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The Internet and Library and Information Services:
A Review, Analysis, and Annotated Bibliography

By

Lewis-Guodo Liu

Graduate School of Library and Information Science
University of Illinois at Urbana-Champaign
THE INTERNET AND LIBRARY AND INFORMATION SERVICES: A REVIEW, ANALYSIS, AND ANNOTATED BIBLIOGRAPHY

By
Lewis-Guodo Liu
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ABSTRACT

The literature on the Internet and library and information services has emerged since 1990 and is rich in both variety and quantity. Yet little effort has been made to organize this literature. This work reviews and analyzes the literature and provides a comprehensive annotated bibliography containing 446 items on the Internet and library and information services. The selected items are classified into various topical categories. The author observes that the literature is descriptive and argues that more analytical research needs to be done in the future.

INTRODUCTION

The literature on the Internet and library and information services before 1990, except for a handful of isolated articles, was almost nonexistent. Since 1990 the literature has been mushrooming. Yet little effort has been made to organize the literature. This bibliography focuses on the Internet and library and information services and aims to provide information on the characteristics of the literature in the hopes to facilitate scholarly research and policy-making in this area.

The emergence of computer and telecommunication technologies in recent decades has had a great impact on traditional information preservation, acquisition, organization, provision, access, and retrieval. Many of these technologies have been integrated into library operations such as acquisition, cataloging, circulation, interlibrary loan, and reference services. Today's library activities are no longer confined within their physical territories. Many libraries are electronically networked and rely heavily on computer and telecommunication technologies as a means of providing library and information services. Information can be stored in various electronic forms and transmitted at high speed over electronic networks to wherever there are computer facilities to receive it.

This bibliography covers a wide range of topics and a great variety of issues related to the Internet and various aspects of library and information services. While this bibliography has a broad coverage, it focuses on research-oriented works, empirical studies, and reports that reflect practices and experiences in developing and maintaining library and information services. Therefore, in general, descriptive items, such as book reviews, popular magazine and newspaper articles, and one or two-page articles have been excluded. Exceptions are those items that contain
original ideas and thoughts and represent new research concerns or new
research directions. Articles that are repetitive and do not add research
value to better understanding of the subject under investigation have
also been eliminated. Commercial books, except for a few books with
comprehensive coverage on Internet resources, services, and tools, have
been excluded because they are basically similar in terms of contents
covered. This bibliography only contains print sources.

Various electronic databases were searched including databases re-
lated to library science, education, computer science, and engineering
as well as databases related to social sciences and business. The follow-
ing databases were most relevant to the theme of this bibliography: ERIC
(1966-September 1994), Library and Information Science Abstract (1969-
1994), and Dissertation Abstracts (January 1861-September 1994). Illinet
Online, a statewide library system consisting of hundreds of libraries in
Illinois and many out-of-state libraries, was used to search books and
other print items related to the topic.

By September 1994, there had been more than a thousand various
publications on the Internet alone. After excluding book reviews, popu-
lar magazine and newspaper articles, duplications, and those items that
are descriptive, repetitive, or irrelevant to the theme of this bibliogra-
phy, 446 items have been selected and annotated. These items reflect
the research concerns and trends in this area.

Selected items are classified into a number of topical categories
and arranged by author in alphabetical order (see the review and analy-
sis section for detailed classifications). The purpose of the classification
is to provide readers with various interests in the Internet and library
and information services with a closer and better view of the literature.
Although items are classified into various categories, they are not mutu-
ally exclusive. Some items in one category may also fit in other catego-
ries. The items that do not belong to any topical categories and the items
whose number is too small to be classified as a topical category are
included in the Internet Resources and Services, Access, Tools, and Mis-
cellaneous Topics Category. The topical categories are arranged in al-
phabetical order.

THE INTERNET AND LIBRARY AND INFORMATION
SERVICES: A REVIEW AND ANALYSIS OF THE LITERATURE

The Internet was originally developed in 1969 for military commu-
nication and research and continued to expand through the 1970s. The
users were primarily military personnel and scientists involved with mili-

1 The references cited in this essay are listed in the annotated bibliography section.
tary research at that time. The National Science Foundation started funding a number of supercomputer centers and interstate structures in the mid-1980s for general academic research and communication, and the users were largely government agencies, academic researchers, college students, and librarians. As computer and telecommunication technologies have advanced, more and more people have become computer literate. As a result, the Internet has become more popular. When it is feasible, both technologically and financially, for a large segment of the population to communicate over the Internet, the potential of the Internet for commercial use has become more obvious. It can be used to support business activities such as advertising products, placing orders, fulfilling orders, and making business transactions. Both teachers and students have found the Internet useful. It not only provides educational information but also is an indispensable tool to stimulate and enrich learning. As the Internet expands and advances, the demand for the use of the Internet from the general public also increases. Today, not only do government agencies, academic researchers and college students, businesses, school teachers and students, and librarians use the Internet, those whose day-to-day work may not be involved with the use of computers also need information from the Internet. This demand is reflected by the literature addressing the efforts made and problems faced by many public libraries in providing and improving Internet access for their patrons. As the Internet continues to grow and emerges into the National Information Infrastructure, and with the Clinton Administration’s support for the development of a national information superhighway and the High-Performance Computing Act of 1991, the demand for Internet services will continue to increase in the future. There are numerous estimations as to how many host computers, workstations, and users are being, and will be, connected to the Internet. For example, Abbott (1994, p. vii) estimated that there were between 10 and 30 million people using the Internet worldwide. Gilster (1994, p. 15) estimated that there would be about 40 million worldwide Internet users in 1995, and the number of people using the Internet will reach 100 million by 1998. Gibbs (1993, p. 9) claimed that approximately 1,000 computers get connected to the Internet every day. While it is difficult to exactly quantify how many people use, or will use, the Internet, it is certain that the number is growing dramatically annually.

Compared with the development of the Internet, the literature on the Internet and library and information services before 1990 virtually did not exist. This topic as a research concern was almost new to academic scholarship as well as to library administrators and policy makers. Since the beginning of the 1990s, the literature has been growing explosively as a result of the development of library applications on the Internet. But many of these items are descriptive. They lack original content for understanding the subject under investigation. Many articles discuss
the same topics. Despite these weaknesses, this body of literature is rich and covers a great variety of issues related to the Internet and library and information services and it can be classified into the following topical categories:

- academic libraries and scholarly research
- bibliographies, directories, guides, and glossaries
- business resources
- collection development and resource sharing
- community, community networks, and community services
- community colleges
- electronic publishing, document delivery, and interlibrary loan
- global and international networking
- government information
- the government's role, policies, and national information infrastructure
- Internet resources and services, access, tools, and miscellaneous topics
- Internet training and education
- law librarianship
- legal, ethical, and security issues
- library science education
- medical and health science libraries, and resources
- Online Public Access Catalogs
- privatization and commercialization
- public libraries
- reference services
- research and development
- schools, school librarianship, and school media specialists
- special libraries
- standards and protocols
- user needs and human cognition
- women, minority, the disabled, and equality

ACADEMIC LIBRARIES AND SCHOLARLY RESEARCH

The articles in this category examine the impact of electronic technologies in general and the Internet in particular on academic library services, academic research, and the role of academic librarians. For example, Barry (1993) looked at the effect of the use of information technology on academic research behavior and how these two variables are correlated. Bazillion and Braun (1994) maintained that the development of information technologies affects academic library building design and the role of librarians and suggested that the library should be designed in such a way that it facilitates students to use computer and
telecommunication technologies to learn research and writing skills, and that academic librarians should be competent in teaching electronic research techniques. Mclaughlin (1994) specifically addressed the issue on the changing role of academic library staff in the telecommunication era. Mclaughlin outlined new responsibilities of academic librarians including coordinating library systems and public service, participating in library administration, computing service, and campuswide information systems. Some authors described the experiences of universities in planning, developing, and implementing Internet-connected and campuswide electronic networks (e.g., Stackpole, 1993; Rivera et al., 1994; Gunning et al., 1993), and integrating electronic technologies into academic library operations (e.g., Lynch, 1989). Others looked at Internet resources and services that academic libraries can utilize such as online catalogs and access to remote sites (Klein, 1991); electronic communication, file transfer, and remote access (Sutton, 1992); the client and server model (Brandt, 1992); the impact of the Internet and NREN on academic libraries including issues related to electronic journals, collection development, and access to remote information resources and services (McClure, 1993); and the utilization of digital library facilities in some academic libraries (Kling, 1993). Electronic technologies such as library automation, networking, and electronic databases are expensive. Financial planning and budgeting are important for successful implementation. Pastine and Kacena (1994) addressed this issue.

BIBLIOGRAPHIES, DIRECTORIES, GUIDES, AND GLOSSARIES

Internet resources and services are rich in quantity and variety, yet they are often not well organized and many users have problems of locating them. The items in this category provide useful information on resources available on the Internet including a guide to library and related computer hardware and software suppliers and services (Brandt, 1992); a guide to sources on the Internet (Descy, 1993); a guide to mailing lists, bulletin boards, and curriculum development programs for education (Kongshem, 1994); a guide to the books written on the Internet (Tuss, 1994); a guide to basic Internet commands for FTP, scanning, and retrieving existing files (Tuss, 1993); and the Internet Yellow Pages, which is a directory of Internet resources by subject (Hahn & Stout, 1994). Machovec (1993) provided a two-volume Internet and NREN glossary. Shieh (1994) compiled a bibliography providing legal information on the Internet. Gabbard (1994) annotated a bibliography on hypermedia tools on the Internet. These items are valuable in providing access to Internet information.
COLLECTION DEVELOPMENT AND RESOURCE SHARING

One of the important advantages of networking is that it enables users to share resources and services and reduce unit costs. Given budget cuts and rising prices of library materials, many libraries have taken advantage of this on the Internet. The literature reflects this trend. For example, Dell and Henry (1993) described the cooperation between two Pennsylvania State University libraries in cutting costs by reducing the number of periodicals subscribed and by using Ariel on the Internet for document delivery; Von Wahlde (1993) discussed joint library efforts for collection development and resources sharing among a number of State University of New York campuses; and Stein (1992) examined reducing costs by using the Internet as a tool to identify core periodical titles in fashion and apparel merchandising. An extreme example (Widdicombe, 1993) is the Stevens Institute Library where there were no periodical titles on the shelves. Faculty and students searched journal databases and used delivery services such as CARL and FirstSearch via the Internet or place orders through the library. The expenditures on the subscription of periodicals were used to acquire and deliver periodicals. These experiences are useful for libraries intending to follow the model.

COMMUNITY, COMMUNITY NETWORKS, AND COMMUNITY SERVICES

As the Internet becomes increasingly popular, and more and more information and services are available on the Internet, the demand for the use of the Internet from the general public increases dramatically. The articles in this category address the issues related to the community-based electronic networks. Many believed that the Internet should not be limited to academic and research use and that the Internet should be free to the public (e.g., Grundner, 1992). In fact, many universities, public libraries, local government, schools, and other local services have started helping their communities build community-based electronic networks. Jordan and Brintle (1993) described the proposed Public Communication System being developed at the University of Wisconsin and University of Iowa. The system was designed to provide public access to Internet/NREN. Siever (1993) discussed the Free-Net in Cleveland which was run by Case Western Reserve University and volunteers and provided free access to the Internet, the university's online catalog, government documents, and educational resources for school children. Walsh (1993) looked at the development of the National Capital Area Public Access Network by local governments, public libraries, schools, and other social services. The literature on this topic will continue to
grow as more and more communities start building their local electronic networks.

COMMUNITY COLLEGES

Unlike large universities which have more financial resources and can afford to provide updated computer and telecommunication technologies, community colleges have more financial constraints. But like everyone else, they want to utilize telecommunication technologies. A few articles discussed the impact of the National Information Infrastructure on community colleges (e.g., Bigelow, 1993) and some alternatives that can be used by community colleges to keep up with educational technology while reducing costs (Connet, 1992). These alternatives include cooperation with business and industry and the use of the Internet.

ELECTRONIC PUBLISHING, DOCUMENT DELIVERY, AND INTERLIBRARY LOAN

One of the salient advantages of using the Internet is the efficient (and free in many cases) publication and delivery of documents over the Internet. A large number of articles have been written on this subject. Topics include commercial information service and delivery on the Internet; electronic journals; various databases; publication catalogs; scholarly publishing on the national networks; electronic document delivery over the Internet using Ariel, which operates with high speed and low costs; digital document transmission on the Internet, using FTP as an electronic publishing system; full-text online delivery on the Internet; electronic ordering; interlibrary loan processing; electronic publishing of professional articles; and transmitting images over the Internet. The drawbacks of electronic publishing are that electronic documents can be easily changed, edited, and even plagiarized.

