EMERGING TECHNOLOGIES
Tools for Distance Education: Toward Convergence and Integration

Robert Godwin-Jones
Virginia Comonwealth University

Interest in the remote delivery of language instruction has increased significantly in recent years. As the Internet has displaced synchronous video as the preferred platform for distance education, the dramatically lower cost and more modest technical requirements of Web delivery make it a feasible option for a much broader range of educational institutions. More broadband connections along with the widespread availability of DVD players allow for incorporation of high-quality video into distance ed courses, while new Internet audio tools make two-way voice communications possible. The power and flexibility of the XML programming environment, now widely deployed on the Internet, make new convergences of educational and entertainment environments possible.

New Web Options

Web environments for distance learning can be custom-created from scratch or built using an interface supplied by a Learning Management System (LMS). A custom-built project offers the greatest amount of flexibility while avoiding the temptation to follow a pre-conceived plan for the structure of the course. On the other hand, this route makes higher demands on design and programming and thus increases cost and development time. A good number of course sites use Macromedia Director or Authorware to create content and Flash for delivery of animations and multimedia. Dreamweaver (Macromedia) and FrontPage (Microsoft) facilitate not only the creation of Web pages, but also enable addition of JavaScript interactivity through pull-down menus. To be used effectively, these tools need not just programming skill (to varying degrees) but -- just as importantly -- an understanding of Web design and user interface issues.

A key advantage of using an LMS is the built-in course framework, a template-based system into which content is added. For distance learning, an LMS can supply crucial communication and management tools, as well as assessment builders and gradebook functionality. Although the most widely used LMS are Blackboard and WebCT, new less-expensive but still highly effective options exist. ETUDES, from Foothill College offers an easy-to-use interface for distance learning and has features comparable to Blackboard (and scores higher in Web accessibility). The Manila environment, part of Userland Frontier, is innovative and powerful groupware which excels at creating a multi-user writing environment. It allows new information to be easily posted to a weblog. For some purposes Manila may work better than WebCT. One of the most welcome Web products for language learning is Wimba, which allows for creation of a variety of voice-enabled Web pages, including voice boards which use the familiar format of threaded discussion forums for the exchange of recorded messages. Wimba is being widely used in the US in language learning, for example, at the University of Arizona to supplement use of a MOO in teaching Mohave. Its use as an "online language lab" is especially useful for less commonly taught languages, with scarce local availability of native speakers. The variety of functions available in Wimba's WebLab could be used together as the core functions of a Web-delivered language class.

LMS excel at course and user management but they are not strong in content creation. Course developers often create structured content outside the LMS using a mainstream multimedia authoring program or programming environment, then link to that content from inside the LMS shell. The disadvantage of this approach is the lack of functional and interface integration with the LMS. Recently, both Blackboard and WebCT have opened up their proprietary systems to plug-ins and add-ons, which extend the system functionality while retaining the familiar user interface and authoring conventions. One of the more powerful content creation tools, available for both of the leading LMS, is Lectora from Trivantis. Lectora enables creation of sophisticated learning modules which incorporate multimedia, branching, and

assessments. Performance on quizzes is automatically linked into the LMS gradebook. Advanced interface options such as show and hide functionality, mouseovers, or object visibility, can all be added without any need for programming knowledge. One of the key features of Lectora is its support for Internet standards. Specifically, the content created is compliant with the SCORM guidelines (Sharable Content Object Reference Model) as well as LRN (Learning Resource Interchange), Microsoft's implementation of the IMS standards (Instructional Management System). Standards compliance enhances the likelihood of content portability from one learning system to another as well as the ability to share among colleagues. Lectora content, for example, can be imported and exported to XML and then transferred to a different learning environment (i.e., from Blackboard to WebCT). Content can also be delivered in Palm and PocketPC formats.

Hybrid Applications

A critically important component of distance education is multimedia, in particular streaming media and Web-enabled DVDs. For language learning audio and video clips often form the meat and potatoes of remotely delivered instruction. In fact, traditionally, distance education meant two-way video, usually in the form of dedicated site-to-site connections using compressed video. Today, successors to the pioneering CUSeeMe (NetMeeting, Paltalk, iVisit) provide much less expensive two-way video on PCs through high-quality USB or Firewire cameras. Some chat programs have video as well as audio capability. Apple recently announced multimedia enhancements of its iChat application, along with introducing the new iSight camera. A recent review in LLT discussed a number of different audio conferencing tools.

