
The Educational Role of Health Sciences Librarians

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ABSTRACT

THE EDUCATIONAL ROLE OF health sciences librarians in both academic centers and in hospitals is expanding due to influences of new educational models and growing use of technology. Innovative health sciences curricula are being applied in undergraduate and continuing education and often incorporate new technologies. The health sciences librarians' educational responsibilities include teaching access to the literature and other information resources, teaching use of technology as a means to access and manage information, and teaching skills in information organization and critical appraisal. Integration of teaching activities into the health sciences curriculum is a promising trend. The many changes in the health sciences environment present numerous teaching opportunities but also require flexibility, adaptation, and creative solutions on the part of practicing librarians.

INTRODUCTION

The only man who is educated is the man who has learned how to learn; the man who has learned how to adapt and change; the man who has realized that no knowledge is secure, that only the process of *seeking* knowledge gives a basis for security. (Rogers, 1983, p. 120)

Today's dynamic health sciences environment is constantly incorporating advances in biomedicine, technology, and educational

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practices that are related to patient care. This changing environment, particularly in education and technology, is creating expanded educational roles for librarians (see Figure 1). The new roles require health sciences librarians to be knowledgeable about innovative and evolving models for undergraduate health sciences curricula and for continuing education of health sciences practitioners. Librarians also must be current with new applications of technology especially in the emerging discipline of medical informatics. Most important, librarians must understand the implications of these advances in order to teach information management skills in a meaningful way to students and practitioners.

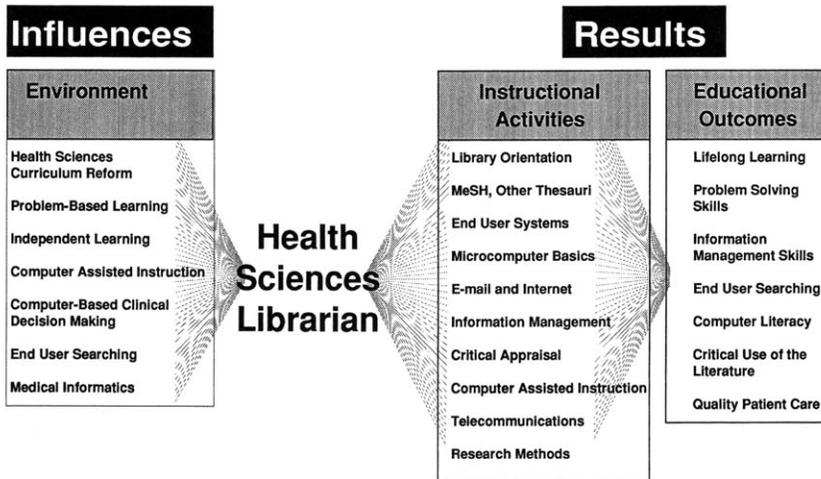


Figure 1. The educational role of the health sciences librarian

Health sciences librarians are responding to the challenges for new educational roles by providing a wide variety of formal and informal instructional programs. Librarians are teaching information management, microcomputer basics, software packages, telecommunications, database searching, Internet access, research methods, and other related topics. Also, librarians are spending more time one-on-one with library clients who are wanting to use the latest technology to answer their questions. Education is becoming a central function in many libraries, a function that demands new skills and discipline awareness.

CHANGING MODELS FOR EDUCATION IN THE HEALTH SCIENCES

“Lifelong learning,” “problem-based learning,” “independent study,” “information literacy,” and “medical informatics” have

become commonplace terms in health sciences educational institutions. These terms reflect not only changes in educators' thinking but also in the recommendations from special commissions and accrediting bodies. Because the size of the health sciences knowledge base is growing exponentially, the traditional lecture and memorization format is becoming increasingly inadequate to prepare health sciences professionals for their careers. The new educational processes recognize that there is too much information in biomedicine to learn in a short period of time. Since the half-life of much of this information is about five years, learning must continue throughout professional careers. Experts in health sciences fields—including medicine, pharmacy, dentistry, and nursing—have called for educational reform in order to better prepare health professionals for the twenty-first century. Two reforms in particular are greatly affecting the role of the librarian: changes in the curriculum requiring students to learn information retrieval and management skills, and the new emphasis throughout the curriculum encouraging the acquisition of lifelong learning skills.

