Full-Featured Web Conferencing Systems
by Joel Foreman and Roy Jenkins

In order to match (and perhaps exceed) the customary strengths of the still dominant face-to-face instructional mode, a high-performance online learning system must employ synchronous as well as asynchronous communications; buttress graphics, animation, and text with live audio and video; and provide many of the features and processes associated with course management systems.

What we here call Web conferencing systems (or "Webcons") address these needs and are gradually becoming more readily available since their rise in the mid-1990s. Improved bandwidth management is enabling access for dial-up users and for the increasing number of people with cable modems and DSL lines at home and T1 or better lines at work. And competition between such vendors as Centra, Elluminate, Horizon Wimba, Interwise, Live Meeting, Macromedia Breeze, and WebEx is driving down costs on systems that provide advanced features such as

- live, multipoint video from the desktop of any participant;
- high-quality, duplex audio operating in parallel with text chat;
- recording and repurposing of content in high-quality compressed files;
- storage and retrieval of multimedia course materials;
- multiple simultaneous online sessions;
- ad-hoc and formal session scheduling integrated with contact systems like Microsoft Outlook;
- breakout sessions; and
- application sharing.

As a result, educators and their students are able to access Web conferencing systems with their desktops—computers furnished with capabilities previously available only to videoconference centers.

The key benefit for instructors and students is the availability in cyberspace of the best virtual classrooms deployed to date. Like the face-to-face classroom, a Webcon can focus a set of eyes and ears on a specific synchronous learning experience. The Webcon can enable multimedia-supported lectures, question-and-answer sessions, voice and video group work, and instant access to and sharing of archived resource materials—all in a geodistributed mode. Does this mean that network technology has finally plunged a dagger into the heart of the face-to-face classroom? Not yet, because the Webcon has its limits and trade-offs, some of which we discuss below.

To indicate how a Webcon might be used, we will draw upon the learning activities that compositionists advocate for writing instruction. We do so, in part, because these activities and processes are relevant to any instructor, in any content area that requires student writing. What follows is a description of an imaginary (but completely possible) business writing course we call BizWrite. Our intent is to describe an advanced prototype that could be adopted in toto or in part, depending on the resources available to a Webcon instructor.

Web Conferencing and Writing Instruction (The Future)

At the start of the semester, 25 BizWrite students log in to the customized Internet portal where the course is housed. Here they review the syllabus, assignments, reading materials, writing models, and other Web-based resources (such as media files and links to other sites) and tools (such as Instant Messenger and a discussion board) that will be used for research or preparation for scheduled online sessions. The schedule is particularly important, as it provides a record of all upcoming and past sessions and links to the ancillary materials required for each. As the semester unfolds, the system automatically generates e-mail alerts for the scheduled events, and its Microsoft Outlook integration feature automatically enters event data on the users' computers.

Several functions produce a greater degree of interactivity for the writing students: live voice and video to and from participants, a multimedia presentation space within which prerecorded and/or edited previous sessions may be played,

and application sharing. We deal with each function below.

Voice and Video

To maximize the benefits of the Webcon course, each participant should have a headset for voice communication and a video capture device (such as a webcam or camcorder), focused to make his or her image available to others online. When positioned properly, the webcam projects an image that is roughly equivalent to what we see when watching a news commentator on broadcast television: The speaker appears to be looking into the viewer's eyes, for a personal effect. The speaker's image and voice are both transmitted over the Internet, so no additional phone lines are required. However, the platform is used much like a phone (rather, a videophone), with the instructor or a student able to initiate informal sessions (with two or more people) that advance the learning goals of the course.

The live video image is about the size of a passport photo. Although it lacks the smooth flow of a broadcast image, it does provide a sense of presence by allowing participants to monitor the facial expressions of others as they speak. A maximum of five video links (enough for small group interactions) can be simultaneously active, although only the presenter and one other participant are streaming (i.e., displaying motion) at any given time. The other three are frozen in a snapshot mode that converts to streaming mode when the microphone is passed around. The five available slots can also be transferred to other participants.

The writing course's first live session begins as a conventional instructor-centered lecture directed to the entire online class. The students see the instructor and the faces of those who ask questions or make comments about the content of the presentation. BizWrite class members prepared for this live event asynchronously: They logged in and reviewed all course materials, followed the automated procedures for installing the Webcon software, tested their own audio/video equipment, and accessed the online Webcon presentation space. These advance activities increased the likelihood that the first session would be glitch-free and focused. The students are now motivated, organized, and engaged for the weeks ahead.

The Presentation Space

The live course introduction incorporates various media and remote-guest capabilities to engage and maintain student attention and to provide a preview of coming attractions. The highly produced sixty minutes required numerous hours of advance work, as the instructor had to assemble materials, organize the schedule with a guest speaker, and rehearse a few times to ensure a smooth result. The introduction simultaneously achieves two learning goals: It demonstrates how the Webcon will be used during the semester, and it lays the foundation for the course.

The instructor is as familiar with the Webcon controls as she is with automobile controls, so the different components of the session seamlessly transition from one to another. After welcoming students to the course, the instructor introduces a strong motivational speaker and advocate of good writing, the chief executive officer (CEO) of Dyncorp. A two-minute, company-produced video provides background about Dyncorp before the executive, who is networked in from his desk in Northern Virginia, addresses the students for a few minutes about the fine art and importance of memo writing; he then answers questions.

In future weeks, similar guests from various national and international locations will speak to the class on diverse topics such as knowledge management and data visualization. All guest appearances will be recorded and stored online so that the students can access them while working on related writing assignments. At the end of the semester, the instructor will review all of the recordings to determine whether they might be edited and reused for future classes.

