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New Technology, New Tools, New Librarians: Shaping the Future

ABSTRACT

Speakers' comments from the Annual Clinic on Library Applications of Data Processing are summarized. The focus of the clinic was designing information, and topics discussed include design principles, knowledge management, applications of technology to information workstations, graphical interfaces, public library use of the Internet, electronic information in school libraries, computer-mediated instruction, computer-based staff training, design techniques, hypertext, information delivery in a networked environment, and the Cleveland Free-Net.

INTRODUCTION

Most of the authors for the clinic have focused on current state-of-the-art technology. This is the technology in use in most libraries and likely to be applied in the near future. While the business of predicting the future is fraught with minefields and notable failures, it is likely that the limits of technology will continue to be pushed forward, and more capability and capacity will be available at ever lower unit cost. Librarians are both the early adapters of new technology and the followers. The authors represented in this volume are among the leaders, pioneers, and early adapters.

DESIGNING INFORMATION

Information Technologies

Among the current technologies that affect information services are workstations, multimedia support, optical and CD-ROM storage media, and networking. Tools in the form of software and some hardware are increasingly available, although as Katharina Klemperer noted, different media require the use of different tools and not all have reached the same level of refinement and application. Among these software tools are various hypermedia packages. A number have been described by Peter Scott. Other tools librarians can and should use in learning about and adapting technology and tools are the technology itself, colleagues, continuing education activities, the literature, and of course the Internet. Themes that have been repeated are information creation, maintenance, use, and evaluation.

Design Principles

Edward Tufte reminds us that we live in a multidimensional environment, but our displays are limited to two dimensions. However, we can use technology and graphic design to achieve apparent multidimensional presentations. He presented a variety of examples to illustrate this showing both good and bad ways of displaying information. His examples, however, required the verbal context he provided for understanding. The pictures alone were insufficient to illustrate his points.

Tufte, like Richard Saul Wurman (1989) and Ronnie Peters, believes that good design and organization can enhance intelligibility of information. He also agreed with Richard Greenfield that most graphical user interfaces are examples of poor design. Some supposed advances he noted are in fact regressions. He also urged using comparisons in display to enhance analysis and comprehension.

High-resolution displays are essential. Some of these begin to approach the print medium in resolution, but the displays available to most users are limited and a poor substitute for the printed page.

Graphical techniques are especially useful when there is an overwhelming amount of information to be conveyed. These techniques can focus attention on the primary points while still including some aspects of the whole. Professional designers can enhance information displays and should be used. Design by committee is fraught with failure. There is no substitute for creativity and for the coherence a single good designer can provide.

Knowledge Management

Carolyn Gray and Richard Lucier covered related aspects of knowledge management. Gray described the Gesher Project, a joint effort of Digital Equipment Corporation and the Brandeis University Library to study scholarly communication and information use and to develop a personal information system for scholars. An ethnographer on the Brandeis Library staff enabled them to apply ethnographic techniques to their study, providing a better understanding of the context and a richer view of critical factors. Gray cautioned that what appears to be inefficient in isolation, such as lunches and coffee klatches, may be highly effective channels for communicating information and teaching. She also cautioned that ethnographic techniques are time-consuming but reveal information that might otherwise be missed.

Gray defined knowledge activity as consisting of seven aspects: diagnosis and problem finding, planning and decision making, monitoring and control, organizing and scheduling, authoring and presentation, communication, and lastly system development. The information chain involves production, distribution, acquisition, and use. These two views must be linked. Librarians must build bridges between scholars and themselves and the information resources. The world is in a constant state of change. Scholars are changing and so is scholarly work and research. Librarians must change too.

Richard Lucier provided an overview of the knowledge management model developed at the Welch Library of Johns Hopkins University. He proposed a new role for librarians as the creators and maintainers of scholarly and research databases and illustrated his view with examples of the support provided by the library to the Human Genome Mapping project.

