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# Tomorrow's library: will it all be infrastructure?

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The form in which knowledge is described and encapsulated has a major impact on the design of libraries and the functions performed within the library. Libraries as we know them have been primarily built to store and disseminate knowledge in book format. New technology and the changing needs of knowledge workers, which form important parts of the logocentric, practicentric, and democentric elements of our information infrastructure, have created profound changes in our culture, challenge our definition of knowledge, and necessitate flexible designs for our libraries. The invention of practical mediums for information access, such as the book in the seventeenth century, television in the twentieth century, and perhaps the Internet in the twenty-first century, open the door to self-education with little economic discrimination. New roles for libraries are emerging that require flexibility in building design for moving collections, services, functions, and equipment; restructuring staff organizations; introducing new services associated with new technology; eliminating unnecessary or nonaffordable services; and housing other institutional departments within the structure of the "new" library.

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Picture for a moment, if you will, a Spanish conquistador exploring the New World with his aides-de-camp atop a hill along what would be for Europeans a virgin coast. The sun is setting in magnificent splendor in the background as he waves his arm in a grand display and says, "One day, this will all be infrastructure." In a society increasingly dependent upon information access, we might well make the same comment about our libraries.

Libraries, as physical entities, exist primarily as a response to a need generated in a culture that believes print is the best, the major, and often the only way to impart information. Based on this belief, we have developed an entire infrastructure in which libraries play a critical role. However, the role of print as a medium for information transfer and the role of libraries in the information-transfer process is rapidly changing. We need to understand what the information infrastructure is or should be if we are to

understand the library's role in it and how the library should be designed to function well in this new era.

## LOGOCENTRIC, PRACTICENTRIC, AND DEMOCENTRIC ELEMENTS

Our complex information infrastructure is composed of separate and yet intertwined logocentric, practicentric, and democentric elements. At the base of the complex information infrastructure is a word-based "logocentric" tradition of transferring information via languages, imagery, and alphabets. We generally think of print as our culture's medium for learning; however, print has been a dominant logocentric tool for less than 400 years, a mere comma in the history of humankind [1]. We forget that the history of our culture has been written largely in images. Humans did not start out 10,000 years ago reading books about

hunting and agriculture. Humans began by looking, by imitating, and by listening.

Printing and reading played no major role as an information-transfer tool for the average person in the West until the sixteenth century. The printing press yielded books to describe and encapsulate knowledge, engendered libraries to house this new format for knowledge, and made literacy a desirable and requisite skill. Thus, Western European schools had to undertake the teaching of reading, a mission often with a premise that says print is intellectual, scholarly, reliable, objective, and a basic learning tool. Conversely, information communicated by other forms of imagery—on television, computers, CD-ROM, videodisk, videotape, Internet—is mindless, unthinking, emotional, irrational, unreliable, and frivolous.

The printing press and the books it created are illustrative of the "practicentric" elements, or practical mediums, of the information infrastructure. The printing press made mass distribution of the book possible. The book was to independent learning after the seventeenth century what television has become in the twentieth century and what the Internet may be in the twenty-first century—a source available to all without a powerful intermediary [2]. The door to self-education was opened first by the printing press, which made affordable books possible, and is expanded by contemporary information technologies, which are making electronic information affordable to the masses. The press not only opened this door, but it also offered that access with little economic discrimination.

Throughout history, the invention of practical mediums for gaining access to information have had a profound impact on our culture. The printing press changed formalized education, which had been restricted to the upper class. Other practicentric mediums such as the camera allowed the Impressionists to redefine painting. Radio, telegraph, and telephone technologies changed communication so that we no longer have the habit or need to write frequent letters in longhand to our family and friends. Television has changed the way we get our news. The computer has changed our libraries.

The information infrastructure also contains a "democentric" element that is composed of organizations and systems designed to assist in the transmission of information to the general public. Publishers, libraries, and the Internet all exist for the purpose of economically and efficiently gathering, storing, and disseminating information. Before the printing press, few libraries and certainly no publishers were needed, because there was an oral tradition of passing on information. Furthermore, what printed information was available was limited to a privileged few. The book gave rise to libraries and continues to define

the form and function of most of the library's physical space. The World Wide Web and the Internet are about to change the way we work, the way we play, and the physical structure of our libraries.

## KNOWLEDGE ENCAPSULATION

The form in which knowledge is described and encapsulated has a major impact on the design of libraries and many of the functions performed within them. The library building, as much if not more than other buildings, must reflect and accommodate the functions it houses [3]. As one form becomes more acceptable or more prevalent than another, our concepts, policies, and standards of librarianship must be challenged if we are to successfully plan structures that will encourage efficient and effective service in this new environment. The library building must incorporate design flexibility to permit greater possibilities for various forms of knowledge encapsulation at a time when future library functions can be defined with less certainty. Such flexibility, however, will be achieved at a higher initial cost and possibly in less aesthetically pleasing buildings.

