colleges and universities . . . based on both a survey of [200] AFT members who teach distance learning classes and previous studies by AFT." Printed copies of the report are available for $2 (US) by writing to the American Federation of Teachers Higher Education Department, 555 New Jersey Avenue NW, Washington, D.C. 20001 USA.

  National Center for Supercomputing Applications - Educational Division. NCSA has long been a leader in Internet software development. This page provides insight into ongoing projects that will influence industry standards.
- H.323 and other Networking Standards

  - Network Design Manual - By Dave Brown of Network Computing, a very nice how-to and comprehensive review of network design anticipating greater use of Voice over IP

Technical Support for Distance Education

One faculty member on my campus boldly told me prior to start of her first web-based class that centralized technical support for her students wouldn't be necessary. I smiled. When the course evaluations returned, the students were very critical of the lack of comprehensive technical support scaled and focused on the needs of off-campus/distant students.

Until all distance education students have unlimited bandwidth, uniformly high quality service from Internet Service Providers, and full comfort with browsers and web activities, there will be a need for high quality technical support to learners. There is no greater challenge for technical support than to assist users they've never seen with computers of many different varieties. So plan your Distance Education technical support organization carefully.

- **Article:** One Size Doesn't Fit All: Designing Scaleable, Client-Centered Support for Technology in Teaching

- When you're dealing with bandwidth limits, remember the big picture. Vendor Jeff Gray (jgray@novologic.com) says Web apps can under-perform because infrastructure design poorly matches available bandwidth. "If you can accurately access the available bandwidth, the design can be sculpted to fit," says Gray, vice president and senior IT architect with NovoLogic Inc. of Lawrenceville, Ga. Find out everything you can about your "ecosystem" -- your locations, usage patterns, hardware, software and users. Gray lists these considerations:
  - Server hardware specifications show how many hits the server can handle at once and what applications it can run. For example, if you want to use Windows Media content, you must be running either Windows NT or Windows 2000.
  - The location of your training server is crucial. If the server is in an area with high line-use rates, the server may respond more slowly.
  - Routers and other load-balancing hardware and software help direct requests to available servers.
  - Proxy servers can both help and hinder. Proxies sit between the main server and your learner. Some proxies are set up to cache content, so that learners accessing the same page needn't both go to the main server. This speeds things up.
  - Proxies, however, screen out certain protocols and file types -- "a huge problem" if the file type is your e-learning media, says Gray.
  - Firewalls protect your content and screen who gets to see it. But firewalls can also be a burden. "Getting things to change on a firewall in a large organization takes an act from Congress," Gray hyperbolizes.
  - You might want to change a firewall for some types of content. "If the firewall was only accepting http requests through Port 80, and you want to deliver RealAudio using the RTSP protocol," says Gray, "then you would need to get a port opening up through the firewall." RTSP (Real Time Streaming Protocol) is an emerging streaming standard.
  - Line speed is a key consideration. How fast does the line coming off the server deliver information? What are the line's utilization rates, and utilization rates of all the legs between different servers? If you're on a local-area network, what is its utilization rate and speed?
  - Line speeds go down as traffic mounts, even on fast T1 lines. Large organizations see spikes in line use for both LAN and Internet at about 8-9 a.m., noon to 1 p.m. and 5-6 p.m as employees check e-mail and the Web. "If you have e-learning that is trying to take place during spikes in your own environment, you may have some bad performance problems," warns Gray. Gray suggests designing for your slowest connections so that a "screen paint" takes no more than five seconds.
  - Other key considerations include users' computer types, their central processing unit speed, hard-disk space, memory, operating system, browser version, security settings, display, installed software and user demographics.

  Findings on the foregoing points will tell you how fast e-learning can run in your "ecosystem."

Service Providers and Consultants in Web-based learning

A number of software vendors provide consulting and outsourcing services regarding their products. A more trendy term for this is "Application Service Provider" (ASP). Additionally, several organizations provide independent consulting on one or more software tools. Services range from instructor training to turnkey course development to facilitated hosting services (often called Application Service Providers -ASPs). Inclusion in this list should not be construed as an endorsement of these services by the author; this listing is provided simply as a convenient, but incomplete, reference.

