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ABSTRACT

In July 1996, the Library Director of Cornell University's Mann Library formed a working committee to explore the technology solutions to providing a library presence with remote users. The committee began its explorations by brainstorming possible services that would utilize technology to bring the library closer to the remote user. After brainstorming ideas, a number of software/technologies were listed that could support some of the service ideas generated. Next, the feasibility of the campus network supporting the widespread use of audio and video was evaluated. Recommendations focused on: more dynamic Web pages; electronic reference document delivery; text/chat, audio and video communication; desk staff viewing and controlling user's screen; and interactive map or tour of the library. The committee's recommendations are made with the understanding that its work represents the first steps in the development of new services for remote users, but future implementation groups will be required to more thoroughly research, design, and create the products. (AEF)

Using Technology to Improve Remote User Support: A Report from the "In Your Face" Working Committee

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The Problem

Mann Library has been very successful at providing access to electronic resources for users outside of the library building. Over 700 bibliographic, full-text, directory, and numeric titles are currently available via the Mann Library Gateway. The Gateway has also been very successful as a mechanism for organizing and accessing such a large number of resources. These efforts by the library have been well received by the Cornell community as evidenced by the heavy use of the system.

The combination of the well-designed Gateway and the provision of both print and on-line user guides and help have made the resources easier to access and to use. In spite of our efforts to create user-friendly systems, there are still (and always will be) library patrons who need assistance. Complimentary reference services, though, have not kept pace with the rapid development of electronic resources and systems of accessing the electronic resources.

Traditionally, users step up to the reference desk when they need assistance finding information or using the library. For the user outside of the library building, this is either inconvenient or impossible. The most significant innovation/improvement in services to remote users is the telephone. The telephone provides interactive audio communication and is heavily used.

Increased use of electronic library resources has resulted in an escalated need for assistance by users at sites remote from the library. Though the telephone allows interactive audio communication, it is often difficult to assess and solve technical problems over the phone. Since the introduction of telephone reference services, very few new services have been added for remote users.

Email has become ubiquitous on campus. With the introduction of email reference service we have provided another form of reference service to the remote user. Although this is not interactive and not immediate, it is a viable method of providing assistance for some types of questions. In addition to sending staff-generated, text-based responses, attaching captured screens enhances this method of communicating with remote users.

Mann staff will also go to a faculty member's office to assist them with a technical problem or a more in-depth information question. This is yet another modification to our services in an effort to meet the needs of remote users.

In spite of some adjustments in service we have done very little to date to improve the avenues of service to remote users. This is not only a disservice to our users, but it also puts the library at risk. As we create access to library resources for users who no longer need to come to the library, we are distancing the library and staff from the resources we provide. As the users lose the connection between the library and the resources, we potentially lose the support and political base that is crucial to our continued existence.

The Charge

In July 1996, Jan Olsen, Mann Library Director, formed a working committee to explore the technology solutions to providing a library presence with remote users. In Jan's words,

> "For a long time now we have discussed the need to move our reference support from behind the Information Desk, face-to-face with a patron, to the patron's desktop. As the Gateway becomes more entrenched in the lifestyle of the academic, and particularly as its resources encompass full-text, we will see our patrons less and less. This is serious from at least two standpoints. First, the patron will narrow his/her range of resources to those he/she understands and is familiar with; and, second, we will be 'out of sight, out of mind,' no longer seen as indispensable for solving problems nor as the essential organization we are considered today. This is the kiss of death.
>
> We have to find ways to be a lively, familiar, indispensable presence in the lives of users whom we don't actually see, who don't come to us or even think about us anymore."

The committee was asked to explore technology solutions to the stated problem and to recommend viable options. Upon receiving the recommendations, the Administrative Council would then address implementation.

Marty Schlabach, Bill Kehoe, Eric Noble and Ben Trelease were assigned to the working committee. Phil Davis and Donna Callais were added and Eric Noble left Mann Library.

The Explorations

- **Brainstorming Service Ideas**

We began our explorations by brainstorming possible services that would utilize technology to bring the library closer to the remote user.