The problem with video conferencing remains the high throughput required for satisfactory size and fidelity (especially in going beyond one to one connections). In a distance learning environment there are likely to be participants without broadband Internet access. This issues arises as well in video distributed through a streaming server. Although streaming technologies, including RealMedia, Windows Media, and QuickTime, have provisions for adjusting streams to bandwidth availability, a dial-up connection nonetheless will not usually provide a reliable and smooth video playback in a reasonably sized window. This becomes an especially serious problem if a distance learning module is built around display of video embedded in a Web page or other delivery environment. One of the options for incorporating streaming media is to use a synchronizing tool to link streaming audio or video of lectures/presentations with slides, Web pages or other content. Such products vary considerably in cost and functionality and include Lecture Browser, PresenterOne, JITL (Just-in-time Lectures), and Microsoft Producer.

One solution to bandwidth issues is to supply the media, especially video, on CD or DVD. This option provides a reliable video source, one which can be accessed independently of Internet connectivity. CD burners have become standard equipment on new computers and DVD burners are now frequently an option as well. Mass duplicators have dropped significantly in price in recent years and, with the current low price of blank CDs, can quickly create a batch of CDs from a master. Both Blackboard and WebCT allow for integration of content distributed on local CDs. An instructor links content from a CD to a Web page, usually signaled on the page by a CD icon. The first time students access the content they provide the location or name of their CD or DVD drive, which then becomes part of their LMS system configuration. This type of hybrid approach works well also for audio files or any other static files an instructor may have ready for distribution at the start of a course. This might include copies of utilities, players, or plug-ins needed to access some course content (Microsoft players, QuickTime, Acrobat, etc.) For delivery of video, a VCD (video compact disk -- 78 minutes) or high-quality SVCD (super video compact disc -- 35 minutes) can be created with most CD authoring software. The subsequent discs can be played on PCs as well as on most DVD players.

Of course, it is also possible to deliver video on DVD, through free or low-cost DVD authoring software such as iDVD (Mac) or DVD Workshop (Windows) or through more powerful and expensive

professional programs. As the current delivery system of choice for feature films, DVDs offer an immense depository of video to tap for language instruction and cultural study. Interactive applications can tap into video segments as was done with laser discs. Today the programming environment is most likely to be a Web browser. In fact many feature films on DVD come supplied with a Web player/browser (usually PCFriendly or its successor, InterActual Player, both from InterActual) which displays the video in a window embedded in an interactive application. Video segments are shown in response to user actions (mouse clicks, menu selections, branching choices, etc.).

DVDs containing non-video data such as HTML pages or graphics use the DVD-Others zone (outside the VIDEO_TS directory). HTML pages stored on a DVD, for example, might link to a live Web site containing related information. A more sophisticated approach is to build Web pages which define an "object" to configure Windows Media Player to play particular segments. JavaScript based controls can also change language tracks or hide/display subtitles. Ralph LaBarge has provided an extensive example of the code he used in creating an astrology DVD, StarGaze, using InterActual Player 2.0. Products from InterActual, Spinware, or Microsoft, can be used to create such a "WebDVD." However, the resulting product will only run on recent versions of Windows, and not at all (or only partially) on Macintosh or Unix computers. There is not yet an approach to authoring a hybrid Web/DVD that will be fully cross-platform and cross-browser.

Task-Based Language Learning

The Open University (England) is using connected DVDs for delivery of distance ed courses. The University of Wollongong (Australia) is implementing a hybrid environment for distance education of DVD and WebCT in order to use media-rich content and try to span the digital divide between the bandwidth rich and poor. At another Australian institution, Flinders University, an interactive CD (containing video/audio clips as well as vocabulary and exercises) is being incorporated into a WebCT course site for learning beginning French. Projects are underway for teaching beginning Hindi (North Carolina) and elementary Swahili (Brigham Young) which will make extensive use of locally shot video presented on DVD's or CDs. The possibility of using full-frame delivery of high quality video is a boon to any discipline but could be particularly compelling in language instruction. DVDs offer a rich source of interactive content, given features such as multiple viewing angles, up to eight different audio tracks, and multiple subtitling possibilities. Target language subtitling can be particularly effective, as used in the DVD edition of the classic Italian Film "C'eravamo tanto amati," developed at Brigham Young University. This version features as well searchable transcripts, English translations, and grammar exercises. Complete bar code access to the DVD is also possible.