- **Carol Fallon, President Integrity E-learning.** Firm specializes in AICC standards-based development. Sells a AICC compatible Learning Management System, WBT Manager.
- Tcert's Edapt - an application service provider featuring an adaptive analysis system (edapt) that tailors learning for each use. Edapt is apparently deployed in several software products and is itself a databased technology internal to the product line, not a product. One product based on Edapt appears to be myetutor.com
- **Internet University** provides hosting and consulting services for best of breed e-conferencing and distance learning environments; Astound, Centra99, horizonLive, LearnLinc, Placeware and Educata.
- **Collegis** - An outsourcing option for infrastructure and consulting related to distance education targeted to higher education
- **Brainshark** - Brainshark is a web communications service provider that allows you to author, publish, and manage multi-media presentations over the internet. The author used tools they are familiar with such as: a phone, PowerPoint presentation, and an Internet Browser to create presentations and host them on Brainshark's secure site.
- **Convene.com** - Convene.com has been creating customized online education solutions for schools, colleges, universities, and training organizations since 1993. Convene's unique learning platform ac@deme, incorporates exclusive WebSync technology that captures and automatically updates the user's computer with a synchronized Internet environment so that students and teachers can be as productive online as off. Convene.com is equipped to handle everything it takes to successfully build an organization's virtual campus and then support it with network, customer development, hosting, and around-the-clock helpdesk services, as well as one of the most comprehensive faculty training programs in the industry.
- **3-D Consulting** - 3-D Consulting is a service provider in the area of online training, creating custom training content for online deployment in a variety of learning platforms.
- Asymetrix Learning Systems Inc. of Bellevue, WA, says its Click2Learn.com site now lets anyone author and publish a course at the site free and collect royalties when the course is sold through the site.
- **Services providing slides over the internet with a live voice broadcast**
  - http://www.e-conference.com/
  - http://www.talkpoint.com/
  - http://www.envoyglobal.com
- **InSync Training Synergy** is focused on providing organizations the best solutions for online training initiatives. InSync's collective experience includes many different types of live and online training. Train The Trainer programs are available for your online training designers and facilitators. InSync's training team is led by Jennifer Hofmann and supported by an established network of instructional designers, graphic artists, and education experts.
- **Question Mark Corp**. of Stamford, CT, launched a Web-based learning center offering interactive "teleseminars," slide shows with audio, downloadable tutorials, free evaluation software and links to on-line user manuals.
- **GeoLearning Inc.** - an interesting visual-based education hosting service offering asynchronous and synchronous delivering, administration and authoring system, testing/survey systems and an on-line resource center.
- **ComputerPrep** - offers a variety of mostly computer system focused, instructor-led training and services.
- **DistaLearning International** - DLI is an interactive site providing Intranet and Internet training course descriptions from training producers. Visitors can interact in forums, chat rooms, and a list serve. DLI provides a place where producers could promote their programs at a reasonable cost, while providing visitors good distant learning resources. Your organization can post messages (new policies, product prices, schedules etc.) to their employees in your own private messaging area. Your organization can also lease a private scheduled chat (sales meetings, group discussions, professors to students) in your own private chat area.
- **David Wooley** - provides consulting services in web-based learning
- **David Strom** - provides consulting services in web-based learning
- **CyberClass** - A service bureau similar to Convene, this product offers several levels delivery format. They sell software licenses to bookstores so bookstores can "Stock" the courseware.
- **Media Semantics, Inc.** is a privately-held software R&D firm that develops manipulative interface and interface agent technology for deployment in commercial software products.
- **UOL Publishing Inc.** of McLean, VA, says that since early 1997 it has delivered more than 100,000 courses to 73,000 students via its Internet-based VCampus. UOL is targeting 500,000 courses in 1999. UOL and partners have 850 course titles including information technology, corporate soft skills and accredited academic courses.
- **E-College.com** (formerly Real Education) of Denver provides online delivery and administration systems to colleges and universities. They have also partnered with Harvard University to making thousands of Harvard Business School Publishing cases and Harvard Business Review (HBR) reprints available "for faculty perusal and assignment and student purchase." Several of e-College's 60 U.S. educational-institution partners offer online business degrees.
- **Eduprise** - a hosting service and service bureau for outsourcing of e-learning services. Includes hosting services for Blackboard's Courseinfo product line.
- **E-education** - a service bureau with a proprietary software solution packaged for outsourcing for e-learning infrastructure. A division of JonesKnowledge.com. E-education provides contractual support services at several levels for faculty and learners. Vendor may make software available for large corporate users, but software is not generally available for sale to educational institutions at this time.