• We discussed the possibility of real-time interactive text, audio and video communication between staff and patrons over the campus network. If this communication were seamlessly accessible from the Gateway, it would make it quite easy for the patron to use. Though the phone is an existing, viable alternative to audio communication over the network, some users use their phone line to access the Gateway from home, preventing a simultaneous phone conversation. In addition, not all networked computers have ready access to a telephone; public access microcomputer centers are a case in point.

• We also considered the idea of reference staff seeing and possibly controlling the remote user's screen. It is often difficult for library staff to assess a technical problem over the phone. Good reference interview skills are of course helpful, but when the user is not very computer literate, it is sometimes difficult to get an accurate and adequate description of the problem and at what point in a process they were stymied. Being able to see the screen that has the problem would facilitate better service. The potential benefit of the users seeing the reference desk computer screen was also discussed.

The above functions are not limited only to communication between staff and patrons but could also be put to use between service points within Mann Library, between service points in different libraries and between the library and other service points on campus.

• When answering a remote patron's question, we can often provide the answer over the telephone or via an email message, but there are many occasions when the answer is not a single fact, but rather a page or two of information. It would be helpful to provide the user with immediate access to those pages electronically, rather than photocopying and sending them through the campus or US mail.

Because of the diversity of hardware and software that users have, it would be necessary for us to deliver the documents in a variety of electronic methods and formats, including FAX, HTML, PDF and several graphical formats. This service could be a combination of previously created and

stored documents and of documents scanned and sent on demand. The previously created documents could be accessed and requested independently by the patron via the Web and/or an automated FAX system, or reference staff could send the previously created document to the patron. It may also be possible to integrate this into an automated phone system that includes audio messages, such as library hours or the phone numbers of other service points in the library.

• An interactive map or tour of the library is another result of our brainstorming sessions. This could be a networked resource and/or a product distributed via CD-ROM. Perhaps every new student would get a CD-ROM from and about Mann Library in their registration packet. Hopefully, this would create a stronger association between the electronic resources we make available and the physical library. In addition to a virtual tour, a CD could include interactive training on library services and/or information technology, as well as a selection of our current 'how-to" sheets.

• We also feel that the library needs a more lively home page. Greater utilization of graphics and dynamic/changing banners announcing services would get the attention of users and bring them back to see what's new. Perhaps we could post the "Pick of the Week", describing an especially interesting print or electronic information resource. There could also be more representation of the physical library to maintain the mental connection between the virtual and physical libraries. A staff directory with pictures would again facilitate the association between the electronic resources and the staff that provide and support the resources. Links could be made from the workshop pages to the staff directory allowing users to readily attach a familiar face to the name of the workshop instructor. What if we provided video clips of "Cornell celebrities" talking about how great the Mann collections and services are?

In addition, modifications should be made to the interface to improve navigation and to encourage users to take advantage of a broader selection of our services. The library should explore the judicious use of newer web technologies such as frames, clickable image maps and interactive 'applets'.

• Another idea is to have a wireless, portable computer (with cellular modem?) that we could take along on consultation sessions outside of the library. We would no longer need network connections when consulting in college departments.

• Instruction services could be more widely accessible if we were to broadcast our workshops. This could be from Stone I to Stone II or it could be distributed across the campus to any individual or group. Network limitations are discussed later on but video conferencing software might eventually provide a convenient and powerful way to increase our workshop audience.

• Yet another idea is to create library knobots that would function as an agent for the user. If users could search the library catalog and then with a simple click of the mouse, select titles, view the table of contents and other summary information on their screens, and then ask for the books to be delivered to their office/lab, that would certainly create an apparent connection between the electronic resources and the physical collections located in the building.

After generating these ideas, we informally evaluated them based on the following criteria:

Value to users
Value to staff
Number of users impacted
Labor intensiveness
Maintenance/staff support commitment
Cost effectiveness
Match to committee's charge
Technical feasibility

• Exploring the Technologies

After brainstorming ideas, we listed a number of software/technologies that could support some of the service ideas we generated. The list is not exhaustive but rather representative of the technologies available. Our charge was not to decide on solutions but to generate ideas and explore the potential technological solutions. A more complete listing of conferencing software, for example, can be found at http://engine.coder.com/daniel/compare.html. Another list may be found at http://www.virtual-voice.com.

