

NEW TASKS AND NEW OPPORTUNITIES FOR LIBRARIES IN THE DIGITAL ENVIRONMENT*

By Ching-chih Chen

Abstract: We are in a most challenging time when technology and our traditional library values are converging. There are many important social, economical, political, and technological issues which we must address to keep our libraries not just surviving but thriving in this new information age.

This speech will first discuss some of the exciting opportunities for libraries in this digital environment with the effective use of cutting-edge multimedia, digital imaging, and communications technologies. Comments will also relate to digital library, global internetworking of information resources, the future of electronic publishing and the effect on the provision of information services.

Years ago, futurists like Toffler predicted the coming of a shrinking global village, and today, we are experiencing the true meaning of such a shrinking globe. Caught in the midst of the digital visual information age, excited in both the great technological potentials and the current development of the global telecommunications networks, it is easy to envision the true "Global Library."

An era of unprecedented change

Since the World War II, we have been in an era of unprecedented technological, social and economic changes. These changes have been particularly dramatic in the past decade. Technologically, the advent of microcomputers, optical discs and other mass storage media, worldwide packet networks and communications technology, digital image technology, computer graphic technology, multimedia technologies, compression technology, etc... have dramatically changed the way we live, think, and communicate with each other, and certainly the way we use and view technologies.

In the last couple of years, the development in communications technology has been so dramatic that we are truly experiencing the power of the open system,

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Internet. The new technology buzzwords everywhere have been global village, electronic or digital information superhighway, information age, cyberspace, electronic frontier, etc... In addition, communications satellites, global trade and investment, global technology transfer, and jet travel have prompted dramatic social and economical changes as well. These have pushed the national economies into an more integrated world economy. Now, more than ever, as many political barriers removed, we have been able to communicate with each other openly and freely. It is high time for us to further explore the use of new information technologies to initiate, plan, and implement new forms of cooperation in this transient world.

Telecommunications, internet and universal information access

Viewing this situation from the angle of communication, we have passed several "information jumps" -- from speech to writing to printing, and now to wire and wireless communications. The last makes effective communications possible on a continental scale, and is taking us toward a global civilization. As computer technology has evolved, leaders of one computer era have had little success in dominating successive eras (Source: *USA Today*):

- 1960s - Mainframes era dominated by big companies such as Burroughs, Univac, NCR, Control Data, Honeywell and IBM.
- 1970s - Minicomputers era dominated by companies such as Digital Equipment.
- 1980s - PCs era dominated by companies such as Microsoft, Intel, Apple, and Compaq.
- 1990s - Networks era with the Internet connecting computers. The 24-year old co-founder of Netscape, Marc Andreessen could become a leader of next computer age.

During this current networks era, Internet, started in 1969 by the US Defense Department with its humble beginning, once exclusively used by American research scientists and computer specialists for e-mail, group discussion and conduct research, has greatly expanded in the last couple of years and has fast become a supranational global digital information superhighway. This global communications network connects networks of federal, regional, academic, private, and foreign users. It is a network of more than 50,000 networks that form the world-wide web. Its membership doubled in 1993 to more than 15 million users, and currently just Netscape alone, there are more than 55 million users.

Clearly this gigantic open system has offered tremendous opportunities to social sciences information professionals. As computing and telecommunications develop and merge, what lies ahead is another jump toward what might be called universal information access. This would mean that anyone, anywhere, could talk, write, confer with, or send both textual and visual information to anyone else in any part of the world. This means that the concept of the digital "Global Library" is not only conceptually sound, but already technological feasible now. With this kind of universal library, we would have access to global information resources which include the collections of the world's greatest libraries.

