**New Roles for Librarians in Supporting Researchers in the Social Sciences: The Impact of New Technology**

**Basic Competencies for the New Roles of Librarians in Social Sciences Libraries and Information Centers**

The impact of new technology is a cumulative process and requires cumulative acquisition of computer and information structuring competencies in order to manage new technology changes. Computer literacy is no longer a new topic, but has become a prerequisite for all special librarians. Required knowledge of databases has now surpassed knowing the retrieval language and database structure of several frequently used subject-oriented online or CD-ROM databases to include new aspects, such as special traits of individual retrieval components from different hosts for the same database, differences between online and CD-ROM databases or between various versions of the same CD-ROM-database, or basic knowledge of the institution's OPAC.

Required knowledge of database structures has expanded to include various types of structures and formats required for downloading into the researchers' own literature databases, modifying the library OPAC or producing new databases for CD-ROM production, etc. Furthermore, with respect to the impact of the currently greatest instrument of new technology, the Internet, knowledge of database struct ures extends from using Telnet connections to access remote library catalogs using a wide variety of access and retrieval structures, to the implementation of existing databases into Internet-compatible databases by using WAIS, Harvester, Excite, and other front-end indexing and retrieval programs, or by converting the entire database into a Z39.50, a Hyper-G or similar database which can be sear ched directly by Internet users.(1) Hence, knowledge of databases has not only expanded "horizontally" to include a wider variety of database structures, but also "vertically" (somewhat like an inverted pyramid) to include meta-database and automated indexing features which extract information on a controlled or non-controlled basis for search and retrieve purposes.(2)

Aspects of networking technology have expanded similarly in a cumulative manner. In many institutions without any prior data processing infrastructure, the library was often the instigator for networking the researchers' computers with the library catalog. In other institutions with well-developed computer services and existing network structures, efforts to automate the library had to either com ply with existing operating systems (in order to take full advantage of the network opportunities) or build up a parallel, but distinctly separate library services network. This requires knowledge of various operating systems (PC, Macintosh, UNIX, VMS, MSW etc.) and their incompatibilities, as well as of various network limitations. After establishing the appropriate network connecting one or mor e library services with the researchers' desktop computers or workstations, new aspects of network technology to include access to networked information sources must be taken into account. Knowledge of various operating systems and of the functioning of various library services software (retrieval software for connecting to external hosts, networked CD-ROMS, library databases, etc.) is necessary to solve individual users' problems with memory space, accessibility and customized downloading.

In addition, the new role of the librarian as network specialist within the home institution may involve finding solutions to alleviate platform incompatibilities between various operating systems (PC, Macintosh, UNIX, etc.), as well as creating new networked services for both internal and external use. Depending on the prior or current infrastructure of computer experts in the research institute environment, this may mean anything from individual assessment of disc space needed by various resident programs, advice regarding maintenance and simultaneous use of various programs while also maintaining connections to CD-ROM-networks, external hosts and information services which rely on various other operating systems. Or it may mean offering multiple versions of the same services (CD-ROMs, library OPAC) for the various operating systems platforms (PC, Mac, UNIX etc.) with the detailed daily or hourly updating required. Or it may turn the librarian into a jack-of-all-trades for downloading, import and export of all sorts of data (not just library-related) into all sorts of target data evaluation structures, making the librarian well-known more for his or her networking, data and in formation processing skills than for his or her role as librarian. This, however, also belongs to the service orientation of the library or information center and solidifies the librarian's status and indispensability within the research institute structures - especially in an era of down-sizing. These competencies are not particular only to social science librarians, but - as opposed to other ac ademic fields where networked information sources have long been in use - are "coming of age" and gaining in importance as the researchers in these areas are moving to greater reliance on such sources (as opposed to the more technology-friendly and technology dominated natural sciences and mathematical fields).

Even within a research environment where computer resources are very sophisticated and computer specialists are available, the librarian who is thoroughly versed in both the technical and the information possibilities is more in demand for customizing individual work station environment to the researchers' needs than often the computer specialist who has limited knowledge of information retrieval methodology and sources.