Undergraduate Health Sciences Education

In response to a perceived need for change in health sciences education, an increasing number of programs, both in the United States and internationally, have introduced problem-based learning (PBL), independent study, and informatics into teaching programs. Many of the recent changes in medical education have their philosophical roots in the 1984 publication of the Association of American Medical Colleges (AAMC) entitled *Physicians for the Twenty-First Century* (Report of the Panel on the General Professional Education of the Physician [GPEP] and College Preparation for Medicine) (Association of American Medical Colleges, 1984). The GPEP report addressed the full spectrum of undergraduate medical education. The report emphasized that information skills are fundamental for effective patient management, both in the collection and analysis of data for patient care and in the critical appraisal and synthesis of information from the published literature. However, as John Cooper, then president of the AAMC, stated in the report's conclusion: "Perhaps the most important concept emanating from this study is that medical students must be prepared to learn throughout their professional lives. This learning must be self-directed, active and independent" (p. 34).

A subsequent AAMC report, *Medical Education in the Information Age* (Association of American Medical Colleges, 1986),

responded to another AAMC concern: organizing and accessing the scientific knowledge base in an effective and timely manner to support research, patient care, and education. This report recommended that:

Medical informatics should become an integral part of the medical curriculum....The challenge to medical schools will be to make students literate in the specialized area of medical computing. At a minimum, this means use of bibliographic retrieval systems, consideration of alternative techniques in computer storage of clinical information, exposure to clinical databases and decision support systems, and explicit consideration of problem-solving and decision-making techniques. (p. 4)

The recommendations contained in both AAMC reports reflect the growing awareness that a fundamental change in educational content and teaching methods is necessary to prepare medical students for practice in today's dynamic health care environment.

Educational reform is occurring in other health sciences disciplines as well. Many nursing programs are experimenting with problem-based learning and, at the University of Calgary, for example, faculty are advocating that nursing informatics be taught to both faculty and students (Hannah, 1988). Pharmacy education and dentistry programs, such as those at the University of Missouri—Kansas City (Reed, 1990), are moving to PBL curricula. Physical therapy educators are also experimenting with PBL and evaluating its benefits (Van Langenberghe, 1988). The Pew Commission summarized the call for changes in all health professional schools in *Healthy America: Practitioners for 2005* (Shugars et al., 1991). This report emphasized competencies which must be taught to prepare practitioners to function in the present health care environment, among them the use of appropriate technology and the maintenance of professional competency throughout one's practice life (Shugars et al., 1991).

Continuing Education

Because of the focus on lifelong learning in the health sciences, continuing education* (CE) is recognized as an important part of the educational continuum. In a rapidly changing health care environment where expectations, even in the smallest communities, are for a national standard of care, CE for physicians and other health professionals is essential. Since the 1960s, a growing number of states, as well as physician, nurse, and other health professionals' specialty associations (including the Medical Library Association) and licensing boards, have required regular CE. The result has been a growing market of CE offerings. While appropriate roles for commercial, academic, and other sponsors of CE are still being sorted

*Abbreviated as CME for physicians and CE for other health professionals; for purposes of this article, the abbreviation CE is used for both categories.

out, health professionals are nonetheless the beneficiaries of a multitude of CE opportunities.

Many continuing education offerings still center around courses and conferences, but there is a trend toward a more sophisticated approach to CE for the health professional. Principles of adult education are being used to differentiate types of learning needs, identify appropriate educational strategies, provide for active rather than passive learning, tailor the content to the needs of the practitioner, and evaluate outcomes (Davis et al., 1992).

The changing milieu of continuing education emphasizes bringing information to the practitioner and teaching at the point of need. This philosophy has encouraged innovative approaches. One of the earliest of these efforts was the establishment in the 1970s of the AHECs (Area Health Education Centers) by the federal government. The AHEC program's goal is to help minimize shortages and maldistribution of health care personnel by improving educational and collegial services in isolated and medically underserved areas. AHECs typically are developed through partnerships between universities and local communities and generally have been successful in decentralizing health professional training and CE programs (Fowkes et al., 1991). Health sciences librarians have played a prominent role in the AHECs.

Other new methods of continuing education include educational programs broadcast through the hospital satellite network and teleconferencing courses delivered by state hospital associations. Computer-based CE has been an option for some time; it has been used most successfully with nonphysician groups as individualized programs for workstations and occasionally as the means for teleconferencing and formal course offerings (Oeffinger et al., 1992; Tempus Consortium..., 1992). Consultation and library services have been integrated into the CE process through such efforts as the University of Alabama's MIST (Medical Information System via Telephone) service (Holt & Crawford, 1992), the University of Calgary's MIS (Medical Information System) system (Jennett et al., 1990), and experimental telemedicine projects such as that pioneered by Texas Tech's MEDNET project (U.S. Congress, Office of Technology Assessment, 1991).

