Research Paper ■

Preparing Librarians to Meet the Challenges of Today's Health Care Environment

Nunzia Bettinsoli Giuse, MD, MLS, Jeffrey T. Huber, PhD, Suzanne R. Kafantaris, Dario A. Giuse, Dr Ing, M. Dawn Miller, MLS, Dwight E. Giles, Jr., PhD, Randolph A. Miller, MD, William W. Stead, MD

Abstract **Objective:** Refine the understanding of the desirable skills for health sciences librarians as a basis for developing a training program model that reflects the fundamental changes in health care delivery and information technology.

Design: A four-step needs assessment process: focus groups developed lists of desirable skills; the research team organized candidate skills into a taxonomy; a survey of a random sample of librarians and library users assessed perception of importance of individual skills; and the research team framed, as a unifying hypothesis, a training model.

Survey methods: The survey was distributed to random samples of 150 librarians, stratified by type of library, and 150 library users, stratified by type of use. A non-randomized sample was obtained by mounting the survey on a World Wide Web server. The survey instrument included 96 distinct skills organized into 13 categories. Respondents rated the importance of each skill on a Likert scale and provided a separate ranking by identifying the ten most important skills for the profession.

Results: Among the participants, 51% of librarians and 36% of library users responded to the survey. All categories of skills were rated above the midpoint of priority on the Likert scale. All groups rated personality characteristics and skills as most important, with an understanding of the health sciences, education, and research being rated comparably to technical skills.

Conclusions: Health sciences librarians need a new educational model that provides them with broad-based tools to discover new roles and new resources for acquiring individual skills as the need arises. A unifying training model would involve trainees in developing their learning plan in a way that promotes proactive inquiry and self-directed learning, and it would rotate the trainees through projects to provide skills and an understanding of end-user work processes.

■ **J Am Med Inform Assoc.** 1997;4:57–67.

Affiliations of the authors: Eskind Biomedical Library, (NBG, JTH, SRK, DM, WWS), and Division of Biomedical Informatics (NBG, JTH, DAG, RAM, WWS), Vanderbilt University Medical Center, Nashville, TN; and Human and Organizational Development, Peabody College (DEG), Vanderbilt University, Nashville, TN.

Supported in part by grant No. 1 T15 LM 07111-01 and IAIMS grant 2 GO8 LM05443-03 from the National Library of Medicine.

Correspondence and reprints: Nunzia Bettinsoli Giuse, MD, MLS, Active Digital Library, Eskind Biomedical Library, Vanderbilt University Medical Center, Nashville, TN 37232.
E-mail: nunzia.giuse@mcmail.vanderbilt.edu

Received for publication: 8/28/96; accepted for publication: 9/19/96.

To meet the challenges of an evolving environment, librarians must be able to recognize and seize non-traditional opportunities for expanded roles.[1] While this concept is now a common theme within the library literature, repetition should not diminish its urgency. For health sciences librarianship, "professional survival, and to a degree the ability of the clinical community to use biomedical information effectively, depends on an urgent and proactive approach by the library community."[2]

Education is an essential mechanism to help health sciences librarians develop into expanded roles. In his 1996 Janet Doe Lecture to the Medical Library Asso-

ciation (MLA), Dr. Robert Braude stressed that specialized education is the key to differentiating the territory of health sciences librarianship from the larger information science field. He hypothesized that, without significant changes in health sciences librarians' educational preparation, this territory would soon be claimed by competitors.[3] The National Library of Medicine (NLM), in its 1995 long-range plan on the future education and training of health sciences librarians, emphasized the need to support innovation in health sciences librarians' professional preparation, continuing education, and recruitment strategies.[4]

To foster expanded roles for health sciences librarians via increased educational opportunities, the NLM in 1995 issued a request for proposals for institutions to develop a plan for innovative training programs. Vanderbilt University Medical Center (VUMC) received one of the seven NLM planning grants to design a model training program.[5] To refine the current understanding of how health sciences librarians' roles are perceived, the authors developed a taxonomy of candidate skills and surveyed a random sample of librarians and library users to determine the degree to which those skills are important to the profession. The results of the survey, reported in this paper, form the core of a knowledge- and skill-based internship model and learning paradigm being developed at VUMC in collaboration with faculty at Vanderbilt's Peabody College. In this joint development, VUMC provides expertise in the health sciences and in library and information science, while Peabody College provides expertise in educational program design.

Background

In recent years, library education leaders have expanded the base of concepts essential to health sciences librarianship. The impetus for this transformation was provided by the rapid advances and high-impact changes in technology and health care.[6] In 1989, the MLA appointed a Knowledge and Skills Task Force, in part to study health information professionals' roles and to determine the skills that would be needed for the profession in the future.[7] In 1993, Fred Roper and Kent Mayfield reported the outcomes of the MLA's comprehensive survey of necessary knowledge and skills. That work engendered a call for new directions in library education and continuing education.[7] The survey identified several skills considered important for future generations of librarians; most librarians responding to the survey reported deficiencies in the areas of telecommunications, networking, budgeting, software, and planning.[7]

The Need for Research Training

In 1995, members of an MLA Research Task Force identified several areas in which knowledge of research practices contributes to expanded roles for health sciences librarians. These areas included (1) development and marketing of health information systems and services and (2) application of the health information science knowledge base to information problems in the institutions where librarians work.[8] The Research Task Force also developed a policy statement that called for a strong baseline of research-related training in librarians' professional preparation and continuing education.[9] While library and information science students may be encouraged to do general research, traditional library school curricula provide little immersion in the culture or methodologies of biomedical research.