GLOBAL AND INTERNATIONAL NETWORKING

This category provides information on how other countries utilize network technologies and Internet resources and services to facilitate their library and information services. It is important to be aware of how other countries use Internet resources and services for their library services because understanding others provides better insight and evaluation of our own technologies. As the world economy and education continues to move toward globalization, the international demand for the Internet will continue to increase, and the Internet will eventually become a true global network. The articles in this category describe electronic networks, the use of the Internet, and information services on the
Internet in many countries including Sweden (Ardo & Koch, 1993; Basch, 1993; Oswald, 1990); Canada (Beaumont et al., 1993; Moore, 1991); the Czech Republic (Bicova, 1994); Hong Kong (Cheng & Ho, 1992); Britain (Foster, 1993; Gartner, 1993); Australia (Luce, 1991); Russian and other Commonwealth of Independent States, and East European Studies Information Networks (Schoenbrun, 1993; Markiw, 1992); Hungary (Nagy et al., 1992); developing countries (Ochs, 1991; Young, 1994); Chile (Ruth & Gouet, 1993); the Asia-Pacific region and Japan (Palmer, 1992). While the overall trend is that almost all the countries under review are trying to utilize services and catch up with the world telecommunication networking movement, there is an uneven pattern of using the global network among librarians in different countries (Brown, 1994). Developing countries do not have sufficient infrastructure to utilize telecommunication technologies. Some question whether or not the Internet can be a truly global information infrastructure (e.g., Ahrens, 1993).

GOVERNMENT INFORMATION

The U.S. government has made tremendous efforts in the provision and dissemination of government information on the Internet. Many articles have been written on access to U.S. government information on the Internet (e.g., Bradley, 1993); disseminating U.S. government information (e.g., Kovacs, 1991); government information sources on the Internet (e.g., Gumprecht, 1994); tools to access and locate government information on the Internet such as electronic bulletin boards (Pattwell, 1994; Rogers, 1993); information locator (McClure et al., 1992); and government policies toward electronic information resources (Hernon & McClure, 1993). These articles provide useful guides to obtain government information on the Internet.

GOVERNMENT'S ROLE, POLICIES, AND NATIONAL INFORMATION INFRASTRUCTURE

Many articles have been written on this topic. The discussion revolves on the development of a National Information Infrastructure (NII) such as the National Research and Education Network and government policies (e.g., Corbin, 1991; Bishop, 1991; Gould, 1990; Heath, 1993; Kapor & Weitzner, 1993; Roberts, 1994; and Weingarten, 1993). A number of hearings before the Subcommittee on Science of the Committee on Science, Space, and Technology, U.S. House of Representatives, and the High-Performance Act of 1991 reflect the government's efforts in, and commitment to, developing the NII. While many authors were con-
cerned about the development of the National Information Infrastructure, some looked at its impact on libraries (Mitchell & Saunders, 1993); the impact on library automation (Kibirige, 1991); and the impact on academic and public libraries (McClure et al., 1992). Kibirige specifically argued that to fully utilize a national telecommunication network, library systems must be compatible with larger networks, and librarians must be technically competent in computer networks in order to improve and maintain the network and be aware of legal issues involving copyright and privacy.

INTERNET RESOURCES AND SERVICES, ACCESS, TOOLS, AND MISCELLANEOUS TOPICS

A large portion of the literature on the Internet and library and information services addresses issues related to Internet resources and services, access, and tools and covers a wide range of topics including e-mail, telnet, Hytelnet, FTP, Archie, Gopher, World Wide Web, Wide Area Information Service, Mosaic, Internet discussion groups, bulletin boards, electronic serials, electronic conferencing, hypermedia, online catalogs, virtual library, electronic library, access information on the Internet, various databases available on the Internet, network interface, digital image, and listservs. While these items provide rich information on Internet resources and services, many of the discussions are descriptive and repetitive.

INTERNET TRAINING

As the number of Internet users increases and more computer and telecommunication technologies are integrated into library operations, the need for Internet training for various users also rises. The articles in this category reflect this trend. Topics include workshops and instructional programs developed for teaching users (Clement, 1994; Foster et al., 1993; Kalin, 1994; Kosmin, 1992; Lippert, 1994); Internet courses for undergraduate students (Rockman, 1993); Internet training for graduate students (Schmidt, 1993); Internet seminars for library users and staff (Silva & Cartwright, 1993); and Internet training for faculty (Pastine, 1993). Some authors suggested integrating graduate-level telecommunication and Internet courses into library science curriculum (Birmingham, 1994; Kochtanek, 1993; Lefelhocz, 1993). The rapid advancement of the Internet in particular and telecommunication technologies in general will continue to challenge library and information science educators to train and educate future library and information science professionals and the general public.
LEGAL, ETHICAL, AND SECURITY ISSUES

Various legal issues arise with the development and the use of the Internet. They not only challenge the current legal system, but also challenge the traditional ways of doing things. The articles in this category addressed the issues of copyright, data protection, electronic publishing (e.g., Eisenschitz, 1994); privacy, ethics, navigation problems (e.g., Miller, 1994); tort liability, free speech on the Internet, equal access to information (e.g., Perritt, 1992); intellectual property and support for commercial and noncommercial information providers (Peters, 1994); safeguarding data transmission, security architecture and programs (Ramaswamy, 1990); and Internet etiquette and ethics (e.g., Szofran, 1994).

ONLINE PUBLIC ACCESS CATALOGS

Computer and telecommunication technologies have a great impact on information access and information retrieval. Online Public Access Catalogs (OPACs) enable libraries in different locations to share library resources and services, reduce unit costs, and provide better services. Some articles in this category deal with various ways of accessing OPACs via the Internet including remote access to OPACs and direct access to bibliographic records of other libraries through shared electronic networks (Sloan, 1991); using OCLC to supplement RLIN searching via the Internet (LeBlanc, 1993); examining textual information accessible via remote access through the Internet and the problems related to creating MARC records using USMARC format and AACR2 for computer files (Dillon et al., 1993); user instruction for access to online catalogs and the design of catalogs for the future (Engel, 1991); and collaboration between universities in developing online catalog programs (Kiegel & Schellinger, 1993). Lynch (1989, 1992) presented the experiences of developing the MELVYL Online Union Catalog at the University of California. Burrows (1993) reviewed the past cataloging practices in Australia and discussed bibliographic integration into the Internet in both academic and non-academic libraries in the future. Some authors (e.g., Lampela, 1993) examined library catalogs on the Internet in different regions and countries and looked at the differences among these online catalogs in terms of languages used for retrieval, contents, and other variables that affect the quality of information retrieval. These studies are very useful in improving quality of access to OPACs.

PRIVATIZATION AND COMMERCIALIZATION

As the Internet continues to expand in scope and complexity, more and more computer and telecommunication technologies are being integrated into the Internet, and the demand for the use of the Internet
continues to increase, the government has increasing problems of handling the Internet financially and technologically. Private companies are eager to get involved with building the National Information Infrastructure and therefore take control of it. Academic institutions and libraries, on the other hand, want Internet resources and services to be free. The debate over privatization and commercialization of the Internet is reflected by the articles in this category. For example, some believed that the U.S. government should have control over the public resources on the network and the public interest must be secured (e.g., Cook, 1993). Others argued for the involvement of private sectors in providing technical and financial support for expanding the Internet and NREN (e.g., Eldred & McGill, 1992), and in government information distribution (Ebersole, 1994).

PUBLIC LIBRARIES

Compared with academic libraries and special libraries, public libraries in general are lagging behind in terms of using Internet resources and services. Many public libraries simply do not have the technical, financial, and human resources necessary to provide such services. Some public libraries are concerned about their future in utilizing resources on the national network and have managed to get on the net. The articles in this category address experiences, problems, and issues related to the use of the Internet by public libraries.

REFERENCE SERVICES

Information on the Internet increases every day. Many librarians use Internet information for their work. A number of articles have been written specifically on how librarians can use Internet resources and services for reference service. Topics in this category cover the new role of librarians in locating Internet resources; Internet mailing lists such as BUSLIB-L, MEDLIB-L, LIBREF-L, and STUMPERS-L where difficult reference questions can be discussed among a group of librarians; ready reference through the Internet and its limitations and costs; holding contests on the Internet to answer reference questions on various subjects; and integrating the Internet as part of reference service.

RESEARCH AND DEVELOPMENT

Many articles in this category are technically oriented. Some of them are Ph.D. dissertations in computer and information science and deal with the technical aspect of networks. Automation or system librarians may find them interesting and useful. Given the trend that computer and telecommunication technologies are increasingly being integrated
into library operations, this type of publication has become an important part of the literature and cannot be ignored.

Compared with the articles written in other topical categories which are descriptive in nature, some articles, particularly some of the Ph.D. dissertations in this category have made original contributions to the understanding of the subject under investigation. This kind of research has theoretical assumptions, solid methodologies, and original data collection. Topics discussed include cyberspace (Bauwens, 1994), virtual communities (Braddlee, 1993), the Internet Architecture Board (Chapin, 1992), digital library and Internet packet telephony (Foster, 1991), Internet management (Ghatak, 1992), interface for information retrieval (Gillespie, 1991), generic file transfer (Lee, 1993), diffusion of information technology (Lin, 1993), and congestion control (Yeh, 1992).

SCHOOLS, SCHOOL LIBRARIANSHIP, AND SCHOOL MEDIA SPECIALISTS

Computer and telecommunication technologies not only have a great impact on businesses, industries, and academic institutions but also have a great impact on schools and school libraries. Many articles have been written on this subject and cover a wide range of issues related to Internet resources and services available for schools, school libraries, and school media specialists including Internet access, services, ERIC on the Internet, resources provided by the Department of Education, textbooks, fiction, and videos; concepts of virtual library and cyberspace with an emphasis on school media applications; KIDLINK, an electronic communication system via the Internet for teenagers in more than two dozen countries; legal issues related to using Internet materials by school students; policies for future internetworked schools; advantages of connecting schools to the national networks; arguments against current format of education and for learning in cyberspace, and the role of school librarians in helping students utilize Internet resources and tools.

SPECIAL LIBRARIES

A small number of articles covered how special libraries can make use of Internet resources and services, and Internet tools such as e-mail, electronic conferencing, and FTP (Tillman & Ladner, 1992); and the use of these resources for collection development and training clients (D'Elmaine, 1993). A survey indicates that more than ninety percent of special library librarians surveyed use the Internet for e-mail (Ladner & Tillman, 1992).

Some articles discussed Internet resources and services related to medical and health science. Topics covered include urging medical li-
Libraries to take advantage of electronic document delivery and transfers (Borsmann, 1994); online databases and services such as MEDLARS Search Service, MEDLINE, and PDQ provided by the National Library of Medicine (Chiang, 1994); the MEDLINE Retriever (Fowler et al., 1993); GenBank database accessible via the Internet (Harzbecker, 1993; Pratt, 1991); the development of electronic medical networks such as SUNY biomedical network, MEDLARS, and SateLife systems (Myers, 1993); LIFENET/Internet (Weinstein, 1994); and the role of the National Center for Biotechnology Information and its databases (Woodsmall & Benson, 1993).

A few authors discussed the Internet and law libraries including using e-mail, listservs, telnet, FTP, Archie, and Gopher to share resources (Marshall, 1992) and using the Internet to access government information (Edmonds, 1993).

The issue of Internet and business resources is also addressed by a number of articles including the use of Internet resources and services for marketing, trading and other business activities (Cronin & Rosenbaum, 1994; Maloff, 1992); and accessing information on European Community, United Nations, and U.S. government through Gophers, bulletin boards, TECnet, and LC MARVEL (Cronin, 1993). Compared with the amount of business information available on the Internet, the size of the literature of this category is very small.

STANDARDS AND PROTOCOLS

The Internet is a network of networks. Thousands of connecting networks form the Internet. Not every network is the same as others. To be able to talk to each other, each network must use certain types of protocols and must follow certain standards. A protocol is a set of rules and procedures governing the timing and format of data transmission between two networks. Standards are mutually agreed upon principles or protocols. The articles in this category addressed the issues related to some network protocols and standards including Z39.50, a standard communication protocol; OSI and TCP/IP; and their operating environment, functions, and library applications. Although these articles are of primary interest to automation and system librarians, they may be helpful for general librarians as well.

WOMEN, MINORITY, THE DISABLED, AND EQUALITY

Social scientists, such as economists, educationalists, sociologists, and political scientists, are often interested in social equity issues. They look at how the social, economic, and educational backgrounds of certain social groups are correlated with their educational opportunities and
social and economic achievements. It is interesting and encouraging that some scholars are aware of these issues and have started examining the impact of computer and telecommunication technology on various social groups. For example, Baldwin (1992) discussed the impact of the development of electronic networking on policies toward American Indian education and reservation and tribal electronic communication development. Behrman (1994) raised the issue of equal access to the Internet by the poor and minors within the public library context. Lane (1993) addressed issues related to information on disability and described the efforts made by the Disability Internet Librarians Group to help librarians to be aware of disability issues. Glass (1993) provided a guide to information on Internet resources related to women and women's studies. Kuntz (1994) introduced four electronic networks related to African studies in the United States. Slater (1994) observes that there is a big gap between blacks and whites in the information society. Blacks lack capital possession and information technology education, and therefore they lack participation in utilizing electronic information. He argues that the technology disparity between blacks and whites starts even before formal education and continues through the school years.

While the existing knowledge of the impact of education on women, people with disabilities, the poor, and various racial and ethnic groups in terms of access, process, and outcome is substantial, our understanding of the impact of information technology on these groups in terms of their access to information technology and participation in utilizing electronic information services is very limited. More research needs to be done to investigate the impact of information technology on these groups and explore to what extent various social groups participate in using electronically networked library and information services.