Libraries in research institutions which have attained network stability and desk-top access for every researcher to the library catalog and other library services provide an important service which enhances the status and technological advantage of the library for the researchers. Nevertheless, precisely because of this expanded information infrastructure for the researcher, the basic function o f the library as information center is now being challenged by the mere fact that the networked access to Internet and other networked information sources often provide the means to bypass the library in the processes of information location, retrieval, and acquisition. To persuade users to take advantage of the information provision services of the library or information center, value-added services, greater familiarity with document delivery services, and adequate research support mechanisms offering more than the already available information sources and which are appropriate to the researchers' needs must be developed. Such new, value-added services offer the researchers time-saving, content-relevant and timeliness (currentness) advantages over their own information seeking activities in the Internet.

The impact of new technology also requires the same kind of cumulative growth in the content level which is evidenced by the pressures on the special librarian or subject specialist to enhance his subject knowledge as well as his technological capabilities. Not only is new technology pervading the research work in the social sciences as in most other fields (though perhaps to a less dramatically overwhelming degree), but also the social sciences are very visible within the new information sources being made available through enhanced technology. This increased exposure to the social sciences, however, brings additional problems of incompatibility when directly comparing or even verbally describing social systems of various countries.(3) The problems begin at the linguistic level of verba l descriptors. This can extend from difficulties in the translation or description of the terms and their meaning.(4) But they don't stop there. Because the structure and content of the social sciences and their information collections are closely interrelated with the social systems of the country itself (educational system, societal structures, parliamentary and legal system, social services st ructures, etc.), the organization and representation of the content often remains very individual, distinctly non-internation and sometimes even contradictory. Certain international similarities can be distinguished - which can also in part be attributed to the impact of new technology in both the field itself and in information work. But the high proportion of both content and linguistic individ uality remains and with the greater use of the Internet presents subject-oriented challenges to the librarian. This affects not only the methods and instruments used for information retrieval and acquisition, but also the development of value-added services which can place appropriate information in the correct context and also provide targeted information in a vastly expanding field. Thus, the r ole of the librarian is evolving to network specialist, information broker, and systems designer, to mention only a few directions. In essence, an overall intensification of specialization both in the technological aspects of library and information retrieval work, as well as stronger subject-oriented competencies and evaluative abilities are being demanded of the information professionals

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**Activities for Social Science Librarians and Information Workers**

As a result of the integration of networking technology, the librarian may be called upon to create new networked services for both internal and external use. These can include making current contents services available (both from external sources or based on internal journal holdings), making the library OPAC networkable for access via the Internet, contributing to the creation of a WEB-presence of the home institution on the Internet, providing value-added services to select, compile and structure relevant accession points in the Internet for the researchers' specialism (subject-oriented Internet clearinghouse principle(5)), and developing search mechanisms and training materials to support the researchers in their use of these new information sources (statistics and other demographic data, access to data archives, directories and/or overviews of relevant software programs for evaluation, assessment and development of data collecting instruments).

In addition, new technology is introducing functions belonging to systems design into the librarian profession. Beyond the systems design for integrating automated library and information systems into the library work routine, new emphasis is now being placed on innovating value-added services based on new technology and which can be integrated into the existing electronic environment. These include creation of meta-databases for both print and digitally-based information sources for retrieval purposes at different user levels, integrating Web-oriented quality management software such as link-checkers, security systems to protect externally offered servers and internal information, adapting Z 39.50 or other automated indexing and retrieval "robots" to make the library database available on the Internet, etc. Most of these are new functions, however, which are not specific to social sciences librarians and extend across the librarians profession regardless of thematic concentration of the library, but are most often found in specialized libraries.

The librarian as information broker must be able to not only find the literature via database references, but he must also be able to find it first, estimate its value, adequately and promptly estimate the user's needs in terms of document delivery conditions and select an appropriate supplier.(6) Establishing new criteria for determining information quality is a further new aspect of the informa tion broker and the process of information brokering.

The entire field of scholarly publishing will take on new contours. Electronic publishing of research results and scholarly works will also take place via the networks, affecting both library work routines in the periodicals section as well as subscription modes, rates, and a new market for individual articles.(7) Librarians will be involved in developing adequate down-loading facilities for e-jo urnals for their users. Archiving techniques will not doubt become a joint venture between journal publishers and libraries. New types of billing (pay as you go) and licensing contracts will have to be negotiated. Various versions of journal articles will necessitate varied indexing and cataloging procedures and may change the face (and usage procedures) of library catalogs considerably. And libr arians may be involved in the graphic and textual preparation of the electronic publications, becoming themselves Web-publishers.