Because it is individualized and often targeted to a need, professional reading is one of the most important methods of continuing education. The King and Rochester studies documented the direct effects of literature on patient care management (King, 1987; Marshall, 1992). Several recent proposals have been made to incorporate the literature more closely into professional CE (Williamson et al., 1991; Manning & DeBakey, 1987). A perennial

difficulty in formalizing credit for CE has been evaluation. A few efforts have been made in this regard, such as a report from British Columbia where delivery of individualized CE through group offerings was considered unsuccessful for rural isolated physicians when compared to a visiting librarian program and direct access to MEDLINE (Craig et al., 1992).

The future of continuing education involves a coalition of educators, discipline specialists, librarians, and innovative technological applications to focus on individualized practice-centered educational needs. It will require a team approach to arrive at creative meaningful solutions for continuing education in the health sciences.

NEW TECHNOLOGY AND MEDICAL INFORMATICS

A second major influence on the educational role of the health sciences librarian has been recent technological advances and the application of technology to manage the growing amount of health sciences information. Literature searching has evolved from mediated online searching to a diversity of end-user search approaches; library automation has advanced from home-grown mainframe catalog and circulation systems to complex vendor-supplied integrated library systems; the microcomputer and its applications programs have allowed individuals to have extensive power over the management of personal information. The widespread use of the Internet and the promise of the National Research and Education Network (NREN) are transforming the world of scholarly communications and allowing disparate systems throughout the world to be linked. New technologies, including telefacsimile, are replacing the transfer of documents through the mail. Multimedia systems are available in libraries and learning resource centers, and the electronic journal is finally here with all of its implications. All these technologies, each with new parameters for information management, represent additional teaching opportunities for the health sciences librarian.

Medicine, too, has been undergoing its own technological revolution. One area which affects the health sciences library is medical informatics. Medical informatics encompasses a developing body of knowledge and techniques concerning the management of medical information through applied technology. It includes bibliographic retrieval systems, decision support systems, medical information systems such as hospital management systems, research support systems, and computer-based education systems. At Erasmus University in The Netherlands, medical informatics is integrated progressively into the four years of the medical school curriculum (van Bommel et al., 1989).

Interest in the field of medical informatics, as well as the National Library of Medicine's promotion of its Integrated Academic Information Management Systems (IAIMS) initiative in the 1980s,

has brought information issues to the forefront in many health sciences institutions. Libraries in these institutions have been positioned to act as partners in institutional-wide efforts to organize and provide access to a variety of information resources. An early example of this partnership was described in a position paper on the goals and responsibilities of the health sciences libraries within the framework of the university's changing perception of information management (Walter et al., 1984). Expanded educational roles have been a by-product of almost all academic environments where information management has been addressed at an institutional level. The result has been increased opportunities for librarians to be more closely involved with the curriculum and to be major players in the introduction of technological innovations on campus. Libraries in these institutions typically offer a rich array of instructional opportunities.

LIBRARY EDUCATIONAL PROGRAMS

Institutions using new technologies and employing new educational models and values create many opportunities for libraries to participate in educational activities for students and health care practitioners. The old focus on teaching the use of the library as a facility has expanded to include teaching access to the literature and other information resources; teaching the use of technology as a means to access, organize, and manage information; and teaching skills in critical appraisal of the literature.

Because today, more than ever, health sciences librarians' teaching roles are closely tied to institutional missions and curricular opportunities, the content and methods of instruction are tremendously varied among health sciences libraries. Most health sciences faculty and students agree, however, that there is need for instruction in information skills. The DaRosa et al. study (1983) highlighted the fact that students and practitioners have demonstrated only limited skills in accessing library resources. As recently as the mid-1980s, many medical students were still not using MEDLINE as a method for accessing the literature (Kaluzsa, 1985).

Most librarians believe that an increase in information skills training will change the information use behavior of health sciences students and practitioners. While such training generates increased responsibilities for health sciences librarians, recent reports of results are encouraging. Schwartz and Schwartz (1992) found that unrestricted access to MEDLINE and training in its use resulted in 96 percent of clerkship students using MEDLINE to prepare a pediatrics thesis. After a year-long evaluation study, Hennessey and colleagues (1992) concluded that computer literature search training should be an

integral part of an internal medicine clerkship. There also is some evidence that these educational programs may convey long-term benefits, as reported by Ikeda and Schwartz (1992) in their follow-up study of pharmacy students. However, more research is needed to investigate the relationships among library-based instructional programs, use of the literature by practitioners, lifelong learning, and the behavioral changes which may ultimately affect patient care.

