

Digital Video: The Next Step in Reference and Education

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With the advent of the Internet and the proliferation of online resources, the boundaries of the library's collection have expanded tremendously and information seekers require more guidance and education than ever. Many libraries are addressing this need by extending reference and educational services over the network so that users can get help anywhere on the Internet and at any time the user chooses.

Currently many reference librarians are conducting entire reference transactions employing various methods and technologies to deliver online reference service including asynchronous (email) and synchronous (chat and application sharing) methods. Enhancing online reference service with audio and video capability is a likely next step, as it holds the promise of duplicating the physical reference encounter. Because of this intriguing possibility, a small team of librarians at the University of California, Irvine was established to investigate the potential library uses of digi-

tal video technology as a method of sharing real-time audio exchanges and visual images using high-speed network connections. The research and demonstration project will test and pilot both videoconferencing and streaming video for delivering reference service and library instruction. Specifically the project seeks to study how to integrate digital video with Web collaboration software to conduct online reference transactions. This new video reference delivery model, utilizing both videoconferencing and Web collaboration tools, will be used to provide online reference service between library locations and with remote users. Streaming video, another use of digital video technology, will also be tested to provide live and archived video sessions of library classes over the Internet. The project team will assess the key benefits, impacts, and issues of these applications, such as technology, costs, staffing, scalability, training, and accessing/archiving of video images.

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Why are we on this path?

1. Increasing availability of standards-based digital video equipment.

Digital video technology is gaining widespread acceptance among colleges and universities. Innovations in technology and faster personal computers and networks have greatly improved the quality of videoconferencing and streaming video at a level better than broadcast television. Digital video standards have also matured. H.323 is now an international videoconferencing standard that has broad vendor support enabling products to be more widely available by a variety of vendors, relatively inexpensive, and easier to use. Today it is possible to purchase videoconferencing equipment from one vendor and have it interoperate across the Internet with a different vendor's equipment.

2. Digital video has myriad uses in education and research.

Two main categories of digital video technology have particular relevance for libraries: videoconferencing and streaming video. Video conferencing enables and enhances remote collaboration and can be delivered to one viewer or multiple viewers for both point-to-point interactions (between viewers at two different locations) or multiple remote viewers (multiple viewers at different locations interacting simultaneously). It can also be used in both desktop and classroom-based environments, e.g., reference and teaching environments. Streaming video is especially useful for information dissemination, distance education, and the storage of image content. It can be used for teaching sessions live or on-demand and delivered either one-to-one or to multiple viewers.

3. Library and campus technical infrastructure capable of supporting quality video images

Because UC Irvine Libraries have already made a significant investment in the development of a technology-rich infrastructure, many of the would-be startup costs for the project were unnecessary. The Libraries had recently purchased new PCs for all library locations, licensed 24/7 Reference software for the Ask a Librarian LIVE service, and purchased a dedicated server to support the software that allows co-browsing of online catalogs, full-text journals, Web sites, and databases, including the Libraries' restricted re-

sources. The team was also able to consult and collaborate with campus videoconferencing and technical experts who were coincidentally exploring various educational applications of digital video in two campus departments.

Additionally, UC Irvine has enjoyed a long tradition of quality network services and support. UC Irvine has a Gigabit Ethernet backbone, which provides excellent connectivity between campus units and to other national and international high-speed networks. The UC Irvine Network connects to the UC Irvine Medical Center's Network via a DS3 (45 mbps) ATM circuit and has a backup T1 line in the event that the DS3 circuit goes down.

4. Enhances direct access to subject specialists.

The UC Irvine library system consists of four library facilities: the Main Library, the Science Library, and the Gateway Study Center on the UC Irvine campus, and the Grunigen Medical Library in Orange. The Main Library primarily serves the Schools of Humanities, Arts, Social Sciences, Social Ecology, the Graduate School of Management, the Department of Education, and Interdisciplinary Studies. The Science Library primarily serves the College of Medicine and the Schools of Biological Sciences, Physical Sciences, Engineering, and the Department of Information and Computer Science. The Gateway Study Center, adjacent to the Main Library, provides study space 24 hours a day during pre-finals and finals week, and 20 hours a day during the quarter. The Grunigen Medical Library serves the UC Irvine Medical Center and is located 13 miles from the main campus in the city of Orange, California.