SUMMARY AND CONCLUSION

The literature on the Internet and library and information services has emerged since 1990 and is rich in both quantity and variety. It covers a wide range of issues related to the use of Internet resources and services in the context of various kinds of libraries. However, many articles are descriptive and lack theoretical assumptions, valid methodologies, original data collection, or in-depth analyses. Many articles are repetitive. For example, a large number of articles discuss Internet tools such as e-mail, bulletin boards, and FTP but add little original insight. Some articles are duplicative. For example, a few articles have been published in different journals twice (with a little modification, perhaps).

To a certain extent, it is understandable that many of the articles are descriptive since library and information science is a practical field and the literature is still in its infancy. The descriptions of practical experi-
rences are important because they provide successful and unsuccessful lessons as examples for others. But future research should take one step further and move in a more analytical direction.

Overall, this body of literature certainly contributes to our understanding of the impact of computer and telecommunication technologies on various library and information services.
Academic Libraries and Scholarly Research


2. Bazillion, Richard J., & Braun, Connie. (1994). Academic library design: Building a 'teaching instrument'. *Computers in Libraries, 14*(2), 12-16. Argues that the development of computer and information technologies, such as networked online catalogs and CD-ROMs, have a great impact on library building design and the traditional role of academic librarians. Suggests that the library is designed in such a way that it enables students to learn research and writing skills by utilizing various electronic information systems, and that librarians should be competent in teaching electronic research techniques.

3. Brandt, D. Scott. (1992). The library in academic computing. *Academic Computing, 9*(7), 18-20. Discusses internetworks and the client and server model which is believed to facilitate research on searching remote servers. Presents the principles of indexing and their importance in utilizing Internet resources and services.

4. Gunning, Kathleen; Myers, Judith E.; & Bailey, Charles W., Jr. (1993). Networked electronic information systems at the University of Houston libraries: The IRIS project and beyond. *Library Hi Tech, 11*(4), 49-55. Presents the Intelligent Reference Information System (IRIS) project at the University of Houston Libraries started in 1989. This project was developed to network ten workstations with access to nineteen CD-ROM databases. In 1992, the IRIS network infrastructure was replaced by a new network with more workstations connected and with remote access to CD-ROMs and OPACs on the Internet.

5. Klein, W. (1991, March). Operations and management of a campus packet network. *IEEE Network*, 16-23. Discusses the networking experiences at the University of Kansas covering connecting the Internet through NSFNET and the information services provided through these networks for students such as library online catalogs and remote site access.

Presents the Digital Library Use (DLU) project developed at UC Irvine. The project evaluates the worth of digital libraries to various groups by looking at how digital library facilities in some academic libraries are utilized.


Provides a guide to selecting automation systems operating in a networked system for academic libraries including issues related to the academic networking environment, library automation, user interface requirements for public access, and security and authentication.


Outlines new responsibilities of librarians in the telecommunication era and Syracuse University's practices in providing information services including coordinating library systems and public service, bibliographers, library administration, computing service; informing and explaining the new information environment to the departments they serve; and the campuswide information system.


This research project explores the effect of national electronic networks such as the Internet and NREN on academic libraries. Issues discussed include academic computing and library services, electronic journals and collection development, and access to remote information resources and services.


Reviews the Research Libraries Group including historical background, cooperation, the Research Libraries Information Network, and various services such as ARIEL, Eureka, CitaDel, and Zephyr server.


Points out that as academic libraries in the U.S. have been able to access Internet resources and services, and CD-ROM technologies have been widely used on campus LANs, library administrators should prepare and plan for incorporation of advanced electronic information technologies into libraries, organizational structural change, personnel management, user training, cooperation with other campus computer services, and hardware and facility needs.
A discussion on the financial planning aspect of library automation at Southern Methodist University such as various costs and budget requirements. Points out that, as the user demand for access to full-text, Internet, and other electronic services increases, libraries need to have clearly defined goals and detailed financial plans for such services.

Discusses fully utilizing academic computing resources by implementing local area networks in an academic environment. Issues covered include Internet resources, e-mail, hardware and software requirements, computer resources management, and licensing.

Describes the installation of two UNIX-based library systems: Scientific and Technical Information Library Automation and Cuadra STAR at the Ruth H. Hooker Research Library and Technical Information Center of the Naval Research Laboratory.

Reviews electronic networks and three commonly used applications: electronic communication, remote access, and FTP and how libraries can benefit from these applications. Also discusses problems including economic access, technological access, training and education, and participative development of the Internet.

This is a study on CD-ROMs' place in academic libraries. Questionnaire data were collected from academic libraries in the United Kingdom, United States, and Canada. The responses were positive. Another survey was conducted towards CD-ROM publishing. The responses from publishers indicate that they favor electronic publishing.

**Bibliographies, Directories, Guides, and Glossaries**

This is a comprehensive international guide to various Internet resources.

This directory covers library related computer hardware and software, supplies, services, resources, and names and addresses of vendors. The emphasis is on the Internet.

Lists and annotates thirteen sources on the Internet including books, online resources, manuals, and guides for schoolteachers.

Presents a bibliography and the recent trends of the development of the hypertext/hypermedia literature including the growth of hypertext/hypermedia tools, the Internet, and the World Wide Web.

A comprehensive book on the Internet. Provides a directory of 600 groups and locations.

A comprehensive book on the Internet. Provides a directory of Internet resources.

A comprehensive guide. Lists Internet services and resources by subject. Provides information on e-mail addresses and login words.

Reviews library automation literature in recent years including journal articles, conference papers, books, and manuals. Lists a number of topics discussed such as the Internet, NREN, interfaces, outline catalogs, and CD-ROMs.

This guide provides Internet access to the University of Georgia's library catalog including commands for accessing the Internet, search guide for the NOTIS online catalog and lists, the Colorado Alliance of Research Libraries network (CARL), and the University of California System (MELVYL).


28. Machovec, George S. (1993). Brief Internet and NREN glossary: Part II (M-Z). *Online Libraries and Microcomputer, 11*(6-7), 1-4. Provides the second part of a selected glossary of terms on the Internet and the National Research and Education Network including terminology related to networks, user interfaces, protocols, various organizations, acronyms, and WAIS.


30. Tuss, Joan. (1993). Easy online access to helpful Internet guides. *Online, 17*(5), 60-64. Provides a list of electronic guides to the Internet and basic commands for using FTP, scanning, retrieving, and exiting files.


**Business Resources**


33. Cronin, Mary J. (1993). Internet business resources. *Database, 16*(6), 47-52. Examines a number of Internet services that focus on providing information on The European Community, United Nations, and U.S. Government including gophers, bulletin boards, TECnet, and LC MARVEL.
Focuses on issues of using Internet as a marketing tool to promote sales and business services and the knowledge and skills needed to find client needs and market niches.

**Collection Development and Resource Sharing**

Presents the interview results from the staff of the Library of Congress. Discussions include policies toward collection development and preservation, databases and connection to the Internet, and other issues. The staff believe that the future of the Library of Congress will be a library without walls.

Presents the cooperation between two Pennsylvania State University Libraries—the Life Sciences Library and the George T. Harrell Library—in cutting costs by reducing the number of periodical subscriptions by using Ariel on the Internet for document delivery.

Discusses issues related to resource sharing including access, navigation methods, and ISDN based on experiences of Illinet.

Argues that given the budget cuts and mounting costs faced by many libraries, there is a need to develop a new tool to identify the core titles for periodical collection development in fashion and apparel merchandising. Describes the study conducted at the Delaware University Library which evaluated periodical collections of eight university libraries, and the outcome of the study including how to identify a serviceable core list of periodicals.

Examines the effect of internetworking on research-oriented academic libraries with a focus on collection development and resources sharing. Briefly traces the history of some networks including the Internet, NREN, and NSFNet and discusses the future development of electronic libraries.

Discusses collection development with a focus on electronically-delivered information at Troy State University in Alabama, the effective use of both printed and electronic indexes, and the criteria used in selecting electronic sources including documents with potential for full-text delivery. The sources may be transmitted via the Internet, have broad coverage, and be easy to use.


Presents a description of joint library efforts for collection development and resource sharing among a number of State University of New York campuses including Albany, Binghamton, and Stony Brook. Discusses the PAClink project which improves access Internet search and advantages of using it and the implications for publishers and library vendors.


Describes an interesting experiment at the Stevens Institute Library where there are almost no periodical titles on the shelves. Faculty and students search journal databases and use delivery services such as CARL and FirstSearch via the Internet or put orders through the library. The expenditures used for periodical subscriptions are now spent on periodical acquisition and delivery. Concludes that this is a better way to provide better service.

Community, Community Networks, and Community Services


Argues that the Internet should not be solely for academic and research use, and that the Internet should be free to the public.


Describes the proposed Public Communication System being developed at the University of Wisconsin and University of Iowa. The system is designed to provide coalition-based nonprofit public access to the Internet/NREN. Also discusses benefits to the public, financial support, and potential for success.


Looks at trends toward providing online community information services in recent years and current online services available for the public covering e-mail,
bulletin boards, health care program, and meeting places. Illustrates the Cleveland FreeNet, the National Public Telecomputing Network, and other online community systems via the Internet.


Presents Free-Net Cleveland, which is run by Case Western Reserve University and volunteers, and which provides free access to the Internet, the university's online catalog, government documents, and educational resources for schoolchildren. The net also strengthens faculty and student interaction.


Describes the efforts made by the Texas Education Agency in creating TENET, an electronic network which enables members of public education to communicate with each other electronically and connecting it to other networks including the Internet.


Traces the growth of free online information services and addresses the needs of communities with an emphasis on CapAccess in the Washington D.C. area including volunteering joint efforts by local governments, public libraries, schools, and other social services.


Outlines a proposed community-based electronic network which provides information services to a town in Virginia. Discusses possible use of the network by business, educational institutions, and other professional groups in the local area.

Community Colleges


This is a survey conducted by the New Technologies Committee of the Community and Junior College Library Section (CJCLS) on expanding CJCLS's membership directory to include e-mail addresses on the Internet. Reports the design and results of the survey.

Discusses the development of the National Information Infrastructure (NII) and current debates over NII such as commercialization and privatization and the possible impact of technological advancement and political decisions on community colleges.


Provides some alternatives that can be used by community colleges to keep up with educational technology while reducing costs including cooperation with business and industry and the use of the Internet.

**Electronic Publishing, Document Delivery, and Interlibrary Loan**


Meckler Publishing has been very active in electronic publishing on the Internet. Its services on the Internet include publications catalogs, electronic journals, and various databases. This paper discusses these activities and addresses issues related to commercial publishing on the Internet such as bibliographic control, pricing, document delivery, and intellectual property and copyright.


Looks at how electronic networks affect scholarly publishing covering issues related to the Internet; electronic documents; electronic publishing; and the social, economic, and legal environment.


Presents the fact that an article in the November-December 1993 issue of the *Journal of Geography* was the first electronically submitted article. Argues that electronic communication is more efficient and urges researchers to submit their manuscripts via e-mail.


Compares the strengths and weaknesses of the high speed fax network and Ariel program on the Internet in document delivery among the health sciences libraries consortium's thirteen institutions in Pennsylvania and Delaware. Concludes that the fax network is costly and difficult to operate and that the Ariel program on the Internet operates with higher speed and lower cost.

Describes the joint efforts among the North Carolina State University (NCSU), the National Agricultural Library, and other land grant university libraries in developing the NCSU Digitized Document Transmission Project which deals with document delivery issues on the Internet.


This paper introduces the use of e-mail in delivering DIALOG online search results. Issues covered include costs and savings and advantages and disadvantages of e-mail delivery.


Discusses the process of document delivery by a corporate library using a Macintosh and the Internet.


Presents Ariel which combines microcomputers, laser printers, scanners, and networks for the purpose of transmitting documents via the Internet.


Describes three electronic document delivery programs—Ariel, digitized document transmission project, and network fax project. These programs are compared and evaluated in terms of operation, potential, and strengths and weaknesses.


Discusses using FTP as an electronic publishing system, various electronic formats of text files, and problems involved, including a lack of consistency.


Lists hardware and software needed to convert OCLC M386 into an interlibrary loan workstation including connection to the Internet.

Focuses on full-text file transfer via the Internet including the use of single interface connectivity to access information on multiple servers.

While the author is not quite sure about the potential for electronic information delivery and the future outcome of continuous expansion of the Internet and the National Research and Education Network (NREN), the author argues that libraries will be an important integrated part of electronic information networks and reviews the functions of the library.

Presents the issues on network navigation of the Internet discussed in the Spring 1992 meeting of the Coalition Task Force for Networked Information including the future digital library, information service delivery, and National Research and Education Network.

Examines the trends that have an impact on traditional interlibrary loan and document delivery. These trends include the use of the Internet, fax technology, increasing costs, indexing services, and integrated library systems with patron-initiated services. Provides examples of new document delivery systems.

Presents online ordering practice via the Internet using Georgetown University Library's B.H. Blackwell's New Titles Online database including the description of accessing, searching, and ordering activities.

Introduces the technical features of the Ariel software program, which can be used for document delivery on the Internet. Describes the use of Ariel in Scandinavian countries for interloans. Notices the advantages of Ariel over FAX in document delivery.

Presents a study on how users at the Rochester Institute of Technology utilized a computer system that enabled them to search both the campus library's catalog and remote online catalog databases via the Internet. The data collected
from 1,891 interlibrary loan requests were analyzed. The effect of this technology on interlibrary loan was discussed.