Biomedical Informatics and Expanding Information Technologies

One of the most significant factors influencing medical librarians' roles is the discipline of biomedical informatics and how it is practiced.[10] Biomedical informatics applications have the potential to bridge the gap between the pool of scientific knowledge and individuals' health care-related information needs. Librarians, in turn, are uniquely equipped to understand and provide linkages between information resources and those who seek assistance. Changes in the form and content of scientific communication also promote an increasing convergence between informatics and librarianship.[11] Physicians and computer scientists have typically been targeted for informatics training programs, but such training (beyond bibliographic retrieval) should be included in librarians' professional preparation as well.

Advances in computing and information resources have shifted librarians' roles toward influencing information resource content and away from managing containers of information.[3] The growth of information resources and access technologies has created new roles for librarians in dealing with the heterogeneous needs of medical information consumers and in filtering out irrelevancies. There is also a niche for medical librarians with expertise in health services research to support continuous quality improvements in health care and to serve on teams involved in developing clinical practice guidelines.[12]

A number of academic medical libraries are attempting to handle the information explosion by building Integrated Advanced Information Management Systems (IAIMS),[13] which typically have educational as well as system-building components. Vanderbilt Uni-

versity has pioneered a method for streamlined IAIMS construction, promoting an aggressive schedule that relies on parallel planning, design, and implementation strategies in the areas of research, patient care, and education.[14] The study described in this paper complements and extends the Vanderbilt IAIMS initiative.

Self-Directed Learning

The traditional paradigm for education has been to "deposit" knowledge and procedures into the learner; the student is seen as an empty vessel that has little to contribute to the act of learning.[15] In traditional educational methods, learning objectives, resources, and evaluation criteria are handed down from a teacher and involve little or no input from the learner. This method is likely to conflict with an adult's need to direct the route of his or her own inquiry, and it may lead to boredom, resistance, and poor learning.[16] The old paradigm is poorly suited to an environment subjected to continual, technology-driven change in which any procedure learned today can be superseded tomorrow. Increasingly, educators recognize that it is appropriate and desirable for adult students to become more involved in setting their own learning goals. A synthesis of theory and practice-based knowledge can be achieved through an emphasis on problem solving in the organizational setting using the framing organizational analysis approach,[17] the ethnographic approach developed in the Cornell Field Study Program,[18,19] and the applied anthropology structure developed by David Moore at New York University.[20]

Independent study programs, non-traditional classrooms, universities-without-walls, and problem-based curricula have been components of the overall effort to apply fresh principles to education. Unfortunately, many such progressive programs fail, however, because they tend to rely on old infrastructure—the format for learning put in place through years of traditional schooling—and they neglect to engage students in the process of becoming self-directed learners.[21] Providing trainees the opportunity to acquire the skills of self-directed inquiry is a realistic, productive educational strategy for the long term. Knowles has said that self-directed learners "enter into learning more purposefully and with greater motivation."[21] Self-directed learners are better at remembering and applying what they have learned to a variety of workplace situations.[22] What is perhaps most important, skills in self-directed inquiry encourage and facilitate lifelong learning, and these skills also encourage an attitude of willing adaptation to dynamic environments.[21]

Internships and Learning Environments

Internships have long been associated with the preparation of highly skilled professionals because they provide trainees with opportunities to develop skills in active inquiry and self-directed learning.[23,24] In a survey of members of the Association of Academic Health Sciences Library Directors (AAHSLD) reported in 1992, fully 40% of 102 respondents considered library school preparation inadequate in providing the skills they sought in new employees.[25] One of the methods most often suggested by library directors for improving librarians' education was "requiring a practicum."[25] In the MLA's study of knowledge and skill sets for medical librarians, internships and on-the-job training were cited as preferred methods to acquire experience with health sciences practitioners' needs, health sciences information resources, information retrieval techniques, and methods of information delivery.[7]

An understanding of the learning environment in which the internship will take place is critical to the overall internship experience. Research in experiential education suggests that institutions learn, just as humans do.[26] Institutions, as Moore points out, "acquire, store, transform, distribute and use knowledge" and "allocate those functions across a variety of roles and events, rather than across neurons and sections of the brain."[26] Moreover, different institutions have different "styles" of using, storing, disseminating, and creating new knowledge. Curriculum designers can obtain information about internship sites by posing questions about "the function, interaction, and transfer of knowledge and information" within the organization.[26] An organization's style of information and knowledge use impacts the overall quality of the internship experience. Knowing what kind of "learning environment" the intern is about to enter can help the intern and supervisor structure a maximal learning experience by arranging coherent tasks that build knowledge and skills in logical increments.

Learning Contracts

Learning that is directed toward professional development and improved job performance must meet professional standards and expectations. Learning plans (sometimes called learning contracts) provide a means for reconciling the external needs of the workplace with an individual's intrinsic objectives and interests.[16] Learning contracts provide a mechanism for learner and trainer to collaborate in planning the course of an educational experience. "By participating in the process of diagnosing needs, formulating objectives, identifying resources, choosing strategies, and evaluating accomplishments," Knowles explains,

"the learner develops a sense of ownership of (and commitment to) the plan . . . There is a long tradition of field-experience learners being exploited for the performance of menial tasks. The learning contract is a means for making the learning objectives of the field experience clear and explicit for both the learner and the field supervisor."[16]

Needs Assessment

The underlying hypothesis of the planning phase at VUMC has been that health sciences librarianship extends beyond the library into the realm of information management within the broader institution. Librarians must be prepared to meet the requirements of new and expanded roles. The VUMC planning phase has focused on systematically identifying the profession's desirable skills and on developing innovative methods for librarians to gain and promote those skills.