Distance Education Overviews and References

- Distance Learning - a Special report from the Wall Street Journal focusing on the business of education.
- "Global Education:...", by Diana Oblinger - For colleges and universities to remain competitive, it will be necessary to think creatively about both structure and mission. Thinking creatively about education has massive economic importance. Education and standard of living, quality of life and social stability are linked. The paper presents a taxonomy of emerging institutional and business models based on observations around the world.
- CORPORATE E-LEARNING (Report) - focuses on corporate training, one of the five segments of the education and training market. In particular, we identify key drivers, perform preliminary market segmentation, and estimate growth for market segments and product groups of the technology-based corporate training industry. We outline major trends and likely winning strategies for companies targeting the corporate e-learning market, which we also refer to as e-training market. Since the e-learning industry is a relatively new, unexplored frontier, this report is intended to provide a concise overview of the key aspects of this emerging market and to offer a framework for analysis for industry players and the investment community.
- Are you ready to cross the e-Line? - Overall context of D. Oblinger's article:
  - The global networked world has arrived faster than expected
  - It threatens to disrupt and dominate the traditional economy
  - The role of the individual grows as more people connect with the network
  - The new challenges will center on institutional models rather than technology
  - Even traditional institutions will be affected
- The American Center for the Study of Distance Education - operated by Penn State, provides valuable research and references to DE matters.
- **CyberLearners.com** - An educational "portal" created by L-Paradigm, Solutions Provider for Web-Based Learning and Training Solutions (Cyber Campuses & Virtual Classrooms) for Schools, Educational Institutions and Corporate Organizations in Singapore.
- **Education Resources Information Center** - ERIC, a function of the National Library of Education, a series of resources on general and topical education.
- The Teaching, Technology & Learning Group - The TLT GROUP, associated with AAHE is the organization which houses "The Flashlight Program," which in turn makes available "Tool Kits for Designing Your Own Studies." The Flashlight Program distributes two major tool kits. The first is called the "Current Student Inventory." The CSI helps you gather information from currently enrolled students so that you can monitor educational uses of technology and their effectiveness. The second tool kit, the Flashlight Cost Analysis Handbook, will help you design models of how programs use money, space and time.
- Sloan Center for Asynchronous Learning - The Sloan Center for Asynchronous Learning Environments (SCALE) was established in March 1995 with a grant from the Alfred P. Sloan Foundation. The original grant was for three years. It was aimed at restructuring undergraduate courses to integrate various techniques associated with asynchronous learning networks (ALN). More specific goals were to create efficiencies in the educational process (cost, time, faculty productivity), to increase student retention, and to decrease time-to-degree. In July 1998 a renewal grant was obtained for an additional two years. The goals for SCALE under the renewal grant are to continue the work in promoting ALN, further investigate ways in which ALN can be used to produce efficiencies in instruction, and experiment with ALN to make this style of teaching attractive to mainstream faculty.
- **Asynchronous Learning Networks** - ALN's focus, as defined by this site funded by the highly respected Sloan Foundation, is very specific. ALN combines self-study with substantial, rapid, asynchronous interactivity with others. In ALN learners use computer and communications technologies to work with remote learning resources, including coaches and other learners, but without the requirement to be online at the same time. The most common ALN communication tool is the World Wide Web. By this definition, a web-based workshop that requires frequent online conferencing and collaboration with others is ALN. So is a text- or computer-based training course that requires learners to use email to discuss assignments with each other and with the coach. ALN also encompasses a proctored examination at a specified time and place, or occasional synchronous chat or lab sessions for near-campus learners, or an in-person kickoff meeting. By this definition, distance education based primarily on a synchronous audio or video presentation or conference is not ALN because these constantly require learners and instructors to be available at the same time. A videotaped course or mail-based correspondence course or computer-based training is not ALN because these do not include substantial and rapid interactivity with others, even though the learner might mail in a paper or test and receive a reply days later.
- **EduCause** - Formerly Educom
- **SYLLABUS magazine** an educationally oriented multimedia users' magazine
- **ADULT EDUCATION AND DISTANCE LEARNER'S RESOURCE CENTER** From the co-authors of The Princeton Review's Best Distance Learning Graduate Schools.
- **YOUR ONLINE GUIDE TO DISTANCE EDUCATION** - Simple, well designed site about the idea of distance learning. No database, but it does have a message board.
- **THE DISTANCE ED. FOR DUMMIES HOMEPAGE** - A distance educator with strong opinions about distance education quality.