New obstacles, new questions and new tasks

On May 18, 1994, on my way to Moscow, I was reading an interesting feature article appearing in the *Wall Street Journal* [Ziegler, 1994] entitled "Building the Highway: New Obstacles, New Solutions." Ziegler stated that the builders of the information highway have created a media sensation with their plans for wiring America or Europe or other parts of the world, but to deliver on their promises they will have to meet challenges of unprecedented complexity and size. These include areas related to data compression and storage, the servers, the conduit, the set-top box, the user interface, and the ordering and billing systems. I can add to these some additional unsolved problems such as intellectual property issues, copyright, and security. Despite of these problems and unsolved issues, some of the skepticism on the hype and reality of our interactive future, one thing is sure. With all the money bumping into this effort, we will have a digital superhighway. Yes, the technologies will be soon available to enable us to link all the global information together to form "The Global Library" for multimedia information delivery. But, are we ready to have our information resources available in digital form so that they can be linked together by utilizing the available technologies? All the products and services which attracted BIG investments in billions and millions of dollars are now related to the delivery of popular, game-like, and entertainment type of products. If so, is this digital *information* superhighway, which we are so much looking for, is more suitable to be called digital *entertainment* highway? To prevent this, information professionals like us need to build our own high-speed quality "cars" to ride on this highway. These are the new tasks. Here, for "high-speed," I mean "digital" or "electronic", and "quality," I mean content-based and knowledge-based, as well as multimedia and not just print-based. Have we begun to think about this and to plan to build this? This is the central question! It is high time for all information professionals, including social sciences librarians, to think seriously on how to work toward that!

Shift toward a global learning-oriented society

With all the unprecedented changes, it should not be surprising that there is an increasing demand for better access to needed global information to enable us to have a bigger picture on the world in which we are living in, a better global view on our environment, our history, our cultures, our economy, our science and technology, etc... Thus, information, has become the key to productivity, and there is a shift toward a knowledge-based learning-oriented "creative society." In this type of society, we are witnessing the following change in emphasis:

- Societal values change from "acquiring" to "learning"
- Growing motivation of individuals for knowledge
- More people learn to use information creatively
- More demand for multimedia information
- More demand for global information

It is clear then that a changing society characterized by continuing technological progress, societal and economic changes will definitely pose new challenges to libraries. It demands our libraries to transcend traditional methods of providing information access within the confines of library's physical structures to providing access to services and global information resources to people at home, in school, at work, or any place so desired by them [Chen. 1994].

The digital global library: reality and challenges

For almost a decade, I have advocated the coming of the digital global library for universal information sharing. With the technological advances and the availability of a wide spread open system, this becomes a reality. Let me share with you briefly the development of such a prototype.

In the last two years, over thirty some national libraries have cooperated with me by providing me with basic information on their libraries, library services and collections, as well as a few selected images of the libraries. In 1994, a photo-CD was created and with the availability of World Wide Web, and the functionalities of the latest web browser, Netscape 2.0 Version and above, a prototype global digital library with instant access to information resources of the world national libraries as well as other major library network resources has been developed. Figure 1 shows a screen of a demonstration of access to information resources of national libraries of 6 countries -- Canada, China, Hungary, Russia, UK, and USA. If USA is selected, then immediately on the left side of the lower screen shows the image icons of the three national libraries of the U.S.A. - Library of Congress, National Library of Medicine, and National Agriculture Library. Then,

if one click on the image icon of Library of Congress, users are immediately welcome to the Library with its picture, and on top of the lower right window, users can choose to either visit the web site of Library of Congress, or use its OPAC or Marvel, or to FTP a known file from the Library, or to use the resources of LC's Digital Library by clicking on the appropriate button. Similarly, if the image icon of National Library of Medicine is chosen, as shown in Figure 2, then immediately NLM's information resources are ready to be used. Information resources of libraries in other countries can also be accessed instantly at a click of the mouse via WWW.

For centuries, major national and academic/research libraries in each country have been store houses of their countries' treasures and rich information resources. But, the contemporary roles of these libraries have to go far beyond those of the store houses. My project demonstrates that each library can be a dynamic and aggressive information provider of both its country's enormously rich information resources, as well as an effective node of global information network which can provide access to all needed global information. Each contributes effectively toward the eventual realization of "The Global Library", in which national and research libraries in the world can be linked together as nodes of the worldwide information network.