This new reference delivery model could be used to provide the Grunigen Medical Library with direct access to the subject specialists at the Science Library. Likewise users in the Science Library would be able to get direct reference assistance and instruction from the clinical medical librarians based at the Medical Center without traveling to this remote branch. Project plans call for extending this reference model to all library facilities in later phases of the project, thus enhancing the users' direct access subject specialists throughout UC Irvine's library system.

5. Leverages limited staffing resources.

Periodically there has been a need for the science and

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medical librarians located in the Science Library to provide backup coverage at the reference desk at the Grunigen Medical Library. This reference model could eliminate the need for Science Library staff to travel between locations to support services at this remote branch. Campus librarians would be able to provide direct assistance while remaining in the Science Library. Other collaboration opportunities could include leveraging staff from a central location to provide service anywhere in the library system or to extend hours of service at branch libraries.

6. Continues UC Irvine's long-standing efforts to explore new ways of applying technologies to enhance reference services.

UC Irvine Libraries have been actively involved in planning and implementing electronic reference initiatives since the mid-1990s. Since that time the Libraries have initiated numerous innovative projects and programs that seek to bring service perspectives and traditions of the physical library to the digital library.¹

- In 1996 science librarians offered video reference service for two quarters between the Science Library reference desk and a College of Medicine computer lab located a half-mile away from the Science Library. This pioneering effort, which used inexpensive commercial desktop videoconferencing software and equipment and high speed network connections generated much attention and its early encouraging outcomes spurred further electronic reference developments at UC Irvine and elsewhere.²

- In fall 1998 Irvine launched Ask a Librarian EMAIL service, a basic e-mail reference service linked from the library's home page. The service enables remote users to fill out an online web form to ask reference questions, which are then answered by librarians within 24 hours. Use of Ask a Librarian EMAIL has consistently increased and periodic user surveys indicate that users are pleased with the quick responses they receive and its convenience.

- In summer 1999 Irvine tested a call-button messaging system between the public PCs and two reference desk workstations. This experimental project, which was conducted at both the Main Library and the Science Library used a Windows NT application to exchange messages between users working at library public workstations and reference staff located at the

reference desk. The experiment allowed users to remain at their workstations while alerting desk librarians by means of clicking a desktop icon that they were in need of reference assistance.

- In fall 2001 Irvine launched Ask A Librarian LIVE, an online chat service, that enables real-time user/librarian exchanges of short messages and co-browsing capabilities. The LIVE service is integrated within the library's suite of reference services and offered Monday through Thursday, 11:00 a.m. to 6:00 p.m. and Friday, 11:00 a.m. to 3:00 p.m. All public service librarians receive extensive training to answer Ask a Librarian EMAIL and Ask a Librarian LIVE questions. Scheduling librarians for the Ask a Librarian services are handled in the same manner as the traditional reference desk.

7. Video- and voiceover-IP seem like obvious next steps in the evolution of electronic reference services.

While UC Irvine Libraries' 1996 Interactive Reference Service project showed that network based videoconferencing could be used with some success to conduct remote reference interviews, it was hampered by the inconsistent quality of the video and audio connections and the lack of robust Web collaboration tools.³ A primary objective of the current project is to investigate whether new digital video technology can be used in combination with extant reference software to address various service and technology issues that were encountered in the earlier interactive reference project. The ability to use broadcast quality videoconferencing coupled with more advanced co-browsing tools to better simulate face-to-face reference transactions prompted UC Irvine librarians to investigate once again the feasibility and desirability of using an interactive video reference delivery mode.