Discusses network knowledge acquisition and dissemination; difficulties in exchanging knowledge in electronic form; requirements for acquisition, dissemination, and management of knowledge; and mediation of knowledge acquisition and dissemination through the Internet.


Points out the problems associated with the high volume of papers used in communications. Suggests the use of electronic media and discusses the technical, social, and economic impact of this change on libraries.


Lists what the Internet can do for interlibrary loan librarians including locating obscure materials; providing a forum for discussion on problems and relevant issues; and seeking consultation from vendors.


Outlines papers presented at the 1989 program session of the Library of Congress Network Advisory Committee with a focus on the impact of newer technologies and electronic networks on document delivery and information services. Topics include trends in document delivery services, experience of the National Library of Medicine, document delivery systems at the University of California, and image transmission via the Internet.


Examines the effect of electronic publishing of scholarly works on academic and research communication. Surveys scholars and researchers in three countries: Australia, the United Kingdom, and the United States investigating publishing through various electronic channels such as the Internet, commercial databases, and other networks. Electronic publishing tends to be viewed as a way of improving efficiency.

Colorado State University Library has installed an interlibrary loan program on the university's mainframe computer through which faculty and staff can order interlibrary items via the Internet. The electronic interlibrary loan program is menu-driven and easy to use.


Presents the practices that integrate image and electronic information into telenetworks for document delivery including the Network Fax Project, Digitized Document Transmission Project, and Ariel.

**Global and International Networking**


Argues that the Internet cannot be a global information infrastructure for various kinds of users based on a case study using two Internet directories and four Internet interface services including Gopher, Archie, WWW, and WAIS and a number of criteria such as capability of sharing information and common interface; that Internet organization needs to be reformed. Provides a number of suggestions.


Presents the creation of Internet resources and services at Lund University's library in Sweden including a Gopher server for local information; classifying information on the Internet by subject, location, and type; and creating and using hypertext links.


Describes the telenetworks in Sweden including SUNET, NORDUNET, and LIBRIS (the Royal Library network), and their connections to the Internet. Provides quantitative data on the number of computers, network users, and some other characteristics of the Swedish networks.


Discusses Canadian experiences in network resource sharing and issues related to choosing appropriate network protocols.
Introduces one of the largest telecommunication networks in the Czech Republic: The Prague School of Economics network and information services available on the network including business information, library information, CD-ROM databases, and access to the Internet.

Notices the increasing global use of the Internet. Looks at the statistics on the participation of librarians in the Internet worldwide. Finds that there is an uneven pattern of the participation of librarians in the use of the global network among countries.

Outlines the development of library automation at the Hong Kong Polytechnic Library from the initial steps and ongoing process to future plans covering network access, a commercial turnkey system, implementation modules, a PC-based Chinese and English retrieval system, imaging, CD-ROM, and Internet connections.

Investigates the U.S. information market from the perspective of the Netherlands Council for Libraries and Information Services. Issues discussed include training the end-user, new infrastructure, improving access, document delivery, and new markets.

Describes the installation of a computer local area network at the Manchester Business School library, which is connected to the school's mainframe and enables users to utilize resources on the network including CD-ROM databases.

Describes Ariel, an electronic document supply and transfer system. Given the fact that the United Kingdom lacks a cooperative network infrastructure which is crucial to utilize SuperJANET Academic Network, Ariel is considered as an alternative for cooperation between Eastern and Western European libraries.

Discusses SALBIN, a PC software at Oxford University's Library, which was
designed to access Internet resources and make them available to users. Installation of the software on microcomputers in the library and getting the program from the Internet using FTP are included.


Presents the survey results from the use of the French Minitel videotex system in libraries and issues related to government's role, and social, political, cultural, and economic factors.


Examines the development of resource sharing networks in Australia including the Australian Bibliographic Network, CLANN and CAVAL, MARC records, CD-ROM, LANs, and AARNET (Australian Academic and Research Network).


Describes information resources on former Soviet Union and East European studies which are accessible via electronic networks such as BITNET. Provides information on access, online library catalogs, electronic databases, discussion groups, electronic journals, and e-mail.


Illustrates a number of ways Canadian libraries utilize CA*NET resources and services (CA*NET is the local name for the Internet in Canada).


Describes the development of the Hungarian Information Infrastructure Development Project started in 1986. Discusses online databases available on the network; connectivity to the Internet and other local networks; e-mail and library systems; and organizing bodies of the project.


Australian Academic Research Network provides researchers access to electronic journals on the Internet. This paper addresses issues including the nature of electronic journals, the ways of accessing them, how reference
librarians can make use of electronic journals, and the impact of electronic journals on the library.

Describes a United Kingdom library bulletin board including its development, access, protocol, and services.

Reviews the development of the Internet with a focus on AARNet. Discusses the role of Australian libraries in the AARNet development both as users and contributors.

Discusses electronic document delivery via the Internet using technologies including fax and optical scanning and the problems of using these technologies in developing countries.

Describes the advantages of using the Internet tools such as Gopher and WAIS by Lund University Electronic Library in Sweden, and problems associated with maintaining the service such as shortages of personnel and financial resources.

Reviews the discussion on the Internet on INET'92 conference held in Kobe, Japan, including networks and social change, network applications in the Asia-Pacific region, and Japan.

Examines variables related to users who use computer and electronic communication systems with a focus on the scientific community in Chile including users' educational level, age, gender, productivity, and issues related to public policies and global networking.

Discusses information access to Russia and other Commonwealth of Independent States members including the English language database,
Internet resources and services, bulletin boards, e-mail, and information on how to get connected.


Presents JANET, a British academic network which connects over 100 academic institutions and the role of libraries in providing information services.


Describes the development of the Internet and a library science database on the Internet made available by the Royal Library in the Netherlands.


Discusses a Toronto-based e-mail network which connects EcoNet and the Internet. The network promotes discussions on the issues related to the environment, society, and peace worldwide.


Provides a background discussion on data networking in the United States, the Pacific region, and Europe. Focuses on issues related to Europe's networking including the current status of networks in Europe, disciplinary networks, the European Internet, and various barriers to the networking development. Also provides recommendations.


**Government Information**


Presents U.S. Government information resources and services available on the Internet including the White House Electronic Publishing Program, the Library of Congress, and the Supreme Court, FEDIX, and ways to access and retrieve them.

Praises the efforts by a number of federal government agencies in popularizing information technology including CD-ROM, electronic bulletin board, and data and voice transmission, and in disseminating government information.


113. Pattwell, Paul D. (1994). An electronic bulletin board for sharing government documents information. *Journal of Government Information, 21*(2), 139-147. Discusses the use of bulletin board systems by New Jersey federal depository libraries; the services via PALINET providing options for the use of e-mail or bulletin board; experiences in using the system and topics related to providing the service through the Internet by the USGPO.

Presents the fact that to accelerate government information dissemination, the Economic Bulletin Board of the Commerce Department has been connected to the Internet. Issues covered include financial and operational constraints, marketing, technical considerations, and network services.

**Government's Role, Policies, and National Information Infrastructure**


This report presents federal government's policies toward information education, information infrastructure, access, competition, costs, intellectual property, and ownership.


In response to The National Information Infrastructure: Agenda for Action by the Clinton Administration, a number of information professionals gathered for the purpose of addressing issues related to the national goals and policy toward the development of the National Information Infrastructure (NII). The topics included the relationship between commercial and public interest, information structure and national economy, information and democracy, competition among telecommunication companies, NII and universal service, information policy, network standards, intellectual property, and corporation and public networks.


Identifies rationales for using internetworked communications including: to promote excellence in education, improve teaching and learning, connect schools to society, enhance productivity and lifelong learning, and problems including lack of technical support, lack of teacher preparation, and limited access to information. Provides recommendations.


Advanced electronic networks were initially used by scientists. In recent years, they have been used widely by various groups including businesses, schools, hospitals, artists, and people in various fields. The current national information policy is to develop information superhighways using faster and high-capacity transmission media. This background paper addresses these issues including
broadband network technology, the Internet/National Research and Education Network (NREN), testbed research, and gigabit research.


The High-Performance Computing Act of 1991 enables the Internet to continue to expand and improve. Reports the federal policies and issues related to the NREN. Discusses important features of the Federal Government's plans for developing the NREN. Observes that the government tends to improve national productivity, competitiveness, and scientific technologies. Concludes that some technology trends may have an impact on networking.


Attempts to clarify misunderstandings of the government's role in the Internet by looking at the cooperation between the government and the private sector in building the net in the past. Discusses issues related to future development of electronic information technology, equality of access, and shared risk.


Describes the efforts made by Vice President Al Gore in developing the National Research and Education Network with a focus on the Internet and BINET.


Discusses the Internet, a scientific and academic research network, libraries' role in the Internet, advanced network services, and economic issues of the Internet such as public good and external economy.


Discusses the future of civic networking which relies on the National Information Infrastructure including issues related to policy toward public communications, public services, education, and health care.


Reviews the evolution of national computer networks and points out the need for the National Research and Education Network (NREN). Discusses a number of networks including ARAPNET, Internet, BITNET, NSFNET, and various issues related to government policies, technological requirements, and legislative status.
Outlines the plans to integrate the Internet into the National Research and Education Network and the role of the National Science Foundation and the Federal Research Internet Coordinating Committee, and the future development of the national network.

Discusses issues related to the development of a national infrastructure and Coalition for Networked Information including the role of government and private sectors; the relationship between NSFNet and NREN; between NSFNet and the Internet; and copyrights.

 Presents the hearing which aimed to obtain opinions from network users and information providers on the goals of the National Science Foundation's Network (NSFNET), to examine how the development of NSFNET meets the goals of the National Research and Education Network set by the High Performance Computing Act, and to further the development of the national electronic network to benefit education, manufacturing technologies, medical imaging, and data storage standards.

The future development of libraries is made possible by the development of a network infrastructure including LANs, the Internet, and the X.25 packet network. Discusses OCLC's involvement in the telecommunications linking program, the gateway projects, and the Internet.

The use of the Internet creates an environment in which public information dissemination and government documentation will become an important part of the development of electronic networks. The author argues that these factors will diminish the distinction between information dissemination and access to information under the Freedom of Information Act.

Traces the development of broadband ISDN and its impact on society and international electronic communication. Topics discussed include regulation
policies, pricing, privacy, public involvement, ownership and control, and other issues.


Discusses the importance of developing a national communications and Information Infrastructure to meet short-term needs. The Electronic Frontier Foundation's Open Platform Proposal, based on ISDN (Integrated Services Digital Network) is described. Recommendations for public policy criteria for evaluating infrastructure proposals are included.


Discusses the impact of the development of national electronic communication network infrastructure on library automation in the 1990s. One of the significant improvements in telecommunication infrastructure is the transmission medium: fiber optics. According to the author, there are five important characteristics of the 1990s: the increasing roles of computer and telecommunication technologies; information; local electronic networks sharing resources; powerful computers; and global development of telenetworks. The impact of these factors on library automation is that a library system must be compatible with larger networks (redesigning or reengineering may be necessary); librarians must be technically competent in computer networks in order to improve and maintain the network; and be aware of legal issues involving copyright and privacy.


Discusses the U.S. Government's responsibilities and initiatives in developing the National Research and Education Network and the future information highway.


The Science Subcommittee focuses on the establishment of the National Research and Education Network (NREN), which will evolve from the current Internet, and the National Science Foundation's (NSF) NSFNET. Discusses policy issues including providing convenience for network services vendors, addressing user needs, effective network management, operation of the NSFNET structure, and the roles of the government and private sectors.

Reports a research project in progress funded by OCLC, Inc. and Meckler Publishing Co. The project aims to study the impact of the evolving Internet and National Research and Education Network (NREN) on academic and public libraries. Issues covered include government policies; human factors; and social, economic, and political aspects of national electronic networking.


This is the continuation of a research report in Federal Information Inventory/Locator Systems: From Burden to Benefit: Final Report (McClure et al., 1990). Aims to make better use of federal government information by identifying existing federal locators, successful factors in designing and developing a government agency locator, and discussing issues and policies regarding the development of a federal locator system and the Internet and NREN.


Traces the development of the National Research and Education Network. Examines the National Information Infrastructure and its impact on libraries. Issues discussed include increasing commercial use of the Internet, the government's role and legislation, and increasing involvement of telephone and cable TV companies.


Outlines the historical development of the Internet: from ARPANET initiated by the U.S. Department of Defense in 1969 to the DARPA (Advanced Research Projects Agency) in the 1970s, and to the current Internet.


This report covers a wide range of issues related to electronic networks including the national information infrastructure, the Internet, access to public information and government information, network policy, image and text retrieval, and government information policies.
Examines issues related to the National Information Infrastructure (NII) including the development and infrastructure of NII, the role of the federal government, the Internet, NII organization structure and policies, deregulation and privacy.

Looks at political factors that affect the Internet and NREN including political environment of the NREN, the development of electronic networks such as the Internet, the political and legal process of developing the NREN.

Summarizes the results of two seminars focusing on the availability of U.S. Government information on the Internet and attempting to identify barriers to the use of the Internet, the needs for locating information, and what federal agencies can do to solve the problems. Discusses issues related to access, training, policy, standards, management, and public versus private interests.

Holds that libraries can fully utilize the Internet potentials to provide services. Examines the role of the National Science Foundation Network and current network applications and environment. Locates some opportunities and challenges of developing global telecommunication network. Maintains that challenges can be met through institutionalized efforts.