In order to assume this role, the integration of new information technology becomes essential. Instead of staying on the early stage of technology applications by simply applying new information technology to traditional functions, processes and procedures, such as cataloging, circulation, OPAC, creating conventional databases, etc..., the libraries need to use the new, exciting technology as a means of changing and/or expanding what they do, not just how they have done it. The multiple convergence of various types of technologies -- with powerful central processing units, versatile and inexpensive micro-processors, very high density storage devices particularly the optical media, facsimile transmission, improved graphics imaging and printing, powerful software development, multimedia applications, wire and wireless communications, etc... -- is enabling us to rethink how people gain access to all types and formats of information in non-traditional ways.

In the current environment, in order to adapt successfully to the technological, social and economical changes, there may be a need to change our keyword from "access" to "selectivity." If our multimedia information resources are available in digital format as alluded earlier, then, in the big ocean of digital information, the most important thing will not be the access of this big ocean, but will be "how to find and retrieve the most relevant from this big ocean." This will be a great

challenge for all information professionals. In addition, what seems critical for adapting to the changes is not so much access to data or information of every sort, but rather a new level of knowledge and wisdom. Clearly, major national and research libraries will be on the front lines of meeting this challenge. Instead of each library worrying about its own development, we need to think of utilizing new information technology to have a new form of cooperation in the broadest sense.

In this kind of environment, the knowledge world is going from a paper culture to an electronic one, and libraries will be deeply affected. In other words, printed information sources, such as books, journals, and archival materials, will not be enough. Digital information sources become essential. That's why more and more libraries are starting to create limitless digital bookshelves.

Conclusion

Despite of potential difficulties, barriers, and challenges, one thing is sure that the technologies and the infrastructure are in place now for us to experiment an universal library. For the first time ever, lack of proper technology is no longer an obstacle. But, technology is not the end in itself rather the means to an end. We should not suffer from the loss of direction caused by preoccupation with technology. As the social sciences librarians speculate on their work in the next millennium, what we they must do is to make sure they can develop a vision for their library's future, and define its role in facing a new frontier. While this digital networks era has offered immense opportunities for social sciences librarians, plenty new tasks are waiting for them as well. This is indeed an exciting time!

References

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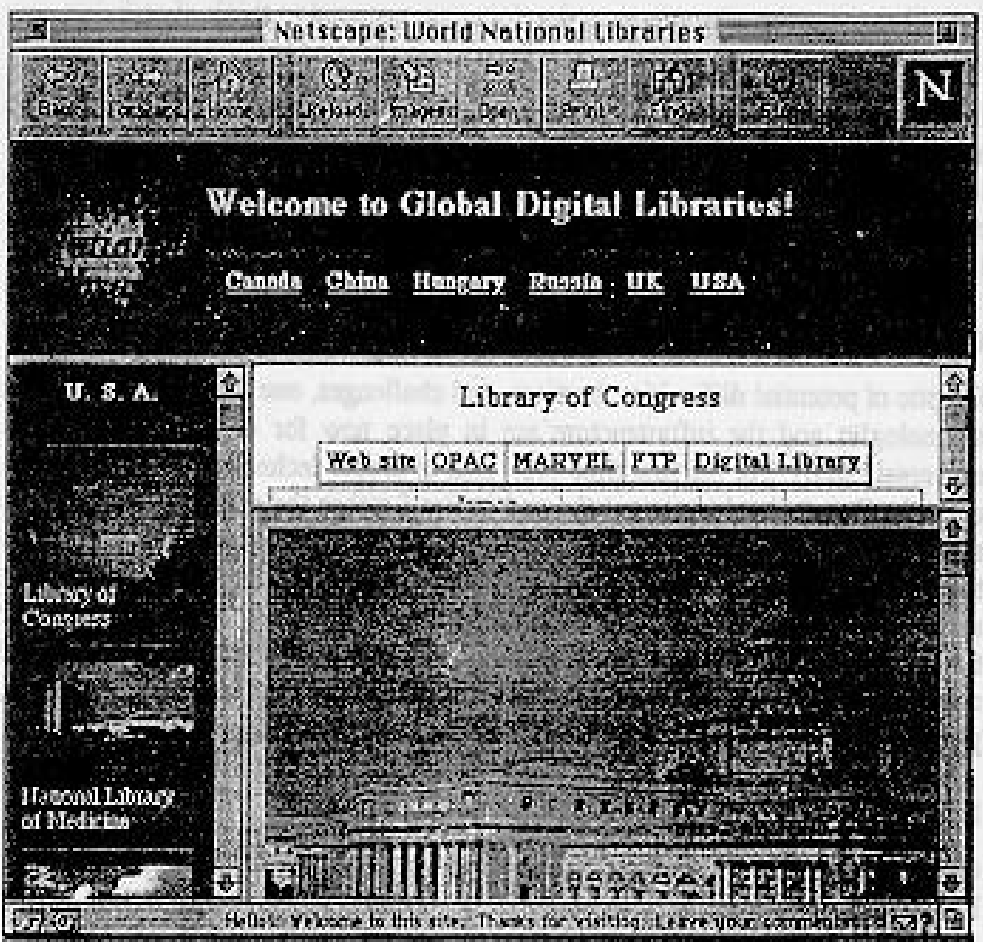