To examine the potential of establishing/utilizing interactive audio and video communications with our library users, we experimented with CU-SeeMe, one example of video conferencing. We also explored the possibility of viewing and controlling the users desktop using Timbuktu. These software packages are available for both Mac and PC platforms.

Our first test was in early fall 1996 when we held one of our meetings over the network. We had four workstations, both Macs and PCs, equipped with the software, cameras and microphones, and all located in Mann Library. This first experiment was quite successful in demonstrating the possibilities. We discovered, however, difficulties with the proper adjustment of the microphone settings. For some workstations the microphone picked up voice quite well if placed on top of the monitor, which could be up to two feet from the person speaking. In other cases the microphone had to be hand-held quite close in order to adequately transmit sound. This appeared to be correlated with the type of computer being used. Additional experimentation would be necessary to resolve this. The video was adequate, but fairly slow to refresh, resulting in rather jerky motion being received.

We also used Timbuktu to view and control another computer's screen. This was a bit confusing at first, not always knowing whose screen one was manipulating. This worked quite well and demonstrated the potential of using Timbuktu to assist remote users to configure their machines to allow them to access our resources or to assist them with database searching techniques.

On another occasion we again used both CU-SeeMe and Timbuktu, but Ben was at home accessing the campus network via a 28.8 modem. It was our intent to have Ben talk about and show In Your Face project group work to the Reference Meeting. We found it impossible to communicate using both the audio and video simultaneously. Audio by itself was adequate but not very good. When we tried using Timbuktu as well, everything became too slow and virtually non-functional. Clearly services based on these technologies would be largely unavailable to the home user in the near future.

At the end of the fall semester we gave a seminar to the Department of Agricultural and Biological Engineering. As part of the seminar we simulated a reference interaction between a faculty member in his/her office with staff at the Mann reference desk. Kathy first explained the motivation for providing service to remote users. Then, with Phil Davis back in the Mann consulting office, Marty (simulating a faculty member working in his/her office) connected to the Gateway, with his computer screen being projected to the large screen for the seminar attendees to see. When (intended) difficulties arose while trying to connect to a specific database, Marty contacted the Mann Library reference desk using CU-SeeMe. Phil responded not only by explaining what needed to be done to

resolve the problem, but also by taking control of Marty's screen using Timbuktu and making the changes to allow a successful connection. Throughout the demonstration, Ben provided technical explanations of what was occurring. This demonstration utilized CU-SeeMe and Timbuktu and was very successful. Toward the end of the demonstration the network communications slowed down substantially, but over all it went very well.

We were not able to experiment with a document delivery system for the reference desk as described in the previous section. We realized, however, that many of the features of such a system closely resemble those currently available in the scanning portion of the new E-Reserve system. It should be possible to build major portions of a reference system by simply duplicating what we already have installed in the Document Services Unit.

We did explore some of the technologies that would allow us to liven up the library web pages. A clickable map of photos representing library services demonstrated the possibility of combining visual with textual navigational queues. A staff directory was prototyped, using standard, commonly used web technology. In addition, we experimented with ShockWave to show the potential for scrolling text on a portion of a web page and a graphic with motion and buttons that produce sound.

To explore the creation of an interactive virtual tour of the library, several different technologies were explored. The simplest was using still images and clickable maps on a series of linked web pages to allow a patron to examine areas of the library more closely. More advanced technologies included Virtual Reality Modeling Language (VRML), a text-based graphical cousin to HTML. Simple explorable models of the reference desk and the first floor of the new addition were created as examples of what the technology could provide. A third technology we explored was QuickTime VR. QTVR has been developed by Apple to provide a means for creating highly realistic 'scenes' that can be navigated and explored. QTVR movies can be distributed via the Web or our internal network. QTVR is a complex technology and we were not able to experiment with it directly.