Documents transcriptions of testimony and statements on national technology policy. Emphasizes the initiatives of the Clinton Administration to support the development of a national information infrastructure.

Argues that as the concept of the use of Internet infrastructure evolves from support for scientific research to education and library use (National Research
and Education Network), to a much broader concept (National Information Infrastructure), there is a need to establish an institution infrastructure to serve the public interest.

**Internet Resources, Services, Access, Tools, and Other Topics**


Discusses the Internet tools and resources with respect to the needs of map librarians including e-mail, telnet, FTP, Archie, Gopher, MAPS-L, Veronica, and World Wide Web.


Lists a number of online systems that provide information on environmental information including Westlaw enforcement tracking system (EDR-NPLSETS), ORBIT's TULSA and ERTH, DIALOG's PEP, and CHEMTOX. Notices that the Internet can be used by environmental professionals to communicate with government agencies, libraries, and among themselves.


One of the early articles about the Internet. Discusses how librarians can take advantage of Internet tools including e-mail, bulletin board, and file downloading.


Argues that Internet groups promote the flow of information and that many networkers benefit from the informal nature of Internet groups. Provides an example of obtaining information about the Gulf War through Internet groups.


Discusses a number of network services including USENET, a language and culture-oriented online service; MINITEL, an online service connecting some European countries such as England, Germany, Holland, and Spain; CTLINK, which provides links to other networks; and EUDORA, an Internet e-mail program for Macs.


Presents a discussion on electronic serials available on the Internet and other networks, controversial issues related to access and ownership, and the impact of electronic publishing on libraries. Also looks at the future of electronic serials.

Being aware of the coming of a new telecommunication era, the author stresses that computer-mediated communication via the Internet is an essential tool for librarians to obtain information, exchange ideas, and engage in professional development. Urges librarians to take advantage of computer conferences and electronic serials.


Describes a project involved with access to library technology in a higher education environment including Internet discussion groups, the use of hypercard, and the navigation of text and images.


Provides a list of online library catalogs of hundreds of libraries located both in the United States and other parts of the world such as Europe, Asia, and the Middle East. The instructions on how to access and search these online databases are provided for each entry.


Discusses advantages of searching online catalog databases via the Internet, problems associated with accessing and retrieving information, and efforts made by librarians at Northwestern University to overcome these difficulties including outreach programs for faculty. Calls for national efforts to improve information provision on the Internet.


Discusses the dynamic changes in information technologies and their impact on the library including changes in vendor products and services, user needs, electronic libraries, standards, and statewide networks.


Maintains that a virtual library contains transformed paper information in electronic form, which is accessible, retrievable, and transferable on electronic networks. Discusses Internet tools, services, and problems.


Presents hands-on experiences in efficiently utilizing Internet resources and services. Provides a few useful methods for librarians.

160. Brett, George H. (1992). Navigating the Internet: A beginning. *North Carolina Libraries, 50*(3), 143-146. Introduces some skills and knowledge needed in utilizing resources and services on the Internet including PC skills, e-mail knowledge, and ability to interact in a networking environment. Discusses efforts that have been made and will be made to improve Internet accessibility.


163. Brown, Christopher C. (1994). Creating automated bibliographies using Internet-accessible online library catalogs. *Database, 17*(1), 67-71. Examines some online library catalogs on the Internet, which can be used to generate bibliographies.


Recognizes the success of Gopher as a navigation tool in creating the virtual library in the United States and Belgium. Suggests close cooperation among libraries to meet the challenges of the new information era.


Presestes the fact that the British Library makes the Department of Environment/Department of Transport Library catalog available on the BLAISE-LINE and accessible worldwide via the Internet.


Presents a discussion on electronic information networks with an emphasis on accessing Internet resources and services. Issues covered include standards for accessing information on the Internet, search approaches, MARC, effective ways of locating network information, and the need for both electronic and printed directories.


Discusses tools available on the Internet for organizing files including programs of compressing files, converting files from binary to text format, file imaging, and the ways to access and download these programs.


Presents the experiences of SEMATECH librarians in using e-mail to provide information services covering issues related to the use of Dialog output options, alerts, off-site searches, no-rush searches, limitations of direct e-mail delivery, costs, addresses, storage, and useful commands.


A discussion on two bulletin boards on the Internet, some Internet resources useful for librarians, and a power supply for portable computers.


Discusses how to access Archie, the current and future information coverage by Archie, the problems associated with resource discovery, and other resource discovery and delivery services on the Internet.

Describes the usefulness of using the Research Libraries Information Network and the Online Computer Library Center for bibliographic and archival descriptions. Argues that the Internet can provide simpler and more efficient access to archival descriptive databases and tools.

Provides a description of NASA Access Mechanism (NAM) used to access Internet resources and services for research and development covering requirements for networking, designing the NAM, information needs, and future perspectives.

This paper discusses various kinds of science databases on the Internet including bibliographic, numeric, and full-text.

Discusses some Internet services and resources such as e-mail, FTP, electronic conferencing, and information access and the benefits of using these in elementary and secondary schools.

Reports that there were more than thirty online catalogs and databases available on the Internet including the MELVYL online catalog.

Describes the experiences of MELVYL online catalog of the University of California and issues related to electronic networking and information retrieval and accessing remote library catalogs.

Examines a number of international telecommunication networks including Bitnet, Telnet, and NSFNet and their roles in serving as telecommunication infrastructures both nationally and globally. Focuses on the Public-Access Computer Systems Forum covering hardware selection, operation systems, and costs.

Introduces some Internet resources on museums including image and text files which are made available by the Library of Congress and the Smithsonian Institution.

Reviews the Internet history covering the period between 1975 and the beginning of the 1990s. Describes the emergence of discussion groups which share the same interests, Netiquette Librarians, Internet reference collections, and Internet Hunts. A learning guide to navigating the Internet.

Introduces a game, the Internet Hunt, which aims to inform information professionals about Internet resources and services including telnet and FTP.

Describes the nature, services, and activities of The Center for Electronic Texts in the Humanities. The center was created in 1991 by Princeton and Rutgers Universities with an emphasis on developing and disseminating electronic texts in humanities via the Internet.

Compiles more than 800 special interest groups mailing lists.

Provides Internet resources accessible via Telnet for the use in schools including Cleveland Freenet; Washington University’s SERVICES gateway; and Wide Area Information Server (WAIS).

Introduces Internet tools to help users utilize Internet resources and services including Gopher, Veronica, Jughead, and Archie.

Reviews the topics covered on the Online/CD-ROM ’93 conference including the increasing use of the Internet, cryptography, intellectual property, electronic library, and various search methods such as natural language search versus boolean search.

Discusses the use of e-mail to exchange messages in various networks including Internet, BITNET, USENET, FidoNet, MCI Mail, and CompuServe.

Praises the success of FirstSearch, a retrieval tool on the Internet, based on the experiences of the Evans Library at Texas A&M University.


Presents the fact that the Internet connects various institutions such as government agencies and institutions of education and research to share access to resources and services. Issues discussed include information access, ethics, and training for librarians.


Describes the efforts made by The Food, Agriculture and Nutrition (FAN) Division of the Special Libraries Association for identifying an e-mail system for communication purposes among members. The Internet, DIALOG's DIALMAIL, and agricultural Library Forum were selected.


Discusses accessing commercial online databases services such as DIALOG over the Internet and issues related to costs, reference services, and access. Also provides Internet addresses for a number of vendors.


Outlines the development of the Internet including the beginning of ARPANET in 1969 by the U.S. Department of Defense; the taking-over by the National Science Foundation in 1990; and the use of the Internet as a foundation for the National Research and Education Network (NREN) in the future. Discusses Internet protocols including FTP, Telnet, and Simple Mail Transfer Protocol (SMTP), and some databases on the Internet such as CARL and MELVYL.


Presents OhioLINK, a statewide information network, which aims to provide 24 hour access to online union catalogs for all patrons from any location. Issues discussed include management, financing, and development of the network.


A comprehensive book on the Internet. Covers both Internet basics and advanced Internet tools and services.
Discusses issues related to accessing the major fee-based online databases via the Internet including DIALOG, LEXIS/NEXIS, and BRS.

Presents electronic conferences available on the Internet and advantages of using them from librarians' perspective including information on employment, surveys, new products and services, and conferences and meetings.

Points out that Internet services, resources, and tools are very useful for reference services. Suggests that librarians should follow the updates of the Internet in order to fully utilize Internet resources and services.

Discusses the impact on libraries and the role of librarians in the development of telecommunications such as the Internet. Lists a number of roles librarians may play in the future including consultant, network and information manager, and resources guide.

Traces the development of the WAIS protocol which provides access to various electronic information using a single interface. Discusses the problems, funding, pricing, hardware requirements, and security issues.

Describes the development of telecommunication networks in the United States and the growth of Internet resources and services. Discusses issues related to network access technologies, information retrieval, information servers, and National Research and Education Network.

Presents the Phoenix Metro Image Project that connects three different OPACs from three institutions including Arizona State University, the Maricopa County Community Colleges District, and Phoenix Public Library via the Internet.

Provides a description of VERONICA, an Internet browser, and how to connect to it, VERONICA servers software, and problems.

Discusses the World Wide Web which organizes Internet resources in the form of hypertext. Describes hypertext, WWW, WAIS, Gopher, and future potentials.

Describes the Internet browser, Mosaic, developed at the National Center for Super-Computer Applications at the University of Illinois. Discusses the relationship with the World Wide Web, FTP instructions, and getting Mosaic client software.

Discusses the impact of the use of the Internet on technical services. Issues covered include e-mail, remote login, FTP, electronic information access, and process.

Discusses software archives and collections of software on the Internet including how to access and retrieve software archives on the Internet free of charge and how to utilize them.

Discusses Internet basics including transmission media such as copper and fiber optic cables, standards, protocols, network addresses, and an Australian network: AARNET and CERFnet service.

Lists three steps of using TCP/IP and HyperCard: (1) finding the tools for accessing Internet resources and services; (2) understanding hardware and software requirements for using TCP/IP with a Macintosh; and (3) demonstrating the implementation process.

Presents the Texas Innovation Network (TIN) by which academic institutions and private companies are connected. Discusses the role of various users of TIN including academic institutions, businesses, federal labs, and organizations involved with technology transfer, and a user-friendly interface for accessing free resources on the Internet.
Introduces resources available on the Internet for librarians. Provides information on the kinds of resources available and how to access, search, and retrieve them.

Describes Prospero, an Internet tool that facilitates users in organizing Internet resources. Discusses a number of ways of accessing and retrieving Internet information.

Examines some communication norms of computer-mediated communication such as e-mail, mailing list, Usenet, bulletin boards, interactive messaging, mass-broadcast media, and multiuser domains.

Describes Internet resources, its hierarchical organization, the use of the Internet in libraries including cataloging, bibliographic instruction, government documentation, interlibrary loan, reference services, and problems.

Presents the concepts of WAIS in searching databases and documents: basic WAIS unit; what in document names causes hits. Calls for more thorough study on WAIS as to its effectiveness as a retrieval service.

Presents Gopher which enables electronic publishing to cross computer networks and enables users to access data based on a client-server communications model. Describes the use of Gopher in libraries with electronic journals and multimedia documents.

Introduces an archive site: LIBSOFT provided by the School of Library and Information Science at the University of Western Ontario, Canada. This archive has information and programs that teach librarians to utilize the Internet.

Presents a discussion on the World Wide Web created at the European Particle Physics Laboratory (CERN), its hypertext links, and potential use for multimedia documents.


Describes the development of the Internet from ARPANET and its future.


Presents a description of the EPIC service provided by OCLC via the Internet. Discusses problems related to Internet access and connection, costs, and communication software.


Provides a discussion on e-mail, FTP, remote login, bulletin board, regional and national networks, and information on guides and directories of the Internet.


Indicates that, as various forms of electronic documents become increasingly available on the Internet and ready for distribution, many libraries do not provide access to Internet information sources. Suggests combining online information services with the library information system.


Reviews the Colorado Association of Research Libraries (CARL) index: UnCover. Finds that there are data and index errors. Compares UnCover with some other databases and concludes that the fax delivery feature of UnCover is special.


Introduces the availability of the Library of Congress catalogs on the Internet. Describes how to connect to the Library of Congress Information System and the interfaces of accessing federal legal databases.


Presents easier ways of searching the Internet including dial-up access (easier than dedicated computer terminals or workstations), programs that make Internet access easier, and customizing start-up files.

Describes the nature of the Internet; advantages and benefits of using the Internet; Internet services including remote login, FTP, e-mail, fast and effective communication among scholars and researchers all over the world for research purposes, and problems.


Presents OCLC's linking strategy which is the Internet and NREN. Discusses electronic networking links and environment for libraries including issues related to economic considerations, performance and support, future developments and plans, and the trend toward an international network.


In recent years, the Internet has been used by more people and businesses for purposes other than academic and research. Lists and describes Internet services and vendors for individuals and corporations who need to connect to the Internet.


Introduces PSILink, a program intended to facilitate access to the Internet, the use of e-mail, bulletin boards, and other Internet services by librarians who only have a PC and modem.


Maintains that electronic networks such as the Internet, BITNET, and NREN can be used to improve international networking and library functions. These networks transmit a large amount of information and provide a new and effective way of communication among education and research communities.