Many existing buildings designed in the sixties and seventies have proven to be somewhat inflexible for the new technologies and networks of the nineties. Larger library buildings designed with specialized computer rooms now find these facilities overspacious and overdesigned. Small or medium-size libraries frequently have no space at all assigned for computer or system functions. Libraries that planned for centralized card catalogs in close proximity to large technical service staffs now find it difficult to adjust to dispersed access via online terminals or computer-output microfiche catalogs.

To date, the need for increasing space for library collections has not diminished with the advent of resource-sharing networks or the proliferation of new technologies. On one hand, the rate of print collection growth has decreased, primarily due to financial restraint. On the other, the paperless society remains elusive, while microcomputing technology, which was supposed to help create the paperless society, has found a major application in publishing and is actually creating more paper publications [4]. Fewer periodical titles are required as access to state, regional, and national collections has improved through electronic networking and electronic publishing. Furthermore, compact storage, whether in the library, on campus, or shared with other libraries, is becoming increasingly popular and necessary.

Additionally, the integration of traditional library services and those that will support the emerging networked information services poses a real challenge for the design of library facilities. Print collections and electronic resources will coexist for the fore-

seeable future. However, the provision of training facilities will be a central mission of the library of the future [5]. Rather than simply being repositories of information and, at best, democentric gateways to other depositories, libraries are beginning to have an emerging role as a logocentric element in the information infrastructure—that of knowledge creation. This requires flexibility in library buildings: flexibility to move collections, services, functions, and equipment; flexibility to restructure staff organizations; flexibility for the introduction of new services associated with new technology; flexibility to economize and eliminate services no longer needed or affordable; and flexibility to house other institutional departments within the physical structure of the “new” library.

### THE KNOWLEDGE WORKER

Staff members, user requirements, and institutional organizational structures have also changed as the result of new technology and networking within the information infrastructure. By the end of this century, “knowledge workers” will make up a third or more of the work force in the United States [6]. Knowledge workers, who will be both employed by and served by libraries, require a good deal of formal education and the ability to acquire and apply theoretical and analytical knowledge. They require a different approach to work, a different work environment, and a different mind-set. Above all, they require a habit of continuous learning.

Organizations and individuals within those organizations, librarians included, will inevitably become far more competitive. In fact, as knowledge becomes universally accessible, there will be fewer excuses for nonperformance, and productivity of the knowledge worker will become the economic challenge of the knowledge society. To remain competitive, we will have to learn to use work teams for different purposes, and we will need to provide the appropriate space for staff and users as well as various groups of staff and users. Libraries have already begun to feel the impact of participatory management concepts that emphasize the need for staff meeting or conference rooms as an adjunct to staff workstations. Standards such as twenty-five square feet per workstation need to be revised upward to thirty-five square feet, and the allocation of 150 square feet per staff member used for sizing purposes is insufficient [7].

Most important is the simple fact that in the knowledge society, workers own the tools of production. Physicians need the hospital's expensive capital equipment, but their twelve or fifteen years of training and the resulting knowledge are their true capital investment. The physician, the student, or the researcher also needs a personal computer. Like their

knowledge, it goes along wherever they go. Larger and different types of space allocation for each staff and user, new categories of library staff, staff who work at home, additional in-service training, more sophisticated facilities in closer relationship to the collections, and communications outlets throughout the library must be assumed.

The institution's ability to support the knowledge worker and the rest of the information infrastructure will depend on the distribution of talent and facilities within the organization [8]. Human factors in built environments assume major importance if we are concerned with human efficiency, safety, comfort, and general usability. Design concerns for the concepts of proxemics, territoriality, privacy, and personal space are interrelated components of environmental design [9]. These concerns apply not only during the design stage but whenever administrative rules and regulations are formatted to govern the freedom employees and users have in adjusting their environment to meet their personal needs.

Each institution must also find ways of maximizing the use of the facility by forming strategic alliances with external enterprises and by internally reorganizing and reexamining the relationship of disparate departments. Space once dedicated to traditional library functions may be shared with curriculum staff, computing staff, or day-care centers. Allowing people to avoid stressful situations and permitting both users and staff the opportunity to be as effective as possible in whatever activity they are engaged assumes added importance in an era marked by institutional reengineering. Failure to adequately plan and design buildings that are “human oriented” result in such structures as the Sears Tower in Chicago, Illinois, the tallest building in the world, which was universally resented by the workers it was designed to house [10].

### SUMMARY

Knowledge has become a key resource, and it is fundamentally different from such resources as land, labor, and capital. It is portable. It can be created everywhere, quickly and inexpensively. Its definition is changing as are the means by which it is created, stored, and disseminated. The democratization of information access is widening further with technologies. We are beginning to recognize the urgent need to represent the interrelated and systemwide nature of problems associated with the logocentric, practi-centric, and democentric elements of the information infrastructure. The dictionary definition of the library as a structure in which literary and artistic materials are kept for reading, reference, and lending will not soon disappear nor should it. However, a definition that implies the library is primarily a passive receptacle for information or at best an intermediary for

the dissemination of second-hand knowledge must evolve and expand to an active definition encompassing the full spectrum of the information.

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