What Librarians Are Teaching

The fundamental elements of educational programs in library use are in place at most health sciences libraries. Formal orientation almost always is provided to new students. These sessions generally introduce students to library services and provide an overview of the structure of the literature. Orientation may differentiate among the types of information to be found in textbooks, journals, and other resources. Introductory tours of health sciences libraries may be live or via videotape or audiotape. In addition to orientation for students, new staff and faculty are introduced to the library through a variety of methods including presentations incorporated in routine institutional orientations for new employees, or individualized orientation and handbooks.

Because of the availability of CD-ROM reference sources, in-house databases, and end-user MEDLINE interfaces such as GRATEFUL MED, much effort in library instruction centers on teaching computer searching skills. These courses are tailored for students and practitioners. Instruction in accessing the literature almost always includes teaching the basics of *Index Medicus'* MeSH (*Medical Subject Headings*), the structure of search logic and use of Boolean operators, and fundamental searching skills and techniques. Even the smallest health sciences libraries generally offer several end-user interfaces for the MEDLINE database so that instruction in searching techniques has become quite complex. Instructional formats vary from brief compact overviews to more in-depth courses. At the University of Rochester, a basic searching curriculum has been divided into modules so that the material can be presented in courses as needed and in time periods ranging from eight to twenty hours (Sollenberger & Smith, 1987).

In addition to this baseline instruction in information access, health sciences librarians also are providing an impressive array of other educational activities. Because the emphasis on independent learning has encouraged use of computer-assisted instruction (CAI), computer-based question banks for self-assessment, and other audiovisual and computer-based learning tools, many academic health sciences libraries operate microcomputer learning centers. Inherent

in the management of these centers is an expanded instructional role. Microcomputer learning centers typically offer regular instruction in basic and advanced use of microcomputer operating systems, word processing, bibliographic management software, graphics and statistics packages, local electronic mail, and Internet. In addition, training is provided in use of curriculum-related instructional programs. A comprehensive microcomputer course at Northwestern University begins with introductory material and, responding to an overall goal of teaching information management principles, progresses through a number of software applications including decision support systems and patient management software (Tawyea & Shedlock, 1986). As Ellis and Hannigan (1986) pointed out in their discussion of computer learning centers, hardware upgrades and new software releases, as well as an increasing number of products and vendors, complicate management and instructional activities in these centers.

Instruction in literature searching and microcomputer applications focuses on the acquisition of techniques and skills. Responding to the educational principles articulated in the GPEP report, some health sciences librarians also teach the structure and organization of biomedical knowledge and the storage, retrieval, and assessment of information for patient care and clinical decision making. These knowledge domains require understanding of the management of information and application of critical appraisal skills to the published literature. Information management, typically presented as organization of personal reprint files and bibliographies, requires both conceptual and technical organization of the literature. While more traditional courses examine the benefits and drawbacks to various nomenclature and vocabulary systems such as the International Classification of Diseases and MeSH, other courses spend more time introducing the variety of bibliographic management software now available. With the new software packages, retrieval is simplified yet they allow multiple points of access.

Critical appraisal skills enable students and practitioners to sift through the large amount of health sciences literature to identify published reports that are scientifically valid and relevant. These skills may be acquired by students as part of epidemiology or biostatistics courses or during a clinical clerkship. The integration of literature retrieval and critical appraisal skills was effectively achieved in a course presented by the Department of Medicine and the library faculty at the University of Illinois at Peoria (Dorsch et al., 1990).

Timing of the Instruction

While most health sciences libraries share broad educational goals, each library's actual instructional activities may be quite

different. Librarians at Ohio State developed elective mini-module courses for second-year medical students which could be tailored to students' interests (Bradigan & Mularski, 1989). An innovative series of electives at Texas Tech address a range of information management issues (Moore, 1989). A long-standing model of successful library education is the information skills curriculum at the University of Tennessee—Memphis. This program is integrated into the regular medical school curriculum and provides sequential learning opportunities in each of the four years (Graves & Selig, 1986).

The most effective library instruction is coordinated with other educational programs and integrated into the curriculum. In this approach, the relevance of the library instruction is clear to the students. Emphasis can be placed on problem-solving strategies in addition to actual information-seeking skills. Also, retention of information methods is improved because the application is associated with a "teachable moment." Librarians at the University of Miami School of Medicine, in collaboration with medical school faculty, applied these principles in the development of an information skills instruction continuum which is part of the freshman and sophomore curriculum (Burrows et al., 1989).