Introduces an operating system that provides workstations with uniform access to NREN resources and services. Its technical features include a file system and a command interpreter which deals with differences among various protocols.


Presents a joint full-text retrieval project between the University of Maryland at College Park and Rensselaer Polytechnic Institute aiming to utilize online library catalogs through the Internet.

Describes NYSERNet's Global Access Information Network, Project GAIN which evaluates how valuable it is for small public libraries to connect to the Internet. Concludes that libraries will be able to connect to thousands of users all over the world via e-mail.

Discusses Z39.50 information retrieval protocol, OCLC's library network, application gateway, and the Internet.

Describes a virtual library as a number of information services and resources in different locations accessible via telenetwork. Lists resources in this virtual library including text files, images, e-mail lists, bulletin boards, and Telnet.

Discusses tools and services related to the World Wide Web including hypertext markup language, Gopher, uniform resources locator, and the hypertext electronic journal.

This is an interesting survey via the Internet to ascertain from engineering librarians which CD-ROM databases they own or would like to own by providing a list of suggested CD-ROM databases. Responses indicate that many librarians wanted CD-ROM databases that were not included in the suggested list, that full-text CD-ROM databases were preferred, and that direct access to resources on library networks is preferred. The interesting part is not the contents of the survey but the way the survey was conducted. The implication is that researchers can collect questionnaire data via the Internet.

Describes the expansion of CD-ROM and Internet facilities by Reading University in the United Kingdom including networking CD-ROMs.

 Presents a discussion on various access points to ERIC including CD-ROM, Internet access, online access via commercial services, and print access.

Discusses the advantages of electronic conferencing via the Internet.

Presents a common practice by electronic database manufacturers, which allows libraries and end-users to use their products free of charge or pays the libraries for using their products for marketing purposes. Discusses the impact of nonprofit organizations on the database and network business and the CARL UnCover database—i.e., its coverage (12,000 periodicals), its availability on the Internet, and costs of subscribing.


Presents an Internet service, SCHOLAR, which processes and disseminates natural language texts related to academic publishing, library operations, commercial projects, classroom and online instruction, and which provides book abstracts, journal articles, reports, and news of text databases.


Explains the value of and how to access and search online catalogs available on the Internet.


Discusses LISTSERV, a program where networkers can create a list or a group for sharing ideas, thoughts, and interests; and BI-L, a new list created by the author for bibliographic instruction discussions.


Discusses how to evaluate alternatives for dial-up Internet access. Presents methods of evaluating costs including pricing methods, remote connecting costs, and other issues.


This guide provides information on Internet tools, resources, services, network addresses, and prices for a large number of references on books, periodicals, and electronic databases.


A further discussion on the virtual library with a focus on the user’s needs. Issues covered include access to remote library catalogs and databases, Internet information resources, and training and skills librarians need to help users.

Explains what a virtual library is: The term originated in 1990 and refers to a system connecting remote libraries and databases via a local computer device. Examples given are OCLC, RLIN, and CARL. The Internet is believed to provide an infrastructure. Notices that development of a virtual library needs the support from the government, and that NREN, CNI, and the High-Performance Computing Act of 1991 will help the development.

Describes PENpages, an agriculture database with full-text provision. It is available through the Internet.

Examines the increasing use of the Internet which is measured by site initiating network connectivity rate; site direct connection rate; and site distancing rate.

Available from gopher://info.lib.uh.edu:70/00/articles/e-journals/uhlibrary/pacsreview/v3/n4/scott.3n4
An introduction in the use of Hytelnet, a hypertext browser, to access Internet resources such as online library catalogs and provides a number of sample screens.

Describes the features of a digital stellar optical library and how to access it via the Internet.

Presents a discussion on file extraction programs, postprocessing software that has been compressed, archived for storage and transfer, and downloaded from the Internet. Describes archiving formats for various operating systems including UNIX, Macintosh, and DOS.

Explains the use of Archie, an online indexing service, including access via e-mail, telnet, Gopher, and provides search examples.

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Describes the availability of the library and information science literature particularly electronic journals on the Internet that are relevant to library and information professionals and how to access them.

Discusses the electronic network in Maryland, Seymour, which provides various databases including community databases, bibliographic databases, full-text databases, and access to the Internet and government information at all levels.

Examines the effect of the Internet on academic libraries in terms of providing access to a variety of resources and services with an emphasis on the Uncover database provided by the Colorado Alliance for Research Libraries. Concludes that small- and medium-sized academic libraries will benefit from the Uncover database.

Examines the LIBS Internet access software that provides Telnet connection to remote site services including library catalogs, databases, campus information services, and other information services.

Introduces tools and resources available on the Internet for reference services via e-mail. Examples are: interloans requests can be handled through e-mail and search results can be sent through DIALMAIL in electronic form. Presents the experiences in using electronic accessing reference services in a number of academic libraries.

Analyzes directory entries for selected electronic journals and newsletters from the user's perspective including factors such as the completeness of the directory entries, the accuracy of the information, and the accessibility of the entries through an index. Discusses the problems associated with electronic serials including difficulties in accessing electronic serials, locating back issues, and the lack of quality control in the index.

Describes the fact that the National Science Foundation Network (NSFNet) serves as the Internet backbone; its development into the National Research and Education Network (NREN); transmission media; network protocols; and some Internet resources, services, and tools including e-mail, bulletin boards, Gopher, the World Wide Web, and FTP.

Examines electronic access to information in libraries and covers a wide range of issues including networking, graphics, full-text, Internet instruction and training, licensing, and software.

263. Tomaiuolo, Nicholas G. (1993). Internet database review: The FDA BBS. Database, 16(6), 82-84.
Outlines the Food and Drug Administration’s (FDA) bulletin board on the Internet and how to access it and other FDAs information resources on the Internet.

Describes the electronic accessing practices in recent years that many libraries at institutions of higher learning have established. Describes how users can use Telnet to access remote OPACs provided by other institutions via the Internet. Believes that remote access to library records benefits scholars in various fields.

Presents LIBLINK, a network linking online catalogs of thirteen university libraries in New South Wales, Australia, and the Internet. LIBLINK provides a uniform interface when accessing online remote catalogs, which overcomes the difficulties in dealing with passwords and Internet protocol addresses.

Describes Internet tools for the higher education audience including e-mail information, such as getting connected, and connecting to Internet discussion groups as well as library catalogs and databases available on the Internet.

Describes the Library of Vatican’s digital images of incunabula available via the Internet and compression procedures for sending color images.

Describes why the Internet is widely used including its use as a reference tool, a communication device and as an expert system as well as a resource of online catalogs, discussion groups and newsletters, and introduces access tools such as Gopher, World Wide Web, WAIS, and Mosaic.

Reports the results of the erring identity of an Internet discussion group for the electronic mail office of President Clinton. Discusses actions and reactions of the members. Suggests guidelines for using electronic discussion groups.

Provides an overview of the Internet: its nature, development, resources and services, accessing and retrieving tools, government policies, online databases, library catalogs, archive files, and other information.

Presents the development of a DOS-based microcomputer including modems, LAN, Fax, laptop computers, CD-ROMs, and the connection to the Internet, and how these factors affect the library information service.

Lists the ways to gain access to IFLA information including Gopher, FTP, and dial up access.

Discusses the University of Minnesota's Gopher system including Gopher clients, FTP, campus information system, electronic publishing, privacy and security issues, and the need for developing Internet navigating tools.

Describes an electronic archive on the Internet, which contains software programs and research reports for lexical research. Discusses issues related to archive administration, various kinds of materials, and provides some samples.
Describes guides to libraries on the Internet and other Internet resources and services including listservs, online services, and online bibliographic records and catalogs.

Reviews some Internet tools that provide users with the capability of searching and retrieving information from Internet databases including WAIS, WWW, Archie, Alex, and Hytelnet.

Discusses Z39.50, a standard developed by the National Information Standards Organization which allows information exchange among various electronic networks with different hardware and software configurations, article also discusses Canada’s involvement.

Discusses an electronic network design and plan for a distributed client-server network for the purpose of sharing resources in Illinois libraries. Covers the phases, alternatives, and limitations of the plan, and components and strategies. Suggests that this model can be applied to other states.

Outlines e-mail systems including e-mail services, the requirements of hardware and software for e-mail services, applications in curriculum such as math, science, social studies, and foreign languages.

Analyzes end-user interfaces of online public access catalogs (OPACs) of OhioLINK which consists of sixteen academic and research libraries and which is accessible via the Internet. Focuses on the mode of interaction and user assistance. Finds that six different software packages were used among the seventeen OPACs, and they provided different interfaces for the same software and various interaction modes. Provides some suggestions.

**Internet Training**

Describes workshop training experiences and strategies for the use of the Internet at Florida International University Library.


Presents a workshop at Western Kentucky University, with the purpose of teaching the Internet. Issues include classroom presentations, hands-on training, and planning for a retreat.


Presents an Internet instructional program by the librarians and computer service staff at Penn State for faculty, staff, and students including Gopher, Mac, DOS, and Listservs.


Argues that it is necessary for librarians to participate in Internet training for faculty.


Provides a brief description of TCP/IP, Internet history, and characteristics of some Internet resources and services. Focuses on a course designed to teach new networkers how to use Internet resources including access to the Internet, the use of various databases, knowledge of TCP/IP protocols, and search and retrieval skills.


Discusses a computer technology training program that provides fundamental skills and understanding of the Internet. The program covers knowledge related to microcomputer, networking, file transfer, and e-mail.


Presents Pascal with Internet Primitives (PIP) which is a combination of a programming language, Pascal, and Internet primitives for achieving effective teaching purpose.

Discusses the role of librarians in familiarizing faculty with new information technologies. Issues covered include online catalogs, CD-ROM, networking, the use of specialized databases, Internet resources and services, and the development of NREN.


Suggests integrating Internet courses into undergraduate curriculum including the use of online catalogs and other online databases via the Internet.


Describes an electronic bibliographic instruction course designed to teach electronic database search techniques and Internet resources to graduate students in the life sciences at the University of Illinois at Urbana-Champaign.


Describes the Internet training experiences for public librarians. Lists some methods to safeguard CD-ROMs from being stolen.


Presents Internet seminars designed for students, faculty, and staff at the McGill University Libraries. Lists teaching objectives, training materials, and methodologies used in the seminars.


Points out that the Internet is not easy to understand and work with, and that there is a need to provide basic Internet training for new networkers in higher education. Training should include knowledge of some important academic networks, how to access the networks, and how to find useful resources and services on the Internet.


Argues that Internet trainers need to know more about the Internet. Lists and discusses a number of things that can be helpful to Internet trainers including user's needs, content, and physical setup.

**Law Librarianship**

Discusses issues presented at the annual 1993 conference of the American Association of Law Libraries including law librarianship in the future, access to government information, the Internet, information needs, and copyright.


Describes the connection of the Student Research Network at Duke University School of Law Library, North Carolina, to the Internet and the advantages of utilizing Internet resources.


Indicates that traditional resource sharing has limitations. Given financial constraints faced by many law libraries, new ways of resource sharing are needed. Introduces Internet tools and resources including e-mail, listservs, Telnet, FTP, Archie, and Gopher.

**Legal, Ethical, and Security Issues**


Discusses legal issues related to copyright term, data protection, electronic journals on the Internet covered in the European Commission's draft directive.


Discusses the impact of 103rd USA Congress's bills on information services including the GPO Electronic Access bill, the Information Technology Applications Program Act of 1993, HR 707, and Infrastructure Act of 1993.


The Internet is an international electronic network. The author discusses ethical issues related to privacy and equal access to information as well as security.


Reports the results from a survey of librarians via the Internet on their views about e-mail and electronic networks including issues related to privacy, ethics, navigation problems, and discussion groups.


Discusses legal issues related to access to information, tort liability, and free
speech on the Internet. Suggests that these legal issues should be dealt with by case law and Congressional hearings.


Discusses legal issues related to the Internet including intellectual property and management and support for commercial and noncommercial information providers.


Presents an algorithm safeguarding data transmission between two networkers using TCP/IP on the Internet. Issues discussed include security architecture comprising an interactive application program and security service module.


Presents a discussion on Internet etiquette and ethics. Identifies the need for training new Internet users not to offend others. Provides training guidelines.


Recognizes the advantages of the Internet, such as providing a large amount of information free to users. Points out the problems including the fact that information on the Internet cannot be permanently stored and the cost recovery issues for colleges.


Reports the fact that thousands of computer accounts had been stolen by computer hackers, and that computer administrators of higher education direct students to change their passwords. Raises serious computer security issues.

**Library Science Education**


Presents a graduate-level Internet course for prospective school library media specialists at Mankato State University in Minnesota. The course covers basic Internet tools and services including e-mail, gopher, FTP, news services, telnet, LISTSERVs, and basic searching skills.

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Proposes a learning model for training master's degree students in library and information science to use Internet resources and services. The model covers training objectives, competencies to be achieved, and concepts that need to be mastered. Discusses the possibility of integrating this model into the graduate curriculum.


Reports a survey result based on data collected from 10 randomly-selected ALA accredited programs, which explored to what extent and in what way 15 computer and information technologies (ITs) have been integrated into the library science curricula. Finds that eight programs offered exposure to at least one-half of the studied ITs through required courses, electives, or non-curricular activities. Instruction about or experience with electronic mail, local area networks, Internet/Bitnet use, PC operating systems, and database creation/handling was present in every studied program.