Refining the Understanding of Health Sciences Librarians' Roles

In order to refine the current understanding of health sciences librarians' roles, the authors undertook a comprehensive survey of knowledge and skill sets. After reviewing the related research published during the last 10 years, the authors hypothesized that technology has outpaced the predictions in the literature, making previously published knowledge and skill requirements obsolete. To evaluate that hypothesis, the authors undertook a four-step process to collect and organize information. The process included (1) in-person focus groups; (2) preliminary e-mail consultation; (3) organization of desirable skills into a taxonomy; and (4) administration of a formal survey via surface mail and over the World Wide Web.

Focus Groups

The study began with a set of three focus groups among academic health sciences librarians, hospital librarians, and directors of resource libraries affiliated with the Southern Chapter of the MLA. The purpose of the focus groups was to provide initial lists of desirable skills for future librarians. The lists were to be evaluated during the subsequent survey. Participants were asked to join in open-ended, round-table discussions centered on five scenarios. Individual scenarios prompted participants to discuss the skills most likely to be needed for (1) a newly created library position; (2) an environment subject to cost-containment and downsizing; (3) a new employee in a library; (4) an individual overseeing medical center academic computing; and (5) responding to the demands of a problem-based learning (PBL) curriculum.

Preliminary E-mail Consultation

In addition to the in-person focus group meetings, the authors canvassed members of the Association of Academic Health Sciences Library Directors (AAHSLD) using the first three of the scenarios developed for the in-person focus groups. The three scenarios were distributed by e-mail to 79 AAHSLD listserv subscribers, who were chosen by manually selecting every other name and e-mail address on the AAHSLD listserv. Sixteen AAHSLD members replied with detailed responses.

Using Focus Group Results to Develop a Knowledge and Skill Taxonomy

Altogether, the 31 focus group participants and the 16 AAHSLD members made 382 suggestions for desirable skills, for a total of 74 distinct skills after accounting for duplicates. Authors NG, JH, and SK added skills from previously published studies and in-house skill inventories used at VUMC's Eskind Biomedical Library, resulting in a taxonomy of 96 knowledge and skill areas (the taxonomy is reproduced in Appendix A). These 96 skills were then sorted into 13 categories, creating a prototype survey instrument.

Faculty and staff from the Vanderbilt University Informatics Center reviewed and revised the prototype survey instrument and suggested that two slightly different versions be used. The second version, targeted to library users as opposed to librarians, removed or translated into general terms some of the professional and technical language used in the librarians' version. The version for librarians and the version for library users were beta-tested among VUMC librarians, researchers, clinicians, and administrators. Respondents were asked to rank, from among all of the skills, the ten they thought were most important to the profession overall. The survey also asked respondents to imagine a health sciences librarian with 3 to 5 years' experience in the field and to rate the importance to that librarian of each of the 96 skills on a scale of 1–7 (with 7 being the highest rating).

Survey Administration

One hundred fifty copies of the librarian version of the survey were mailed to academic medical, hospital, and special/corporate health sciences librarians selected manually at random from listings in the Directory of the Medical Library Association and the Directory of Special Libraries and Information Centers.

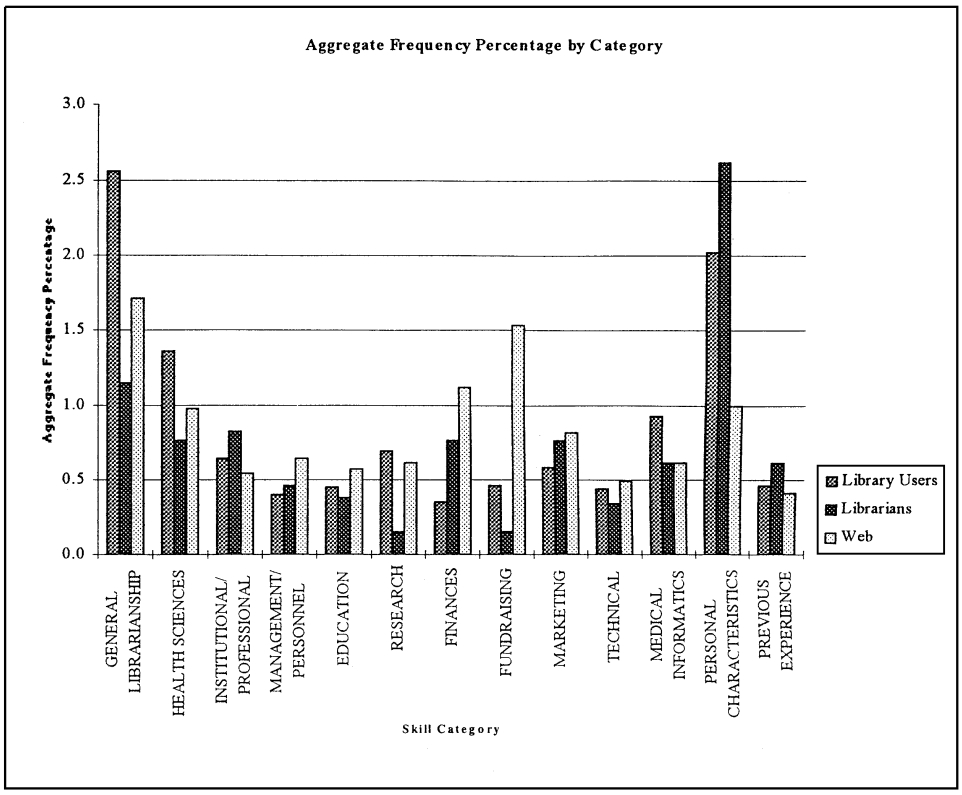

Figure 1 An aggregate score for the ten top-ranked skills in each of the main survey categories. To obtain an aggregate, the authors determined each skill's frequency by counting the number of times it was selected in a respondent's top ten list. We divided the frequency by the total number of responses in each category to calculate a *frequency percentage*. To calculate an aggregate score for each skill area, we took an average of the frequency percentages for all of the ranked skills in each taxonomic category, allowing the results to be compared across categories and populations.