Because effective access to drug information is critical to the field, pharmacy education has a tradition of strong bibliographic instruction that is well integrated into the curriculum. Wood described the library's active role in the pharmacy curriculum at the University of California—Los Angeles where information skills instruction becomes increasingly complex as it is developed through the four-year curriculum (Wood et al., 1990). In a problem-based learning medical curriculum, instruction in information skills may be incorporated in tutorial settings. At the University of New Mexico, library instruction is provided through a problem-based methodology; at other PBL schools, specific problems within the regular sequence of learning may have acquiring library skills as a primary learning objective.

As the trend toward greater integration of information skills instruction into the regular curriculum continues, several observations can be made about the role of the health sciences librarian in the academic health sciences library. Instructional opportunities are increasing for health sciences librarians. The educational programs which seem most effective are those taught at the point of need; that is, they capitalize on the "teachable moment." This teachable moment almost always occurs within the context of the curriculum. The trend in library education programs toward greater collaboration with discipline experts is a promising one. Taken to the extreme, the librarian trains the discipline expert who then conveys

the library educational content to the students. This, however, is a costly solution unlikely to be adopted by many institutions. A more practical approach places the librarian as a partner on the teaching team, an effective position from which to convey the value of information services in the health sciences.

TEACHING IN THE PRACTICE MILIEU

Although located in a setting quite different from the academic center, the hospital librarian also has many teaching opportunities that correspond with the numerous constituencies within the hospital. In addition to permanent employees—including medical staff, administration, and allied health personnel—teaching hospitals traditionally sponsor third and fourth year medical student clerkships and electives, and medical residency programs. Many hospitals also have clinical experiences available for students in pharmacy, occupational and physical therapy, and other allied health programs. Some hospitals still sponsor nursing schools or have an affiliation with a university-based program in nursing. To function effectively, the hospital librarian must maintain close communications with the hospital's clinical staff, administrators, and educators. The challenge to the hospital librarian is to balance responsibilities for meeting the immediate information needs supporting clinical decision-making with the educational requirements of students and practitioners and the new opportunities for expanding the librarian's role within the hospital.

In addition to providing information for direct patient care in a fast and efficient manner, the traditional role for the hospital librarian has been to offer educational support services for students and practitioners. Formal hospital library educational programs have focused on orientation and instruction in the use of bibliographic tools. Established programs such as LATCH (Literature Attached to Charts) and clinical medical librarianship, described in Marshall's article in this issue of *Library Trends*, were designed to meet the critical education and information needs of physicians and residents. As a participant in these programs, the librarian functions as a central member of the health care team integrating information services into both the patient care and educational activities of the hospital. More recently, hospital librarians began offering classes on end-user searching of the literature and microcomputer hardware and software operations as well as providing individualized tutorials in these areas.

Continuing Medical Education

Hospital librarians take an active role in formal CE programs by providing library clients with tapes and satellite broadcasts

approved for continuing education credit. Simply by making information accessible and responding to information requests, librarians are contributing informally to the clinicians' continuing education. A recent trend toward implementing total quality management (TQM) or continuous quality improvement (CQI) in U.S. hospitals is providing librarians with a unique opportunity to contribute to the quality process as well as continuing education according to Chris Jones (1992). Jones maintains that the literature, when provided in response to an identified need or unfamiliar situation, is recognized as an effective educational tool which can improve practitioners' performance. Improved practitioner performance is a central part of continuous quality improvement and results in enhanced patient care. The hospital librarian's role in the quality process is to work with others on the health care team to provide a continuous infusion of current literature into the organization. The librarian on the CQI team provides the intellectual linkage of information sources and packages the information in response to an expressed or unexpressed need. In this proactive manner, "the librarian is communicating state-of-the-art information to practitioners as they update their practice patterns" (p. 2).

In their article on the changing paradigm for continuing education, Leist and Kristofco (1990) advocate librarians implementing a literature selection and synthesis role and making decisions about the information clinicians might need. The authors also state that library information requests can be analyzed to determine needs for formal CE programming. By adopting a proactive stance, librarians become learning consultants for physicians, acting as guides and instructors for access to information and information technology.