Figure 1. Access to information resources at the Library of Congress

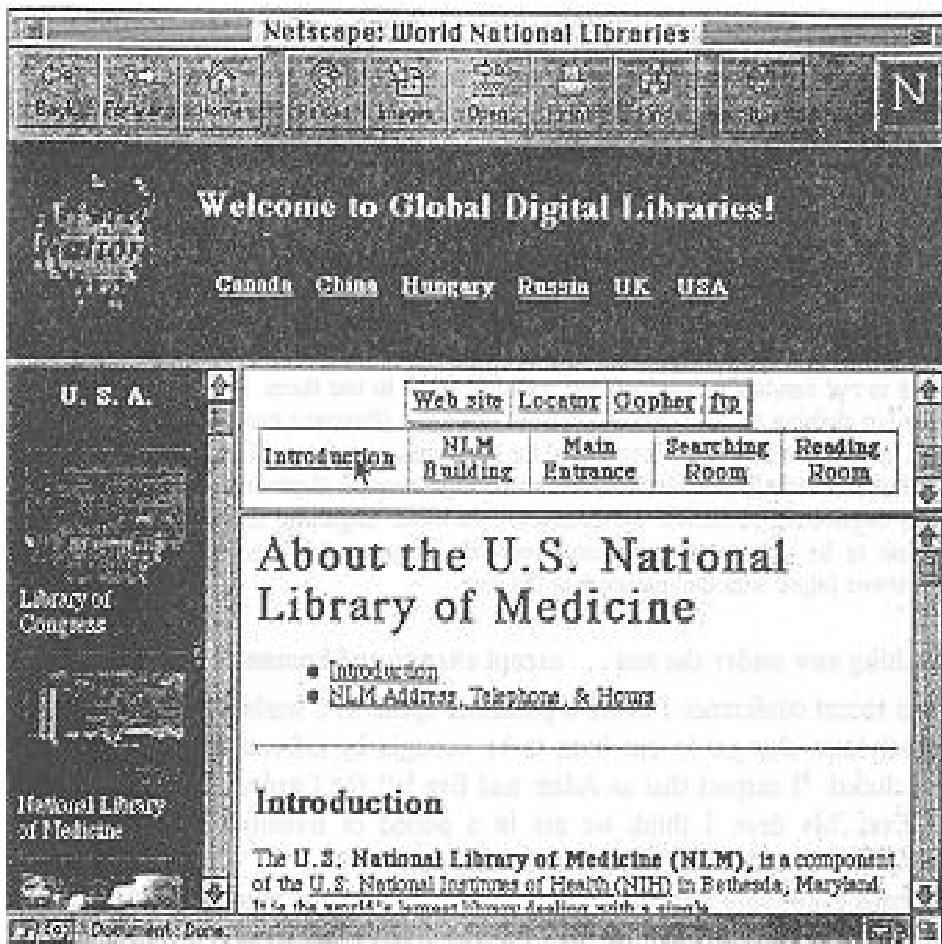


Figure 2. Access to information resources at the US National Library of Medicine