Another 150 copies of the user version of the survey were mailed to clinicians, biomedical researchers, and medical directors and administrators selected manually at random from the Directory of Hospital Personnel and the Directory of the American Men and Women of Science. The recipients were stratified geographically. The 300 surveys were sent via surface mail on or before January 2, 1996.

In an attempt to get information from a non-randomized sample of technically sophisticated librarians, we mounted the survey on the VUMC World Wide Web server. The Uniform Resource Locator (URL) was posted to the AAHSLD listserv, the Medical Librarians' electronic listserv (MEDLIB-L), and the Health Education Information listserv (H-INFOED).

Survey Analysis

Responses were divided according to the category of respondent—Librarian Survey, Library User Survey, or Web respondent. Each response was given a unique and a categorical identifier and entered into a database. Two measures—ranks and ratings—were calculated. Ranks are a measure of the number of times a certain skill was chosen by respondents as one of the ten most important to the profession; not every skill was ranked. To allow comparison across respondent groups, we calculated the skill's *frequency percentage* by dividing the frequency with which it was rated as a top skill by the number of responses in each group. To represent the ranks visually, all of the scores within each skill-category were added for each population; the category ranks are shown graphically in Figure 1.

Ratings represent the average Likert score for a skill, on a scale of 1–7; every skill was rated. The Likert scores for each skill were totaled across each survey population, and averages and standard deviations were calculated. To represent the ratings visually, all of the scores within individual skill categories were added and averaged for each population. The average ratings for each category are shown graphically in Figure 2. To simplify the presentation of data for this paper, charts are included that summarize the bulk of the information collected. The complete numeric data is available on the World Wide Web at ⟨http://www.mc.vanderbilt.edu/adl/survey/data⟩

Survey Results

Survey Response Rates

Of the 150 surveys mailed to librarians, 77 were returned, for a 51% response rate. Of the 150 surveys mailed to library users, 54 were returned, for a response rate of 36%. Figure 3 gives a breakdown of responses by category of respondent. Surveys were marked before mailing to enable identification of the

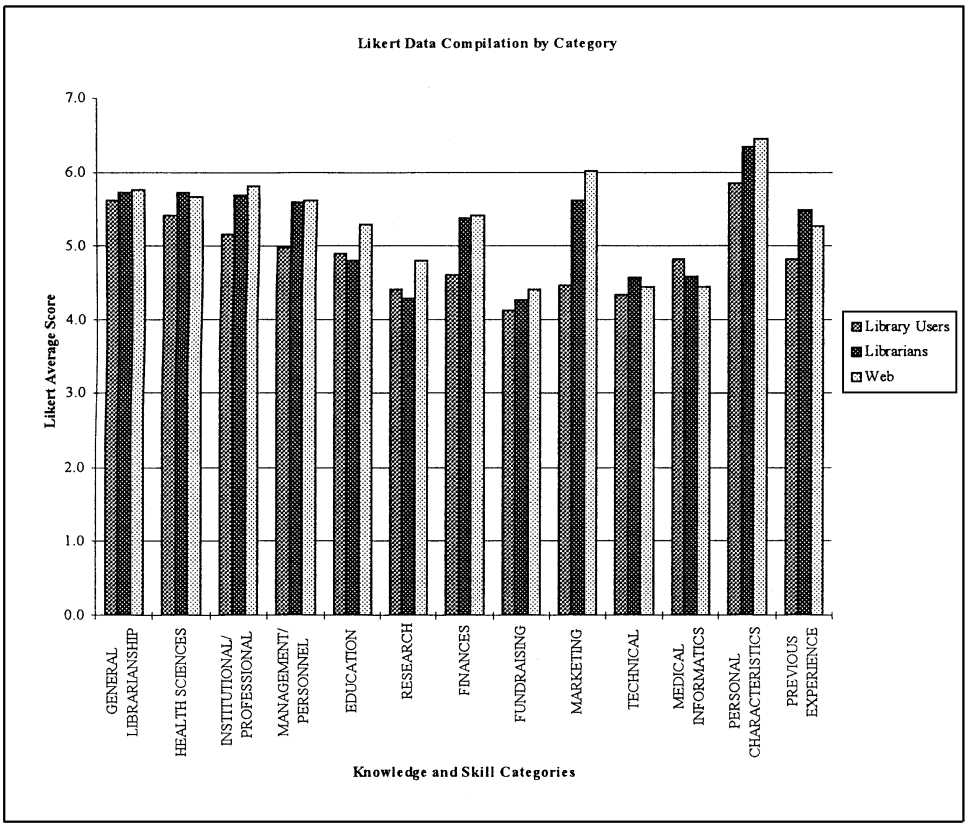

Figure 2 The average rating, on a scale of 1 to 7, for 96 skill and knowledge areas combined by category. Categorical ratings for library users, librarians, and Web respondents are compared.

category of respondent; otherwise, no identifying personal information was requested, and survey respondents remained anonymous. In addition to the 131 overall respondents to the surface mail survey, 55 people responded via the Web.

