

TELECOMMUNICATIONS ANALYSIS FOR ILLINOIS LIBRARIES

Telecommunications has become an important part of library networking. This is true for several reasons. First, many resources developed specifically for libraries are accessible electronically over long distances. OCLC services, databases, and electronic mail systems (e.g. ALANET) are examples. Second, the changes in the telecommunications environment have established telecommunications as a variable cost item in library budgets, requiring careful management and planning. Third, more and more information is and will be available in electronic form, allowing for direct electronic access to reference materials previously published in print format only. While numerous opportunities for controlling costs through competition in services and products now exist which did not exist a few years ago, cost restructuring due to divestiture and deregulation is placing more of the telecommunications burden on libraries and library networks.

Libraries and library networks are responding to these changes in important ways. They are analyzing telecommunications costs to reduce them wherever possible. They are assuming responsibility for building and managing their telecommunications networks. In some cases, they are reevaluating the costs and needs for online networking. For some types of databases and certain size libraries, new mass storage options, such as optical or laser disc systems, can provide access to catalog databases sufficient to meet current staff and patron needs.

Illinois libraries, library systems, and library networks have not been unaware of the need to develop and manage cost-efficient electronic resource sharing networks. Previous studies have been conducted to address the issues of efficiency and effectiveness in the management and application of

telecommunications in Illinois libraries. However, new technologies emerge, or new applications of existing technologies to library needs are discovered. Therefore, this chapter includes both a review of three studies and one paper addressing telecommunications in Illinois libraries, a discussion of management and technological issues regarding telecommunications and Illinois libraries identified during the course of this study, and a discussion of emerging technologies which may be appropriate to maintaining or expanding electronic networking among Illinois libraries. This chapter concludes with a brief look at the next important step in library networking--systems integration.

Previous Studies

In the course of this study, three recent reports and one paper were identified as significant to an analysis of telecommunications use by Illinois libraries. These reports include: An Evaluation of the Facsimile Transmission Project Among Multitype Libraries in West-Central Illinois (1983, 1984, 1985); Regional Library Data Communications Networks: A Configuration and Installation Guide [ABW Associates, Ltd.]; Resource Sharing Alliance: Data Communications Review and Assessment [Telecommunications International, Inc.] and "Access to Information in Unserved Rural Areas." All of these reports and the paper are 1985 publications. Their importance is in their diversity of content, from the assessment of an existing telecommunications delivery system to a guide for development of telecommunications networks to a proposed program to bring information to rural libraries to a specific application of an end-user technology in libraries. While two of the studies are limited in their geographic coverage to West-Central Illinois and to the members of the Resource Sharing Alliance, their analyses and the development guidelines of

the third report are applicable to all Illinois libraries. The desire to serve the unserved or underserved is universal to all libraries.

Report: Evaluation of the Facsimile Transmission Project Among Multitype Libraries in West-Central Illinois (1983, 1984, 1985).

A total of twenty-two libraries of all types participated in the telefacsimile (fax) transmission project. The objectives of the effort were "to demonstrate that local and regionally held resources would be better utilized among various types of libraries, that subminute fax transmission technology would be an enhanced and thus effective communications link among projects agencies, that client satisfaction would increase by delivering information more quickly, and that a database would be available for collection development in a regional context."

State of the art fax equipment was employed, including programmable communications for auto-dialing. Two union lists of periodicals were the primary resource bases: the West-Central Illinois Regional Periodical Holdings List and the Heart of Illinois Library Consortium and Illinois Valley Library System List. In general, the study reported satisfaction of both library personnel and users with the scope of resources accessible via fax and with the quality of the product. Of particular interest to this study is the analysis of the telecommunications costs and efficiency.