Courseware and Content Publishers

Looking for pre-developed courseware, software or materials? Check out these sources.

- PEARSON EDUCATION Inc. and netLibrary Inc. of Boulder, Colo., partner to create e-versions of "hundreds of the world's most popular college-level textbooks" in the next year. Pearson, a unit of Pearson plc in London, says it will have as many as 100 e-texts available via its CourseCompass platform.
- McGraw-Hill Offers Digital Texts through netLibrary's Metatext - McGraw-Hill Higher Education, a provider of electronic learning solutions for the college market, parters with MetaText, netLibrary's digital textbook division, to develop electronic versions of its college textbooks. McGraw-Hill will make its digital textbooks available through classroom Web sites created with its PageOut course management software, free to professors who use McGraw-Hill materials. Through PageOut, a student can view a professor's instructions and notes, take tests pre- pared by instructors, and directly link to a MetaText e-text- book and other electronic tools, such as McGraw-Hill's Online Learning Centers, exercises, and links to related Web sites. MetaText will convert about 30 McGraw-Hill market-leading text- books, covering a variety of subject areas and make them available throughout the spring and summer for review and adoption by instructors at colleges and universities throughout the North America.

- Skillsoft - SkillSoft's charter is to provide business, government and educational organizations with e-Learning solutions that can be deployed cost-effectively on a global basis. In support of that charter, SkillSoft has created over 425 e-Learning courses and over 1000 online job aids, adding 200+ courses each year. SkillSoft is actively localizing courses for the United Kingdom and other major geographic markets.
- Unext - In addition to the development of its own online university called Cardean University, UnExt offers bundles of courseware for redistribution.
- ThinQ - aggregations of professional learning content and proven change management services that help to drive learners to improve performance.
- EdHelper - currently have over 1,000 Webquests and 6,200 Lesson Plans including Science, Social Studies, Mathematics and other resources.
- SkillSoft.com - provider of "Off the Shelf" courses for Soft Skills and Business Skills(360 US titles @ 2-3.5 hrs per title length plus over 150 localized for UK) and 200 additional titles per year in production. Our Courses are true web-based content with both Pre-assessments and Mastery Assessments, as well as an Accelerated Path option which allows the student to "test out" of any part of a course that they have already mastered. Doesn't use software browser "plug-ins" which means the courses work well in externally-hosted scenarios. Deployment methodologies allow a user to take a course either docked to a local area network, through a dial-up connection, or they can download and play either part or all of a course. Company also offers a Personalized learning portal (SkillPort) and a Course Customization Toolkit which allows a client to customize our courses to their internal needs or even to create additional content using our Software and ID template.
- Education to Go - A hosted service providing predeveloped courses ready for instructor use.
- CourseLinks - a faculty-based review and cataloging system of web pages suitable for adoption as parts of wholes of course material.
- Smartforce - Known mostly for its CD Rom course materials; selected courses are also available in web formats
- Course Technologies - Offers selected prewritten courses in a variety of formats including formats suitable for Blackboard Courseinfo
- Archipelago Productions - Archipelago is an educational multimedia publisher, and Harcourt Higher Learning Company, dedicated to bringing quality content and interactive learning to students in asynchronous learning environments. Archipelago Online Courses are delivered in a hybrid "netCD" environment, leveraging both CD-ROM and Internet technologies. The Archipelago/Blackboard Course Cartridges will allow instructors to easily upload Archipelago's Web-based content modules into Blackboard's popular online learning platform. Archipelago's course listings in Blackboard.com, Blackboard CourseInfo and Blackboard Campus for Fall 1999 will include Principles of Microeconomics, Principles of Macroeconomics, General Chemistry I, and Physics I (calculus-based). All Archipelago course content is fully customizable by instructors. Easy-to-use editing tools allow instructors to reorganize, delete, modify, or create entirely new screens within the Archipelago multimedia lesson environment. Instructors may also add text notes, hyperlinks, and personal audio narration to their multimedia lessons.
- Academic.com - Academic Systems Corporation, the higher education division of The Lightspan Partnership, Inc., has focused on meeting the needs of higher education faculty and students since it was founded in 1992. Its first products were interactive, multimedia instructional programs that offer an enhanced learning environment in mathematics and writing for college students in developmental and entry-level courses. Created in concert with educators, Academic Systems' Interactive Mathematics and Interactive English programs have demonstrated impressive increases in learning and achievement. Academic Systems' networked courses are offered at more than 250 campuses in 36 states. The new millenium marks the launch of academic.com products and services which enable instructors to easily create a range of online components for a wide variety of courses. academic.com brings together Academic Systems' award winning Active Content with Blackboard's core platform technologies to create a one-stop-shop for eLearning solutions. Faculty can choose from a large menu of Active Content to enhance their courses, giving students supplemental exercises where they need it and freeing faculty to teach their core subject matter. Faculty training helps to make instructors successful users of academic.com while 24/7 technical support keeps all systems running smoothly.
- **Pearson Education** - Pearson Education, through its three major imprints - Prentice Hall, Addison Wesley Longman, and Allyn & Bacon - will offer its online content to over 100 textbooks for use within the popular Blackboard product line. These "course cartridges" contain web-based content and resources such as online study guides, assessment databanks, and lecture resource material. Pearson Education's abundant online content, combined with Blackboard's popular tools and user interface, result in robust web-based courses that are easy to implement, manage, and use - taking your courses to new heights in student interaction and learning. These course management solutions range from enabling you to quickly add an online component to your campus-based course to providing you with a sophisticated technology base for distance learning.
- **International Thomson Publishing** - International Thomson Publishing (ITP) is among the world's largest educational publishers of elementary to post-graduate level products. ITP publishes in a variety of academic and career disciplines, including technology, science, engineering, business, health sciences, the humanities and social sciences. In addition, ITP actively supports individual and organizational efforts to build new learning networks and services such as Western Governor's University and California Virtual University. Blackboard's partnership with ITP is aimed at implementing the emerging EDUCAUSE IMS standards into interoperable ITP content and Blackboard's Web-based learning environments. Well recognized for leading educational materials, Blackboard is pleased to make ITP content available in its learning environments.