The potential of adding a video dimension to enhance electronic reference has also been discussed in the literature. Several future service models have been proposed using videoconferencing in combination with other electronic reference and instructional delivery modes to enable libraries to provide a comprehensive and complementary mix of core services through the network.^{4, 5, 6, 7}

8. Limitations of chat-based electronic reference.

One of the most common observations in articles con-

cerning electronic reference is the fact that chat reference lacks the visual and auditory clues we rely on at the physical reference desk.^{8,9,10,11} Without such clues, the librarian is neither able to observe the patron's impatience, confusion and hesitation nor their gratification, understanding and participation. Likewise, the patron receives no visual/auditory cues from the librarian. The project team approached this video project with an understanding of those limitations and an expectation that video reference could potentially alleviate some of these problems.

9. Building a testable model to compare a video reference delivery model and other types of reference models.

Because the obvious benefit of video reference is the return of visual and auditory cues to the reference interview, this project will explore the differences and similarities between a video reference delivery model and other types of reference models. Given that comparative research on electronic reference delivery models is limited, UC Irvine is taking a research-based approach and building a video reference delivery model that will evaluate user satisfaction with the video reference process to inform local library decision-making, as well as other reference practitioners and library educators.

Project Planning

A small project team, Digital Video Research and Planning Team (DVRPT), was established in spring 2002 to investigate the potential uses of digital video technology in reference and instruction. DVRPT membership was formed based on expertise, departmental affiliation, and interest in electronic reference services. It includes librarians from the Main Library, Science Library, and the Grunigen Medical Library; two programmers; and a staff member from the Facilities Department. The DVRPT consults closely with the campus videoconferencing coordinator, and other programmers in Network and Academic Computing Services (NACS) and Graduate School of Management (GSM).

Shortly after the DVRPT was established it developed a detailed plan for the digital video research project outlining each phase of the project:

- Phase I: Offer a video reference service pilot between the Science Library and the Grunigen Medical Library.

- Phase II: Offer a video reference service pilot between the Main Library, Science Library and the Grunigen Medical Library; also offer service between Main Library and the Graduate School of Management.

- Phase III: Video teleconferencing of meetings between library facilities.

- Phase IV: Develop and test streaming video options for library classes.

The plan detailed every step in the planning process including project goals, resources required, an extensive assessment component, and a timeline denoting phase commencement and completion dates through December 2003.

Assessment

The DVRPT is fortunate to consult with a faculty expert at the UCLA Department of Information Studies who is well-versed in reference research, emerging technologies, and assessment to identify methods for evaluating the team's pilot projects. The team explored possible assessment methods for a video reference delivery model compared to other reference delivery methods. With the assistance of the faculty member, the team identified an appropriate assessment tool and is currently exploring how best to implement it to assess video reference transactions. This tool was originally designed to assess users' perceptions of chat reference service but will be adapted for use in video reference service. Each user of video reference service will be asked to complete an assessment questionnaire after each transaction. Data from these questionnaires will be compiled, analyzed, and then compared with survey results of different reference delivery models to contrast users' perceptions of video reference to their perceptions of chat and face-to-face reference.

Progress to Date

The DVRPT began its work by learning about a campus research project that used digital videoconferencing for online collaboration and then reading about new advances in this technology.¹² Team members visited a vendor's showroom featuring Polycom, Tandberg, and Pictoretel videoconferencing appliances and investigated all available equipment. The team also considered cost, appliance to appliance compatibility, document camera compatibility for document shar-

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ing, and IP video/voice delivery. After reviewing the product lines, two appliances were setup at the Science Library and the Grunigen Medical Library for an on-site demonstration.

Based on a very successful demonstration the team recommended the purchase of one Tandberg and one Polycom videoconferencing appliance. The Tandberg was selected because its compact size is well suited to the designated workspace in the Science Library. The Tandberg is an all-in-one appliance that incorporates a monitor, speaker and camera, and is approximately the size of a flat screen computer monitor. It is also compatible with a Polycom appliance. The Polycom includes a speaker and camera, and will work with most televisions. Both appliances come with remote controls for call connections, volume, and camera position.