Patient Education

Expanding their educational roles to that of learning consultant, many hospital librarians also are becoming providers of patient and consumer health information. Hospitals are recognizing the need to provide patients and the community with health information and are establishing patient information centers within the hospital. Hospital administrators know that providing this service not only benefits the community but also attracts patients. Providing education and information services to patients requires developing collections and services specifically for patients either within the hospital library or by developing a separate patient education library or resource center. Patient education services include providing pamphlets,

articles, or audiovisual information directly to patients; selecting and scheduling audiovisual programs for general broadcasts; and providing support for patient education departments and committees.

Outreach

Hospital librarians in larger centers may provide outreach services to small hospitals without access to information services and to underserved or isolated health care practitioners. Outreach responsibilities can be the result of institutional ties through hospital management corporations or may be implemented to establish or reinforce patient referral patterns. Hospitals affiliated with Area Health Education Centers or large hospitals surrounded by less populated areas also provide library and educational outreach services to small and isolated hospitals and clinics. Services vary according to the region. Librarians may ride "circuits," making regular visits to hospitals without access to information services, or they may act as consultants when needed. Their "home base" library acts as a resource center for the smaller institutions. Outreach librarians assume an important teaching role, one that is often overlooked. They must not only teach the staff of small hospitals how to use information sources and services, but often they must promote the value of information services to hospital administrators and medical staff.

Technology has provided an important communications vehicle for outreach services. Library-sponsored information networks that offer rural practitioners dial access services to a computer-based information system provide end-users with fast access to information. An early example is GaIN (Georgia Interactive Network for Medical Information), which was developed in response to the need to provide rural practitioners with medical information (Rankin et al., 1987). In recognition of the effectiveness of professional literature in meeting individualized CE needs at the "teachable moment," practitioner use of GaIN MEDLINE, as well as other GaIN functions, qualifies for CE credit. A variety of GaIN services support educational needs of the practitioner including GaIN MEDLINE, the online catalog of network libraries, the CE bulletin boards and current alert services, electronic mail and conferencing, and others. This kind of applied technology brings the value of information and educational services directly into the office or small hospital which cannot support these programs at the local level.

In these times of economic retrenchment when traditional library services are coming under increasing scrutiny by hospital administrators, hospital librarians are assuming greater teaching responsibilities to integrate their services more fully into the life of

the hospital. It is sometimes difficult to separate the teaching role of the hospital librarian from the information provider, learning consultant, patient information provider, or outreach services roles. Within each of these roles, there is an element of teaching, not necessarily in a formal educational setting but always tailored to the needs of the constituency being served.

RESPONDING TO THE CHALLENGE

Certainly advances in technology and the institutional-wide focus on information management have given health sciences librarians opportunities to take a more central role in the educational process. Also, because the curriculum revision models such as problem-based learning and independent study rely heavily on effective use of information resources, librarians have additional opportunities to exert their leadership in education.

During the past twenty years, libraries have evolved along with the technological revolution into centers of information exchange. Librarians today are guides to a growing number of complex electronic and print resources; they are teachers of information structure and access; they often are leaders of technological change within their institutions. Librarians are reaching beyond the boundaries of the library to anticipate needed services and provide information when and where it is needed.

Appropriate teaching roles for health sciences librarians are becoming more diverse and closely tied to institutional needs and priorities. In order to accomplish the changes necessary to meet the challenge of an expanded educational role, The Association of Academic Health Science Library Directors (AAHSLD), in their publication *Challenge to Action: Planning and Evaluation Guidelines for Academic Health Sciences Libraries* (Joint Task Force..., 1987), recommended assuring that the library's mission statement reflect the educational priorities for the institution, integrating the library's educational activities into the curriculum, expanding educational databases to off-site locations, and designing programs which reflect changes in technology, among others.

The new challenges require librarians to be involved in the "people" business; good communication skills are critical in order to teach and to relate to numerous and varied constituencies. In a service industry within the information society, librarians' expertise is becoming more highly valued and sought. Within health sciences, librarians are playing an increasingly important role as members of the health care team, and, within academic institutions, as faculty members.

To respond to the challenges, librarians should continually update their skills, learning as much as possible about new technologies, new educational theories, and advances in the health care field. Also, by being innovative, by incorporating ideas from other disciplines into their work, by trying new ideas, librarians can move away from a reactive mode and adopt a more successful proactive stance. As educators, librarians need to anticipate instructional needs, look for the "teachable moments," work with other professionals to provide effective learning experiences for students and practitioners, and find opportunities to integrate library education into existing curricula and hospital practices and procedures. A librarian who can face uncertainty and challenge will not only adapt to the changes presented by the current environment but will succeed as an effective information provider and educator.

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