Respondents' Ranking of Top Skills

The respondents' rankings of top skills are summarized by category in Figure 1. Librarians and library users responding to the surface mail survey highly valued knowledge and skills in the General Librarianship and Personal Characteristics categories. Web survey respondents divided their preferences more evenly. Librarians overwhelmingly favored Personality Characteristics and Skills as being the most important to the profession, while library users ranked skills in the General Librarianship category higher than any other category.

Respondents' Rating of All Skills

In addition to ranking their personal choices of the 10 most important skills, respondents were asked to rate the importance of each of the 96 knowledge and skill areas on a scale of 1–7. The results are summarized by category in Figure 2. This figure shows that all of the knowledge and skills in their categorical groupings were rated above the Likert mean and, in fact, often exceeded the mean considerably. All three surveyed populations showed strong agreement in their rating of skills within individual categories. In general, librarians and Web respondents rated individual skills slightly higher than did library users, particularly in categories that are removed from the public's view, such as Institutional/Professional, Management/Personnel, Finances, and Marketing.

Discussion

In contrast with previous studies focusing on health sciences librarians' requisite knowledge and skill sets, the results of this survey clearly indicate the need for a concept-based rather than a competency-based approach to education and training. This trend was evident in the initial focus groups, where participants mentioned key personality characteristics and skills—such as a capacity for lifelong learning, initiative, assertiveness, flexibility, and proactivity—40% of the time as being extremely important qualities for success in the field.

Based on the high ranking given to personality characteristics and skills in the VUMC survey, the authors have concentrated on developing a new approach for educating librarians. Rather than focusing on provid-

ing static technical skills, future training programs must give trainees the opportunity to develop the habits of lifelong learning and proactivity. This can be achieved through educational practices that focus on supporting the self-directed inquiry of adult learners in a progressive environment. As the field of health sciences librarianship continues to shift away from narrowly defined areas of competence and toward broader expertise with a variety of roles,[27] the habits of proactivity and self-directed learning will become increasingly important.

The prominence of skills in the personality characteristics category makes sense, when interpreted as an expression of this changing focus in the field of health sciences librarianship. Without proactivity, initiative, commitment to lifelong learning, and similar characteristics, the more specific or technical skills-of-the-moment can become static and inflexible habits. Despite notions about the unteachability of these kinds of skills, educators and human-potential researchers, including the authors' colleagues at Peabody College, are involved in developing productive methods for teaching initiative, flexibility, and other such skills.[22] Moreover, management and business educators routinely teach courses in leadership, vision, and adaptability.

Two other trends were evident in the results of our survey: Library users ranked skills in the General Librarianship category more highly than librarians did; library users also rated skills in the 12 other taxonomic categories slightly lower than librarians did. This suggests that users know little about the library beyond the first few defined areas they encounter, and it reinforces the authors' belief that much more can be done to educate users about the library's actual—and potential—institution-wide role.

Recipient	Returned/Sent	Return Rate
Academic Librarians	29/50	58%
Special/Corp. Librarians	21/50	42%
Hospital Librarians	27/50	52%
TOTAL Librarians	**77/150**	**51%**
Clinicians	12/50	24%
Researchers	28/50	56%
Directors/Administrators	14/50	28%
TOTAL Library Users	**54/150**	**36%**

Figure 3 The survey response rate broken down by category of respondent. These figures are from a total of 300 surveys sent via surface mail on January 2, 1996.

Limitations of the Study

The response rates (51% for librarians, 36% for library users), while adequate for the purpose of this study, make it problematic to assume that these results represent these groups, given that those who responded are likely to be more interested in and progressive about librarianship issues. The specific choice of wording for each skill name may have influenced the responses to some extent, since definitions of terms were not provided in the survey. Finally, the results may have been affected by the specific categorical labels (such as General Librarianship, Health Sciences, Research, etc.) given to groups of skills. Respondents from different groups, such as biomedical researchers versus hospital librarians, may have interpreted the categorical labels differently.

A Unifying Hypothesis: The VUMC Learning Paradigm for Health Sciences Librarians

The VUMC Learning Paradigm for Health Sciences librarians (Fig. 4) was developed from a synthesis of the survey data, the initial planning grant outcome objectives, and current trends in adult education. The paradigm presents a method of matching individual and institutional goals for training, and it can be approached from the perspective of the trainee or the training team—the program director, project supervisor(s), mentors, and peers. The institutional goals are developed by the training team in conjunction with the institutional leadership. The paradigm features several core components that involve trainees in laying the groundwork for their internship experiences. Two components—the trainee's Pre-evaluation[16] and the institution's Outcome Goals/Objectives—converge in a Learning Plan, an Evaluation, and a Postevaluative readjustment of the trainee's skill assessment. Each of the project-planning tools within the Learning Paradigm is designed to encourage and develop proactive inquiry and self-directed learning. These tools are flexible enough to be used by trainees with different interests and levels of skill.

Pre-evaluation

As a first step in planning the course of an individual's training, the Pre-evaluation allows trainees and their supervisors to identify existing strengths, weaknesses, priorities, and training interests. The Pre-evaluation is a close adaptation of the Competency Diagnostic and Planning Guide developed by Malcolm Knowles.[16] With the guidance of a team of expert evaluators, trainees used a defined scale to rate their *level of present development* and *career objectives* (Know-