As part of Phase I, the Science and Grunigen Medical Libraries prepared sites with equipment and furniture to provide a pilot digital video reference service. The Science Library houses the Tandberg appliance sitting on a table in a small alcove area behind the reference desk. The alcove (previously used for storage) is an ideal location for the pilot service since it is near the Reference Desk and Ready Reference materials. It comfortably accommodates three people and provides privacy for conducting reference interviews. A PC sits on the table to the left of the Tandberg and to the right a lamp, telephone, and place for supplies. This arrangement evolved in reaction to team members' observations during our initial tests. For example, a lamp was added to reduce shadows that appeared on the librarian's broadcast image. After discussions with the digital video equipment vendor, the alcove was painted a light blue color to enhance the video image and reduce background glare caused by the formerly white background. A telephone was installed to provide communication between videoconferencing locations and between team members. The team may also add sound absorbing panels on one or more walls to enhance the audio quality of the video reference service.

The Grunigen Medical Library houses the Polycom and a 15" flat-screen LCD monitor. Based on a recommendation from the vendor, the team had originally ordered a 32" color television for use with the Polycom appliance to be able to conduct video reference transactions and for meeting videoconferencing.

However, after viewing a videoconferencing demonstration on campus that utilized a Polycom appliance with a smaller, flat-screen LCD monitor, the team changed its original order. The team considered the personal nature of the reference interview and decided that a 32-inch television would not be ideal for a reference interview. The team has been pleased with the LCD monitor as it provides more portability and flexibility. Initially the team planned to locate the pilot video reference service in a conference room at the Grunigen Medical Library. However, this large conference room was abandoned in favor of a smaller room (previously used for media storage) as it provides better utilization of library space and closer proximity to the existing public service desk. And whereas the conference room had numerous windows and bright natural light which diminished the quality of the video images, this smaller room has consistent light-control during video broadcasting.

The DVRPT meets weekly and has created an internal Web site for team documents and resources. All team members have received training in the use of the reference software and digital video equipment. Software and equipment instructions have also been prepared and are available at each of the video reference stations.

Recognizing the importance of obtaining feedback from the librarians using this video reference delivery method, a brief informal survey was completed by each team member to gather their expectations and perceptions about the project. Team members thought that the digital video equipment was very easy to use and that the quality of the audio and video reception was excellent. After actually experiencing how easy the digital video technology was to use, team members became even more enthusiastic about its reference service applications, in addition to its obvious uses for instruction and meeting videoconferencing. As the project progresses, insights of team members will be elicited and the survey will be repeated to track the evolution of members' perceptions, as they become accustomed to using the new technology.

During fall 2002 team members conducted a series of video reference tests at the Science Library and the Grunigen Medical Library that led to the various changes and refinements described above. Currently the team is finalizing the assessment tool and proce-



Illustration 1. Digital Video Service at the Grunigen Medical Library.

dures and making arrangements for a small group of Grunigen Medical Center users to start using the service to interact directly with librarians in the Science Library.

What will services look like?

The Librarian's Station

The Science Library video reference alcove will be staffed during designated hours by a science librarian who will respond to questions from users at the Grunigen Medical Library. The alcove is close to the reference collection and colleagues at the science reference desk are nearby, but the digital video service will be staffed separately (See Illustration 1).

The User's Station

In the Grunigen Medical Library video reference room, the team chose to install a Polycom Viewstation. Unlike the Tandberg which integrates the camera, microphone, picture, and audio transmission all in one apparatus, the Polycom appliance consists of a camera and microphone which must be linked to a TV, LCD monitor, or projector. The Polycom is connected to a Samsung 151MP, LCD monitor with a 15-inch screen. Users who need reference service during designated hours when Grunigen reference service is not

available will be invited to go to the video reference room and "speak" with a librarian located in the reference alcove at the Science Library. This designated video reference room will provide a measure of privacy for the users when discussing their information needs with the reference librarian (See Illustration 2).

The Reference Transaction

During hours of service, a librarian at the Science Library will use the Tandberg remote control to establish a connection to the medical library so the librarian's image will be seen on the LCD monitor in the Grunigen video reference room. The science librarian will also logon to the Ask a Librarian LIVE software in preparation for a reference interaction.



Illustration 2. Video reference room at the Grunigen Medical Library.