Thus far in the scientific community, evaluation of print sources were based on the journal impact factor of the journal in which the article appeared, the frequency and time-span of citations of individual articles, and often contextual information such as inclusion in a thematic issue of a journal, solicited or non-solicited article, length of time between article submission and its publication or between publication date and first citations. Whereas print literature in the English language for major journals in a field were covered by inclusion in Science Citation Index, Social Science Citation Index or Arts and Humanities Index, sources which appear simultaneously in print and electronic journals or solely in an E-journal will either not be fully represented by this process or even c ompletely left out. New systems for establishing "use" and "citation" statistics will have to be developed, as well as new evaluation systems to deal with these in perspective with traditional scientometric citation analyses.

Furthermore, from a systems point of view, the impact of new technology has been to introduce a huge wave of down-sizing in libraries and information centers. As a result, new ways of evaluating services, sustaining important services with fewer staff and resources, and even developing new services to meet new needs of researchers and other users are more and more common in the librarian's profes sional life. Social sciences libraries are also most often affected, because their environment and object of study is imbedded in social structures which respond rapidly to the economic developments which are directly affected by the integration of new technology (i.e., reduction of jobs, elimination of redundancy in routine jobs or procedural transitions, etc.). Furthermore, social sciences rese archers will be relying more and more on sources which formerly belonged to the category "official publications". In particular, these sources are more readily available, often electronically (on CD-ROMs, in Web-Sites, etc.), and free of charge.

Systems design approaches may be helpful in producing routine queries using adequate search engines or other indexing mechanisms in order to obtain the newest documents on the topic being dealt with or to check the validity of links on a clearinghouse resource page. Thus, a systematic design and continuous expansion of profiling techniques depending on the medium (Web, CD-ROMs, online hosts) and incorporating information from several mediums will be necessary to provide adequate coverage and up-to-date information. Here, librarians may find the market of services offered by network organizations useful, or they may find it more useful, depending on the complexity of the profile requirements, to develop current awareness services for themselves and their researchers.

Last but not least, the librarian and information professionals must often be network specialists. In addition to just knowing how to hook up the various technology into the network, the depth and variation of networking knowledge is expanding daily. This includes not only the physical networking technology to connect computers, workstations and peripherals with the central institutional computer , with CD-ROM and other physical information servers at the institutional level and also the integration of various computer technology (PC, Macintosh, UNIX, etc.) within an institutional network. It also includes the networking technology of the Internet Protocol (TCP-IP) and various other aspects of virtual connections with the world wide network of information sources in the Internet and other related networks. In smaller institutions, the librarian may be required to set up or maintain the World Wide Web server, produce HTML-pages both for the library and the institution itself, and set up Internet services such as training sessions, trouble-shooting, and specialized services.

**Implications for Librarians and Information Workers in the Social Sciences in view of the Expanding Impact of New Technology**

The impact of new technology has only begun to be felt - especially in social sciences libraries. Information resources from the Internet offer greater currency on social problems and background issues which will influence the content of the library's collection policy and require inclusion of electronic journals, current awareness services, document delivery and even ephemeral information from t he Internet in reference and information services. Librarians and information workers will have to be familiar with key Internet resources and even provide their own. Clearinghouse services, whereby Internet sources targeted to the needs of the library clientele are selected, compiled, structured, and presented in a HTML-resource page in the institutions server with active links to the URL or to a proxy server, will augment daily reference work. Librarians will help train researchers to use the Internet and its resources, so that in essence, the clearinghouse resource pages will be a joint project with feedback and additions from the researchers, molding it for their particular use. Book orders, interlibrary loan, electronic document delivery, etc., in fact, almost all service aspects of library work, will necessitate knowledge of networking, of key resources, of the cost-benefit proportion of various external services. New electronic resources, such as statistical data, data archives, institutional information, etc., will become more relevant in the library's offerings. Direct support of the research and activities of the parent institution through these new services will contribute to increasing esteem of the library and to building new productive partnerships with researchers dependent on current, focused subject-oriented information.

**Conclusion**

Thus, the role of the librarian is evolving to network specialist, information broker, and systems designer, to mention only a few directions. In essence, an overall intensification of specialization both in the technological aspects of library and information retrieval work, as well as stronger subject-oriented competencies and evaluative abilities are being demanded of the information professionals and should be taken into considering both in the training and education of librarians as well as in in-service continuing education to meet the changing technological demands at the workplace.