Medical and Health Science Libraries and Resources


Argues that medical libraries should make use of electronic document delivery and transfers when facing limited financial resources and increasing information needs. Suggests reevaluating document delivery systems as the Internet continues to expand and as the trend moves away from relying on libraries to relying on commercial vendors. Presents a report from a beta test site.


Discusses MEDLARS Search Service, MEDLINE, PDQ and other databases provided by the National Library of Medicine. These databases are available on the Internet. The National Library of Medicine's online catalog can be used free of charge via the Internet.


Presents the MEDLINE Retriever, a successful database retrieval tool developed at Baylor College of Medicine for querying MEDLINE. The technical features include: it operates under the X Window in the Knowbot Operating Environment, utilizes a graphical user interface, and communicates with MEDLINE through the Internet.

Presents the National Institute of Health’s GenBank DNA database and the way of accessing it via the Internet and discusses the potential of the Internet for the use of information retrieval.


Describes the impact of High Performance Computing and Communications (HPCC) and its effect on international cooperation in health care and medical science, and the goals and role of the HPCC in building the national information infrastructure. Outlines the efforts made by the National Library of Medicine and addresses issues related to privacy, virtual reality, and networks.


Discusses the efforts made by the United States Department of Agriculture (USDA) in developing the Plant Genome Research Program which aims to develop "new agriculture." Research subjects include new biotechnology development, genes transfer and isolation, and high- and low-resolution chromosomal maps. A database for the Plant Genome Research Program is developed at the National Agriculture Library (NAL) and will make the database accessible by users via the Internet.


Indicates that there is a lack of efforts by librarians and information professionals in developing subject-specific materials on the Internet. Describes the efforts made by Thomas Jefferson University library in Pennsylvania in sharpening staff skills and making full use of Internet resources related to the health science community.


Describes the historical development of some computer medical and health information networks including MEDLARS, SUNY biomedical network, and the Internet and SatelLife telecommunication systems.


Describes how to access and retrieve information from GenBank, a genetic and biotechnology-related database, through academic health sciences centers and via the Internet.

Presents the use of Internet resources and services related to biomedical sciences and molecular biology at the National University of Singapore including access to databases of DNA, protein sequences, and online catalogs.


Presents a discussion on LIFENET, an electronic communications system developed by the Medical Library Center of New York. This system provides access to the Internet for members of the center. Provides documentation and training information and examples of how the system is used such as reference service, bibliographic verification, duplicating periodicals lists, e-mail, and discussion groups.


Demonstrates the important role of the National Center for Biotechnology Information and its databases in molecular biology research including collaboration with partners abroad and dissemination of information using CD-ROMs and the Internet.

**Online Public Access Catalogs**


Reviews past cataloging practices in Australia. Discusses bibliographic integration into the Internet in both academic and nonacademic libraries in the future. Describes Internet tools including Archie, the Wide Area Information Server, Gopher, and Mosaic with respect to cataloging and the role of catalogers in the future.


Presents a project examining textual information accessible via remote access through the Internet and the problems related to creating MARC records using USMARC format and AACR2 for computer files. Suggests adding a new MARC field including electronic location and access. Provides cataloging guidelines to facilitate the application of existing rules.


Discusses Internet access issues covering the design of catalogs for the future, online library catalogs, access by remote users, search terms, and menu design.

Presents Yale's solution to the Internet data transmission problem, which is to use a Multi Protocol Gateway (MPG). The MPG, a communications software, supports various terminal emulations and therefore provides successful connectivity and ease of use.


Outlines the cooperation between the University of Minnesota libraries and Washington University libraries in developing a catalog program. Stresses the importance of the Internet as a communication tool.


Examines a number of library catalogs on the Internet in different countries including Asia, Australia, Europe, Scandinavia, and the United States. Identifies the differences among these online catalogs in terms of language used for retrieval, ease and comfort, contents, and quality.


The paper reports the results from a search on OCLC and six OPACs on the Internet for fifty items whose catalog copies are not available on RLIN. The findings indicate that the search on OCLC yielded a 34% hit rate and the search on six individual OPACs on the Internet yielded a 2%-10% hit rate. The implications are that the user may want to use OCLC and OPACs on the Internet to supplement an RLIN search.


Traces the history of the network which has been used to support the MELVYL online union catalog. Discusses issues related to networking technologies, policy, the role of the network in a local automated system, access to resource databases, Internet protocol gateways, and other issues.


Describes the expansion of MELVYL, the University of California's online union catalog system, from a single database to multiple databases containing 7
million titles and 13 million holdings. It also has Internet connectivity and
serves as a gateway.

the online catalog. *Cataloging & Classification Quarterly, 13*(3-4),
133-140.
Describes various ways of accessing public access catalogs (OPACs): remote
access via the Internet or direct dial and direct access to bibliographic records
of other libraries through shared electronic networks. Illustrates these
widespread practices.

**Privatization and Commercialization**

public interest vacuum. *Internet Research, 3*(1), 3-9.
Discusses policy issues related to the privatization and commercialization of
NSFnet and the role of some computer and telecommunication giants such as
IBM, MCI, ANS (Advanced Network and Service), and the federal government.
Emphasis is on public access and affordability.

policy: The case for private-sector information services: U.S.
Presents an argument for the engagement of private companies in government
information distribution using U.S. patents as an example. Covers various issues
related to information dissemination systems, public access, employment, user
fees, the Internet, and NREN.

of the Internet/NREN: Introduction. *Electronic Networking: Research,
Applications and Policy, 2*(3), 2-4.
Argues for the involvement of the private sector in providing technical and
financial support for expanding the Internet and NREN.

Internet Exchange: How the CIX can help further the
commercialization of the Internet. *Electronic Networking: Research,
Applications and Policy, 2*(3), 24-28.
Discusses issues related to the commercialization of the Internet including the
efforts made by the Commercial Internet Exchange Association in exchanging
ideas about networking, government regulation, standards, pricing, and
cooperation.

337. Lester, David. (1994). The Internet in 1994: Do we know where we
are going? *Technicalities, 14*(1), 6-8.
Discusses factors affecting the future of the Internet including commercialization,
expansion, and hardware and software.

339. Rosenbaum, Howard, & Cronin, Blaise. (1993). Digital entrepreneurship: Doing business on the information superhighway. *International Journal of Information Management, 13*(6), 461-463. Presents a discussion on issues related to the commercialization and privatization of the national electronic network. Reflects debates among various groups: private companies are eager to take actions to get involved with building the National Information Infrastructure (NII) and therefore take control of it; the academic world and libraries prefer Internet resources and services to be free. Illustrates a number of businesses via the Internet including document delivery, subscription of print periodicals with electronic supplements, and digital radio programs.


**Public Libraries**

341. Balas, Janet L. (1993). Learning about the Internet online. *Computers in Libraries, 13*(9), 26-27. Many public librarians who are interested in using Internet resources and services to serve their patrons may have to do so via local higher education institutions. This paper reflects this difficulty faced by public librarians. It also describes the author's experiences in exploring Metroline BBS and Library User Network BBS, two bulletin boards which provide information on the Internet and Internet resources and services.


Argues that it is important for public libraries to have access to the Internet and other networks such as the National Education and Research Network (NREN). Issues covered include the role of the public library, how the public library contributes to network information, linking to the NREN, the integration of public libraries into the national networks, and training and financing issues.

A discussion on the use of the Internet by public libraries. Issues covered include the role of the public library; computer and information networks; the National Information Infrastructure; National Research and Education Network; the telecommunications industry; federal legislation; costs; file transfer protocol; and users' information needs.

Presents a Pacific Bell company's program supported by the state of California and whose objective is to network thousands of public libraries and schools in California for data transfer and video conferencing by 1996.

Describes the New York Public Library's plans to create the Science, Industry and Business Library equipped with multimedia workstations, user-friendly Internet gateway, and dial-in access.

Examines the impact of networked information on rural libraries. Six rural communities in New York were connected to a regional network (NYSERNet) and through NYSERNet to the Internet. Project GAIN shows the effectiveness of linking rural communities to the Internet. Suggests that rural public libraries should play a role in the National Information Infrastructure.

Evaluates important factors that impact on the role of public libraries in using nonbibliographic information sources and services on the Internet and the role of public libraries in the NREN in the future.

Discusses how public libraries can make use of the National Research and Education Network (NREN) including issues related to access, the use of the Internet, sharing of resources, and the Internet/NREN services available in public libraries.

352. Ryan, Joe, & McClure, Charles R. (1991). The role of public libraries in the use of the NREN. OCLC Micro, 7(5), 31-33. This is a study on the role of public libraries in the future national telecommunication networks. Examined the use of the Internet by public libraries and the problems encountered. Suggests policies to encourage public libraries to use Internet resources and services.

Reference Services


354. Billings, Harold; Carver, Ira E.; & Racine, Drew. (1994). Remote reference assistance for electronic information resources over networked workstations. Library Hi Tech, 12(1), 77-86. Presents the Texas University at Austin General Libraries' project which intends to enable reference librarians to provide reference services to remote users who are using various networked information resources including information on the Internet, online catalogs, and other online databases. Identifies problems and solutions associated with this technology. Believes that this is a future reference service model.

355. Bobp, Mary E.; Kratzert, Mona; & Richey, Debora. (1993). The emergence of systemwide electronic access to information sources: The experience of two California State University libraries. The Reference Librarian, 39, 111-130. Presents the experiences of integrating a number of online systems including CARL Uncover, First Search, and LEXIS/NEXIS, and Internet resources for reference services at two California State Universities. Evaluates the strengths and weaknesses of these systems in terms of public service.

356. Cline, Patricia. (1995). Confessions of a reference technophile. The Reference Librarian, 39, 5-11. There are a large number of databases with a great variety of structures and interfaces on the Internet. Such diversity of databases imposes difficulties for end-user searching. The author argues that reference librarians still play the role of search mediator between end-users and diverse databases.

Analyzes the impact of recent developments in information services including the Internet, online catalogs, CD-ROMs, and others on electronic reference services.


Presents an Internet mailing list, STUMPERS-L, where hard reference questions are discussed among concerned librarians and information specialists.


Describes Usenet and how librarians can use it for reference service.


A comprehensive book on Internet references covering about 700 Internet resources.


Contains twelve articles on the impact of library technologies on reference services including training staff, the role of academic librarians as information providers and teachers, reference service planning and management, the electronic library, and systemwide electronic access.


Outlines the benefits of using the Internet for reference services and provides a number of electronic discussion lists including BUSLIB-L, MEDLIB-L, LIBREF-L, and STUMPERS-L.


The University of California Santa Barbara Library marketed the library’s computer services, including access to both domestic and foreign systems on the Internet through a campus media fair.


Discusses providing ready reference through the Internet. Issues covered include limitations, costs, reference policies, databases available on the Internet, service levels, and personnel management.

Introduces a contest that uses Internet resources and services to answer reference questions on various subjects.


Summarizes the efforts made by Wolfgram Library of Widener University in Pennsylvania in seeking Internet resources and making them available to the reference service.


Consists of three papers discussing the role of the mediator in the electronic world. Covers a variety of issues including computer-assisted instruction, the Internet, CD-ROM databases, online systems and catalogs, standards, and vendors.

### Research and Development


Presents a discussion on what cyberspace is and other related concepts such as mediaspace, cybrarians, cyberocracy, cyberology, virtual library, and virtualization.


Discusses the Group Communication Service designed to support computer-supported cooperative work in an Open Systems Interconnection global network.


Studies the role of computer-mediated communication in creating virtual communities in which individuals in different geographical locations share common interests via the Internet and other electronic networks. This study focuses on GayNet, an Internet discussion group that serves the needs of gays and lesbians.


Describes the role of the Internet Architecture Board (IAB), Internet Engineering Task Force, and Internet Research Task Force in developing the Internet, Internet standards, and the future of the Internet.

Describes the cooperation among Cornell University Library and Cornell Information Technologies and other private companies in converting the library's records into digital images and making them available through the Internet. Discusses the advantages of utilizing digital technologies for preserving books and for information access.


374. Foster, Steven L. (1992). Internet Packet telephony: A NeXT Case Study. Unpublished master's thesis, University of Nevada. Programs a bidirectional realtime packet speech communication utility based on a NeXT computer and the Internet datagram protocol. Focuses on an algorithm dealing with irregular intervals between arrivals of packets. Surveys Internet protocols to see if they are suitable for realtime continuous media services. Concludes that in the light traffic situation, Internet telephony with a UDP protocol is practicable, but in a heavy traffic situation it is not practicable.

375. Ghatak, Subhendu. (1992). Evaluation methods for internet management schemes. Unpublished doctoral dissertation, University of Tennessee. Goal is to identify a procedure of evaluating network management frameworks. Compares the ISO and Internet network management frameworks. The evaluation process includes the agent's performance and host impact, the management framework's response, and its effect on the network. Finds that the lower layers of the ISO stack need more time than the agent, and that the connectionless method is needed for network management if packets are dropped. Suggests future network management protocols.