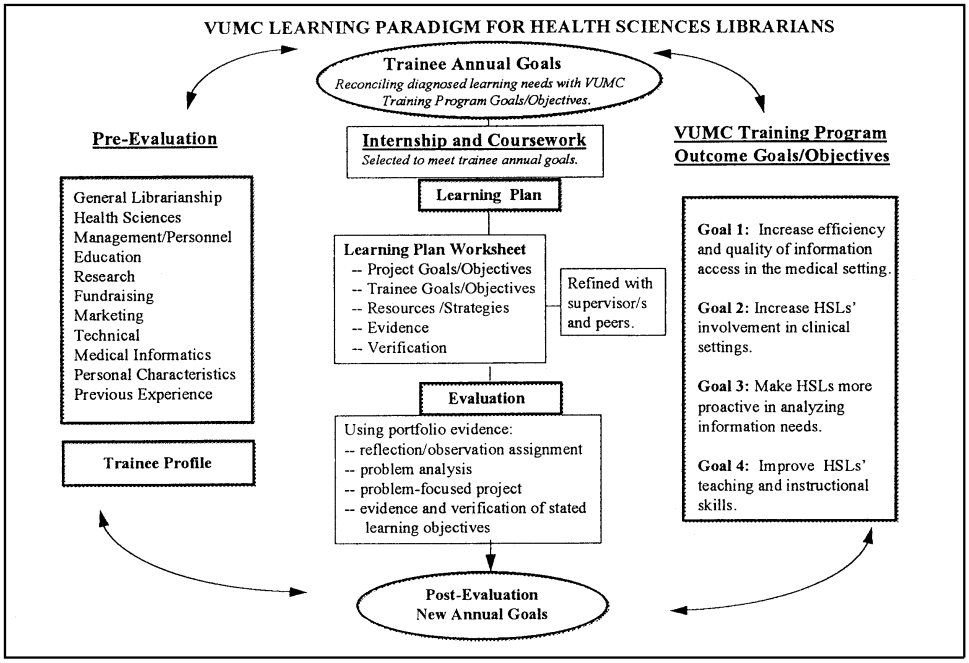

Figure 4 The VUMC Learning Paradigm for Health Sciences Librarians. This learning paradigm can be approached from two perspectives: the trainee on the left, and the institution on the right. The left side shows the skill and knowledge areas in which the trainee will be evaluated and the trainee's individual profile. The right side shows the institution's broad outcome objectives and goals for training. The central portion represents the merging of trainee and institutional goals in a structured internship, learning plan, and evaluation component.

les uses these terms in his Competency Diagnostic model) in each of the 96 knowledge and skill areas identified for the national survey. Training supervisors use the same scale to assess departmental priorities over a 6-month period. The trainee's self-assessment scores are then sorted and filtered in an electronic database program to identify areas where training is needed. Skills and knowledge areas that would benefit from further development are then compared with institutional priorities to identify areas where an internship or coursework would benefit both the trainee and the institution.

Institutional Goals

The VUMC Learning Paradigm reflects the synergy between the individual and the workplace by subjecting *both* to continual scrutiny. While the trainee is evaluated as a learner, the workplace itself is evaluated as a learning environment: Can it sustain and satisfy individual goals for learning? The "institutional side" of the VUMC Learning Paradigm (Fig. 4) contains four broad goals: (1) increase the efficiency and quality of information access in the medical setting; (2) increase health sciences librarians' involvement in clinical settings; (3) make librarians more proactive in delivering quality-filtered information that supports health care; and (4) improve librarians' teaching and instructional skills. Because this environment is in a state of continuous flux, these goals will change. In a cyclical process, as new institutional goals are identified by the training team and institutional leadership, the knowledge and skill areas of the trainee self-assessment will be updated. At all times, expanding opportunities within the profession as it moves through new phases will inform these processes of review and refinement.

Learning/Working Plan Worksheet

Adapting the concept of a learning contract, VUMC researchers created a Learning/Working Plan Worksheet that allows trainees to take an active role in planning the objectives, activities, content, and direction of their learning experience. Figure 5 shows our adaptation of a learning contract developed by Malcolm Knowles.[16] Using the pre-evaluation results, trainees and supervisors identify an appropriate project. The trainee then pinpoints the knowledge and skill areas that must be strengthened or gained to complete the project, along with the resources and strategies to be used. Resources can include colleagues, texts, coursework, and other formal or informal sources of information. Strategies include active observation, testing of a particular technique, formal research, and other methodologies. A target completion date is identified, and the trainee lists the *evidence* and *verification* he or she will produce to show that the project has been satisfactorily completed. Evidence encompasses trainee-imposed tests that the completed project must pass before it is released as finished work. Verification takes this process one step farther and asks the trainee to consider the requirements of an internship supervisor, teacher, customer, or other project evaluator. In this step, the trainee names the person or group who will receive the finished project and assess it, as well as the criteria by which that person or group will evaluate the work.

The Learning/Working Plan is meant to be a pliable document, open to revision as the training proceeds. Input from the trainee's peers and supervisors is an expected part of the planning and training process. The training program director reviews each Learning/Working Plan and suggests additional tasks, resources, evidence, and verification methods, as well as other revisions and clarifications to the worksheet.

Evaluation/Post-Evaluation

Before the internship begins, the program director maps each of the objectives or tasks listed in the trainee's Learning Plan Worksheet to specific skills contained in the Pre-evaluation form; these become the targeted skills for training and postevaluation. The trainee's self-assessment scores for the targeted skills are listed on a separate Skill Mapping form. At the end of the internship period, a team of experts evaluates whether the trainee has improved in the targeted skill areas. The trainee's initial self-assessment and the evaluators' assessments are listed side-by-side on the Skill Mapping form and are entered into the trainee's professional portfolio as evidence of skills acquired.

In addition to the structured projects of the internship, the evaluation component of the paradigm requires that trainees complete a series of critical reflection and analysis assignments. These are aimed at having trainees explore their impressions about the structure and functioning of the organization and their parts in it. Critical reflection and analysis of this type produces learning, especially in problem-solving situations.[28]

The trainee's initial assessment of his or her development of 96 knowledge and skill sets (*Pre-evaluation*) is updated at the end of the training in a *Post-evaluation*. The updated skills guide the next series of internship projects.