When a user approaches the video reference station at the medical library, the science librarian will ask the user to logon to the Ask a Librarian LIVE service through the library's Web site (<http://www.lib.uci.edu/>), talking the user through the simple logon procedures, so that he/she can begin to work collaboratively. In our testing, we noted that this process takes several seconds and the silence can be awkward for both parties. It is similar to waiting for a Web page to load while assisting someone at the traditional reference desk. Also, the patron must be told how to use the video equipment.



Illustration 3. Reference software at work in the Grunigen Medical Library video reference room.

What takes place in the video reference transaction is a combination of electronic and traditional reference activities. The librarian can push pages to the users; “escort” the user in a search by controlling the remote browser; observe user searches; type information or URLs using the chat component; and send the user documents such as PDF or Word files. However, the video component allows the librarian to rely less on typing instructions and advice in the chat box and rely more on audio and visual communication, just as though he/she were sitting next to the user at the reference desk. Both the librarian and the user will see and hear each other as they work through the reference transaction. Speech intonations, facial expressions, and body language will play an important role in the communication, just as they do in a face-to-face reference interview. The librarian is freed from the cumbersome task of typing simple instructions like “Do you see the full-text icon in each citation following the page numbers? Click on the PDF icon to get the article.” This kind of information can be conveyed in speech quickly, and feedback from the patron is returned through voice and facial expression. “Oh yea!” and a smile is a quick clue that the librarian is on the right track and can move on. While reference software is used primarily for co-browsing, chat can be used to convey accurate spellings of medical terms, scientific names, subject headings to use in a catalog search, names of authors, or URLs. The reference software will also conveniently send a transcript of the chat session with all URLs visited and

any other advice to the user at the close of each reference transaction (See Illustration 3).

Future Directions for Digital Video

With information technology expanding and becoming more accessible, Janes suggests that “libraries will need to provide a mix of [reference] services via a range of methods,” which might include face to face, various forms of synchronous and asynchronous electronic interaction, and video.¹³ The team is launching this video reference pilot project within exactly that kind of varied atmosphere. As we research this new model, we will need to consider ways that video reference might be integrated into, complement, or even replace current reference options. Through the evaluation and assessment component of the project, including user and librarian feedback, our understanding of the role of video in reference and instruction relative to other platforms will increase.

Over the next year, the team will complete Phases II–IV of the project. This will entail the installation of equipment at the Main Library (linking all three branch libraries), testing the technology for library-wide or inter-campus live meeting broadcasts and interactive conferencing, and providing archived, streaming video instruction on demand via the library’s Web site.

Refine existing policies and develop new ones

UC Irvine’s Ask a Librarian services (both EMAIL and LIVE) have articulated service guidelines (who is served, by whom, how quickly and in what depth) and a privacy statement, which explains to users what information is captured during the transaction and what is permanently retained. Video reference adds several elements in need of explicit consideration and articulation, including privacy of the physical space in which the reference transaction occurs and of the digital transaction. On both the user and the librarian side, we will need to ensure that the user is not inappropriately visible or audible to other library users. And, in contrast to the UC Irvine Libraries practice of permanently retaining EMAIL and LIVE transcripts (stripped of personal information), video reference transactions will be encrypted, temporarily stored, and then deleted at the end of each video stream. Given the presence of cameras in our everyday lives, and a growing cultural and political anxiety

about privacy, such policies will need to be clearly communicated to users in order to engender their trust. Finally, as Phase I of the project involves users from the UC Irvine Medical Center, we are even more cognizant of the importance of the confidentiality of video reference transactions and the need to convey policies that protect it.

Integrate services

Phase I of the project is a point-to-point connection tied to specific equipment in the Science and Grunigen Medical Libraries. Initially, therefore, there will only be a small subset of science and medical reference librarians involved in this effort, in contrast to our more seamlessly integrated model of physical desk and Ask a Librarian services, in which all public services librarians participate. This video reference delivery model will enable us to expand the more limited service hours at the Grunigen Medical Library by linking those users physically present at the Medical Center to the Science Library. In Phase II, the Main Library will explore applications for video reference, including desktop video conferencing and multi-point broadcasting using ViaVideo, a USB-based video communication appliance. The Main Library will work with students in the Graduate School of Management (GSM). Librarians at the Main Library are also interested in using this technology to explore service to residence halls.