Funding Sources for Distance Learning

- The Funding $ourcebook Website
  The Funding $ourcebook offers the latest research on grants for telecommunications, multimedia, curricula development, and teacher training for private and public schools, higher education, museums, libraries, arts and culture organizations, health and social service agencies, and grassroots community organizations. At the site, click on "funding sources" via the menu at the bottom of the page. Then, on the new page, choose "view slides" for a quick summary.
- Learning Anytime Anywhere Partnerships (LAAP)
  LEARNING ANYTIME ANYWHERE PARTNERSHIPS (LAAP), are administered by FIPSE, at U.S. DOE. The Website above provides access to the following information: (1)LAAP Authorizing Legislation; (2) LAAP Competition Guidelines and Application Materials; (3) deadline for 7-page Preliminary Proposals; (4) Technical Assistance Workshops for Potential Applicants; (5)Frequently Asked Questions about Applying to LAAP; (6)Program Evaluation Information; (7)Links to Other Distance Learning and Technology Websites. LAAP Contact Information: 202-708-5750. E-mail: LAAP@ed.gov
- TIIAP - U.S. Dept. of Commerce, NTIA -
  TIIAP provides matching grants to non-profit organizations such as schools, libraries, hospitals, public safety entities, and state and local governments. Grants are used to fund projects that improve the quality of, and the public's access to, education, health care, public safety, and other community-based services. The grants are used to purchase equipment for connection to networks, including computers, video conferencing systems, network routers, and telephones; to buy software for organizing and processing all kinds of information, including computer graphics and databases; to train staff, users, and others in the use of equipment and software; to purchase communications services, such as Internet access; to evaluate the projects; and to disseminate the project's findings.
- Educational Technology Grants - U.S. DOE
  The Clinton Administration has made an unprecedented commitment to bringing technology into the classroom. As a central element of the President's lifelong learning agenda, the Administration created the President's Educational Technology Initiative. Recognizing that technology can help expand opportunities for American children to improve their skills, maximize their potential, and ready them for the 21st century, President Clinton and Vice President Gore have challenged the nation to assure that all children are technologically literate by the dawn of the 21st century and equipped with the communication, math, science, reading, and critical thinking skills essential for enhancing learning and improving productivity and performance.
- Distance Ed. Demonstration Program, U.S. DOE
  Certain provisions of the Higher Education Act (HEA) prohibit or limit the eligibility of institutions and/or students participating in Distance Education Programs to receive federal student financial assistance under Title IV of the Act. The 1998 amendments to the HEA authorize the Secretary to select up to 15 institutions and/or systems or consortia of institutions to participate in a Distance Education Demonstration Program designed to help determine the most effective way of delivering quality education via distance education, the specific student aid requirements which should be altered to provide greater access to distance education programs, and the appropriate level of federal assistance for students in distance education programs. The Secretary may waive specified statutory and regulatory provisions that would otherwise bar or limit the participation of the institutions, systems or consortia.