A project which will make extensive use of video is ELLS (the E-Learning Language Project), a joint project of the US Department of Education and the Chinese Ministry of Education to deliver Chinese and English instruction to high school students and teachers. What is of particular interest in the planned approach is the variety and innovation in the task-based approach to language learning. Borrowing from the entertainment community, ELLS will make extensive use of adventure and mystery gaming as well as of puzzles and simulations. Grammatical explanations and vocabulary help are supplied as needed to help students in information gathering and problem solving, needed to find clues to game challenges. Authentic video and images will be incorporated throughout with students placed in authentic cultural and communication situations (restaurants, hotels, schools, etc.) One could certainly take advantage of the versatility of the DVD format to help in creating such an environment, particularly the ability to include hidden video segments that will play back only in response to certain user input (i.e., correct clue provided) and are not selectable (or visible) from menus. It is possible as well to program the content so that accessing particular parts of Web pages triggers video playback or that video playback triggers display of particular pages.

A considerable amount of effort and creativity are needed to create engaging and effective language learning tasks. This is all the more the case if the project involves integrating different media and distributing the resulting project through the Internet. If developers follow emerging standards for "learning objects" in the creation of language learning content, it is possible to share and integrate the products in a variety of learning environments. At a minimum, content modules can be archived in a zip file with a simple XML file (preferably in the form of an IMS manifest file) identifying key characteristics. In addition to the normal meta-data categories (name, title, author, date, size, etc.), cataloging of proficiency level, pedagogical approach, preferred learning style, and professional orientation, would be very helpful. Such cataloged modules could be used independently (as language refreshers) or linked (together with a connection to a live tutor/teacher) to build a course. This could result in the more wide-spread availability of opportunities for quality distance language learning.

RESOURCE LIST

Web Tools and Standards

Manila groupware from Userland

Using Manila from David Davies

Internet Audio Communication for Second Language Learning: A Comparative Review of Six Programs by Gary Cziko (in LLT)

Wimba WebLab tools for language learning

Web software with audio used for language instruction on use of Wimba at the University of Arizona

Lectora authoring system from Trivantis

ETUDES Learning Mangagement System from Foothill College

A Door into Hindi Hindi language learning project from the Triangle South Asia Consortium (North Carolina)

Distance Language Learning and Teaching: From Audiocassette to Internet Audio, Some Pedagogical Implications for Learning to Speak a Foreign Language by Bernard Haezewindt and Lesley Shield (Open University)

Lecture Browser tool for synchronizing lectures and audio/video (from Berkeley)

JITL Just-in-Time Lectures synchronizing software

Instructional Management System IMS standards for object interchange

LRN Microsoft's Learning Resource Interchange

SCORM object exchange project from Advanced Distributed Learning (ADL)

DVD, Video, and Convergence

Groove software peer to peer sharing and videoconferencing

Ivisit videoconferencing software

NetMeeting videoconferencing software from Microsoft

Paltalk videoconferencing software

CUWorld source of CUSeeMe videoconferencing

Videoconferencing: an Interactive Communication Tool for Distance Learners by Trish Andrews (University of Central Queensland)

Teaching and Learning Languages at a distance by Antonella Strambi and Eric Bouvet (Flinders University)

DVD Workshop DVD authoring software for Windows

A Hybrid System for Delivering Web Based Distance Learning and Teaching Material by Joel Greenberg (Open University)

Destinos DVD version

Review of C'eravamo tanto amati Italian film on DVD

Reviews of DVD authoring programs PC Magazine

WebDVD Products & Techniques by Ralph LaBarge

Interactual Web connected DVD authoring

Hybrid WWW and CD-ROM systems from the Advisory Group on Computer Graphics