Librarians must be active or lose the initiative to others. Budget problems are not an excuse. The present constraints are part of an overall systemic change and not just the effect of escalating serial and material prices. Structural changes are necessary. Librarians must reallocate existing resources and seek new resources outside traditional bounds. Changing people is difficult if not impossible.

Too many librarians focus on replacement strategies rather than innovation or transformation. Knowledge management requires transforming people, functions, and organizations. Revolution, not evolution, is needed. Lucier has found it better to separate functions and set up new units with new people to develop knowledge management activities. Once such groups become viable, they act as change agents for the more traditional units such as the library. However, librarians must find ways to maintain critical traditional services while making such transitions.

Identifying the critical institutional needs is one way of establishing priorities and identifying potential new resources. The major barriers are legal, technical, and financial. Knowledge management will come. Librarians must decide what role they want to play.

Information Workstations

William Mischo of the University of Illinois and Virginia Tiefel of Ohio State University (OSU) described applications and innovative uses of technology at their respective institutions. Mischo discussed the library information workstation project based on an IBM workstation providing access to local databases, campus resources, the library catalog, and external resources including the Internet. Tiefel presented the OSU Gateway software that helps students to formulate a search query and execute a search using an encyclopedia, dictionary, CD-ROM indexes, and the library catalog. The Macintosh-based Gateway encourages use of both print and electronic resources. Both are focused on providing seamless, one-stop shopping for the user.

Mischo noted that current information retrieval systems deliver both too much and too little. They either overwhelm the user with many documents or fail to retrieve anything. Many users are uncertain which information resources to use or how to formulate their questions.

Mischo noted that keeping all workstation software updated is a problem. At present, sneakernet is used; i.e., a staff member individually loads new software into each workstation. Eventually he hopes to use the network to distribute such software. Since Illinois has a number of branch libraries, each can offer local databases and customize the software interface, particularly help screens, default search values, and vocabulary. Future changes will incorporate searching multiple databases, multimedia databases and functions, and more image data storage and transmission.

Tiefel said that OSU has a continuous evaluation process for The Gateway. At present, use is limited to units within the main library, but network access for dormitory and remote use is planned. With such a large user education program, the tutoring nature is particularly helpful in providing new students with an easy-to-use access to electronic resources that requires no prior knowledge of the system or of the resources used.

Graphical Interfaces

Richard Greenfield, consultant, provided an illustrated tour of several graphical user interfaces with examples of what not to do as well as examples that were well done. He urged avoiding most icons,

pointing out that they were not intuitive and were often confusing. He also noted that naive users do not care where information comes from. Like Joe Friday, they just "want the facts, ma'am."

Public Libraries and the Internet

Jean Polly, Liverpool Public Library, continued her paean on the Internet. While it is not easy to use, it has a wealth of resources that public libraries can use to better serve their patrons. As more resources become available only in electronic form, access to the Internet and its resources becomes increasingly important.

While most university staff have access via stable, permanent connections, these are too expensive for most public libraries. Instead they can use dynamic, inexpensive connections to the Internet. While more difficult to use, they are cheap.

Her list of needs are better interfaces, cheaper interfaces, more and better training, and more vision regarding Internet use and resources. Her message to librarians: GET INVOLVED.

Electronic Information in School Libraries

David Loertscher, Hi Willow, discussed the role of the school librarian and the use of technology in schools. He noted that a number of the publications, print and diskette, published by Libraries Unlimited are created by school librarians.

Technology is being used routinely in more schools, and the school media center is often a major resource in such use. Schools use personal computers for most administrative tasks such as letters to parents, scheduling, inventories, and accounts. A large number are also using computers in the curriculum. He suggested that the best way to teach students information and computer literacy is to teach them to create databases in support of projects related to the curriculum.

Computer-Mediated Instruction

Ruth Small, Syracuse University, provided insights into the principles for designing computer-mediated instructional programs. Critical factors are the learner, the information, the task, and the instruction. She recommended use of the ARCS Model: Attention, Relevance, Confidence, and Satisfaction. Her own examples were clear, consistent, well ordered, logical, and used repetition.