376. Gillespie, Thomas K. (1991). Mapping thoughts: Visual interfaces for information retrieval. Unpublished doctoral dissertation, University of California, Berkeley. Explores interface design for information retrieval systems from the point of view of visual thinking. Examines information systems including maps, cataloging systems, and electronic information systems such as online public access catalogs. Evaluates MELVYL, the University of California's online public access catalog, and develops a VisualMELVYL model based on visual thinking, information retrieval, and graphical design. VisualMELVYL shows a visual interface to an online public access catalog or other information services on the Internet.

377. Kappe, Frank; Pani, Gerald; & Schnabel, Florian. (1993). The architecture of a massively distributed hypermedia system. Internet Research, 3(1), 10-24. Presents a hypermedia information architecture and telecommunication system used on the Internet. This system is developed by the Graz University of
Technology in Austria. Issues discussed include distributed hypertext, cache servers, clients and servers, server protocol, and hypermedia systems.


Discusses Socks, an Internet socket service which includes client library routines and a daemon. Examines a number of methods related to secure environments.


One of a few analytical studies. Observes that the existing file transfer application programming interfaces (API) are protocol specific. This protocol specific nature makes it difficult for an application based on an existing file transfer API to be used in an environment which supports a different file protocol. Argues that this practice violates the principle of applications portability. Proposes the Generic File Transfer API, which can be used in various file transfer protocol environments.


One of the few analytical studies in the Internet literature. Examines the correlation between information technology (IT) diffusion and the roles of government, industry, and education based on the cross-country data. Finds that government plays an important role in IT diffusion at the initial stage; at the Majority Adoption stage, industry plays a key role; and academia contributes significantly to the infrastructure. Discusses the policy implementations of this study.


Describes Knowbots, intelligent software agents, and how these affect the Internet. Issues discussed include ethics, problems associated with the increasing use of the Internet, continuous development of information technologies, and the trend toward a market economy.


Describes what the Fuzzball is—i.e., an operating system designed for the PDP11 computers; what it is for—i.e., for the DARPA/NSF Internet as a research platform; and its applications (such as congestion avoidance and control).

Discusses the concept of a virtual academic library including access to libraries through PCs, online catalogs, the Internet, and issues related to computer center services, administration, and the development of technologies.


Deals with locating people and resources on the Internet. Observes that it is difficult to locate any particular object on the Internet given increasing use of the Internet by millions of people. Points out that hierarchical name services are inadequate. This thesis provides fast query processing in large electronic networks.


Analyzes traces from four Internet sites to determine wide area network traffic. Performs simulations of wide area internetworks using a new workload model and conducts a simulation study of policies for multiplexing datagrams via virtual circuits. Finds that cell-based networks based on standard protocols are not efficient in handling wide area network traffic. Concludes that data compression techniques significantly improve wide area network efficiency.


Notices the impact of computer technologies, such as electronic networks, on library operations and new challenges faced by libraries. Discusses OSI reference models for networking and TCP/IP.


Deals with a telepathology system using the Internet, which enables pathologists to conduct remote diagnosis. Tests a model of the telepathology system.


Presents the mission and goals of the Digital Preservation Consortium (DPC). Some of these are: to improve the infrastructure in order to advance the use of digital technology for the preservation of, and access to, library materials; to evaluate the usefulness of digital imagery for preservation and access; and to advocate standards for processing, storing, and distributing digital images. Discusses factors that are important to achieve the mission and goals of DPC.

It is feasible to support voice, data, image, and video transmission over a Broadband Integrated Service Digital Network (B-ISDN) using fiber optics cabling. This dissertation points out that congestion with such high-speed networks cannot be dealt with using low-speed network control mechanisms. This study deals with the design and evaluation of a method for admission control for broadband networks.

Schools, School Librarianship, and School Media Specialists


Presents Pennsylvania Learning Link, an electronic network that provides access to the Internet, e-mail, discussion groups, local and state services, information resources related to various educational curricula such as distance education, and classroom-oriented services such as Linknet and other educational activities.


Introduces the concepts of the virtual library and cyberspace with an emphasis on school media applications. Points out that there is a great variety of Internet resources available for school media specialists and suggests relevant literature and materials for school educators.


Discusses Internet resources and services with special reference to school media specialists including Internet access, services, ERIC on the Internet, resources provided by the Department of Education, textbooks, fiction, and videos.


This is an introduction to the Internet for school media specialists including access to, and resources on, the Internet. Provides a number of Internet sources designed for training new networkers to understand the Internet. Discusses the importance of the Internet for school libraries.


Expresses concerns teachers and parents may have when K-12 students have access to various kinds of Internet materials and discusses related legal issues.

Presents KIDLINK, which is an electronic communication system via the Internet for teenagers in more than two dozen countries.

Discusses the use of Internet resources and services for educational purpose.

Stresses the role of librarians in helping students utilize Internet resources and tools for research when students are not competent to do so independently.

Describes experiences in using Internet resources by Arkansas school libraries.

 Presents updates of some Internet resources related to schools such as new e-mail addresses and new discussion groups related to kindergarten through grade 12 students, parents, teachers, and school curriculum.

Discusses linking elementary and secondary schools to the Internet and policies toward effective use of the Internet. Describes a project of high school science education conducted by Northwestern University in Illinois.

Reviews and analyzes selected research literature related to school library media centers including computer circulation systems, collections, CD-ROMs, Internet knowledge, literacy in telecommunication, and other issues.

This was a survey meant to obtain information on the use of electronic communication technologies by K-12 educators. Finds that electronic communication technology provides valuable professional resources and learning tools. Identifies the problems, such as the lack of training in telecommunication, for teachers and suggests improvements.

Presents a model for electronic networking at public elementary and secondary schools. It utilizes an Internet connection to link local bulletin boards at the school level. Covers issues such as teacher training, protocols, and library resources.

404. Kane, J. (1993). CYFERNET: A virtual library for sharing information. CWIS (Campus-Wide Information Services), 10(3), 27-30. This is a description of Child, Youth, Family Education Research Network (CYFERNET) including its development, its access to information, the virtual library, and the cost of information management.

405. Lemke, J. L. (1993). Education, cyberspace, and change. Electronic Journal on Virtual Culture, 1(1). Available from gopher://refmac.kent.edu:70/0F-1%3a3779%3aEducation%20-%206-Lemke Argues that the current format of education is not compatible with the present and will be unlikely to be so in the future, and that scholarly work in the future will be conducted in a multimedia hypertext environment and cyberspace and will focus on how people will learn in cyberspace. Teachers’ and students’ roles will change, and educational research should deal with new issues emerging from the advancement of computer and electronic technologies. Libraries will be in cyberspace which will contain information stored in electronic format.


407. Maule, R. William. (1993). The network classroom. Interpersonal Computing and Technology Journal, 1(1). Examines the importance of computer and telecommunication technologies in education with an emphasis on major elements in electronic networking systems such as ISDN; implementation of networks; public online information resources; and services for schools such as the Internet, BITNET, USENET, LISTSERVs, electronic libraries, and online government documentation.

408. McKanna, Susan A.; Johnson, Ray; Zimmer, David; & McKanna, Michael J. (1994). Merging onto the Information Superhighway. School Business Affairs, 60(5), 3-12. Discusses important factors in integrating computer and telecommunication technologies into various areas of a school system including a planning committee to design a plan, standardization of network hardware and cabling, availability of printers in classrooms, the use of a wide area network, and a voice and video network.

Maintains that it is important to share information resources among high school students for intellectual development. Students from Davis Senior High School were provided access to the Internet and other networks by the University of California at Davis.


Maintains that school students benefit more in reading and writing from using electronic communication than actually gaining the added knowledge of technology.


Outlines possible advantages of connecting elementary and secondary schools to the Internet. Argues that computer and telecommunication technology can be used to improve education by providing students with wider information access. Also discusses the costs and funding needed to connect to the Internet.


Discusses what electronic networks can do for schools. Postulates that networks enable schools to connect their classrooms, libraries, media centers, and computer rooms; enable schools to receive and send multimedia messages; and to connect to the world via the Internet, satellite transmission, and cable TV.


Looks at the effect of the use of the Internet on K-12 schools. Holds that the Internet is a resource for education and research and provides explanations for supporting electronic networks for education and librarianship.


Reports the use of computer-based telecommunications services to meet educational needs at home. Focuses on math, science, technology, engineering, and services for students from grades 7 through college. Topics discussed include telecommunication functions in supporting education, service providers, the Internet, commercial networks providing education services, local and state networks, bulletin board, and telephone homework hotlines.


Recommends the use of electronic networking to stimulate students’ curiosity and improve instruction including the use of compact discs; e-mail;
KIDSPHERE on the Internet; and learning language, geography, and science on computer networks.


Describes the KIDLINK project created in Arendahl, Norway, for the purpose of developing international electronic communication among teenagers.

**Special Libraries**


Discusses Internet resources and services from the special library’s perspective. Points out that the special library can utilize Internet resources and services for collection development and for training clients to gain access to the information they demand.


Based on a survey of 113 special librarians in 1991 which inquired regarding the time special librarians spent on the Internet/BITNET, the training they had, and the knowledge on basic functions on Internet/BITNET. Fifty-four of the librarians surveyed responded. The findings indicate that the median level of experience level on the Internet/BINET was two years; more than half of the respondents learned how to use the Internet by themselves or from their colleagues. Most of special librarians surveyed (93%) used the Internet for e-mail.


Covers issues discussed at the Special Libraries Association Annual Conference held in 1992 including the importance of information in a global economy, Internet/NREN, standards, ethics, and corporation downsizing due to financial difficulties.


Discusses the traditional role of special librarians in the traditional special library environment and the future role of special librarians in an electronic world.

Discusses a few networks and services including the Internet, WAIS, LANs, CD-ROMs, and management programs that provide business services.

Urges special librarians to take advantage of Internet resources and tools. Discusses e-mail, electronic conferencing, and FTP.

Describes how Internet services were used by Arkansas medical libraries.

Standards and Protocols

Discusses various data networks including public data networks, private data networks, and academic networks and their providers with an emphasis on academic networks and the gateways connecting some major academic networks such as JANET, EARN, and the Internet.

Describes Z39.50, a standard communication protocol, and gives an example of how it is used in SIRSI's unicorn environment.

Discusses OSI with an emphasis on the lower four layers which deal with data transmission including issues related to data transmission standards, architectural design, internetworking protocols and applications, and a comparison between OSI and TCP/IP.

Emphasizes the importance of information retrieval standards in achieving interoperability among various systems. Reviews the development of telecommunications standards including the Open Systems Interconnection (OSI) and Z39.50.

Compares two network protocols—TCP/IP and OSI. Gives recommendations to libraries moving toward an integrated library system as to which one is more appropriate.
Presents the development of the Internet since 1985 including discussions on network protocols and library catalogs that are available and accessible via the Internet.

Points out the limitations of online library systems including problems with locally loaded periodical indexes, search protocols, and log-in and log-off.

Explains the major components of the virtual library including connectivity: The Internet ISDN; standards: Z39.50; digitization: Project Mercury; and accommodation: FELIX.

Describes a Z39.50 server developed by the Research Libraries Group for searching RLIN and CitaDel databases, how it works, and who uses it.

Looks at ANSI Z39.50: information retrieval service definition and protocol specification for library applications. Observes that standards are necessary for various computer operation systems and configurations to work together to share resources and services.

Presents a discussion on the Z39.50 protocol including its operating environment, functions, library applications, use on the Internet, and advantages such as easy access to information from any location.

**User’s Needs and Human Cognition**

This is one of the original research articles in the literature. It is based on the author’s thesis which deals with user needs for an electronic search including issues related to interaction and browsing.

Traces the growth of information services on the Internet from a user perspective. Issues covered include user training, access to information vs. retrieval of information, information services available on the Internet, and training for librarians.


Studies the relationship between concerns for human cognition and communication technology and between human organization and electronic networks. Concludes that if global electronic networks are developed in an appropriate way, they could have a positive impact on human organization abilities to access information.

**Women, Minorities, the Disabled, and Equality**


Points out that the development of electronic networking has an impact on policies toward American Indian education and reservation. Discusses American Indian groups on networks including the Internet and commercial networks, tribal telecommunication development, and policy issues.


Discusses information equality within the public library context and covers issues related to access to library services by minors, the poor, and charging fees. Also raises the issue of equal access to the Internet.


This guide provides information on Internet resources related to women and librarianship and women’s studies.


This guide provides information on research resources on women on the Internet and BITNET and tools to access them including e-mail, electronic journals, and various databases such as full-text and numerical.


Introduces four electronic networks related to African studies in the United States. These networks include Internet and Bitnet, Fidonet, UseNet, and BBS and provide a wide range of information for scholars and students interested in African studies.
Addresses issues related to information on disabilities. Describes the efforts made by the Disability Internet Librarians Group to help librarians in their awareness of disability issues.

Addresses the needs of disabled network users. Lists rehabilitation providers available on the Internet for the handicapped via Gopher including SUNY-Buffalo's Cornucopia of Disability Information, the University of Maryland's Disability Directory, and the Electronic Rehabilitation Resources Center at St. John's University.

Presents search approaches and terms selection for searching information on Native Americans on DIALOG databases including search by tribal names, full-text search, Internet sources, and CD-ROM databases on Native Americans.

Observes that there is a large gap between blacks and whites in the information society. Contends that blacks lack capital possession and information technology education, and therefore they lack participation in utilizing electronic information. He argues that the technology disparity between blacks and whites starts even before formal education and continues through the school years.
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