- **Evaluating the Feasibility**

The campus network and the installed base of hardware and software of our users provide us with a number of limitations. The current bandwidth of the campus network cannot support wide-spread use of audio and video. In a meeting with Dave Lambert, VP for Information Technologies, we learned that CIT is moving toward increasing the speed and bandwidth of the campus network, but that the changes are a number of years down the road. Dave discouraged extensive use of video over the campus network until the network is upgraded, but supported experimentation with pilot projects. It was not clear what, if any, improvements in access speed would be made available to people connecting from home via EZ-remote. Time-Warner cable is beginning to experiment with high-speed cable modems, but it is not clear at this time when they might be available in Ithaca or how widespread their use might be.

Assessing the installed base of hardware and software in the campus community is very difficult if not impossible. In the words of Carrie Regenstein, Associate Director of Academic Technology Services at CIT, "Unfortunately, campus-wide efforts to get computer inventories have not been particularly successful, so the best information we can offer is what's currently recommended & purchased. Another measure of 'standards' is what ATS/CIT puts out in our computer labs."

The Colleges of Engineering and of Art, Architecture and Planning recommend 12-16 MB of RAM as a minimum with a 250-500 MB hard drive and in some cases a CD drive. The Big Red Machines sold by Cornell's Technology Connection generally meet or exceed these recommendations. These recommendations only reflect current purchases. We do not have a good method of assessing what is already on the scholar's and student's desktops or when an upgrade is planned. Our anecdotal experience is that there are still many users who do not even have WWW capable computers, and we know that many off-campus users are accessing the campus network at a connection speed of 28.8K bps or less.

Given the current technical environment, full-blown implementation of the technologies we explored would not have wide-spread use. The minimum levels of the hardware, software and network capacity will continue to move upward, and we can anticipate that implementation will be viable within the next year or two.