As the testing and development of video reference increases throughout the libraries, we can envision a creative staffing model whereby digital video connections among the three branch libraries can even replace staff at physical service desks during certain hours. In any case, integrating this new video reference delivery model will necessitate an examination of our staffing levels and workloads across the Public Services Division as a whole.

Implement staff training

During fall 2002, the electronic reference services librarian provided training in the reference software to members of DVRPT who were unfamiliar with the software. Likewise, one of the programmers on the team trained team members on the use of the new video equipment, and wrote usage instructions and guidelines to accompany it. As more librarians participate in the video reference project, we expect the

training to expand and coordinate with a formal training program that supports Ask a Librarian services, expanding that program to include issues and practices related to video reference.

Monitor developments in technology

The DVRPT will continue to monitor new digital video technologies for usability, affordability, and general applicability to reference and instruction situations. As we formulate and report results and recommendations to UC colleagues and committees, our video reference delivery model may serve as a platform for the development of networked reference services among other UC institutions. Collaborative electronic reference services in the UC system are currently in the research and exploration stage.

Apply and test technology for group library instruction

In its 2001 white paper on the relevance of digital reference service to the UC libraries, the UC Task Force on Digital Reference identified the proliferation of database interfaces as a primary reason to provide reference at the point of need.¹⁴ By the same logic, users should be able to access instruction at the point of need—through carefully edited instruction modules on the successful searching of library databases. By using streaming video, we will be able to deliver these modules on demand through our home page. Digital video technology, for both reference and instruction, will thus be among the many tools that we employ to support UC-wide and UC Irvine specific information literacy objectives.

Although UC Irvine's reference software has multi-user, meeting functionality that can be applied to user instruction, we have not yet taken advantage of it. However, our goal in Phase IV of the project is to use streaming video to capture, edit, and archive library instruction for both local and remote users. The Libraries are well-situated to partner with other campus groups—including the Division of Undergraduate Education (DUE), the Graduate School of Management (GSM), the Instructional Resources Center (IRC) and Networking and Academic Computing Services (NACS)—to build upon successes in streaming video instruction. GSM in partnership with the DUE has already implemented streaming video for certain GSM classes. Of particular interest is their solution for students not present in the classroom to

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ask questions during live broadcasts, using the desktop application Microsoft Outlook. Outlook allows students to send e-mail questions to the instructor, who then prints them out and responds to them immediately during the session. The UC Irvine Libraries teach many workshops of interest to users at all three branch libraries – such as the multidisciplinary Web of Science, or the bibliographic management software EndNote. Such workshops could be ideal test beds for streaming video.

Finally, as UC Irvine joins campuses nation-wide in providing distance education degree programs, this technology will prove invaluable to those remote students who never come to campus for library instruction.

Evaluation and assessment

Assessment is a major component of the Libraries' digital video research project. Working with a professor from the UCLA Department of Information Studies, the team is exploring methods to assess the impact of technology on the reference transaction, as well as the quality of the transaction and user satisfaction with this service model. The team is particularly interested in collecting data that will enable us to compare digital video reference with our existing services, including synchronous chat-based reference, e-mail, and traditional face to face encounters at our reference desks. Such evaluations will help us plan for the appropriate balance and mix of services throughout the libraries.

Conclusion

In RUSA's 2002 forum on the future of reference, both Tyckoson and Janes predicted that reference queries will be increasingly complex, and that users will increasingly consult sources other than libraries for "ready-reference" factual questions. If this prediction is true, the more robust our modes of communication – combining co-browsing and chat with audio and video – the better equipped we'll be to handle such queries and fulfill our roles as reference librarians and teachers of information literacy. The experience we gain from this project will help inform the balance of different types of reference services that UC Irvine offers its users, and which works best for what circumstances.

Writing on the future of reference services in general, Tyckoson envisions that "personal service will be

valued. In an increasingly impersonal world, the librarian will continue to provide personalized service to patrons. Personal service is what will differentiate the library from other information providers."¹⁵ Adding video to our electronic reference interactions with users can only help us accomplish this worthy goal.

Notes

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