Conclusion

Health sciences librarianship has been conceptualized by some as a closed system increasingly under attack by competitors.[29] It has been conceptualized by others as a rapidly expanding field of possibilities, nourished by technology.[1] Whether health sciences librarians visualize themselves defending existing turf or striking out into unexplored country, most agree that they will not succeed without the support of vigorous, specific training. The program under development at VUMC is dynamic, interdisciplinary, and concept based. It retains a highly structured core that allows trainees to assess, develop, and track their improvement in a full range of library-related knowledge and skill areas. In-

Trainee: _____
Date Submitted: _____
Date Revised: _____
Project Name: Outreach

Items should be listed in priority order, as established by both the individual and his or her mentor/supervisor.

STEP 1: Identify Projects/Operational Functions		STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
Special Operational Projects and Associated Objectives	Routine Operational Functions and Associated Tasks	Skills I need to strengthen or gain to complete the objectives/tasks	Resources and strategies for completing the objectives/tasks	Target Completion Date	Evidence that the objective/task is completed	Verification that the objective/task is completed
1. Develop and coordinate interactive component of Web-based outreach model.		Information needs assessment skills. Supervisory skills.	Work closely with Information Management Planning and the Physician Liaison Program to understand better information needs of remote users. Monitor information requests and responses. Work with Active Digital Library technical team to create a cc:Mail account specifically for information requests. Work with appropriate library staff to monitor and respond to information requests.	August 20, 1996. September 3, 1996. Ongoing.	Cc:mail account is operational. Staff feel they can adequately respond to information requests.	Information requests received and responded to by library staff. Positive feedback from users at remote sites.

Figure 5 An excerpt of a learning plan developed for an outreach project. (From Knowles MS. Using Learning Contracts. San Francisco: Jossey-Bass, 1986; p. 52.

ternships have been identified as the primary vehicle for promoting development of a broad base of skills in an environment of proactive, self-directed inquiry. This learning paradigm represents the unique and logical reconciliation of disparate sources of information—such as the survey data and the educational literature—with the needs of a variety of stakeholder groups for training, for evaluation, and for accountability. In the next year, the authors will undertake a comprehensive evaluation of the applicability of the model to trainees with different needs and backgrounds.

The authors believe that this training program will give librarians an excellent opportunity to pursue and realize expanded roles within the sphere of biomedicine and will enhance the responsiveness, visibility, and effectiveness of librarians within the larger health care community. These goals will be accomplished by cultivating a supportive learning environment, honoring the needs of adult learners, providing a mechanism for quantitative and qualitative self-assessment and feedback, and enforcing continual refinement of both individual and institutional goals. While this process was undertaken specifically to benefit medical librarians, the authors believe it is applicable to other fields that must continually adapt to new circumstances.

The authors thank Karen Dahlen, MLS, VUMC IAIMS Apprentice (1995–1996), and Drs. Vera Chatman, PhD, William Corbin, PhD, and Robert Innes, PhD for their contributions to the educational content of this work. In addition, the authors thank John Boswell and Tommy Williams for their technical assistance in making the survey and data available on the World Wide Web.

References ■

1. Matheson NW. The idea of the library in the twenty-first century. Bull Med Libr Assoc. 1995;83:1–7.
2. Frisse ME. The commerce of ideas: internets and intranets. Acad Med. 1996;71:749–53.
3. Braude RM. On the origin of a species: evolution of health sciences librarianship. Janet Doe Lecture, Medical Library Association. Kansas City, June 1996. ⟨http://www.kumc .edu/MLA/janetdoe.html⟩
4. National Library of Medicine. Long-range plan on the education and training of health sciences librarians. 1995, Bethesda, MD; NIH Publication No. 95–3912:1–50.
5. Giuse NB, Huber JT, Giuse DA, Kafantaris SR, Stead WW. Integrating health sciences librarians into biomedicine. Bull Med Libr Assoc. In Press.
6. Matheson NW. Things to come: postmodern digital knowledge management and medical informatics. J Am Med Inform Assoc. 1995;2:73–8.
7. Roper FW, Mayfield MK. Survey of knowledge and skills in the health sciences: results and implications. Bull Med Libr Assoc. 1993;81:397–407.
8. Dalrymple PW, Dahlen KH, Stoddart J. Imperatives for continuing research education: results of a Medical Library Association survey. Bull Med Libr Assoc. 1992;80:213–8.
9. Using scientific evidence to improve information practice: the research policy statement of the Medical Library Association. National Library of Medicine 1995, Bethesda, MD, NIH Publication No. 95-3912:1–12.
10. Giuse DA, Miller RA. Potholes in the road to professionalism in medical informatics. Methods Inf Med. 1995;34:434–40.
11. Frisse ME, Braude RM, Florance V, Fuller S. Informatics in medical libraries: changing needs and changing roles. Acad Med. 1995;70:30–5.
12. Masys DR. The informatics of health care reform. Bull Med Libr Assoc. 1996;84:11–16.
13. West RT. The National Library of Medicine's IAIMS grant program: experiences and futures. J Am Soc Inform Sci. 1988;39:142–5.
14. Stead WW, Borden R, Bourne J, et al. The Vanderbilt University fast track to IAIMS: Transition from planning to implementation. J Am Med Inform Assoc. 1996;3:308–17.
15. Freire P. The Pedagogy of the Oppressed. New York: Herder and Herder, 1970;35–60.
16. Knowles M. Using Learning Contracts. San Francisco: Jossey-Bass Publishers, 1986.
17. Bolman L, Deal T. Reframing Organizations. San Francisco: Jossey-Bass Publishers, 1991.
18. Giles DE Jr., Freed J. The service-learning dimensions of field study: The Cornell Human Ecology Field Study Program. In Kendall JC (ed). Combining Service and Learning. Raleigh, NC: National Society for Internships and Experimental Education, 1990.
19. Giles DE, Jr. Experimental education in the Field and International Study Program: Linking campus and community. Human Ecology Forum. 1987;16:6–8.
20. Moore DT. Discovering the pedagogy of experience. Harvard Educational Review 1981;51:286–300.
21. Knowles M. Self-Directed Learning: A Guide for Learners and Teachers. New York: Cambridge, 1975.
22. Giles DE, Jr., Schmiede A. Internship in human and organizational development. Nashville, TN: Vanderbilt University, 1995.
23. Eyler J. From andragogy to pedagogy: The role of internships in the transition to adult learning. Experiential Education. 1993;17:5–7.
24. Eyler J. Graduates' assessment of the impact of a full-time college internship on their personal and professional lives. College Student Journal. 1995;186–94.
25. Bowden VM, Oliver ER. The first professional position: Expectations of academic health sciences library employers. Bull Med Libr Assoc. 1995;83:238–9.
26. Moore DT. Knowledge at work: An approach to learning by interns. In: Becoming a Worker. ed. Norwood, NJ: Ablex, 1986.
27. Huber JT. Library and information studies education for the 21st century practitioner. Journal of Library Administration. 1995;20:119–30.
28. Eyler J, Giles DE, Jr., Schmiede A. Reflections on service: A guide for practitioners. In press, 1996.
29. Bradley J. The changing face of health information and health information work: A conceptual framework. Bull Med Libr Assoc. 1996;84:1–10.