Virtual Worlds and Simulation Software

- Edutorium - using 3D interfaces, the system allows development for rich media educational content.
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Glossary of Technical and Distance Education Terms

- PC Webopedia
- CNET glossary
- Net Lingo
- Internet Hyperglossary
- **Web Learning Favorites**

Andragogy - pedagogy of adult learning; closely related to accelerated learning, andragogy is the art, philosophy, and science of helping adults learn.
(see research by Malcom Knowles)

Application sharing. A feature that allows two or more people in different locations to work together in a single live software application. In application sharing, one user launches the application and it appears on all participants' computers simultaneously. Both users can input information and otherwise control the application using the keyboard and mouse. Although it appears that the application is running on both PCs, it actually is running on only one. The person who launched the application may have the option to lock out the other person from making changes, so the locked-out person sees the application running but cannot control it.

Asynchronous. A type of communication that occurs with a time delay between steps in the dialog, allowing participants to respond at their own convenience. Literally "not synchronous"; in other words, not at the same time. Asynchronous capabilities give learners access to course materials, including readings, embedded and streamed multimedia, and external Web sites. They also let learners participate in facilitated discussions, and complete assignments individually and collaboratively. A more narrow definition is offered by the ALN Network.

Audio Conferencing - In the context of a web-delivered technology, this term generally refers to voice conferencing over the internet. The equivalent of a telephone conference using dial-up internet services, generally through software installed in a web browser. Implementations range from half duplex to full duplex. The term may also be used to refer to standard telephone conferences.

Authoring software/tools. High-level computer programs designed for creating computer-based training, interactive presentations, and multimedia. Commands are often presented as simple terms, concepts, and icons. Authoring software translates these commands into programming code.

Browser Interface - Denotes that the host software allows use of most product features through Java-enabled browser such as Internet Explorer or Netscape Navigator/Communicator. There is often implied an assumption that some additional software (generally referred to as a "java applet" or a "plugin") has been added to the browser to increase selected functionality.

Chat. Generally refers to real-time, text-based conversation between two or more individuals connected online. As you type, everything you type is displayed to the other members of the chat group. Some implementations provide for private communications between individuals, most packages provide for a group chat (i.e. everyone sees everything). Some chat software now features voice-enabled chat.

Chat Logs - Software has the ability to save and optionally post transcripts of chat sessions.

Computer-based training (CBT). An interactive instructional approach in which the computer, taking the place of an instructor, provides a series of stimuli to the student ranging from questions to be answered to choices or decisions to be made. The CBT then provides feedback based on the student's response.

Desktop videoconferencing. Videoconferencing on a personal computer equipped with a fast Internet connection (at least 28.8 Kbps modem), a microphone, and a video camera . There can be two-way or multi-way video and audio depending upon the hardware and software of participants. Most appropriate for small groups or individuals.

Distance Education. See Distance learning. This term is often used synonymously with distance learning. However, "distance education" seems to be preferred in undergraduate and graduate academic settings.

Distance Learning. A system and a process that connects learners and instructors who are in different locations. Distance learning has historically involved correspondence courses, video, or satellite broadcasts. With the connectivity of the Internet and a new generation of software applications, distance learning has evolved into a new model, which provides higher quality and more flexibility and which is more appropriately called "distributed learning."

Distributed learning. A system and process that uses a variety of technologies, learning methodologies, on-line collaboration, and instructor facilitation to achieve applied learning results not possible from traditional education in a truly flexible, anytime/anywhere fashion.

e-learning - A term referring broadly to technology-based learning. Seems to focus on web-based delivery methods but often used in a broader context. Used initially by corporate universities, now being embraced by academia.