Application Sharing

After the Dyncorp CEO responds to student questions, the instructor activates the application-sharing function to display to students the Microsoft Word document (one of the CEO's memos) on her desktop. This section has been rehearsed: The instructor has prompted the CEO to speak about his use of a brief introductory paragraph and bullets, headings, and examples—elements that the students must consider when producing their own first memos for the course. As the CEO

makes his points, he scrolls through the illustrative memo, highlights the features being discussed, and then stores the marked-up text for future student reference.

As the course develops, students will use the application-sharing feature to share their computer desktops with each other and with the instructor. They will be able to record and display the products of brainstorming sessions, to collaborate on compositions, to peer review student work, to support editing sessions and proofreading, to mark up and critique model compositions, and to discuss graded assignments with the instructor. Because control of the shared application can be passed back and forth between those in a conference, the participants can take turns using such word-processing features as track changes, comment insertion, and highlighting to communicate their insights.

Breakout Sessions

For the purposes of the live introductory session, the instructor has used application sharing to show specific examples of the rhetorical techniques that students will employ in their own memo-writing efforts. To reinforce these points, she creates five-person breakout groups that meet in their own virtual spaces and have the full power of the interface to interact among themselves. The students' task is to introduce themselves and to discuss their understanding of the first assignment and the key writing competences they will need to exercise. They use the Webcon whiteboard to list what they regard as the indicators of an "A" memo, and they submit it for the instructor's future consideration. The demonstrated ability of the Webcon to support five or more private and simultaneous virtual conferencing spaces establishes it as the "place" where students will come when they need to visit an open "lounge," take advantage of regularly scheduled instructor office hours, have one-on-one impromptu conferences with the instructor, or participate in small group work.

During the first breakout session, the instructor "drops in" to monitor each small group. She then reconvenes the entire class to conduct a question-and-answer session, informed by what she has observed during her monitoring, that reinforces the targeted learning goals. The session is almost over, and the instructor has used nearly every tool available in the Webcon to address the students' eyes and ears and to engage them (through their interaction with her and each other) with the material. But she wants to end the class with more than talk. The Webcon enables her to display any digital media accessible by a computer: PowerPoint presentations, Flash animations, audio files, or Web sites and all that they might contain. In this instance she posts to the class portal a previously prepared Webcon session that reviews key lesson points in advance of the online quiz that concludes the class.

Reality (The Present)

Although a Webcon course like the one we have just described could happen tomorrow, two familiar constraints are preventing implementation: money and human resources.

At present an organization can either own and operate a Webcon or buy an annual license. Outright ownership is prohibitively expensive for most educational organizations, but an annual licensing fee of about $50,000 (the minimum for a state-of-the-art system) will provide unlimited usage for up to 25 faculty members and 2,500 students. That economy of scale makes the yearly fee look reasonable to some institutions. The Webcon would be hosted by an application service provider that takes care of all upgrade and maintenance costs, so the only technical support issue that the school must manage is a user help desk—a function that could be added to existing help desk responsibilities.

Another promising approach is the pioneering collaboration of the Missouri Research and Education Network (MOREnet) and Centra. Together they provide Webcon services to schools, libraries, and government agencies throughout the state. As Klonoski (2005) notes in this issue of *Innovate*, such statewide forms of collaboration can offer substantially lower prices for institutions seeking advanced technology resources for their teachers and students.

Faculty members will need training, of course, to manage the Webcon interface and operate all of its functions. With regard to course content and course design, many instructors will need the help of an instructional designer to bring their conventional practices into cyberspace, sequence activities, integrate visualizations in their lessons, and exploit materials available on the World Wide Web. Some instructors will be willing and able to customize and preproduce instructional

materials with tools like Microsoft PowerPoint, Macromedia Flash, and Camtasia Studio. Many schools have media groups that offer this kind of faculty support; thus the costs (which can be considerable for visually dynamic learning objects) can be amortized by producing materials that will be used in many sections of the same course and repeated in subsequent semesters.

Conclusion

It should be quite clear from the tone and content of this article that we regard the Webcon as a significant player in the future of electronic education. Will it do a comparable or better job than the face-to-face classroom? That question is impossible to answer without controlled comparative studies. However, we do know that our culture is becoming comfortable and working productively with phone conferencing (the Webcon's older sibling and a clearly effective substitute for face-to-face work groups). We do know that the Webcon can (within certain limitations) replicate most face-to-face classroom activities and that it excels in bringing students into contact with each other and with distant guests. Moreover, many people who already utilize Web conferencing at work will be attracted to Webcon courses, as will those who want to overcome the inconvenience of face-to-face attendance.

Prices obviously need to decline or be distributed among numerous subscribers before the Webcon can begin to realize its potential for ubiquity. Strides in bandwidth management will contribute to adoption as the Webcon gradually becomes as easy to use as the telephone. (The phone/Internet convergence is already under large-scale commercial development by Vonage and others.) But very powerful and user-friendly Webcons are now available for those who can get access to them. They serve a diverse group that includes

- lecture-dependent technophobes who wish merely to extend the spatial reach of their classroom voices;
- computer-literate faculty members who master all the Webcon tools and manage courses as complex as the one described above;
- teams of instructional designers who create highly produced courses that are furnished with multimedia learning objects and sequenced with diverse activities to address diverse learning styles and to deeply process learning goals; and
- faculty and staff members who recognize that Webcon technology can reduce standard meeting costs and provide useful facilitation tools.

There will be some who lament the loss of face-to-face social amenities, but they are not likely to be the "digital natives"—Prensky's term for those born into the digital environment (2001). Having spent many of their youthful hours instant messaging and interacting with their peers in massively multiplayer online games, the natives will know better.

References

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