1: EDUCATION
1.1. Curriculum Development
1.2. Educational Needs Assessment
1.3. Instructional Design & Teaching Methodologies

2: FINANCES
2.1. Budgeting
2.2. Fiscal Management

3: FUNDRAISING
3.1. Fundraising and Development
3.2. Grants Experience

4: GENERAL LIBRARIANSHIP
4.1. Information Needs/Info-Seeking Behavior
4.2. Database Resources
4.3. Internet Resources
4.4. Print Resources
4.5. Information Delivery Methods
4.6. Information Retrieval Techniques
4.7. Evaluation and Synthesis of Information
4.8. Organization of Information
4.9. Copyright Laws
4.10. Current Trends in Librarianship
4.11. Publishing and Publishing Industry
4.12. Service Orientation
4.13. Written and Oral Communications
4.14. Acquisitions Procedures and Processes
4.15. Inventory Control Techniques
4.16. Collection Assessment Techniques
4.17. Consultation/Reference Interview
4.18. Preservation Practices

5: HEALTH SCIENCES
5.1. Biomedical Concepts
5.2. Health Care Delivery and Trends
5.3. Medical Specialties and Trends
5.4. Medical Terminology and Concepts
5.5. Health Sciences Educational Process
5.6. Organization of Health Sciences Literature

6: INSTITUTIONAL/PROFESSIONAL
6.1. Programs and Policies of Institution(s)
6.2. Institutionwide Information Management
6.3. Integrated Library Systems
6.4. Interdepartmental/Interinstitutional Relations
6.5. NLM Programs and Policies
6.6. Professional Associations

7: MANAGEMENT/PERSONNEL
7.1. Conflict Resolution
7.2. Coordinating
7.3. Facilitating
7.4. Goal Orientation
7.5. Interpersonal Relations
7.6. Mentoring/Role Modeling
7.7. Personnel Management
7.8. Physical Facilities Management
7.9. Staff Development
7.10. Supervisory Skills
7.11. Time Management

8: MARKETING
8.1. Inreach/Outreach
8.2. Marketing/Public Relations

9: MEDICAL INFORMATICS
9.1. Biomedical Informatics Theory/Application

10: PERSONALCHARACTERISTICS/SKILLS
10.1. Ability to Work in Teams
10.2. Adaptability
10.3. Analytic Ability/Problem Solving
10.4. Assertiveness
10.5. Common Sense
10.6. Creativity
10.7. Decisiveness
10.8. Diplomacy
10.9. Enthusiasm
10.10.Flexibility
10.11.Initiative
10.12.Innovativeness
10.13.Intuitiveness
10.14.Leadership
10.15.Lifelong Learning
10.16.Motivation
10.17.Multitasking
10.18.Organization
10.19.Patience
10.20.Planning
10.21.Proactivity
10.22.Productivity
10.23.Vision
10.24.Willingness to Learn

11: PREVIOUS EXPERIENCE
11.1. Multidisciplinary Education and Experience

12: RESEARCH
12.1. Applied and Theoretical Research Methods
12.2. Outcomes Assessment/Evaluation
12.3. Scholarly Communications
12.4. Statistical Theory

13: TECHNICAL
13.1. Authoring Software
13.2. Basic Hardware Platforms
13.3. Hardware Maintenance and Installation
13.4. Networks
13.5. Operating Systems
13.6. Basic Software Packages
13.7. Computer-Based Graphic Design
13.8. Computer Assisted Instruction
13.9. HTML Design/Programming
13.10.HTTP Server Administration
13.11.Integrated Library Systems Administration
13.12.Multimedia Software
13.13.Programming
13.14.Software Maintenance and Installation
13.15.Technical Terminology
13.16.Technical Writing
13.17.Technology Forecasting
13.18.Telecommunications