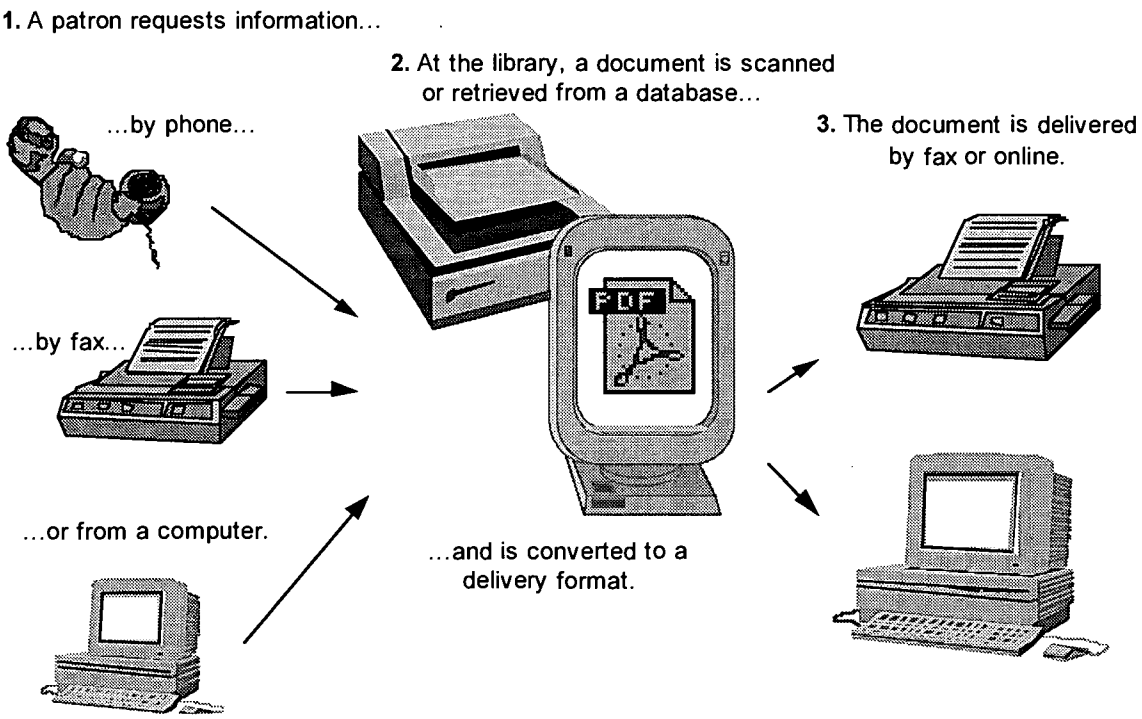
The Recommendations

- **More dynamic web pages**

Improving the library web pages using currently available technologies is quite promising. More use of graphics and adding features mentioned in the explorations section should be developed and implemented in the near future.

- **Electronic reference document delivery**

As mentioned earlier, much of this plan relies on utilizing scanning/processing technology already used by the Document Services Unit staff for generating PDF images for the E-Reserve system. A simple reference system which would involve scanning a requested document and then making it available to the patron in PDF format via the Web could be set up quickly by closely following the technology installed in DSU. Other features such as fax delivery and an automated phone system would need to be researched further. We anticipate however that it would be possible to integrate these features into the above PDF delivery system with a minimum of difficulty. For example, fax services might be provided by installing a fax modem on the scanning machine and using built in software to fax a document directly after it has been scanned.



- **Text/chat, audio, video communication**

Given a computer with moderate capabilities (probably anything produced in the past 4-5 years), the extra hardware and software required to implement video and audio communication with our remote users are minimal and inexpensive. A grayscale video camera can be purchased for >$100 and at least one video conferencing software option (CU-SeeMe) is free. Network bandwidth on and off campus is still the most limiting problem, but the campus network is certainly adequate at this point for the limited implementation of a pilot program.

A good place to begin would be to install the necessary equipment at major service points in the library. These would include Stone I and II, the Entomology Library and the reference desk. This would also include Olin and Uris reference desks, where they have already installed the necessary hardware and software. Implementation at these points would give us a test-base sufficiently simple enough to give us a chance to work out any problems or issues without causing undue inconvenience to a remote patron. We should be able to work out problems in the system rapidly and be able to move on to a wider pilot involving faculty in their offices. We could encourage participation by offering to provide faculty with the necessary camera/microphone free of charge.

- **Desk staff viewing and controlling user's screen**

The technological issues involved in implementing remote screen capture and control with our remote patrons are similar to those described above for video communication. In this case, no special hardware is required beyond a computer with a Mac or Windows OS. The software is more expensive, costing between $120 and $140 per machine, but significant price breaks are available with volume purchasing and we should be able to get down to <$60 per machine. Again, the network is a limiting factor, particularly for off campus users, but should be more than adequate to service connections between faculty and a limited number of service points in the library. As with video communication, implementing the service between library service points initially allows us to become familiar with the technology without inconveniencing remote users. Once this is accomplished we can scale up to a pilot involving remote faculty patrons.

- **Interactive map or tour of the library**

As mentioned above, several different technologies were explored and it seems clear some combination of them could be used to provide users with

an engaging and useful way to explore the library's physical presence. We recommend pursuing this possibility, but as a lower priority.

The Conclusion

As charged, the committee explored the potential of using technology to improve library services to users remote from the library building. Our service ideas were generated based on our collective experiences in the area of public services and technology support in the library. There was no direct user input into either the generation of service ideas or the evaluation of the potential acceptance by the user or benefits to the user.

Searching for existing and future technologies that would allow a service idea to become a reality is indeed tricky business. The existence and capabilities of the technologies change very rapidly. Improvements to software, hardware and networking appear almost daily. Identifying the appropriate technological solution is clearly a gamble since a more appropriate solution may appear before implementation is complete, and the investment in human resources and the technology may already be substantial.

The committee's recommendations are made with the understanding that our work represents the first steps in the development of new services for remote users, but future implementation groups will be required to more thoroughly research, design and create the products. The potential services provide exciting areas for future development, the results of which will be improved services to the user and enhanced perceptions of the library's role in the academic community.

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