Computer-Based Staff Training

Joe Rader, University of Tennessee, Knoxville (UTK), described the project at UTK to create a computer-based training program for

staff. He noted that industry spends some \$40 million annually on staff training. There is no estimate available for what libraries spend or how much time they devote to staff training.

Lessons learned include (a) staff participation is critical, (b) experts can make the job easier and the finished products better, (c) technology can make the task manageable, (d) libraries can adapt tools to their needs as well as the products created by other libraries, and (e) staff and supervisors need to feel they have control of the process. He recommended considering development of packages for both staff and users or with other libraries to reduce costs. He also asked whether libraries should consider more standardization of practices and procedures to enable easy transference of training software.

Design Techniques

Ronnie Peters, graphic designer, reiterated some of Dr. Tufte's observations and provided copious examples of design techniques. Among the most interesting of these, however, were his illustrations from Korean artists showing different approaches to perspectives and horizons. His illustrations underscored that different cultural perspectives must also be considered in designing information systems and graphical interfaces. Context matters.

Peters noted that there is a well-established body of design principles for print media, and some of these apply equally well to computer displays. Others must be modified to accommodate the more limited resolution, size, shape, and color of computer displays. Designers may use representations of the object itself or symbols standing for the object. Flags are often used to represent countries. Icons are a formalized symbol. He noted that icons in a system should have similar shapes and formats. The eye first perceives the shape and then what it contains.

Type fonts should be used with care. Some fonts are not well suited to screens. Peters ended by asserting and demonstrating that good design clarifies and enhances communication, echoing Dr. Tufte.

Hypertext

Peter Scott spoke as an advocate of hypertext programs. He provided an overview of available software, focusing mostly on tools created with HyperRez. He said such packages are easy to use, create, maintain, and adapt for local needs. Paper is a waste, and electronic exchange can replace it. Scott provides access to information on library and information services and resources available on the Internet.

Information Delivery in a Networked Environment

Katharina Klemperer provided an overview of Dartmouth services then focused mainly on three information trends: an increasing volume

and variety of information, workstations, and networking. She identified five types of information sources: indexes, structured full text, full text, numeric, and multimedia. Most information systems handle indexes—periodical indexes, online abstracting and indexing databases, and library catalogs—well. They can also handle many structured full-text files satisfactorily such as dictionaries, almanacs, and the Bible. They do not handle unstructured full text such as a large monograph adequately.

Different search engines, display formats, and systems are needed for unstructured files. Most multimedia files rely on words and codes for providing access. Work is underway on other access means.

Klemperer echoed Polly on the need for better navigating tools for locating information resources in networked environments. She provided examples of some of the categorized displays Dartmouth is experimenting with.

Cleveland Free-Net

Sievers provided an overview of Cleveland Free-Net: its history, use, and relationships with Case Western Reserve University. The community access system is supported by the university, and staff interact with the community through it. Both gain. Most support comes from volunteers. It opens access to computing and information resources to all citizens. Schools and libraries use the resources heavily. Other communities have established their own Free-Nets.

CONCLUSION

These writers provide multiple answers to what the new roles for librarians could be. Gray and Lucier suggest that knowledge managers may be the future: creating bridges to resources, building databases, and assisting in providing scholarly information systems. Mischo, Tiefel, Klemperer, Sievers, Scott, and Polly see providing enhanced access to information and support and guidance to users as major roles. All of them advocate an active role and involvement in the use of new technology and resources. Electronic resources are proliferating, and users need assistance in locating and accessing the information needed for problem solving, decision making, and even entertainment. The role librarians play depends on the willingness of the individual librarian to become involved, participate, learn, and contribute. These leaders have provided examples of how they have done it and where they expect to move in the future. The rest of us need to follow their examples

and begin making changes in ourselves and in our environments so we can remain effective contributors to society and scholarship. The turtle only moves forward when he sticks his neck out.

REFERENCE

Wurman, R. S. (1989). *Information anxiety*. New York: Doubleday.