Per page transmission time for fax ranged from 23 to 70 seconds. Public library transmissions alone averaged 23-31 seconds, while academic library transmissions were found to be much higher, averaging 64-70 seconds. Factors affecting transmission time included density and quantity of the image on the page and the quality of the transmission line over which the image must travel. The results imply either that the types of information requested by

patrons of public libraries did not contain a high density of material per page relative to academic library patron requests, or the quality of the transmission lines was better for the public libraries in the study. Most likely, the cause is a combination of the two factors. However, an assumption can be made that the quality of telephone lines to an academic library would be better than the average quality of lines to a public library, since the public libraries are more likely to be found in rural areas where line quality is diminished and error rates higher than in academic libraries. If that is the case, then the difference in transmission times could be attributed to the type of materials requested by library patrons. The type of material to be transmitted (number of characters per message, etc.) must be carefully estimated in planning a networking system. The speed and capacity of the system can be varied depending on the anticipated demand on the system.

The asymmetric nature of library traffic must also be acknowledged. Often, the main/central node in a network will send 100 characters for every character it receives from a remote terminal. This discrepancy can be taken advantage of in system planning if an accurate estimate of system traffic is available.

Transmission cost analyses indicated that the distance between the transmitting/receiving libraries was a significant factor in per document cost. This is not surprising, especially when distances between nodes may include interexchange area connections. The long distance telephone charges resulting from such a configuration can increase the costs of the transmission because of the need to deal with separate telecommunications vendors and because of added levels of switching which can increase error rates and added transmissions to obtain error-free documents. The increased costs can be

managed through appropriate use of technology to take advantage of night and weekend discounts. Auto-dial modems can batch transmit requests and documents during the least expensive time periods. Transmission costs ranged from \$.174 to \$1.05 per page, including monthly telephone charges and applicable long distance fees. At an average of five pages per document, the cost would \$.87 to \$5.25 per document. Eliminating the rural locations (the higher cost locations) brings the per document costs to \$.87 to \$1.80. However, one of the advantages of fax is bringing rural libraries closer to the standards set forth in Avenues to Excellence. If this remains an objective of Illinois libraries, reducing the costs associated with fax service to rural libraries will be necessary, or higher costs will have to be accepted as a necessary cost of obtaining the goal.

Including the costs of fax service to rural areas, however, increases the importance of cost effectiveness as an issue. The fax study compared fax with other document delivery services as a way to address this issue. Fax, not surprisingly, was the fastest of the four alternatives considered. The alternatives included the United States Postal Service (USPS), United Parcel Service (UPS), and the Intersystems Library Delivery Service (ILDS). USPS, with the second fastest turn-around time of the four alternatives, was slower than fax by a factor of 4 (4.25 hours for fax vs. 4.5 days for USPS). While speed is an important consideration, it is not the only consideration. Therefore, round trip costs (requests and document delivery) were analyzed for the same four methods. Fax was the least expensive method if the transmissions did not include long distance charges. Of course, if the use of fax technology has as a primary purpose access by rural libraries, these added costs must be factored in. In that case, USPS was the lowest cost alternative, with UPS as the highest cost alternative. Although the highest

fax cost was \$3.11 per document, exceeding the highest UPS cost (\$2.86 per document), the lowest fax cost (\$.58 per document) was significantly below the lowest UPS cost (\$2.07 per document). USPS costs ranged from \$.74 to \$1.52 per document, higher at the low end as compared to fax but about one-half the high end cost. Supply, transmission, and delivery costs for ILDS resulted in a range of \$1.31 to \$2.10 per document.

It is not clear from the report whether the fax machines used in the study accept originals in a form other than single sheet format (e.g. bound text). If not, then the cost of a photocopy of the document to be sent must be included in the cost as well. It is also not clear if the costs of the fax machines and any necessary peripheral equipment (modems, etc.) have been factored into the equations. The other three methods have no associated capital investment expenses (USPS, UPS), or the capital expense is associated with an existing service (ILDS) not exclusive to the document transfer considered in the study. Fax equipment is, of course, for facsimile transmission only. Prorating the cost of such equipment (keeping in mind that a fax unit is required at each circuit end) could raise the fax costs substantially relative to the other three methods.

Report: Regional Library Data Communication Networks: A configuration and installation guide.

The second document reviewed was prepared for the Lincoln Trail Libraries System. It is a guide to help library or systems directors establish resource sharing networks using telecommunications. The report covers a broad range of topics, from "Why network?" to the installation and maintenance of a network and the training of staff. The chapter of most interest to this report is Chapter 2: Connecting Regional Libraries. This chapter is well written and