Instant Messaging - a system allowing users to know when others in their "group" are online and to interact with them via text, voice chat and or other synchronous or asynchronous modes of communication.

Instructor-led training (ILT). Training in which learners are taught by an actual person: an instructor, teacher or faculty member. Instructor-led training can occur synchronously or asynchronously.

Java. A programming language developed by Sun Microsystems that creates code for interactive applications that is executable on web pages by web browsers. These Java applications can execute on any platform: Macintosh, PC, and so on.

"Just in Time" (JIT). A term used to describe a system or information that is available for the user at the exact time the user needs it.

Multimedia. A very general term that usually refers to computer programs that use a combination of sound, video, animation, pictures, and/or text.

Multipoint. Communication configuration in which several terminals or stations are connected. This differs from point-to-point, where communication is between two stations only.

Open Enrollment - The ability to enroll in a course or program of study at any time. Contrasted with the typical term-based enrollment and lock-step cohort programs of traditional schools, "open enrollment" is frequently requested by adult learners. Correspondence courses are traditionally offered as "open enrollment" delivery systems, although logistical issues and faculty concerns (especially workload) often block its implementation.

Pedagogical. Of, relating to, or befitting a teacher or education, especially with regard to a process of learning.

Real-time. The processing of information that returns a result so rapidly that the interaction appears to be instantaneous. Telephone calls and videoconferencing are examples of real-time applications. These kinds of real-time information not only need to be processed almost instantaneously, but it needs to arrive in the exact order it's sent. A delay between parts of a word, or the transmission of video frames out of sequence, makes the communication unintelligible. See also Synchronous.

Repurpose. To create new material from older material.

Self-paced learning. Education in which the learner is on their own, studying without interaction with others. Sometimes used to refer to asynchronous modes of delivery. CBT has been the most common form of self-paced learning, but web-based asynchronous systems are catching up quickly.

Shovelware - a pedagogically critical term used when traditional courseware is re-purposed for the internet without full consideration of the quality of the new learning experience. Essentially "Shoveling" content onto the internet for better or worse.

Synchronous. A type of two-way communication that occurs with virtually no time delay, allowing participants to respond in real time. Also, a system in which regularly occurring events in timed intervals are kept in step using some form of electronic clocking mechanism. Synchronous capabilities add a living, breathing dimension to online learning. Generally includes tools supported by standards-based data, audio, and videoconferencing — like whiteboard, application-sharing, and question-and-answer. See also Asynchronous.

Voice-over-IP. (VOIP) Uses the internet to allow phone-like voice interaction over dial-up internet connections. Typically implemented as a browser add-in or external piece of software. Some systems are full-duplex, other voice-over-ip systems use "push-to-talk" half-duplex systems.

Video Conferencing. In the context of web-delivered learning, refers to "Talking" head, small size video over IP networks. Generally requires additional hardware for implementation. Generally implemented as an optional feature, due to its significant bandwidth requirements.

Web-based training (WBT). A form of computer-based training in which the training material resides on pages accessible through the World Wide Web. Typical media elements used are text and graphics. Other media such as animation, audio, and video can be used, but require more bandwidth and in some cases additional software. The terms "online courses" and "web-based instruction" are sometimes used interchangeably with WBT.

Whiteboarding or Shared Whiteboard. A term used to describe the placement of shared documents or material on an on-screen "shared notebook" or "whiteboard." Desktop videoconferencing software often includes "snapshot" tools that enable you to capture entire windows or portions of windows and place them on the whiteboard. You work with familiar tools - such as "colored pens" and "erasers" to mark up the electronic whiteboard much like you do with a traditional wall-mounted board.

Workgroups - allows subsetting of learners into on-line workgroups. Implementations vary from simply email group lists to virtual voice enabled on-line collaborative workgroups.

Understanding Database Terminology

Advanced web learning developers will inevitably encounter the need to know about databases. Database terminology tends to vary, even though when talking about similar concepts. For easy reference, here is a translation table, assuming you are comfortable with terminology in at least one of the database disciplines:

File Processing Term	Relational Database Design Term	Relational Database Implementation term	Object Oriented Database Design Term
file	entity, relation	table	object, object class
record	instance of a relation	row	instance of an object
field	attribute	column	property
data	data item	data item	data item
related files	relationship	relationship, link	relationship, link